ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR CHANGES TO THE BAKUBUNG PLATINUM MINE

May 2016

SUBMITTED FOR ENVIRONMENTAL AUTHORISTAION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT 107 OF 1998) AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT (ACT 59 OF 2008) IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT (ACT 28 OF 2002) (AS AMENDED)

NAME OF APPLICANT: Bakubung Minerals (Pty) Ltd on behalf of Wesizwe Platinum Limited

TEL NO: (011) 994 4600

FAX NO: (011) 994 4601

ADDRESS: Wesizwe House, Devcon Park, 9 Autumn Road, Rivonia Ext 3, 2128

SAMRAD FILE REFERENCE NUMBER: EMP Amendment: NW-00152-MR/102;

DMR reference number: NW 30/5/1/2/3/2/1/339 EM

DOCUMENT INFORMATION

Title	Environmental impact assessment and environmental management programme report for changes to the Bakubung Platinum Mine
Status	FINAL
Applicant	Bakubung Platinum (Pty) Ltd on behalf of Wesizwe Platinum Limited
Consultant	SLR Consulting (Africa) (Pty) Ltd
Project Number	710.23001.00007
Project Manager	Chiara D'Egidio Kotze
Report Author	Chiara D'Egidio Kotze
Reviewer	Alex Pheiffer
Report Number	1
Date last printed	2016/04/01 05:12 PM
Date last saved	2016/04/07 02:18 PM
Issue Date	May 2016

ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR CHANGES TO THE BAKUBUNG PLATINUM MINE

EXECUTIVE SUMMARY

INTRODUCTION AND PROJECT OVERVIEW

Wesizwe Platinum Limited (Wesizwe) is the owner of Bakubung Platinum Mine (BPM), currently shaft sinking on the farm Frischgewaagd 96JQ (Portions 3, 4 and 11). The mine is located near Ledig, just south of the Pilanesberg Game Reserve and Sun City in the North West Province. As part of the approved operations two reefs will be mined for Platinum Group Elements - platinum, palladium, rhodium and gold, with copper and nickel as by-products. The project area falls within the Rustenburg and Moses Kotane Local Municipalities of the Bojanala District Municipality. A locality map is provided in Figure 0-1.

In 2008, BPM conducted an Environmental Impact Assessment (EIA) process for the development of the BPM. This was conducted by TWP Environmental Services (TWP). The BPM received Environmental Authorisation in 2009, in terms of both the National Environmental Management Act (Act 107 of 1998) (NEMA) and Mineral and Petroleum Resources Development Act (Act 28 of 2002) (MPRDA). A Water Use Licence (WUL) was issued in terms of the National Water Act (Act 36 of 1998) (NWA) in 2010.

In 2014 a Basic Assessment process was conducted for the development of mine housing on site. Authorisation for Phase 1 of the Gabonewe Estate mine housing was received in 2015. The Basic assessment was conducted by AB Enviro-Consult T/A (ABEC).

While construction at the BPM has commenced, not all facilities have yet been constructed. Mining has not yet commenced. BPM is now proposing to make several changes to the approved mine. The changes are required in order to cater for an increase in ore processing capacity, optimise the layout and operation of the mine as well as additional support infrastructure.

The following changes are proposed to the BPM:

- Increased capacity of approved facilities including:
  - the concentrator plant and related mine product and tailings storage
  - the storage of dangerous goods
  - the sewage treatment plant
- Inclusion of waste rock as aggregate into the mining right
- Re-alignment/ re-positioning of approved infrastructure within the Shaft and Concentrator Complexes
  - Repositioning of the approved waste rock dump and sewage treatment plant
- Repositioning of the Crusher Circuit to aboveground

- Reconfiguration of storm water and process water management on site
- Storage of waste materials in the repositioned salvage yard
    - Establishment of new/additional infrastructure including:
    - Stream crossing along the approved access road
    - Track and perimeter roads
    - Phase 1a housing of the Gabonewe Residential Estate
    - Tailings and return water pipelines
    - Erosion control measures along a section of the ephemeral tributary of the Elands River
    - A bridge connecting Phase 1 and Phase 1a housing
    - Refurbishing a security bridge north of Phase 1 and Phase 1a housing
    - Magalies Water Board pipeline river crossing
    - Ventilation shafts and raise boreholes
    - Generators
    - A solar plant
    - Water storage reservoirs
    - Topsoil stockpiles

SLR Consulting (Africa) (Pty) Ltd (SLR), an independent firm of environmental consultants, has been appointed by Bakubung Minerals (Pty) Ltd to undertake the environmental assessment process for the proposed project.

LEGAL FRAMEWORK

Prior to the commencement of the proposed project, environmental authorisation is required from various government departments. These include:

- Environmental authorisation from the Department of Mineral Resources (DMR) in terms of NEMA including a waste management license in terms of the National Environmental Management: Waste Act No. 59 of 2008 (NEM:WA). The proposed project incorporates several listed environmental and waste activities. The EIA regulations being followed for this project are Regulation 982 of 04 December 2014.
- Environmental authorisation and amended mining right from the DMR in terms of Section 102 of the MPRDA. The approved environmental management programme (EMP) needs to be updated to include the proposed changes. In addition, the mining right needs to be amended for the inclusion of waste rock as aggregate.
- A water use license from the Department of Water and Sanitation (DWS) in terms of the NWA for approved operations and project changes. The additional water uses in terms of Section 21 of the NWA triggered by the project changes could include 21(b) (storage of water), 21(c) (impeding or diverting flow of water in a watercourse), 21(i) (altering beds or banks of a watercourse), and 21(g) (storage of water that contains waste). Exemption in terms of GN 704 is also required.

- A single scoping report for the mining right amendment, the EMP amendment and the environmental authorisation in terms of NEMA and NEM:WA for the proposed project was submitted to the DMR for review. A single EIA and EMP report has been compiled and will be submitted to the DMR for decision making on the amendment of the mining right, the EMP amendment and the environmental authorisation in terms of NEMA and NEM:WA.

STAKEHOLDER ENGAGEMENT

The stakeholder engagement process commenced prior to scoping and has continued throughout the environmental assessment process. As part of this process, authorities and interested and affected parties (IAPs) were notified of the project, given the opportunity to attend public meetings, submit questions and comments to the project team, and review the background information document, scoping report and now the EIA and EMP report. All comments that have been submitted to date by the authorities and IAPs have been included and addressed in the EIA and EMP report. Further comments arising from the EIA and EMP report review process will be handled in a similar manner.

IMPACTS AND MITIGATION MEASURES

This report provides an assessment of the potential impacts of the proposed project and provides measures to prevent or mitigate the impacts.

The potential impacts associated with the proposed project activities and infrastructure can be categorised into those that have low, medium and high significance in the unmitigated scenario. All three categories of impacts require a measure of mitigation which, if successfully implemented will reduce the significance of the impacts and the related residual risk.

The table below provides a summary of the potential impacts in no particular order of importance. The table is a cumulative consideration of the approved mine impacts and the impacts as a result of this project. In the significance columns, L = Low, M = Medium and H = High.

Table A – Potential impact summary

Aspect	Potential impact	Impact discussion	Significance without mitigation	Significance with mitigation
Geology	Additional mineral resource	Mineral resources have economic value. If they are utilised/sold, their economic value is realised. If they are disposed of, their economic potential can be lost depending on the disposal method. Waste rock currently produced on site from shaft sinking, can be sold as aggregate provided the mineral rights are in place. Mitigation measures for realising the economic benefit is through maximising the sale of waste rock.	M	H+
Topography	Hazardous excavations, surface subsidence and infrastructure that can be harmful to people and animals	Hazardous excavations and infrastructure include all excavations, structures or land forms into or off which third parties and animals can fall and be harmed. Included in this category are facilities that can fail such as the tailings storage facility. Related mitigation measures focus on infrastructure safety through appropriate design and implementation as well as on limiting access to third parties and animals.	H	M (plant area) M-H (TSF area)
Soil and land capability	Loss of soil resources and land capability through contamination	Soil is a valuable resource that supports a variety of ecological functions and is the key to re-establishing post closure land capability. Soil and related land capability can be compromised through pollution and through physical disturbance through compaction, removal and erosion. Related mitigation measures focus on pollution prevention, maintenance of infrastructure, implementing soil conservation procedures and limiting site clearance to what is absolutely necessary.	H	L M-H (pipeline)
	Loss of soil resources and land capability through physical disturbance		H	M-H
Biodiversity	Physical destruction of biodiversity	Areas of high ecological sensitivity are functioning biodiversity areas with species diversity and associated intrinsic value. The project area also falls within a critical biodiversity area. In addition, some of these areas host protected species. The linking areas have value because of the role they play in allowing the migration or movement of flora and fauna between the areas, which is a key function for the broader ecosystem. This project (as well as the approved operations) has the potential to impact on biodiversity through both physical destruction (mainly during infrastructure establishment) and general disturbance during all project phases. Related mitigation measures focus on limiting the project footprint area, shifting infrastructure layouts and operation controls to limit on-going disturbance.	H	M- H (habitat / vegetation type) M (other components)
	General disturbance of biodiversity		H	M
Surface water	Contamination of surface water resources	The proposed project has the potential to contaminate surface water resources, which could include the Elands River, the Sandspruit and ephemeral channels, drainage lines and wetlands. Related mitigation measures focus on pollution prevention, monitoring and risk based response to identified pollution occurrences.	H	L
	Alteration of surface	Rainfall and surface water run-off are collected in all areas that have been designed with	H	M

Aspect	Potential impact	Impact discussion	Significance without mitigation	Significance with mitigation
	water drainage patterns	water containment infrastructure. The collected run-off will therefore be lost to the catchment and can result in the alteration of drainage patterns and reduction to downstream surface water users. Infrastructure positioning can also alter natural flow patterns of watercourses. Related mitigation measures focus on minimising the footprint areas associated with containing rainfall and runoff and diverting clean run-off away from the project site as well as shifting infrastructure layouts to avoid drainage areas where possible.		
Groundwater	Contamination of groundwater resources	The nature of the mining projects is such that they present a potential for the contamination of groundwater resources that in some cases may be used by third parties for domestic and livestock watering purposes. This project and the approved project have the potential to impact groundwater resources at both the plant and tailings storage facility area. Related mitigation measures focus on pollution prevention, appropriate design and implementation, monitoring and risk based response to identified contamination occurrences.	H	L
	Changes in groundwater levels	The main activities influencing ground water levels are dewatering to ensure safe operations. This has not changed from the approved operations and thus the approved mine impact assessment and management measures for changes in groundwater levels are considered to still be applicable. Mitigation measures focused on measures to decrease the ingress of water, re-use of water and continuous monitoring.	No change from approved project	No change from approved project
Air	Air pollution	The main contaminants associated with the approved project and this project include: inhalable particulate matter less than 10 and 2.5 microns in size (PM10 and PM2.5) and larger total suspended particulates (TSP) that relate to dust fallout. To a lower extent there are underground and plant vehicle exhaust emissions. At certain concentrations, contaminants can have health and/or nuisance impacts. Potential receptors include Sun City, the Bakubung Bush Lodge, the Pilanesberg National Park, animals and plants, residential areas including Phatsima, Ledig and Chaneng as well as the future Gabonewe Estate. Related mitigation measures focus on pollution prevention and minimisation, monitoring and risk based response to identified pollution occurrences.	H	M (PM_{10} & Dustfall) M -L ($PM_{2.5}$)
Noise	Noise Pollution	Noise pollution (disturbance and nuisance) will have different impacts on different receptors because some are very sensitive to noise and others are not. The distance of receptors from noise generating activities also influences the impact. Potential receptor sites include the surrounding land owners/land users such as the future Gabonewe Estate, Bakubung Bush Lodge and Sun City, settlements including Phatsima, Ledig and Chaneng and schools/crèches in the Lekwadi, Letlhabile and Serosecha sectors of Ledig. Mitigation focuses on decreasing noise pollution, monitoring and risk based response to noise pollution occurrences.	M	M (No change from approved project)
Traffic	Road and traffic	The proposed project will result in an increase in traffic volumes along the R565 and R556,	M	H+

Aspect	Potential impact	Impact discussion	Significance without mitigation	Significance with mitigation
	disturbance	which impacts the road's level of service. Potential traffic safety risks include pedestrian accidents and vehicle accidents. Related mitigation measures focus on road and pedestrian safety and consideration of changes to road infrastructure to improve traffic conditions.		
Visual	Negative visual impacts	Visual impacts are assessed by considering changes to the visual landscape. The approved operations would have already changed the landscape and this project can contribute to the changes. The project area is surrounded by varying landscapes including other mining activities as well as the Pilanesberg Mountain range. Related mitigation measures focus on landscaping interventions particularly during the decommissioning and rehabilitation stages.	H	M
Heritage, cultural and paleontological resources	Destruction of heritage, cultural and paleontological resources	Various cultural and heritage resources have been identified in the project area. No potential for paleontological resources exist. The approved operations and this project have the potential to damage low to high significance heritage/cultural resources. Related mitigation measures focus on avoidance and preservation as a first priority and relocation where avoidance is not possible.	H	L-M
Socio-economic	Economic impact	Bakubung's contribution to the local, regional and national economy is positive and significant. Part of this contribution is through employment, procurement, investment, tax contributions, and foreign exchange earnings. The objective of the related mitigation measures is to enhance the positive economic impacts and limit the negative economic impacts. Part of this objective is to enhance the contribution to the local economy in particular.	H+	H+
	Inward migration impacts	Mines tend to bring with them an expectation of employment in all project phases prior to closure. This expectation can lead to the influx of job seekers to an area, which could cause: an increase of people moving through the area, pressure on the capacity of existing communities and possibly also the development of informal settlements. In general, both increased movement of people into an area and informal settlements are associated with lower standards of living, which can promote disease, crime and a general threat to the safety and security of an area. Linked to this influx of people is the potential inability of receiving areas to supply basic services such as water, food, electricity, health, education and sanitation. Related mitigation measures focus on cooperation with the local municipal authorities, traditional authorities, skills development, employment, procurement and social development.	H	M
	Tourism	The components of this project are not expected to contribute significantly to changes in tourism as changes are mainly within project footprints and are related to the already approved operations. The approved mine impact assessment for tourism is thus considered to still be applicable. Mitigation measures focus on managing environmental impacts identified and effective communication with applicable stakeholders.	No change from approved project	No change from approved project

Aspect	Potential impact	Impact discussion	Significance without mitigation	Significance with mitigation
Land use	Change in land use	Approved project footprints are in areas approved for mining activities. The pipeline will be located on communal grazing land. Other land uses within and surrounding the proposed project area includes: mining, conservation, agriculture, residential areas and infrastructure (existing road network and power and communication lines, cemeteries, railway, and an airport). These land uses may be negatively impacted by one or more of the above mentioned environmental and social impacts. Related mitigation measures focus on mitigation of potential environmental and socio-economic impacts described above and measures to promote the continuation of surrounding land uses.	H	M-L L (at closure)
Blasting	Blasting impacts (fly rock, air blasts and ground vibrations)	No additional areas will be mined for this project and there are no changes to approved underground mining activities. Therefore no additional blasting and vibration impacts were identified. The mine impact assessment and management measures in the approved project are still applicable to the approved operations. Blasting was considered in the emissions inventory of the Air Quality Impact Assessment due to the addition of ventilation shafts. Mitigation focuses on monitoring and communication with applicable stakeholders.	No change from approved project	No change from approved project

ENVIRONMENTAL STATEMENT

The assessment of the proposed project presents the potential for significant negative impacts to occur (in the unmitigated scenario in particular) on the bio-physical, cultural and socio-economic environments both on the project sites and in the surrounding area. With mitigation these potential impacts can be prevented or reduced to acceptable levels.

It follows that provided the EMP is effectively implemented there is no environmental, social or economic reason why the project should not proceed.

ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR CHANGES TO THE BAKUBUNG PLATINUM MINE

CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

ACRONYMS AND ABBREVIATIONS

Acronyms / Abbreviations	Definition
~	approximately
BID	Background information document
CBA	Critical biodiversity areas
dBA	A-weighted decibel
DEA	Department of Environmental Affairs
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
EA	Environmental Authorisations
EAP	Environmental Assessment Practitioner
EIA	Environmental impact assessment
EMP(r)	Environmental management programme (report)
GN R	General Notice (Regulation)
Ha	Hectares
IWWMP	Integrated Water and Waste Management Plan
IAPs	Interested and/or affected parties
JKA	Jongens Keet Associates
Km	Kilometres
LOM	Life of mine
m	Meters
mamsl	Metres above mean sea level
mm	Millimetres
MR	Mining Right
MPRDA	Mineral and Petroleum Resources Development Act, 2002
NEMAQA	National Environmental Management: Air Quality Act, 2004
NEMBA	National Environmental Management: Biodiversity Act, 2004
NEM:WA	National Environmental Management: Waste Management Act, 2008
NEMA	National Environmental Management Act, 1998
(N)FEPA	(National) Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resources Act, 1999
NO_2	Nitrogen dioxide
NPAES	National Protected Area Expansion Strategy
NWA	National Water Act, 1998
NW READ	North West Department of Rural, Environment & Agricultural Development
PGE / PGM	Platinum Group Elements / Metals
PM_{10}	Particulate matter less than 10 micron diameter
SACNSP	South African Council for Natural Scientific Professionals
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANS	South African National Standards
SAR	Southern access road
SLR	SLR Consulting (Africa) (Pty) Ltd
SO_2	Sulphur dioxide
TSF	Tailings Storage Facility
TSP	Total suspended particles
WML	Waste Management Licence
WRD	Waste Rock Dump
WUL(A)	Water Use License (Application)

ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR CHANGES TO THE BAKUBUNG PLATINUM MINE

INTRODUCTION

INTRODUCTION TO THE PROPOSED PROJECT

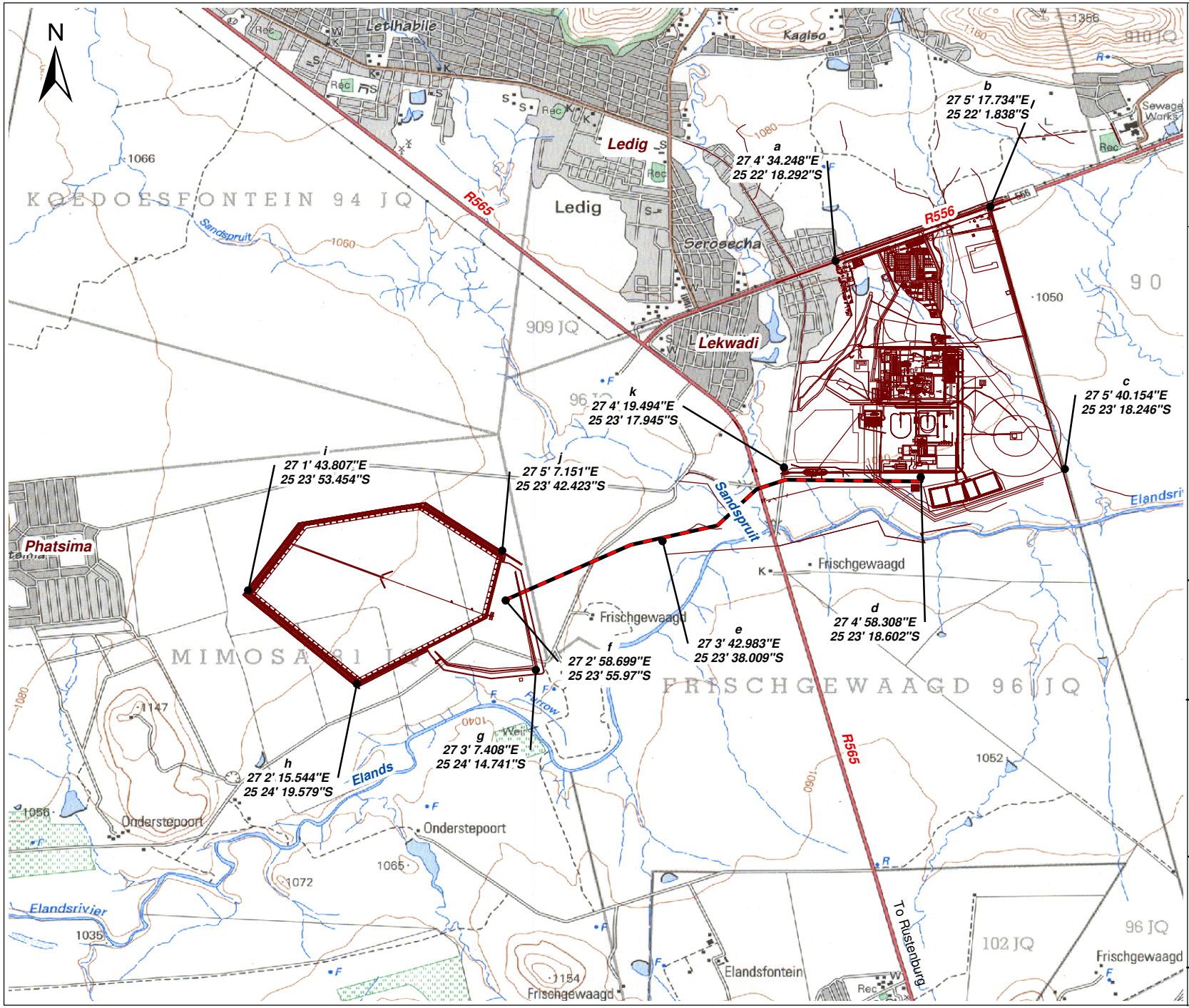
Wesizwe Platinum Limited (Wesizwe) is the owner of Bakubung Platinum Mine (BPM), currently shaft sinking on the farm Frischgewaagd 96JQ (Portions 3, 4 and 11). Bakubung Minerals (Pty) Ltd holds the mining right for BPM. The mine is located near Ledig, 2km south of the Pilanesberg Game Reserve and Sun City in the North West Province (Figure 0.1). Two reefs will be mined for Platinum Group Elements - platinum, palladium, rhodium and gold, with copper and nickel as by-products. The mine falls within the Rustenburg and Moses Kotane Local Municipalities of the Bojanala District Municipality Figure 0.2.

In 2008, BPM conducted an Environmental Impact Assessment (EIA) process for the development of the BPM. The mine received Environmental Authorisation in 2009, in terms of both the National Environmental Management Act (No. 107 of 1998) (NEMA) and Mineral and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA). A Water Use Licence (WUL) was issued in terms of the National Water Act (No 36 of 1998) (NWA) in 2010.

In 2014 a Basic Assessment process was conducted for the development of mine housing on site. Authorisation for Phase 1 of the Gabonewe Estate mine housing was received in 2015. The Basic assessment was conducted by AB Enviro-Consult T/A (ABEC).

While construction at the mine has commenced, not all facilities have yet been constructed. Mining has not yet commenced. BPM is now proposing to make several changes to the approved mine following refinement of the mine plan and layout. The changes are required in order to cater for an increase in ore processing capacity, as well as additional support infrastructure.

SLR Consulting (Africa) (Pty) Ltd (SLR), an independent firm of environmental consultants, has been appointed by Bakubung Platinum (Pty) Ltd to undertake the environmental assessment process for the proposed project.



Legend

- Mine Layout
- Proposed Pipeline
- Main Roads
- Secondary Roads
- Other Access Roads
- Power Line
- Rivers and Streams
- 20m Contour Lines
- Cultivated Areas
- Built-up Areas

Kilometers
0 1 2

Scale: 1:48 000 @ A4

SA Grid WGS84

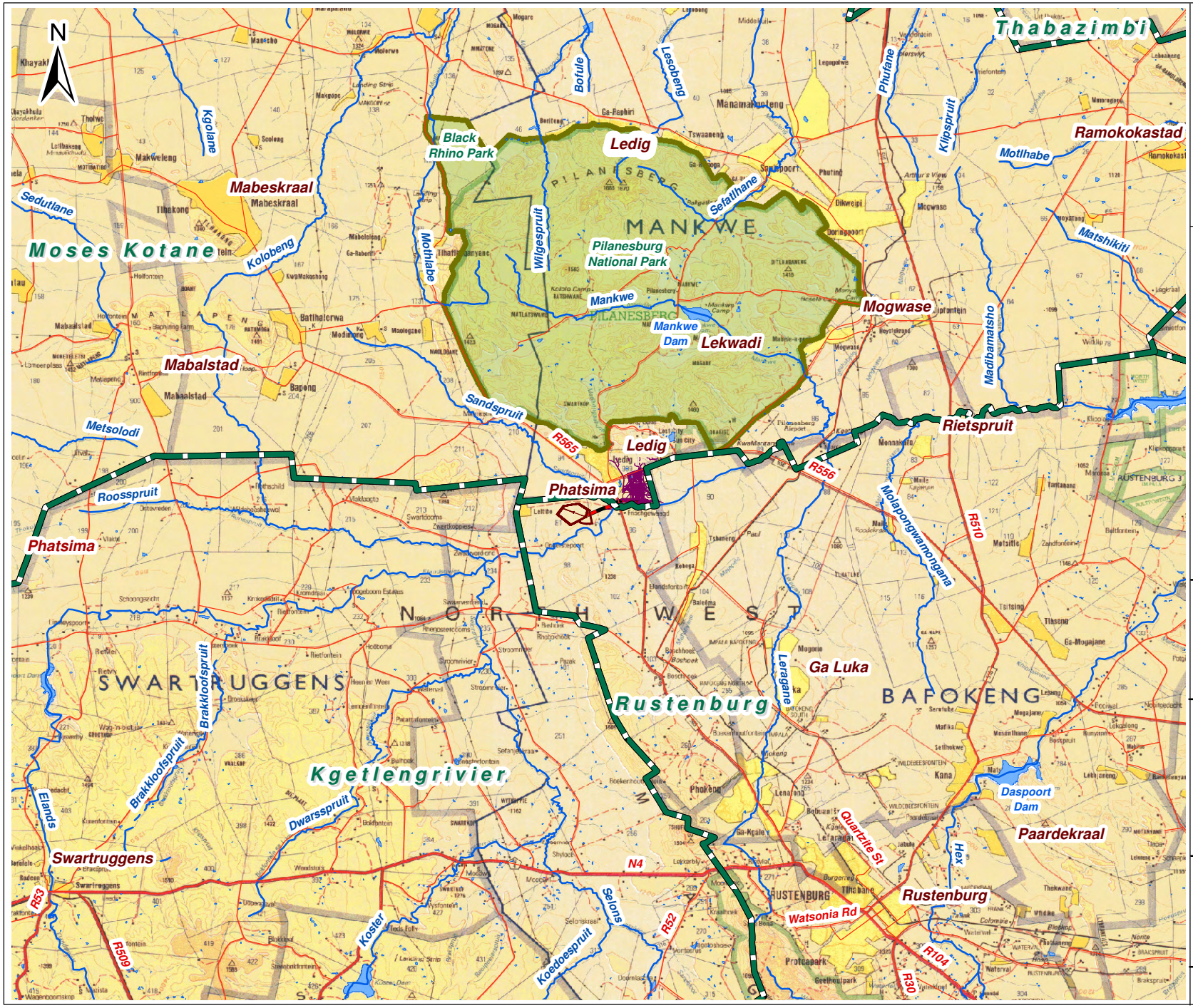
BAKUBUNG PLATINUM MINE (PTY) LTD

Figure 0.1

Local Setting

SLR Consulting (Africa) (Pty) Ltd
P O Box 1596,Cramerview, 2060, South Africa
Tel: +27 (11) 467-0945 Fax: +27 (11) 467-0978

710.23001.00006 | March 2016



Legend

- Mine Layout
- Proposed Pipeline
- Roads
- Perennial Rivers
- Dams
- Local Municipalities

Kilometers

0 5 10

Scale: 1:400 000 @ A4

SA Grid WGS84

BAKUBUNG PLATINUM MINE (PTY) LTD

Figure 0.2

Regional Setting

SLR Consulting (Africa) (Pty) Ltd
P O Box 1596,Cramerview, 2060, South Africa
Tel: +27 (11) 467-0945 Fax: +27 (11) 467-0978

710.23001.00006 | March 2016

LEGAL FRAMEWORK

Prior to the commencement of the proposed project, environmental authorisation is required from various government departments. These include:

- Environmental authorisation from the Department of Mineral Resources (DMR) in terms of NEMA including a waste management license in terms of the National Environmental Management: Waste Act No. 59 of 2008 (NEM:WA). The proposed project incorporates several listed environmental and waste activities. An application was submitted by SLR to the DMR on 30 September 2015. The applicable list of activities is provided in Section 4.2. The EIA regulations being followed for this project are Regulation 982 of 04 December 2014.
- Environmental authorisation and amended mining right from the DMR in terms of Section 102 of the MPRDA. The approved environmental management programme (EMP) needs to be updated to include the proposed changes. The application for the EMP amendment was submitted on the 13 November 2015. In addition, the mining right needs to be amended for the inclusion of waste rock to be sold as aggregate. It has been agreed with the DMR, that the mining right amendment application, as well as an updated mine works programme, that includes waste rock will be submitted once the DMR have processed the pending application of the current mine works.
- A water use license from the Department of Water and Sanitation (DWS) in terms of the NWA for approved operations and project changes. The additional water uses in terms of Section 21 of the NWA triggered by the project changes could include 21(b) (storage of water), 21(c) (impeding or diverting flow of water in a watercourse), 21(i) (altering beds or banks of a watercourse), and 21(g) (storage of water that contains waste). Exemption in terms of GN 704 is also required.
- A single scoping report for the mining right amendment, the EMP amendment and the environmental authorisation in terms of NEMA and NEM:WA for the proposed project was submitted to the DMR for review. A single EIA and EMP report has been compiled and will be submitted to the DMR for decision making on the amendment of the mining right, the EMP amendment and the environmental authorisation in terms of NEMA and NEM:WA

OTHER APPROVALS / PERMITS

Other approvals/permits needed for the proposed project are listed below. In this regard, there are other approvals that are required prior to construction and/or commissioning of the mining and related activities. This list does not cover occupational health and safety legislation requirements.

- Prior to removing or damaging any protected plant species, the necessary permits will be obtained from the Department of Agriculture Forestry and Fisheries in terms of the National Forests Act, 84 of 1998.
- Prior to the destruction or relocation of heritage resources, permits will need to be obtained from the South African Heritage Resources Agency (SAHRA).

EIA AND EMP PHASE OBJECTIVES

The objectives of the environmental assessment process are as follows:

- The identification of policies and legislation that are relevant to the proposed project
- To describe the need and desirability of the proposed project
- To describe the proposed project including alternatives that are being considered
- To provide an assessment of the environmental and social impacts taking into account all project alternatives
- To identify measures to avoid, manage or mitigate identified impacts including the residual risks that need to be managed and monitored

PART A – SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

1 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONERS

1.1 DETAILS OF THE EAP WHO PREPARED THE REPORT

The details of the environmental assessment practitioners (EAPs) that were involved in the preparation of this scoping report are provided in Table 1.1 below.

TABLE 1.1:DETAILS OF THE EAPS

Details	Project manager and author	Reviewer
Name of the practitioner	Chiara D'Egidio Kotze	Alex Pheiffer
Tel No.:	011 467 0945	011 467 0945
Fax No.:	011 467 0978	011 467 0978
E-mail address	ckotze@slrconsulting.com	apheiffer@slrconsulting.com

Neither SLR nor any of the specialists involved in the environmental assessment process have any interest in the project other than fair payment for consulting services rendered as part of the environmental assessment process.

1.2 EXPERTISE OF THE EAP

Alex Pheiffer has a Masters' Degree in Environmental Management with over 14 years of relevant experience in the assessment of impacts associated with mining operations. Alex Pheiffer is registered as a professional natural scientist (Environmental management) with the South African Council for Natural Scientific Professions (SACNSP). Chiara D'Egidio Kotze has a Masters' Degree in Ecology, Environment and Conservation and has 4 years' experience. Alex Pheiffer and Chiara D'Egidio Kotze have been involved in several impact assessments for large scale mining developments in Southern Africa. Curriculum Vitae are attached in Appendix B.

2 PROJECT DESCRIPTION

A description of the property on which the proposed project is located is provided in Table 2.1.

TABLE 2.1: DESCRIPTION OF THE PROPERTY

Farm Name	Remaining extent and portions 1, 3, 4, 11 of the farm Frischgewaagd 96 JQ; The remainder of the farm Mimosa 81JQ.
Application area (Ha)	TSF and return water dam: 166 ha on remainder of Mimosa 81JQ Plant area, pipeline and housing: 331.4 ha on RE, PTN 1, 3, 4, 11 of Frischgewaagd 96 JQ
Magisterial district	Moses Kotane and Rustenburg Magisterial Districts
Distance and direction from nearest town	Plant Area: approximately (~) 1.2 km south east of Ledig, 150 m south east of Lekwadi Section from the edge of the closest infrastructure TSF Area: ~ 3 km south west of Ledig, 450 m east of Phatsima from the edge of the closest infrastructure
21 digit Surveyor General Code for each farm portion	T0JQ00000000009600001 T0JQ00000000009600003 T0JQ00000000009600004 T0JQ00000000009600011 T0JQ00000000009600000 T0JQ00000000008100000
Co-ordinates (Also illustrated on Figure 0.1)	**Plant area:** a. 27 4 34.248E 25 22 18.292S b. 27 5 17.734E 25 22 1.838S c. 27 5 40.154E 25 23 18.246S k. 27 4 19.494E 25 23 17.945S **Pipeline:** d. 27 4 58.308E 25 23 18.602S e. 27 3 42.983E 25 23 38.009S f. 27 2 58.699E 25 23 55.97S **TSF:** g. 27 3 7.408E 25 24 14.741S h. 27 2 15.544E 25 24 19.579S i. 27 1 43.807E 25 23 53.454S j. 27 5 7.151E 25 23 42.423S

3 LOCALITY MAP

The local and regional setting of the proposed project site is illustrated in Figure 0.1 and Figure 0.2.

4 DESCRIPTION OF THE SCOPE OF THE PROPOSED ACTIVITY

4.1 OVERVIEW OF THE PROJECT

The BPM is proposing to make changes to their approved mine. This will include new infrastructure as well as modifications and realignments to approved infrastructure. An overview of the proposed changes is provided below. Appendix D provides an updated surface infrastructure layout for the site with annotations. Further details for each change are provided in Section 4.3 below.

Increased capacity of approved facilities including:

- the concentrator plant and related mine product and tailings storage
- the storage of dangerous goods
- the sewage treatment plant
- Inclusion of waste rock as aggregate into the mining right
- Re-alignment/ re-positioning of approved infrastructure within the Shaft and Concentrator Complexes
- Repositioning of the approved waste rock dump and sewage treatment plant
- Repositioning of the Crusher Circuit to aboveground
- Reconfiguration of storm water and process water management on site
- Storage of waste materials in the repositioned salvage yard
- Establishment of new/additional infrastructure including:
- Stream crossing along the approved access road
- Track and perimeter roads
- Phase 1a housing of the Gabonewe Residential Estate
- Tailings and return water pipelines
- Erosion control measures along a section of the ephemeral tributary of the Elands River
- A bridge connecting Phase 1 and Phase 1a housing
- Refurbishing a security bridge north of Phase 1 and Phase 1a housing
- Magalies Water Board pipeline river crossing
- Ventilation shafts and raise boreholes
- Generators
- A solar plant
- Water storage reservoirs
- Topsoil stockpiles

In the sections below the infrastructure that has already been authorised as part of the approved EIA in 2008 is not discussed, unless to provide background and context to the current application. Estimated project timelines are detailed below (Table 4.2).

TABLE 4.1: ESTIMATED PROJECT TIMELINES

Aspect	Timing
Start construction of changes	Target date is 2018 (subject to regulatory approval)
Duration of construction	Three years from 2018 (this is not considering construction that has already started on site for shaft sinking)
Start operation	Ramp-up in 2020 to reach a steady-state of mining and production in 2021, this is 5 years later than the approved EIA and EMP.
Life of operation	Life of mine on current planning is scheduled for 2044, this is two years later than the approved EIA and EMP.

4.2 SPECIFIED LISTED ACTIVITIES

The activities and infrastructure associated with the proposed project are listed in Table 4.2 below and are illustrated in Figure 4.1 and Appendix D (where relevant). In each case the relevant NEMA and/or NEM:WA listed activities which will be triggered by the proposed project for the various activities and infrastructure are included in Table 4.2. A description of each of the listed activities identified is provided in Table 4.3.

TABLE 4.2: LIST OF ACTIVITIES/INFRASTRUCTURE ASSOCIATED WITH THE PROPOSED PROJECT

Activity/Process	Aerial Extent of the Activity (ha / m)	Construction of project components	Operation	Decommissioning	Closure	Listed Activity for this project	Applicable listing notice
Continuation of approved activities							
The continuation of development on site where not all construction of approved infrastructure has commenced		As required				X	GNR 983 Activity 32
Site preparation							
Selective bush clearing in areas where infrastructure will be established	Additional 90.4 ha	As required	-	-	-	X	GNR 984 Activity 15 GNR 985 Activity 12
Establishing construction support facilities		As required	-	-	-		
Earthworks							
Stripping and stockpiling soil resources in line with Bakubung's soil management programme (including noise berms)	Additional 90.4 ha	Ongoing	As required	-	-		
Bulldozing activities		Ongoing	Ongoing	-	-		
Establishing and maintaining new service and perimeter roads and use of approved access roads	Approximately 3 m width	Ongoing	Ongoing	Ongoing	-		
Foundation excavations and compaction (including preparation of TSF and water dam footprints)	4 ha	At start of phase	As required	-	-	X	GNR 983 Activity 19
Civil works							
General building activities and erection of structures		At start of phase	For maintenance	-	-		
Steel work (including grinding and welding)		At start of phase	For maintenance	-	-		
Installation of cables/lines and pipelines		As required	For maintenance	-	-		
Construction and use of new bridges and culverts for stream crossings	<1 ha	At start of phase	Ongoing	-	-	X	GNR 983 Activity 12 GNR 983 Activity 19

Activity/Process	Aerial Extent of the Activity (ha / m)	Construction of project components	Operation	Decommissioning	Closure	Listed Activity for this project	Applicable listing notice
							GNR 985 Activity 14
Establishing erosion control measures along a watercourse	<1 ha					X	GNR 983 Activity 12 GNR 983 Activity 19 GNR 985 Activity 14
Mining and mining related activities							
Crushing of ore in aboveground crushing circuit	0.005 ha	-	Ongoing	-	-	X	GNR 984 Activity 21
Additional ventilation system for underground mining	< 1 ha	-	Ongoing	-	-		
Waste rock management							
Storage on existing approved waste dump (on-site, on surface) (no additional capacity required)		-	Ongoing	-	-		
Final disposal on existing approved waste dump (on-site, on surface) (if applicable)		-	Ongoing	-			
Crushing of waste rock for sale as aggregate	5 ha	Ongoing (when possible)	Ongoing (when possible)	-		X	GNR 984 Activity 17 GNR 984 Activity 21
Approved use of waste rock for bank areas (including roads, terraces and housing foundations)		At start of phase	For maintenance	-			
Mineral processing operations							
Increased capacity of the concentrator plant and the related mine product stockpiles (no changes to the process)	38.1 ha	-	Ongoing	-	-	X	GNR 983 Activity 34 GNR 984 Activity 21 GNR 985 Activity 12
Tailings management							
Delivery of tailings and return water via pipelines	11.4 ha	-	Ongoing	-	-	X	GNR 983 Activity 10 GNR 983 Activity 12 GNR 985 Activity 14

Activity/Process	Aerial Extent of the Activity (ha / m)	Construction of project components	Operation	Decommissioning	Closure	Listed Activity for this project	Applicable listing notice
Final disposal on an approved TSF with a return water dam with increased capacity and footprint	Additional 36 ha	-	Ongoing	-	-	X	GNR 983 Activity 19 GNR 983 Activity 12 GNR 983 Activity 28 GNR 983 Activity 34 GNR 985 Activity 23 GNR 921 Activity Category B (7) GNR 921 Activity Category B (10) GNR 921 Activity Category B (11)
Power Supply and Use							
Power will be sourced from existing Eskom supply (no additional capacity needed)		Ongoing	Ongoing	Until facilities are no longer needed	-		
Power supply from new genset/generators	<1 ha	Ongoing	Ongoing	Until facilities are no longer needed	-	X	GNR 984 Activity 2
Renewal energy generation from a new solar plant	21 ha	-	Ongoing	-	-	X	GNR 983 Activity 1 GNR 983 Activity 28
Water supply and use							
Use of water (sourced from same sources that are planned for the current mine)		As required	Ongoing	-	-		
Water storage in new reservoirs	<1 ha		Ongoing	-	-	X	GNR 983 Activity 13 GNR 985 Activity 2
Process and storm water management							
Diversion of clean water around the site (where applicable) in line with an updated storm water management plan		Ongoing	Ongoing	Until facilities are no longer needed	As required		
Collection of potentially dirty water in PCDs (within footprint of approved for dirty water containment area)	4.2 ha		Ongoing	Until facilities are no longer needed-	-		

Activity/Process	Aerial Extent of the Activity (ha / m)	Construction of project components	Operation	Decommissioning	Closure	Listed Activity for this project	Applicable listing notice
Transport systems							
Use of approved access points and roads to the mine		Ongoing	Ongoing	Until facilities are no longer needed	As required		
New service road along the tailings and return water pipelines route and a new perimeter access road around the TSF	Approximately 3 m	-	Ongoing	Until facilities are no longer needed	-	X	GNR 985 Activity 4
Vehicle movement to and from mine for material, staff, waste removal and product (via surfaced and gravel roads) (no significant increase in volume expected)		Ongoing	Ongoing	Ongoing	Infrequent		
Vehicles/machinery movement within mine boundary (via surfaced and gravel roads) (no significant increase in volume expected)		Ongoing	Ongoing	Ongoing	Infrequent		
General and hazardous waste management							
Handling and storage of general and hazardous waste at an approved salvage yard in line with waste management procedure	0.62 ha	Ongoing	Ongoing	Until facilities are no longer needed	-	X	GNR 921 Activity Category B (7) GNR 921 Activity Category C (3)
Sewage sludge management					-		
Provision and maintenance of portable sanitation facilities at construction sites		Ongoing	-	-	-		
Sewage treatment plant to be used with increased capacity	0.44 ha	-	Ongoing	Until facilities are no longer needed	-	X	GNR 984 Activity 25
Site support services							
Increased storage capacity of dangerous goods	0.15 ha	Ongoing	Ongoing	-	-	X	GNR 984 Activity 4
Housing							
Additional housing for mine employees	22 ha	At start of phase	Ongoing	Until facilities are no longer needed	-	X	GNR 983 Activity 12 GNR 983 Activity 28 GNR 985 Activity 14

Activity/Process	Aerial Extent of the Activity (ha / m)	Construction of project components	Operation	Decommissioning	Closure	Listed Activity for this project	Applicable listing notice
Site/contract management							
Appointment of contractors and workers		At start of phase and ongoing	At start of phase and ongoing	At start of phase	-		
Site management (monitoring, inspections, maintenance, soil stockpile management, alien invasive management, security, access control)		Ongoing	Ongoing	Ongoing	As required		
Environmental awareness training and emergency response		Ongoing	Ongoing	Ongoing	As required		
Ongoing rehabilitation of facilities/disturbed areas (where possible)		Ongoing	Ongoing	Ongoing	-		
Implementing and maintaining management programmes		Ongoing	Ongoing	Ongoing	-		
Demolition (unless alternative end land use is identified during the detailed closure planning)							Decommissioning and closure are included for completeness but no specific activities related to these phases are being applied for at this stage due to the length of the life of mine.
Dismantling and demolition of project-related infrastructure (where applicable)		-	-	As required	-		
Removal of project-related equipment		-	-	As required	-		
Rehabilitation							
Replacing soil resources in line with a soil management plan		-	-	As required	-		
Landscaping and slope stabilisation		-	-	Ongoing	-		

Activity/Process	Aerial Extent of the Activity (ha / m)	Construction of project components	Operation	Decommissioning	Closure	Listed Activity for this project	Applicable listing notice
Re-vegetation of disturbed areas including the TSF		-	-	Ongoing	As required		
Restoration of natural drainage patterns where applicable		-	Ongoing	Ongoing	For maintenance		
Rehabilitation of access tracks and roads unless alternative end land use is identified		-	-	As required	-		
Initiation of aftercare and maintenance		-	-	At end of phase	-		
Maintenance and aftercare							
Maintenance of vegetation in rehabilitated areas		-	-	-	As required		
Maintenance of facilities (such as fencing, fire breaks, access roads, overflow structures, where applicable)		-	-	-	As required		
Removal of any invasive species from the rehabilitated sites		-	-	-	As required		
Repair of erosion gullies		-	-	-	As required		

TABLE 4.3: DESCRIPTION OF THE LISTED ACTIVITIES APPLIED FOR AS PART OF THE PROPOSED PROJECT

Activity number	Listed activity
NEMA Listing Notice 1 GNR.983	
1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where - (i) the electricity output is more than 10 megawatts but less than 20 megawatts; or (ii) the output is 10 megawatts or less but the total extent of the facility covers an area in excess of 1 hectare; excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs within an urban area.
10	The development and related operation of infrastructure exceeding 1000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes - (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 infrastructure is for bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve; or (b) where such development will occur within an urban area.
12	The development of - (i) canals exceeding 100 square metres in size; (ii) channels exceeding 100 square metres in size; (iii) bridges exceeding 100 square metres in size; (iv) dams, where the dam, including infrastructure and water surface area, exceeds 100 square metres in size; (v) weirs, where the

Activity number	Listed activity
	weir, including infrastructure and water surface area, exceeds 100 square metres in size; (vi) bulk storm water outlet structures exceeding 100 square metres in size; (vii) marinas exceeding 100 square metres in size; (viii) jetties exceeding 100 square metres in size; (ix) slipways exceeding 100 square metres in size; (x) buildings exceeding 100 square metres in size; (xi) boardwalks exceeding 100 square metres in size; or (xii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs - (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; - excluding - (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; or (ee) where such development occurs within existing roads or road reserves.
13	The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014.
19	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 of more than 5 cubic metres from - (i) a watercourse; (ii) the seashore; or (iii) 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, dredging, excavation, removal or moving - (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies.
28	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 01 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.
32	The continuation of any development where the environmental authorisation has lapsed and where the continuation of the development, after the date the environmental authorisation has lapsed will meet the threshold of any activity or activities listed in this Notice, Listing Notice 2 of 2014, or Listing Notice 3 or Listing Notice 4 of 2014.
34	The expansion or changes to existing facilities for any process or activity where such expansion or changes will result in the need for a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the release of emissions or pollution , excluding - (i) where the facility, process or activity is 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 the National Environmental Management: Waste Act, 2008 applies; or (ii) the expansion of or changes to existing facilities for the treatment of effluent, wastewater or sewage where the capacity will be increased by less than 15 000 cubic metres per day.
NEMA Listing Notice 2: GNR. 984	
2	The development and related operation of facilities or infrastructure for the generation of electricity from a non-renewable resource where the electricity output is 20 megawatts or more.
4	The development of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.
15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.
17	Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources

Activity number	Listed activity
	Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource, including activities for which an exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).
21	Any activity including the operation of that activity associated with the primary processing of a mineral resource including winning, reduction, extraction, classifying, concentrating, crushing, screening and washing but excluding the smelting, beneficiation, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies.
25	The development and related operation of facilities or infrastructure for the treatment of effluent, wastewater or sewage with a daily throughput capacity of 15000 cubic metres or more.
NEMA Listing Notice 3: GNR. 985	
2	The development of reservoirs for bulk water supply with a capacity of more than 250 cubic metres.
4	The development of a road wider than 4 metres with a reserve less than 13.5 metres.
12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.
14	The development of - (i) canals exceeding 10 square metres in size ; (ii) channels exceeding 10 square metres in size; (iii) bridges exceeding 10 square metres in size;(iv) dams, where the dam, including infrastructure and water surface area exceeds 10 square metres in size; (v) weirs, where the weir, including infrastructure and water surface area exceeds 10 square metres in size;(vi) bulk storm water outlet structures exceeding 10 square metres in size;(vii) marinas exceeding 10 square metres in size;(viii) jetties exceeding 10 square metres in size;(ix) slipways exceeding 10 square metres in size;(x) buildings exceeding 10 square metres in size; (xi) boardwalks exceeding 10 square metres in size; or(xii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs - (a) within a watercourse ;(b) in front of a development setback ; or(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.
23	The expansion of- (i) canals where the canal is expanded by 10 square metres or more in size; (ii) channels where the channel is expanded by 10 square metres or more in size;(iii) bridges where the bridge is expanded by 10 square metres or more in size;(iv) dams where the dam is expanded by 10 square metres or more in size;(v) weirs where the weir is expanded by 10 square metres or more in size;(vi) bulk storm water outlet structures where the structure is expanded by 10 square metres or more in size;(vii) marinas where the marina is expanded by 10 square metres or more in size;(viii) jetties where the jetty is expanded by 10 square metres or more in size;(ix) slipways where the slipway is expanded by 10 square metres or more in size;(x) buildings where the building is expanded by 10 square metres or more in size;(xi) boardwalks where the boardwalk is expanded by 10 square metres or more in size; or (xii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more; where such development occurs -(a) within a watercourse ;(b) in front of a development setback adopted in the prescribed manner; or(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse ;excluding the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.
NEM:WA Listed Activities GNR 921	
Category B (7)	The disposal of any quantity of hazardous waste to land.
Category B(10)	The construction of a facility for a waste management activity listed in Category 8 of this Schedule (not in isolation to associated waste management activity).

Activity number	Listed activity
Category B(11)	The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).
Category C(3)	The storage of waste tyres in a storage area exceeding 500m2.

4.3 DESCRIPTION OF THE ACTIVITIES TO BE UNDERTAKEN

As part of the approved project, not all activities have commenced on site, this is based on slow construction, the length of the shaft sinking phase and proposed changes to the mine (this project). This project thus includes application for the continuation of development where construction of some approved infrastructure has not yet commenced.

The project comprises two phases for the concentrator, Phase A is ore handling and receipt and Phase B includes the balance of the plant (build and operating of the plant).

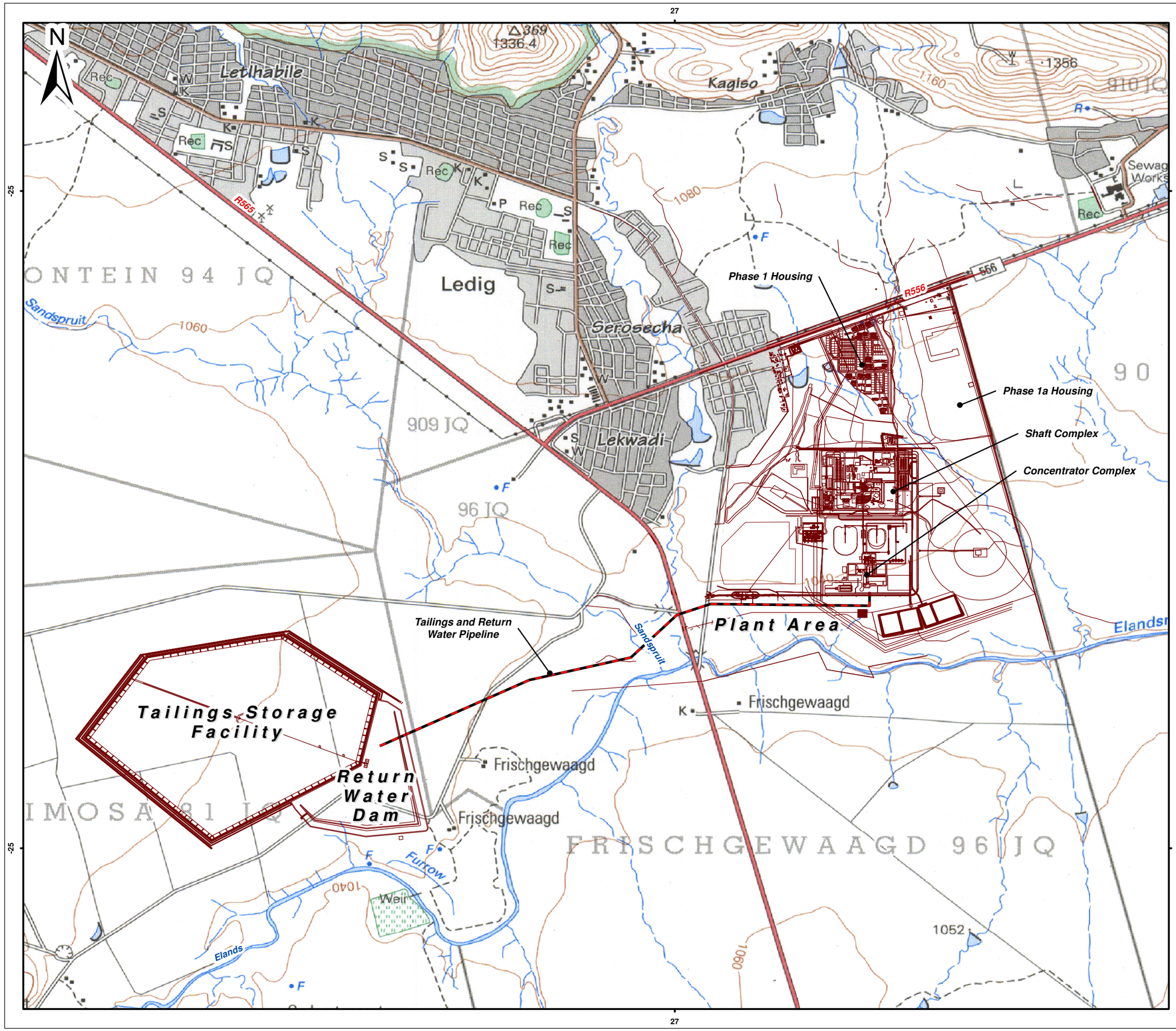
4.3.1 SURFACE INFRASTRUCTURE

Note that most of the surface infrastructure required for the mine has already been approved in the 2008 EIA. Approved infrastructure has been indicated as such below. An infrastructure plan of the project, showing the location and extent of infrastructure is provided in Appendix G and Figure 4.1. The layout of infrastructure within the Shaft and Concentrator complexes has been re-aligned to support optimisation of the mining and mineral processing operations.

The final layout catering for both approved and proposed infrastructure will include:

- A tarred road to provide access to the shaft and plant from south-western side and a tarred road to provide access to the housing, to the north (approved);
- Internal mine and service roads (approved);
- Pipeline service track (bush break) (this project);
- Two gatehouses with entry and exit roadways to the shaft and plant. Pedestrian access will be via turnstiles (approved);
- A vertical twin shaft system (two man, material and rock shafts) with a steel A-frame headgear on the man, material and rock shaft. An additional raise bore shaft will be required at a later stage. This will be within the current mine footprint (approved);
- Two additional ventilation shafts and raise boreholes (this project);
- An emergency winder with a cage and a steel A-frame headgear over the second man and material shaft (approved)
- Surface conveyor belts to transport ore to the Merensky and UG2 stockpiles (approved)
- Mineral processing plant and associated infrastructure is approved, however increased capacity is proposed for this project;
- Box culvert bridges where necessary (approved);
- A bridge near the mine housing (this project);
- A topsoil storage area and stockpiles is planned to the north-west of the shaft and plant infrastructure (approved);

- Additional topsoil storage areas south of the waste rock dump and east of the Concentrator Complex (this project);
- A waste rock dump (approved);
- Infrastructure for services including potable, process and fire water, compressed air and sewage reticulation (approved);
- Potable water storage tanks (approved);
- Increased sewage treatment plant capacity (this project);
- New sewage and water pipelines (this project);
- Updated storm water management with storm water diversion berms (this project);
- Erosion control measures along a section of the tributary of the Elands River (this project);
- Dirty water settling dams/pollution control dams (PCDs) (approved) and 2 PCDs (this project, to be built in the footprint of approved but not to be constructed dirty water dams);
- Electrical reticulation (approved);
- TSF, with associated lining preparations and return water dams (increased footprint and capacity of the TSF is proposed in this project);
- A tailings pipeline and return water pipeline between the mine and the TSF (this project);
- Mine product stockpiles (approved, increased capacity included in this project);
- Bus and taxi offloading area with shelters (approved);
- Parking facility for shaft and plant personnel (approved);
- Security fencing (approved);
- Helipad (approved);
- Aboveground ore crusher circuit (this project);
- Storage and handling of dangerous goods such as diesel and reagents on site (approved, additional capacity included in this project);
- New Generators (this project);
- A solar power plant on site, for back up ventilation (this project);
- Phase 1 of the mine housing and associated infrastructure (approved);
- Phase 1a of the mine housing (this project); and
- A salvage yard (temporary storage of general and hazardous waste) (approved but not yet constructed, included in this project for the waste licence application).



Legend

- Mine Layout
- Proposed Pipeline

0 500 1 000 Meters

Scale: 1:10 000 @ A3

SA Grid WGS84

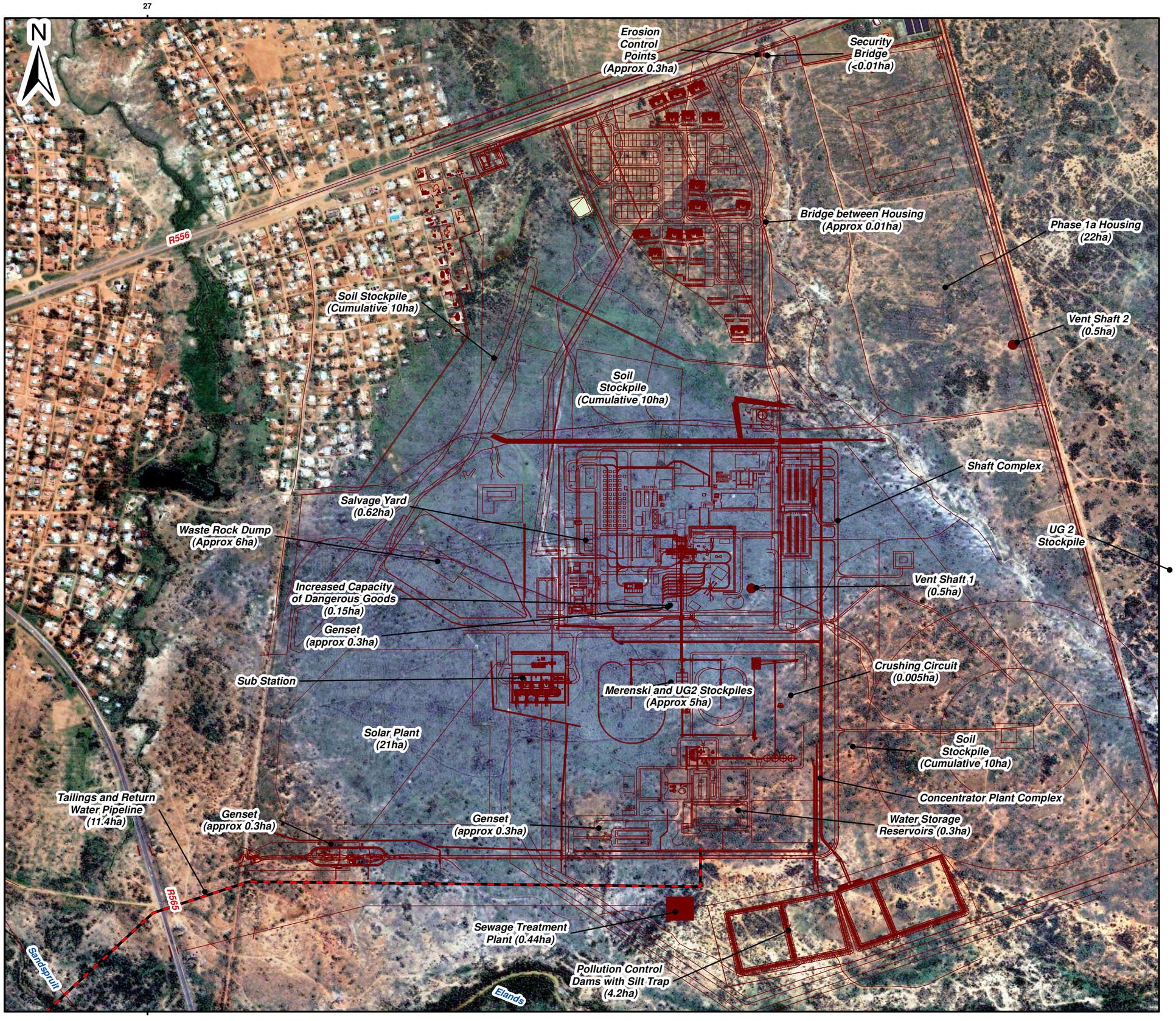
BAKUBUNG PLATINUM MINE (PTY) LTD

Figure 4.1

Infrastructure Layout

SLR Consulting (Africa) (Pty) Ltd
P O Box 1596, Cramerview, 2060, South Africa
Tel: +27 (11) 467-0945 Fax: +27 (11) 467-0978

710.23001.00006 | March 2016



Legend

- Mine Layout
- Proposed Pipeline

0 250 500 Meters

Scale: 1:10 000 @ A3

SA Grid WGS84

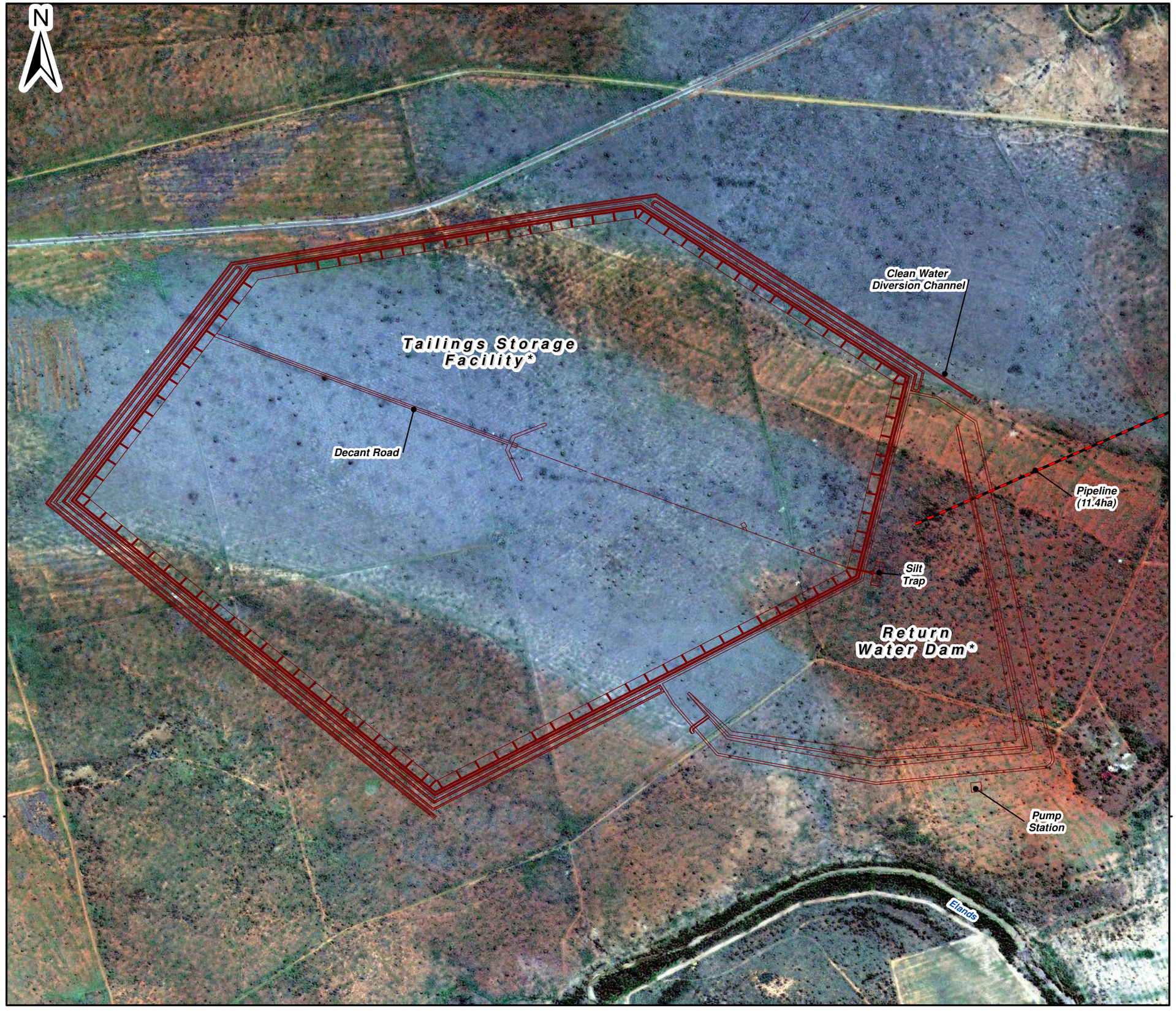
BAKUBUNG PLATINUM MINE (PTY) LTD

Figure 4.1

Plant Layout

SLR Consulting (Africa) (Pty) Ltd
P O Box 1596, Cramerview, 2060, South Africa
Tel: +27 (11) 467-0945 Fax: +27 (11) 467-0978

710.23001.00006 | March 2016



Legend

- Mine Layout
- Proposed Pipeline

***Size of TSF, with perimeter roads and Return Water Dam = (166ha)**

0 250 500 Meters

Scale: 1:10 000 @ A3

SA Grid WGS84

BAKUBUNG PLATINUM MINE (PTY) LTD

Figure 4.1

TSF Layout

SLR Consulting (Africa) (Pty) Ltd
P O Box 1596, Cramerview, 2060, South Africa
Tel: +27 (11) 467-0945 Fax: +27 (11) 467-0978

710.23001.00006 | March 2016

4.3.2 SITE PREPARATION AND CONSTRUCTION FACILITIES

Site preparation will include the clearing of vegetation where infrastructure is to be established. Most of the vegetation clearing has already been approved; this project will require additional clearing for increased footprints. The approximate area equates to an additional 90.4 ha disturbance.

There will also be the establishment of temporary construction facilities which will be established on site for the proposed additional/changed infrastructure. These facilities could include:

- Workshops, stores, washbays, lay-down areas, fuel handling and storage area, offices, ablution facilities
- Handling and storage area for construction materials (paints, solvents, oils, grease) and wastes
- Generator/s for temporary power supply.

These facilities would either be removed at the end of the construction phase or incorporated into the layout of the operational mine.

4.3.3 EARTHWORKS

Earthworks mainly relate to the movement of soil and rock. For the project, earthwork activities will include bulldozing, digging and/or blasting foundations and trenches, establishing and maintaining roads (discussed further in Section 4.3.13), stripping and stockpiling of soil resources in new/ increased footprints (where applicable), and excavating/compacting TSF and water dam footprints (discussed further in Sections 4.3.7 and 4.3.10, respectively)

Since there will be additional areas disturbed by the project, soil resources from these areas will be stripped and stockpiled in line with Bakubung's soil management procedure. The soil stockpiles will increase in capacity. This will also include the establishment of additional topsoil stockpiles on site. The additional topsoil will be from approximately 90.4 ha of additional area to be disturbed. It is estimated that an additional volume of 27.12 m^3 will require storage. New topsoil stockpiles will be located in the following areas:

- At the TSF area for topsoil removed from the TSF footprint.
- East of the Concentrator Complex

4.3.4 CIVIL WORKS

Civil works relate mainly to any steel, piping, liner and concrete work. Civil works linked to the project will include preparing the TSF and PCD footprints (discussed further in Sections 4.3.7 and 4.3.10 respectively), the construction of stream crossing infrastructure including bridges and culverts, the

installation of cables/lines and pipelines and constructing erosion control infrastructure along a section of the unnamed tributary of the Elands River.

Erosion control measures are required along a section of the unnamed tributary of the Elands River flowing between the Phase 1 and phase 1a housing to the north of the Shaft Complex. Erosion control measures will include gabions baskets filled with stones.

Stream crossing infrastructure required for the project (located within 32 m of a watercourse) is outlined below. All stream-crossing infrastructure will be designed to cater for the 1:50 or 1:100 year flood events, depending on the application.

- A new bridge will be constructed between the Phase 1 and Phase 1a housing developments. The bridge will cater for two lanes, with a single lane in each direction. There will be a pedestrian walkway and space for pipelines and electrical cables.
- Refurbishment of a security bridge north of the Phase 1a and Phase 1 housing that previously washed away.
- A section of the mine's Magalies water supply pipeline, located underground and still to be constructed, will cross under an ephemeral channel of the Elands River.
- A culvert will be required where the approved mine access road crosses a non-perennial drainage line.
- The tailings and return water pipelines track will cross over ephemeral drainage lines and channels present south of the Concentrator Complex as well as over the Sandspruit to the west of the R565. The pipeline will be located on plinths either side of the drainage line.
- Sewage pipeline from the Phase 1 and Phase 1a housing area.

4.3.5 MINING AND PROCESSING

4.3.5.1 Minerals to be mined

Waste rock as aggregate will be added to the mineral right of the mine.

4.3.5.2 Crushing circuit

The plant is designed with primary and secondary crushing, with Merensky and UG2 ores campaigned through the crusher circuit from Run of Mine (RoM) feed to crushed ore silos. The secondary crusher will be used in the latter years of the life of mine (LOM) when the ore hardness is expected to increase. In the approved EIA and EMP the ore crusher circuit was to be placed underground. With this project, BPM is proposing to move the crusher circuit to aboveground and will be located within the Concentrator Complex.

Crushed ore will be delivered to two stockpiles, one for each ore type, Merensky and UG2. The plant design is based on the separate milling and flotation of the two ore types using the Mill-Float – Mill-Float or MF2 circuits and then combining the concentrates produced as a final concentrate. This remains unchanged.

4.3.5.3 Concentrator and product stockpiles

The intention is to build the concentrator plant in three modules. Module 1 will be for the Merensky ore and will consist of a single RoM mill with a complete flotation circuit, concentrate, spillage and tailings handling system sufficient to cater for the final concentrator circuit. The concentrator plant is already approved, though the capacity is now increasing from 230000 tons per month to 265000 tons per month. The related mine product stockpiles and tailings storage will thus also be increasing in relation to the increased concentrator plant capacity. The mine product stockpiles will still be located within the Concentrator Complex. The tailings will be deposited on the TSF (Section 4.3.7). The mine product stockpiles will have a storage capacity of 131 kilotons for UG2 and Merensky.

4.3.5.4 Ventilation shafts

Two additional up-cast ventilation shafts will be located at the mine area, one will be within the Shaft Complex and one will be located at the eastern property border, south of the Phase 1a housing. Two satellite compressors will be located west of the Complexes, one south west of the waste rock dump and one south west of the noise berm. As part of optimisation at the Shaft Complex, the main ventilation shaft is being converted to an upcast / man and material shaft. Two downcast ventilation shafts provide fresh air underground.

4.3.6 WASTE ROCK MANAGEMENT

Waste rock is currently being produced from the shaft sinking occurring on site. Waste rock will continue to be produced during construction and will either be used to develop the bank areas (this includes roads, terraces and housing foundations) or will be disposed of on the approved waste rock dump. The waste rock dump was approved in the 2008 EIA but the location and orientation has changed, however, it is still within the development footprint (Figure 4.1). The size and capacity of the waste rock dump is staying the same as per the approved project. Currently the waste rock dump is smaller than the approved LOM capacity, with a storm water drain on the perimeter of this smaller footprint. The storm water drains around the waste rock dump will be re-aligned if necessary, should the waste rock dump reach its full Life of Mine capacity.

BPM is proposing to crush the waste rock to sell as aggregate. This will occur in both the construction and operational phases should excess rock be available. Waste rock will first be used for the construction of bank areas and should there be excess waste rock, this will be sold. The quantities of waste rock available for sale will only be determined after construction activities are complete.

4.3.7 TAILINGS MANAGEMENT

A Tailings Storage Facility (TSF) was proposed in the approved EIA and EMP. With the increased capacity of the concentrator plant, changes to the TSF are required. Details on the TSF are included in Table 4.4 below. The TSF will increase from 130 ha to 166 ha (including the return dam), and decrease in height from 50 m to 46 m from the lowest point. The TSF will include a return water dam, with a capacity of 433 000 m^3. The TSF has been designed to have a maximum capacity of 78 million tonnes with tailings production rate of between 223 – 262 kilotonnes per month, giving a life of 25 years if operated at the maximum rate of 262 kilotonnes. The TSF design is shown in Appendix U. Table 4.4 provides an overview of the design criteria of the TSF.

TABLE 4.4: DESIGN PRINCIPLES FOR THE TAILINGS COMPLEX

Feature	Detail
Tailings Delivery and Deposition	A tailings distribution pipe around the TSF will be a rubber lined steel pipe. Tailings in the form of slurry will be delivered at a rate of 420 tons per hour. The slurry density will be 1.55 tons per m^3 with a void ratio of 3.18.
Diversion	Surface runoff from the outer slopes of the TSF will be collected in toe paddocks and allowed to evaporate. Any rainfall falling within the TSF footprint will drain to the return water dam from where it will be recycled to the plant. A clean water diversion canal will be provided around the perimeter of the TSF to intercept clean surface run-off and convey it around the facility. The canal will discharge captured flow to the environment downstream of the TSF.
Topsoil Stripping	Topsoil within the TSF footprint areas will be stripped and stockpiled in accordance with the topsoil conservation guide in close proximity to the TSF. A stripping depth of 300 mm was indicated in the design. Stripping and stockpiling of topsoil will be done as part of the initial TSF construction works.
Lining	A Class C barrier system is required. For the proposed design of the BPM TSF barrier system, Class C is as listed below starting from the waste (Platinum tailings) to the natural ground. • Over liner drainage (finger drains) • Waste body (Platinum tailings) • Geotextile A7 or similar approved • 1.5 mm thick HDPE geomembrane (double textured) • 300 mm thick ripped and re-compacted in-situ clay • In-situ undisturbed material
Embankments	A starter wall will be constructed from material borrowed from the basin of the TSF at 1V:1.75H downstream and upstream slopes with a crest width of 6 m wide. The starter wall will be constructed in two phases, with the first phase raising the wall to elevation 1055 mamsl (11 m high wall) and phase 2 raising it to elevation 1058 mamsl. This will result in the final height of the starter wall of 14 m above the natural ground level. The TSF will be developed / constructed using the upstream method with an overall outer slope of 1V:5H. This will be achieved by constructing inter benches at every 7 m outer wall height increase with the inter slopes at 1V:4H. The final elevation of the TSF will be 1090 mamsl. The final height of the TSF will be 46 m above the lowest natural ground level. Outer toe paddocks will be constructed outside the impounding embankment using material borrowed from the basin. The purpose of the paddocks is to collect runoff from the outer slopes of the facility and any potential tailings spillage. The paddocks are designed to contain the 1:100 year storm runoff and will be provided with emergency overflow spillways.
Under Drains & Decanting system	The underdrainage system has been designed to control the phreatic surface, to assist with consolidation of the tailings material and to minimise the hydraulic gradient over the liner. The system consists of the following: A toe drain, which runs along the inside toe of the starter wall; and A network of finger drains located on top of the geomembrane to reduce the hydraulic gradient over the barrier system. These drains have been designed as filter drains consisting of a series of filter sand, 6 mm and 19 mm stone aggregate. The intercepted seepage is collected using slotted corrugated HDPE pipes. An intermediate decant intake, which consist of a multi–stage stacked concrete rings, will be constructed towards the outer wall for decanting supernatant during the early development of the facility. A permanent penstock decant consisting of a 20 m high concrete tower and a multi-stage stacked concrete rings used to final elevation of 1090 mamsl will be constructed towards the centre of the TSF. When supernatant water reaches the permanent penstock decant the intermediate decant system will be sealed off. Paddocks will be constructed at the outside perimeter of the starter wall to collect all the run-off water from the surface of the TSF slopes or any potential tailings spillage and allow the run-off water to evaporate.
Access and Access Control	A perimeter road will be constructed around the TSF for access during operations, routine inspection and maintenance. There is an existing access road to the TSF area on the farm Mimosa, which will be used. A perimeter fence is already established on site.
Waste Minimisation	No re-processing of the tailings is envisaged in future. No opportunities for the reduction of the tailings production rate are envisaged.
Rehabilitation	Being an upstream constructed facility, concurrent rehabilitation work will be able to be carried out on the outer slopes of the facility. The overall outer slope will be 1:5 with intermediate slopes between benches at 1:4.

Feature	Detail
Monitoring	The monitoring of the TSFs will include: • Safety aspects e.g. monthly review of freeboard during operational phase, presence of seepage, functioning of blanket drains etc., quarterly inspections (operational phase) and annual audits. • Groundwater pollution aspects including monitoring of nine boreholes (four deep, four shallow and one near the Elands River) located on the perimeter of the TSF to ascertain upstream and downstream groundwater levels and quality including, NO_3, Ca, Mg, Fe, Mn, Na, Cl, K, SO4, HCO_3, PO_4, Cr (VI) and piezometric level. Monitoring frequency of major cations and anions quarterly, minor constituents annually after 2 years of quarterly monitoring – quarterly report. • Vegetation cover and success rate. The rehabilitation and vegetation of the outer slope of the TSF will be done during the operational phase – quarterly report. • Erosion damage and general condition of catchment paddocks, drainage outlet pipes, solution trench and sumps – quarterly report. • Dust generation – annual report.
Dust Control	Rehabilitation and vegetation of the TSF outside slopes reduces the risk of dust generation. During the construction of the TSF containment walls, dust suppression will be undertaken by wetting roads and TSF walls.
Closure	Closure of the facility is expected to include: • removal of the slurry delivery and return water pumps and pipelines, • sealing the gravity decant outlet, • removal of the synthetic liner from and landscaping of the return water dam, • upgrading the toe paddocks, • contour surface water paddocks over the top surface of the facility, and • placement of a low permeability soil cover over the top surface of the facility and vegetation on the area. Aftercare and maintenance of the site is expected to be maintained for a period of 3 to 5 years after completion of the rehabilitation and closure works described above. Monitoring of surface and groundwater quality in the area is likely to be required to continue for a period of up to 30 years or even longer. This will need to be determined when applying for closure.

The safety classification, conducted by Knight Piesold Consulting, for the TSF has been determined in accordance with the South African Code of Practice for Mine Residue Deposits (SANS 10286:1998) and the requirements of Section 3(c) of GN 527 of the MPRDA. The TSF was rated as High Hazard, as the TSF zone of influence encompasses the river on the eastern and southern side of the TSF. The summarised safety classification is included below.

TABLE 4.5: TAILINGS COMPLEX SAFETY CLASSIFICATION

Criteria No.	Criteria	Comment	Safety Classification
1	No. of Residents in Zone of Influence	The TSF zone of influence is thought to impact more than 10 residents.	High Hazard
2	No. of Workers in Zone of Influence	It is thought that between 11 and 100 workers will be at risk.	Medium Hazard
3	Value of 3rd party property in zone of influence	It is thought that the replacement value would more than R20 million.	High Hazard
4	Depth to underground mine workings	The depth of underground workings will be > 200 m	Low Hazard

Environmental classification for the TSF

In accordance with Section 5 GN632 of the NEM:WA, mine residue stockpiles need to be classified taking into account Regulation 8 of GN R634 of 2013, which references the following associated National Norms and Standards:

- National Norms and Standards for the assessment of waste for landfill disposal (GN R635 of 2013).

- National Norms and Standards for disposal of waste to landfill (GN R636 of 2013).

The tailings has been classified as a type 3 waste, and therefore needs to comply with a Class C landfill liner design facility. The return water dam shall comply with the same landfill liner classification as the tailings dam.

A new tailings pipeline and return water pipeline will be constructed from the plant area to the TSF area. These will follow along the same servitude and will cover an area of 11.4 ha (the total servitude is 30m in width). The pipelines will be approximately 3.8 km in length and will be constructed on plinths. Each plinth will be approximately 300 mm high. The tailings pipeline will have a diameter of 300 mm and the return water pipeline will have a diameter of 150 mm. The tailings (in the form of slurry) delivery rate will be approximately 420 tonnes per hour.

4.3.8 WATER SUPPLY AND USE

4.3.8.1 Potable water

The infrastructure included in the approved EIA will be applicable for the project for the construction and operational periods. There will be additional water requirements as there will be an additional two years for the Life of Operations, thus water will be required for longer. Potable water will be supplied by Magalies Water. This will be supplied to the mine process plant site via a pipeline from the north-eastern boundary of the mine. For phase A, this pipeline will be routed to the north-eastern boundary of the mine from where contractors will be able to use the water as required. At a later stage (Phase B of the project); the line will be routed to feed the potable water tank and the process water tank at the plant.

The anticipated volume of water required is 5 mega liters of potable water per day for reagents, human consumption and make-up process water.

New water storage reservoirs will be constructed within the Concentrator Complex. These reservoirs will have a total capacity of approximately 3 mega liters, will cover a footprint of 0.3 ha and will be in steel tanks.

4.3.8.2 Mine Water Supply System

The capacities and infrastructure included in the 2008 EIA will be applicable for the proposed changes to the Bakubung Mine.

Make up water for mining activities will be drawn from the main supply reservoir and all water will, where appropriate, be recycled to minimise demand. Underground mining water will gravitate from surface reservoirs to points of application, and all run-off water will be collected and pumped to underground settlers. The clear water from the settlers will be recycled and reused.

Water from the change houses may also be utilised as process water, where possible.

4.3.8.3 Process water supply system

The capacities and infrastructure included in the 2008 EIA will be applicable for the proposed changes to the Bakubung Mine.

Make up water will be drawn from the main supply reservoir on site and recycled to minimise demand. Tailings will be pumped to the TSF and the clear water will be returned to the plant. Water can also be sourced from the sewage treatment plant (discussed in Section 4.3.12). This will be subject to test work confirming suitability.

4.3.9 POWER SUPPLY AND USE

The electrical power will be fed to the process plant site from the existing infrastructure situated on the mine. During construction, the mine feed will be brought into the construction area and stepped down to 400V via a single 630kVA miniature substation. Contractors will make allowances for all equipment required to distribute power from the miniature substation to their required facilities.

During Phase 1 of the project, the main backbone for all reticulation will be installed; namely, the extension to the existing mine 33kV substation. From this substation, power will be routed to the plant via a 33kV overhead line. Power will be stepped down to 11kV via two 40MVA power transformers and fed into the new plant main 11kV substation. The phase 1 installation requires power and as such, the motor control centres in this area; as well the reticulation to this area, will be installed. Phase B will see the rest of the electrical reticulation installed to the relevant motor control centres situated in each area.

New gensets will be installed on site; this will include a 1 MVA genset to be placed at the Shaft bank, 200 kVA genset to be placed at the security offices and a 2 MVA genset to be placed at the Concentrator Complex.

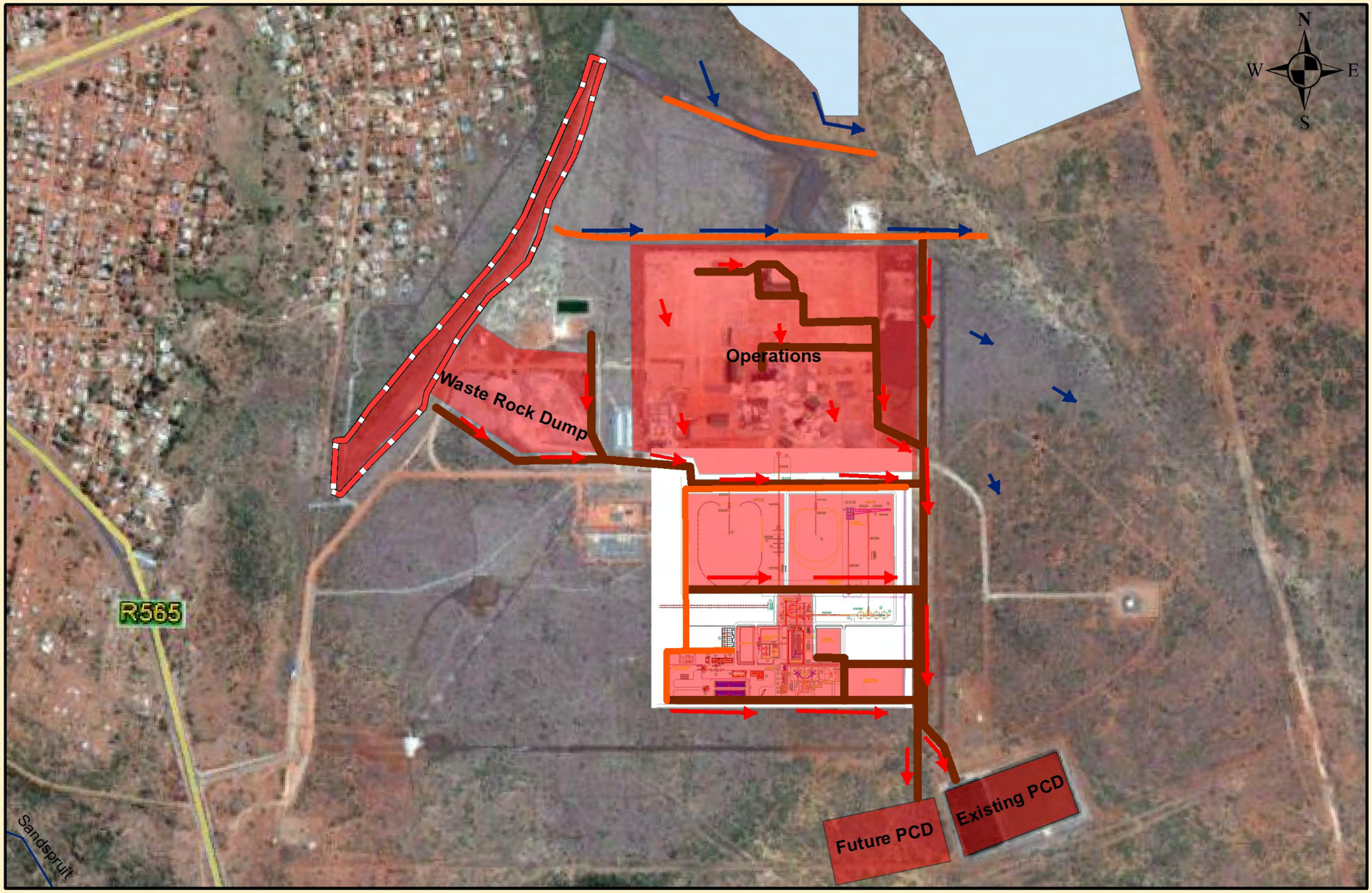
A photovoltaic solar plant is also proposed for the project. The rating will be between 15 MWp to 18 MWp depending on a detailed evaluation of solar irradiation at the site and whether fixed tilt or single axis tracking tilt solar panels are to be used. The energy delivered per year is expected to be ~33GWh (based on 15MWp). The solar plant will cover an area of 22 ha and be located west of the Concentrator Complex.

4.3.10 PROCESS AND STORM WATER MANAGEMENT

There are proposed changes to the management of process and storm water on site. This includes additions and changes to the storm water infrastructure that will be constructed to cater for changes to

the operations and layout. The full layout of the current storm water management plan is included in Figure 4-2.

The approved EIA included the construction of three dams south of the Concentrator Complex; one polluted water dam, one dirty water dam and one storm water dam. Of these dams, only one dam has been constructed as a PCD (referred to as the eastern 'dirty water dam') and the storm water dam will no longer be built. Two smaller PCDs will now be constructed west of the existing PCD in the place of the polluted water dam. The overall footprint remains similar. The one will be concrete lined and the other will be uPVC lined. They will have a total volume of 70 000 m^3 and cover an area of 4.2 ha. There will be a spillway between the two PCDs and the concrete lined PCD will have a silt trap.



Clean Flow
Dirty Flow
Berm
Trench
Dirty Areas
Dams
Paddocks

Bakubung Platinum Mine
Conceptual Stormwater Management Plan

0 100 200 400 600 800
Meters

4.3.11 GENERAL AND HAZARDOUS WASTE MANAGEMENT

General and hazardous waste will be temporarily stored on site in the salvage yard. Waste that can be recycled will be separated on site for collection by an appropriate recycling company. Remaining waste will be sent for final disposal at registered waste facilities e.g. municipal landfill for general waste and an H:H landfill site for hazardous waste. The identification of the landfill sites is dependent upon transportation costs, disposal costs, capacity of the landfill site and permitting status. Waste streams include paper and cardboard, scrap metal, general waste, used oil and hazardous waste. The salvage yard will be approximately 1000 m^2.

4.3.12 SEWAGE SLUDGE MANAGEMENT

During construction, there will be provision and maintenance of portable sanitation facilities. These will be routinely cleaned and sewage disposed of at a licensed sewage treatment plant.

A sewage treatment plant was included in the approved EIA and EMP. It was previously to be located within the Shaft Complex and will now be located (along with the sewage pipelines) north-west of the new PCDs. The sewage treatment plant will have an increased capacity to cater for the additional housing development. The sewage treatment plant will cover 0.44 ha and will have a new capacity of 600 kl per day.

There are no requirements for sewage disposal from the concentrator plant while the Phase A equipment is operational. During the operation of Phase B, sewage disposal will gravitate to the sewage treatment system. Sewage from the various process plant buildings will be reticulated via underground PVC pipelines to a sump located at the sewage treatment plant.

4.3.13 TRANSPORT SYSTEMS

The mine lies approximately 3.5 km southwest of Sun City. Access to the mine is on the east of the R556 provincial road, while an access to the TSF is off the Phatsima road.

The access to mine has already been constructed. Only the first 200 m of this southern access road (SAR) has been constructed. The remainder of the paved access road that will run along the southern boundary of the mine project area and parallel to the eastern site boundary has been cleared but still needs to be completed. This access road to the mine has already been approved and will be used for the project. The approved road will be paved and have widths between 3 m and 6 m.

A temporary gravel access road runs along the western boundary of the process plant before turning east to line up with future process plant roads. This will be used during the ongoing construction phase.

The existing access road to the TSF will be used, though a service road along the TSF pipeline will also be constructed as part of this project.

4.3.14 SITE SUPPORT SERVICES

The storage of dangerous goods has been approved, though the storage capacity will now be increasing on site. The dangerous goods to be stored at the Concentrator and Shaft Complexes will include, but is not limited to, paraffin, degreasing fluids, lubricants, solvents, electrical cleaner, activator, xanthate, frother, depressant, flocculant and diesel. The total capacity of storage will be above 500 m^3.

4.3.15 HOUSING AND EMPLOYMENT

Phase 1 of the Gabonewe Residential Estate (mine housing) has been approved and Phase 1a, which will be east of the Phase 1, is being proposed as part of this project. Phase 1a will cover 22 ha, comprise 400 houses and will include residential stands, single houses and apartments, as well as a primary school. Electrical cables, water, sewage and storm water infrastructure will link up to the Phase 1 housing. Phase 1 and Phase 1a will be connected by a new bridge. The security bridge at the northern section of the housing will be refurbished. Housing will be for operation employees.

Houses and apartments will be constructed with brick and mortar.

There will be an additional 570 jobs created during the construction phase but no additional jobs during the operational phase of the project. The mine housing will be available for operational phase mine workers.

4.3.16 DECOMMISSIONING AND CLOSURE

Following the end of the LOM, the site will be cleared where infrastructure will be dismantled and / or be demolished and all equipment will be removed from the site. A closure plan will be developed prior to the application for a closure certificate. The closure plan will detail what will happen to each facility or infrastructure present on site. At this stage it is planned that the mine facilities that can be utilised by the community e.g. the housing and training/community centre will remain. The facilities that cannot be utilised by the community will be demolished and sold off where possible.

The closure objectives will be to return the land use as closely as possible to pre-mining land use of grazing; this will be done through the implementation of the rehabilitation plan (Section 29.1.3). The TSF will remain on site indefinitely and will be vegetated with an end use plan after closure for pasture grazing land.

5 POLICY AND LEGISLATIVE CONTEXT

This section outlines the key legislative requirements applicable to the proposed project. Table 5.1 below provides a summary of the applicable legislative context and policy.

TABLE 5.1: LEGAL FRAMEWORK

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the policy and legislative context
Mineral and Petroleum Resources Development Act No. 28 of 2002 (MPRDA) and Regulations	As outlined in Table 5.2	BPM will apply for an amendment to their mining right in terms of the MPRDA. BPM has applied for an amendment to their EMP,
National Environmental Management Act No. 107 of 1998 (NEMA)	As outlined in Table 5.2	An application for environmental authorisation in terms of listed activities in accordance to NEMA has been applied for. The NEMA application was submitted on 30 September 2015 to the DMR. A copy of the application form and acknowledgment of receipt is attached in Appendix E.
Regulations 983 (Listing Notice 1), 984 (Listing Notice 2) and 985 (Listing Notice 3) in terms of NEMA	As outlined in Section 4.2	
Guideline on the need and desirability in terms of the Impact Assessment (EIA) Regulations, 2010, GNR. 891 of 2014.	Section 6	Need and desirability has been taken into account as part of project planning.
National Environment Management: Waste Act No. 59 of 2008 (NEM:WA)	Section 4.2	An application for a waste management license in terms of the NEM:WA was submitted 30 September 2015 to the DMR. A copy of the application form and acknowledgment of receipt is attached in Appendix E
Regulation 921 in terms of NEM:WA	Section 4.2	
Regulations regarding the planning and management of residue stockpiles and deposits from a prospecting, mining, exploration or production operation in terms of NEM:WA, Regulation 632.	Section 4.3.7 Table 26.1	Informs the design requirements for the tailings facility associated with the proposed project.
National Norms and Standards for the assessment of waste for landfill disposal (GNR 635 of 2013)		
National Norms and Standards for the disposal of waste to landfill (GNR 636 of 2013)		
National Water Act No. 36 of 1998 (NWA)	Section 7.4.1.6, Section 7.8, and Section 28	An amendment to the existing water use license application will be submitted to the Department of Water and Sanitation for various water uses in accordance to Section 21 of the NWA. As part of the water use license application, exemption in terms of Regulation 704 of 1999 will be applied for.
Regulation 704 of 1999 in terms of the NWA	Section 7.1.3, Section 7.4.1.6, Section 7.8, and Section 28	
National Environmental Management: Biodiversity Act No. 10 of 2004 (NEM:BA)	Section 7.4.1.5	Biodiversity has been taken into account as part of project planning.

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the policy and legislative context
Mining and Biodiversity Guideline (DEA et al, 2013)	Section 7.4.1.5	Biodiversity has been taken into account as part of project planning.
National Freshwater Ecosystem Priority Areas 2011 (NFEPA)	Section 7.4.1.5	Biodiversity has been taken into account as part of project planning.
National Veld and Forest Fire Act No. 101 of 1998	Section 7.8 and Section 28	Fire management has been taken into account as part of project planning.
International Union for Conservation of Nature (IUCN)	Section 7.4.1.5	Biodiversity has been taken into account as part of project planning.
National Forest Act No. 84 of 1998 (NFA)	Section 7.4.1.5	Permit applications will have to be made to the DAFF and READ to obtain the required permission to remove and/or translocate protected species in terms of the NFA.
Conservation of Agriculture Resources Act No. 43 of 1983	Section 7.4.1.5 and Section 28	Agriculture has been taken into account as part of project planning.
National Protected Areas Expansion Strategy 2008 (NPAES)	Section 7.4.1.5	Biodiversity has been taken into account as part of project planning.
South African National Botanical Institute (SANBI) Integrated Biodiversity Information	Section 7.4.1.5	Biodiversity has been taken into account as part of project planning.
Rustenburg Local Municipality Integrated Development Plan	Section 6	Land planning has been taken into account as part of project planning.
Moses Kotane Local Municipality Integrated Development Plan	Section 6	Land planning and economic development has been taken into account as part of project planning.
Bojanala District Municipality Integrated Development Plan	Section 6	Land planning has been taken into account as part of project planning.
National Heritage Resource Act No. 25 of 1999	Section 28	Heritage has been taken into account as part of project planning.
National Environmental Management: Air Quality Act 39 of 2004	Section 28	Requirements of the NEMAQA have been taken into consideration.
South African Code of Practice for Mine Residue Deposits (SANS 10286:1998)	Section 4.3.7	Mine residue planning has been taken into account as part of project planning.

This document has been prepared strictly in accordance with the DMR EIA and EMP Report template format, and was informed by the guidelines posted on the official DMR website. This is in accordance with the requirements of the MPRDA. In addition, this report complies with the requirements of the NEMA. The relevant criteria are indicated in Table 5.2.

TABLE 5.2: EIA REPORT REQUIREMENTS

EIA and EMP report requirement as per the DMR template	EIA and EMP report requirements as per the 2014 NEMA regulations	Reference in the EIA report
Part A of DMR report template	**Appendix 3 of the NEMA regulations**	**-**
The EAP who prepared the report	Details of the EAP who prepared the report.	Section 1.1
Expertise of the EAP	Details of the expertise of the EAP, including curriculum vitae.	Section 1 and Appendix B
Description of the property	The location of the activity, including - the 21 digit Surveyor General code of each	Section 2

EIA and EMP report requirement as per the DMR template	EIA and EMP report requirements as per the 2014 NEMA regulations	Reference in the EIA report
	cadastral land parcel. Where available the physical address and farm name. Where the required information is not available, the coordinates of the boundary of the property or properties.	
Locality plan	A plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken or on land where the property has not been defined, the coordinates within which the activity is to be undertaken	Section 3
Description of the scope of the proposed overall activity	A description of the scope of the proposed activity, including all listed and specified activities triggered.	Section 4.1 and Section 4.2
Description of the activities to be undertaken	A description of the scope of the proposed activity, including all listed and specified activities triggered and being applied for and a description of the associated structure and infrastructure related to the development	Section 4.2 and Section 4.3
Policy and legislative context	A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context	Section 5
Need and desirability of the proposed activity	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.	Section 6
Motivation for the preferred development footprint within the approved site including	A motivation of the preferred development footprint within the approved site including	Section 7
A full description of the process followed to reach the proposed development footprint within the approved site	A full description of the process followed to reach the proposed development footprint within the approved site	Section 7
Details of the development footprint alternatives considered	Details of all the alternatives considered.	Section 0
Details of the public participation process followed	Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs.	Section 7.2
Summary of issues raised by IAPs	A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them.	Section 7.3
Environmental attributes associated with the development footprint alternatives	The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.	Section 7.4

EIA and EMP report requirement as per the DMR template	EIA and EMP report requirements as per the 2014 NEMA regulations	Reference in the EIA report
Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts including the degree of the impacts	The impacts and risks identified, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts can be reversed, may cause irreplaceable loss of resources and can be avoided, managed and mitigated.	Section 7.5
Methodology used in determining the nature, significance, consequence, extent, duration and probability of potential environmental impacts and risks.	The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks.	Section 7.6
The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternative will have on the environment and the community that may be affected.	Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.	Section 7.7
The possible mitigation measures that could be applied and the level of risk	The possible mitigation measures that could be applied and level of residual risk.	Section 7.8
Motivation where no alternative sites were considered	If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such.	Section 7.9
Statement motivating the alternative development location within the overall site	A concluding statement indicating the preferred alternatives, including preferred location within the approved site.	Section 7.10
Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (in respect of the final site layout) through the life of the activity	A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structure and infrastructure will impose on the preferred location through the life of the activity including a description of all environmental issues and risks that were identified during the environmental impact assessment process and an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.	Section 8
Assessment of each identified potentially significant impact and risk	An assessment of each identified potentially significant impact and risk including cumulative impacts, the nature, significant and consequence of the impact and risk, the extent and duration of the impact and risk, the probability of the impact and risk occurring, the degree to which the impact can be reversed, the degree to which the impact and risk may cause irreplaceable loss of a resources and the degree to which the impact and risk can be mitigated.	Section 9
Summary of specialist reports	Where applicable the summary of the findings and recommendations of any specialist report complying with Appendix 6 of these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report.	Section 10
Environmental impact statement	An environmental impact statement which contains a summary of the key findings of	Section 11

EIA and EMP report requirement as per the DMR template	EIA and EMP report requirements as per the 2014 NEMA regulations	Reference in the EIA report
	the environmental impact assessment, a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers and a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives	
Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr	Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation	Section 12
Final proposed alternatives	The final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment	Section 13
Aspects for inclusion as conditions of authorisation	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation	Section 14
Description of any assumptions, uncertainties and gaps in knowledge	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed	Section 15
Reasoned opinion as to whether the proposed activity should or should not be authorised	Reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation	Section 16
Period for which environmental authorisation is required	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised	Section 17
Undertaking	An undertaking under oath or affirmation by the EAP in relation to the correctness of the information provided in the reports, the inclusion of comments and inputs from stakeholders and IAPs, the inclusion of inputs and recommendations from the specialist reports where relevant and any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties	Section 18
Financial provision	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts	Section 19
Deviation from the approved scoping report and plan of study	An indication of any deviation from the approved scoping report, including the plan of study, including any deviation from the methodology used in determining the	Section 20

EIA and EMP report requirement as per the DMR template	EIA and EMP report requirements as per the 2014 NEMA regulations	Reference in the EIA report
	significance of potential environmental impacts and risks; and a motivation for the deviation	
Other information required by the competent authority	Any specific information required by the competent authority.	Section 21
Other matter required in terms of section 24(4)(a) and (b) of the Act.	Any other matter required in terms of section 24(4)(a) and (b) of the Act.	Section 22
Part B of the DMR report template	**Appendix 4 of the NEMA regulations**	-
Details of EAP	Details of the EAP who prepared the EMPr and the expertise of that EAP to prepare the EMPr, including a curriculum vitae	Section 23
Description of the aspects of the activity	A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description	Section 24
Composite map	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 any areas that should be avoided, including buffers	Section 25
Description of impact management objectives including management statements	A description of the impact management objectives, 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 planning and design, pre-construction activities, construction activities, rehabilitation of the environment after construction and where applicable post closure; and where relevant, operation activities	Section 26
The determination of closure objectives		Section 26.1
The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity	-	Section 26.2
Potential acid mine drainage	-	Section 26.3
Steps taken to investigate, assess and evaluate the impact of acid mine drainage	-	Section 26.4
Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage	-	Section 26.5
Measures that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage	-	Section 26.6
Volumes and rate of water use required for the mining	-	Section 26.7
Has a water use license been applied for?	-	Section 26.8

EIA and EMP report requirement as per the DMR template	EIA and EMP report requirements as per the 2014 NEMA regulations	Reference in the EIA report
Impacts to be mitigated in their respective phases	-	Section 26.9
Impact management outcomes	A description and identification of impact management outcomes required for the aspects contemplated in paragraph	Section 27
Impact management actions	A description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes be achieved, and must, where applicable, include actions to avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; comply with any prescribed environmental management standards or practices; comply with any applicable provisions of the Act regarding closure, where applicable comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.	Section 28
Financial provision		Section 29
Mechanism for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon	The method of monitoring the implementation of the impact management actions	Section 30
	The frequency of monitoring the implementation of the impact management actions	
	An indication of the persons who will be responsible for the implementation of the impact management actions	
	The time periods within which the impact management actions must be implemented	
	The mechanism for monitoring compliance with the impact management actions	
	A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations	
Environmental Awareness Plan	An environmental awareness plan describing the manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work; and risks must be dealt with in order to avoid pollution or the degradation of the environment	Section 31
Specific information required by the competent authority	Any specific information that may be required by the competent authority	Section 32
Undertaking	-	Section 33

6 NEED AND DESIRABILITY OF THE PROPOSED PROJECT

The need and desirability of the proposed project is described below. This section has been compiled taking into account the need and desirability guidelines in terms of the environmental impact assessment regulations 891 of 2014.

The motivation for the project as outlined by BPM is provided below:

- The waste rock on site has economic value as it can be utilised as aggregate. Selling the waste rock will perform two functions, maximise its economic potential and reduce the size of the waste rock dump on site.
- The tailings and return water pipeline is necessary for the transfer of tailings to the TSF and for transferring return water from the TSF to the plant for re-use in the process, reducing the need for additional water on site. A TSF is required for the mine to operate.
- Through various optimisation studies it has been established that BPM can hoist faster with a shorter shaft and thus the concentrator capacity needs to increase to accommodate the receipt of material.
- Phase 1a mine housing is desirable to increase the number of houses available for mine employees.
- The photovoltaic solar plant on site will allow for the generation of renewable energy on site decreasing the need for electricity from non-renewable sources.
- Infrastructure within the Shaft and Concentrator Complexes are to be shifted for optimisation of layouts.

Of importance to note is that this project is an amendment to an approved project, therefore location alternatives are limited (refer to Section 7.1 for further details). Preferred alternative locations are described in Section 6.1 below in context of mitigation measures applied to impacts.

6.1 ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES

Due to the nature of mining projects, impacts on sensitive biodiversity areas, linkages between biodiversity areas and related species and the role that they play in the ecosystem are probable. The proposed project also has the potential to directly disturb vegetation, vertebrates and invertebrates. In addition to this, soil is a valuable resource that supports a variety of ecological functions. The proposed project has the potential to damage soil resources through physical disturbance and/or contamination, which has a direct impact on the potential loss of the natural capability of the land.

As part of the project, independent biodiversity and soil specialists were appointed to determine the sensitivity of the proposed additional project area. In this regard the approved mine and proposed project site falls within a CBA2 area (it should be noted it was not categorised as a CBA at the time of authorising the approved operations in 2009), it includes areas of high biodiversity sensitivity as well as three species (one mammal and two plant species) of conservation concern (identified on site in the most recent survey

(refer to Section 7.4.1.5 for further information)). These can be impacted as part of the proposed project (Refer to Appendix F for the detailed assessment). Linked to this, is the loss of soil functionality and related land capability as an ecological driver for vegetation and ecosystems that rely on soil (Refer to Appendix F for the detailed assessment). Measures that were considered to avoid the destruction and disturbance of biodiversity and the loss of soil resources included limiting the project footprint to what is absolutely necessary as well as shifting layout footprints where possible. It needs to be taken into consideration that the current project is for changes to an already approved project and layout and thus there are limitations on where infrastructure can be placed.

Where sensitive biodiversity areas and the removal of protected trees could not be avoided, mitigation measures that focus on ensuring ecological sustainability include the implementation of sound veldt management principles including fire management and grazing techniques to ensure optimal vegetation condition and biodiversity levels. Other mitigation measures for rehabilitation aim at restoring pre-mining land capability to grazing and wilderness potential, where applicable.

The approved project is located near the Elands River and Sandspruit as well as an unnamed tributary of the Elands River, ephemeral drainage lines and channels and unchannelled and channelled valley bottom wetlands. The delineated watercourses within the approved project area ranged from having high to very high ecological importance and sensitivity. The Sandspruit has moderate ecological importance and sensitivity. The aquatic specialist indicated that the Sandspruit and unnamed tributary of the Elands River are systems important for the provision of services to the terrestrial fauna of the area and have a fair importance from a socio-cultural point of view. The impacts associated with the approved project and this project are discussed in Appendix F. Mitigation measures include minimising footprints to what is absolutely necessary, implementing appropriate storm water management measures, sediment control measures, rehabilitation of disturbed areas and re-alignment of infrastructure where possible, further details are contained in Section 28. Not proceeding with this project, particularly the tailings pipeline will not make the approved project viable as tailings will need to be transported to the TSF and any route will cross over the Sandspruit. The chosen pipeline route has a lower impact in terms of crossing over the Sandspruit (refer to Section 7.1.1 for further details).

The plant and TSF areas fall within approved footprints and are approved for mining. The tailings and return water pipeline will be located on communal grazing land. Grazing land will still be available and accessible to the community and mitigation to ensure accessibility includes having the pipeline on plinths which will have the pipeline being 30 cm above the ground. In terms of convenient and safe pedestrian and livestock crossing, overpasses and underpasses at regular intervals or in designated locations along the pipeline route will be provided.

6.2 PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT

The approved project, which has not yet been fully developed, will result in positive socio-economic impacts (Refer to Appendix F for the detailed assessment). This project will also contribute to the support of the local and regional economy. Direct economic benefits will be derived from wages, taxes and profits. Indirect economic benefits will be derived from the procurement of goods and services and the spending power of employees. This project will also provide additional housing for mine employees and an extension to employment as a result of the increased Life of Mine. The Moses Kotane Local Municipality Integrated Development Plan (IDP) (MKLM, 2014), included the BPM housing development as part of their spatial development area for residential development and indicated that a challenge in the municipality is the provision for bulk engineering to cater for residential, commercial and economic development. The Bojanala Platinum District Municipality IDP (BPDM, 2012) indicated that the mining industry makes a viable contribution to the district economy, and platinum mining contributes towards overall economic output of the municipality. The BPDM IDP also indicated that opportunities for small scale mining ventures should be explored, which can apply to BPM being a junior platinum group metals mine. Further to this, through employment of an additional 570 construction employees and the extension of employment from the increased Life of Mine, persons at the mine will gain skills in the construction and operation of a mine and development which contributes to the building of the nation. Management measures that are implemented to further enhance positive socio-economic impacts include the employment of people in local communities (as far as possible), implementing the developed policy and program for the training, development, mentorship, skilling and career progression of BPM's permanent employees, identifying candidates from the local communities for apprenticeships and on-the-job training programmes. BPM have also established the Bakubung-Ba-Ratheo Non-Mining Economic Development Trust (the trust) and the Bakubung-Ba-Ratheo Economic Development Unit (EDU) as part of shareholding agreements between BPM and the *Bakubung-Ba-Ratheo*. The intention of the Trust, EDU, and local economic development projects, and capacity building amongst local businesses is to develop a more self-sufficient and therefore sustainable economy. Further to this, the proposed development will also ensure local economic development through the implementation of projects identified in the social and labour plan (SLP). The projects identified in the SLP were indicated to be identified based on the RLM and MKLM IDP documents and aim to contribute towards the socio-economic development of the area. SLP projects that will be implemented by BPM are focused on improving road infrastructure, small business development, education infrastructure, sports and recreational facilities, housing, skills development, water supply and job creation. Some of the infrastructure related SLP projects were indicated to link to some of the priority needs identified in the MKLM and RLM IDPs.

Due to the expectation of employment associated with mining projects there is a potential for negative socio-economic impacts to occur. In this regard, an influx of job seekers to an area which in turn increases pressure on existing communities, housing, basic service delivery and raises concerns around safety and security. The social specialist indicated that this project is not expected to bring about a

significant influx. The cumulative influx of the approved operations and this project is assessed in Appendix F. Management measures to manage and remedy these impacts include the implementation of a health policy on HIV/AIDs and working together with the *Bakubung-Ba-Ratheo* to manage the development of informal settlements. In addition to this, formal communication structures and procurement procedures have been developed and will continue to be utilised.

7 MOTIVATION FOR THE PREFERRED DEVELOPMENT FOOTPRINT ON THE SITE INCLUDING THE PROCESS FOLLOWED TO DEFINE THE PREFERRED DEVELOPMENT ALTERNATIVES

As the BPM has already been authorised and is already under construction, the potential alternatives are limited. Many of the proposed changes to infrastructure at the mine are expansions and/or modifications to authorised structures and thus the location will not change. The location of new structures is also based on the location of already approved structures e.g. the additional mine housing is planned to be adjacent to the approved mine housing; and the diesel store will be within the approved mine shaft area. The only feasible locality alternatives relate to the tailings pipeline route.

Three possible alternative locations for the tailings pipeline route (Option 1A - northern route, Option 1B – central route and Option 2 - southern route) have been considered and assessed. These are described below.

7.1 DETAILS OF THE DEVELOPMENT FOOTPRINT CONSIDERED

This section describes location alternatives, alternative means of carrying out the operation, and the consequences of not proceeding with the proposed project.

The main project alternatives to be considered include:

- Location alternatives
- Type of activity alternatives
- Design or layout alternatives
- Technology alternatives
- Operational alternatives
- The “no-go” alternative

As the BPM has already been authorised and is already under construction, the potential alternatives are limited. Many of the proposed changes to infrastructure at the mine are expansions to authorised structures and thus the location will not change. The location of new structures is also based on the location of already approved structures e.g. the additional mine housing is planned to be adjacent to the approved mine housing; and the diesel store will be within the approved mine shaft area. The only feasible locality alternatives relate to the tailings pipeline route.

7.1.1 PROPERTY OR LOCALITY

Applicable alternatives are discussed below. Three possible alternative locations for the tailings pipeline route (Option 1A - northern route, Option 1B – central route and Option 2 - southern route) have been considered and assessed. These are described below:

Option 1 A - Northern Route

The pipeline exits the concentrator plant area on the southern boundary, then runs directly westwards along the southern boundary of the plant and crosses under the R565 Rustenburg provincial road. It then passes under Eskom overhead powerlines at an oblique angle, in a south westerly direction towards the tailings storage facility.

Just after the road crossing the pipeline will be located on Bakubung-Ba-Ratheo tribal land. Here it must cross over two tributaries of the Elands River. These floodplains are very wide, making the crossing of the flood plain approximately 400 m long. At the same time it passes under the Eskom overhead powerlines, not at right angles but obliquely.

From here the route is undulating up to the TSF on the farm Mimosa 81 JQ.

Advantages

- Most of the pipeline route falls within the mining right area, or on land owned by BPM. This means that BPM would only need to negotiate with only one landowner (Bakubung Ba Ratheo) and one mining right holder (Maseve Investments) along the pipeline route.

Disadvantages

- Very wide 400m flood plain, of two tributaries, to cross.
- Increased cathodic protection measures are required when crossing under the Eskom powerlines obliquely.

Option 1 B - Central Route

This pipeline route also exits the concentrator plant area on the southern boundary, then runs directly south-westwards from the plant towards the R565 Rustenburg provincial road. The route then crosses under Eskom overhead powerlines at a 90 degree angle, just before passing under the R565. It then continues in a south westerly direction towards the tailings storage facility.

Just after the road crossing the pipeline will be located on *Bakubung-Ba-Ratheo* tribal land. Here it must cross over one tributary of the Elands River. The crossing of the flood plain of this tributary is approximately 360 m long.

From here the route is undulating up to the TSF on the farm Mimosa 81 JQ.

Advantages

- Most of the pipeline route falls within the mining right area, or on land owned by Wesizwe. This means that Wesizwe would only need to negotiate with only one landowner (*Bakubung-Ba-Ratheo*) and one mining right holder (Maseve Investments) along the pipeline route.
- This route only crosses one tributary of the Elands River and crosses over a narrower floodplain than Option 1A.
- This route passes under the Eskom line at right angles thus minimising electromagnetic induction and electrolytic corrosion.

Disadvantages

- There is still one watercourse crossing required for this route.

Option 2 - Southern Route

This route exits the concentrator area on the southern boundary and travels directly south across the Elands River at a narrow point, approximately 120 m wide. Here it turns south west, crosses over Maseve Investment's property, passes perpendicularly under Eskom overhead powerlines, still on Maseve Investment's property, and then passes under the R565 Rustenburg provincial road.

After the R565 the pipeline traverses *Bakubung-Ba-Ratheo* tribal land then crosses the Elands River, for a 2nd time. Here the river crossing is also approximately 120 m. From here the route is undulating across the Bakubung-Ba-Ratheo tribal land up to the TSF on the Mimosa farm property.

Advantages

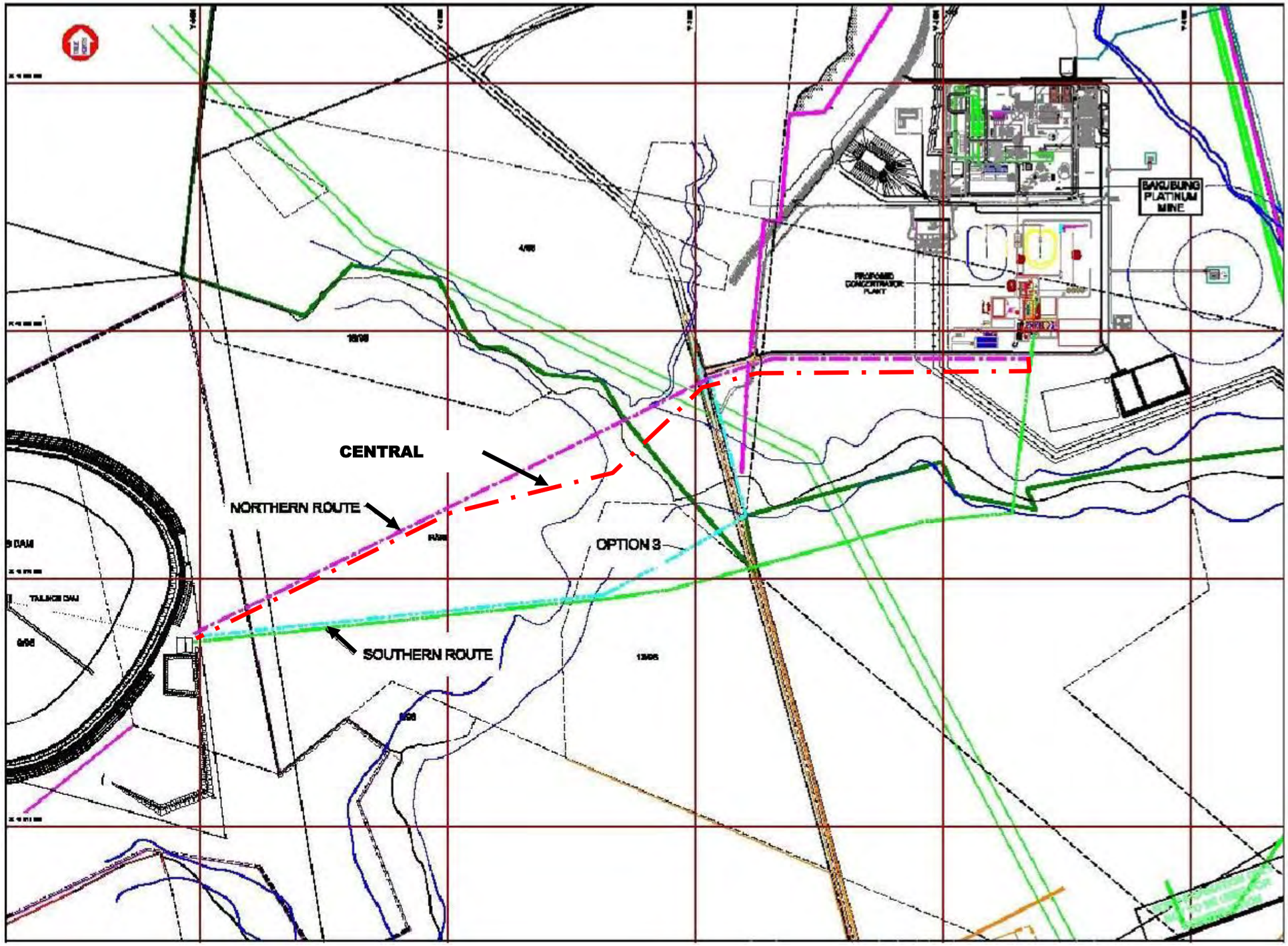
- Narrow river crossings (no wide floodplains).
- This route also passes under the Eskom line at right angles thus minimising electromagnetic induction and electrolytic corrosion.

Disadvantages

- Negotiate with two landowners (Maseve Investments and *Bakubung-Ba-Ratheo*) and two mining rights owners (Royal Bafokeng and Maseve Investments) along the pipeline route.
- Two river crossings of the Elands River.

The potential impacts of these three routes were assessed in the scoping phase. All three of the route alternatives aim to minimise the overall length of the pipeline and limit river and stream crossings. Most environmental conditions were expected to be similar for all three route alternatives. However, the central (option 1 B) and southern (option 2) routes are preferred because they cross 360 m and 240 m of river/stream area respectively, whereas the northern route crosses 400 m of stream/wetland area. The northern route thus has the greatest potential to negatively impact biodiversity and cause surface water

pollution. One of the landowners along route option 2 has denied BPM access, making this option unfeasible. Therefore the specialists assessed route option 1B.


BAKUBUNG PLATINUM MINE
PROPOSED CONCENTRATOR PLANT
CENTRAL
NORTHERN ROUTE
OPTION 3
SOUTHERN ROUTE
TAILINGS DAM

7.1.2 TYPE OF ACTIVITY ALTERNATIVE

The type of activity for the project is platinum mining. This is the future activity planned at the site and this activity will not change as a result of the changes to the mine infrastructure. Therefore different activity alternatives were not considered at the site, as there is only one activity option, and that is to continue with the activity of constructing a mine for platinum mining.

7.1.3 DESIGN OR LAYOUT

The tailings pipeline layout alternatives are discussed in Section 7.1.1 above. For reasons already mentioned, alternative layouts for other infrastructure are not feasible.

7.1.4 TECHNOLOGY

There are no technology alternatives that have been considered for the project. This is due to the fact that there are no feasible alternative technologies for the infrastructure changes.

7.1.5 OPERATIONAL ALTERNATIVES

There are no operational alternatives that have been considered for the project. This is due to the fact that this project is an amendment to an approved project and thus is limited to approved operations.

7.1.6 THE "NO-GO" ALTERNATIVE

In accordance with the NEMA Regulations, the no-go alternative is required to be investigated and assessed. The no-go alternative would mean that the changes to infrastructure at the BPM are not undertaken and therefore the associated negative and positive environmental and social impacts will not occur. The status quo would remain.

Proceeding with the project will potentially:

- Increase the direct economic benefit derived from wages, taxes and profits.
- Increase the indirect economic benefits will be derived from the procurement of goods and services and the spending power of employees;
- Optimise resources through the sale of waste rock as aggregate;
- Optimise operations at the Concentrator Complex;
- Provide additional housing for employees;
- Optimise renewable energy options on site;
- Disturb a portion of communal grazing land;
- Disturb additional heritage resources;
- Disturb additional areas of untransformed habitats; and

Add cumulatively to impacts identified for approved operations e.g. air quality, noise

Not going ahead with the project will maintain the environmental and socio-economic status quo.
If this project does not go ahead, particularly the implementation of the tailings and return water pipeline, the approved operations at BPM will not be able to go ahead as planned as tailings will need to be transported to the TSF.

In the unmitigated scenario, assuming no measures are implemented to control the mine's operations, the significance of potential impacts would be high. Assuming effective implementation of the mitigation and monitoring as outlined in the EMP report (Section 28), the significance of impacts can be reduced to acceptable levels. Following specialist investigations, no reasons for not proceeding with the project were identified.

7.2 DETAILS OF THE PUBLIC PARTICIPATION PROCESS FOLLOWED

This section describes the undertaking of the public participation process and details the information provided to the community, landowners and interested and affected parties (IAPs). The intent was to inform IAPs of what the proposed project will entail, in sufficient detail, in order that they may contribute meaningfully to the identification of impacts and alternatives. The public participation was done in line with the requirements of the NEMA EIA regulations.

7.2.1 IDENTIFICATION OF INTERESTED AND AFFECTED PARTIES

Potential IAPs were identified using existing databases for BPM. The databases included regulatory authorities, traditional tribal authorities, tourist venues and surrounding mines. Additional people and/or organisations were registered as IAPs for the project if they:

- Are landowners or tenants adjacent to or within 100 m of the project,
- Are the local municipality/ ward councillor with jurisdiction in the area,
- Represent the ratepayers association,
- Are an authority or organ of state having jurisdiction in respect of any aspect of the activity,
- Responded to the BID, press advertisements and site posters,
- Attended one of the Bakubung Mine Environmental Forum meetings,
- Attended the Public Open Days,
- Own, operate or administrate infrastructure affected by the project.

A list of all parties that have been identified thus far is included as Appendix E.

7.2.2 NOTIFICATION OF LANDOWNERS, LAWFUL OCCUPIERS AND IAPS

The initial public consultation process for the scoping phase of the project was carried out between 16 July 2015 and 24 August 2015. As part of the consultation process, IAPs were notified of the proposed project and the details of the Scoping and EIA process being undertaken through distribution of a Background Information Document (BID). Notifications to IAPs were provided in English and Setswana.

The BID was circulated via registered post, email and by hand to relevant authorities, IAPs and adjacent landowners between 16 and 22 July 2015. Copies of the BID were also left at shops and public buildings in Phatsima, Ledig and Sun City on 16 July 2015.

The BID provided background information on the Project and provided an explanation of the Scoping and EIA process that is currently being undertaken for the project. The BID also invited members of the public to register as IAPs and participate in the EIA process. A response sheet was attached the BID on which IAPs could provide written comments on the proposed project.

IAPs were given a 30 day period to submit comment on the above in accordance with the EIA Regulations (22 July 2015 to 24 August 2015).

Copies and proof of distribution of the public notifications are contained in Appendix E.

7.2.3 NOTIFICATION OF AUTHORITIES

North West Department of Mineral Resources (DMR)

The DMR was notified of the project via two project meetings held with the DMR on 8 May 2015 and 6 July 2015. As part of the public participation process, a BID was also sent to the DMR on 22 July 2015.

North West Department of Water & Sanitation (DWS)

The DWS has been notified of the project through the circulation of the BID on 22 July 2015 and through a meeting held on 12 May 2015. The DWS was also issued with a notice of intent to submit a WULA.

North West Department of Rural, Environment & Agricultural Development (NW READ)

The NW READ has been notified of the project through the circulation of the BID on 22 July 2015.

Rustenburg Local Municipality and Moses Kotane Local Municipality

Representatives of these municipalities have been notified of the project during the authorities meeting on 13 August 2015 and they have also been sent the BID on 22 July 2015.

Other Commenting Authorities

In addition to the authorities listed above, the BID was circulated to the following commenting authorities on 22 July 2015:

- Bojanala District Municipality
- North West Parks and Tourism Board and Pilanesberg Game Reserve
- Elands Hex River Water Forum
- Department of Health North West
- Department of Transport, Roads and Community Safety: North West
- Department of Rural Development and Land Reform: North West
- Department of Agriculture: North West
- South African Heritage Resources Agency

Copies and proof of distribution of the authority notifications are contained in Appendix E.

Media Advertisements and Site Notices

- Press adverts were placed in the following newspapers:
- The Rustenburg Herald in English on 17 July 2015;
- The Sowetan in English on 22 July 2015.

Site notices (A2 size) were placed on 16 July 2015 at the following areas:

- Entrance of the BPM on the R565 (English and Setswana);
- On the BPM fence boundary on R556, just outside of Ledig (English and Setswana)
- At 2 places along the road to Phatsima on the tailings dam property fence (on the farm Mimosa 81 JQ) (2 x English and 2 x Setswana)

In addition to the A2 notices, several A3 notices were also placed at areas where the public would see them:

- On the R565 between the mine and Ledig – Ledig supermarket (English and Setswana)
- At the corner of the R565 and R556 – at the general dealer (English and Setswana)
- At 2 other shops on the R556 between Ledig and Sun City (English and Setswana)
- At the Spar at Sun Village shops, Sun City (English and Setswana)
- Phatsima Community Centre and Library (English and Setswana)
- Phatsima Community Hall (English and Setswana)
- At a shop in Phatsima (English and Setswana)

The press and site notification was undertaken to elicit interest from other IAPs that might not have been identified during the stakeholder identification process.

The adverts and site notices, and proof of placement, are included in Appendix E.

7.2.4 PUBLIC OPEN DAYS AND AUTHORITY MEETINGS

Authorities meetings have been held with the DMR and DWS (see section 8.2.3 for details).

An additional authority meeting was held at the Wesizwe Community (Information) Centre in Ledig (adjacent to the BPM) on 13 August 2015. Several authorities were invited to the meeting, though only representatives from the Rustenburg Local Municipality and Moses Kotane Local Municipality attended. Copies of the attendance register, minutes of the authorities meetings are in Appendix E.

An additional site visit was held with the environmental department of the Rustenburg Local Municipality on the 29th April 2016, who was not in attendance at the previous site visit. A summary of the site visit is contained in Appendix E.

Two public open days were held with IAPs on 11 and 12 August 2015 in Phatsima and Ledig respectively. The Open Days included posters explaining the project, EIA and WULA process. The posters were in English and Setswana and the SLR team explained the posters in English or Setswana to members of the public who were interested in the project. Copies of the attendance registers, posters, notes and photographs of the open days are in Appendix E.

7.2.5 PUBLIC REVIEW OF DRAFT SCOPING REPORT

The scoping report and summaries of the report were made available for public review for 30 calendar days from 12 October 2015 until 13 November 2015. The report summaries were available in English, Setswana and Zulu. Copies of the report and summaries were placed at the Phatsima Library, Bakubung Tribal Hall and the Wesizwe Community (Information) Centre. The report and summaries were also made available electronically to IAPs on request.

7.2.6 AUTHORITY REVIEW OF DRAFT SCOPING REPORT

Copies of the draft scoping report were distributed to commenting authorities for a 30 calendar day review period from 12 October 2015 until 13 November 2015. The reports were circulated to authorities listed above.

7.2.7 PUBLIC REVIEW OF FINAL SCOPING REPORT

Following review of the draft scoping report, no comments requiring substantial changes to the draft scoping report were received from the public. The only changes required for the final scoping report

included updating the public participation section for inclusion of proof of public participation for the draft scoping report and inclusion of requests for information from the public. These are contained in Appendix E. The public have been informed that no substantial changes were made to the draft scoping report for finalisation of the final scoping report and that a copy of the final scoping report is available for review for a period of 30 days from 16 November 2015 until 07 January 2016 (15 December to 5 January is excluded from timeframes). The public were notified of the submission of the final scoping report to the DMR. Comments received following review of the final scoping report are included in the table below.

7.2.8 AUTHORITY REVIEW OF FINAL SCOPING REPORT

Following review of the draft scoping report, no comments requiring substantial changes to the draft scoping report were received from authorities. The only changes required for the final scoping report included updating the authority participation section for inclusion of proof of authority participation for the draft scoping report and inclusion of requests for information from authorities. These are contained in Appendix E. Authorities have been informed that no substantial changes were made to the draft scoping report for finalisation of the final scoping report and that a copy of the final scoping report is available for review for a period of 30 days from 16 November 2015 until 07 January 2016 (15 December to 5 January is excluded from timeframes). Authorities were notified of the submission of the final scoping report to the DMR. Comments received following review of the final scoping report are included in the table below.

7.2.9 PUBLIC REVIEW OF DRAFT EIA REPORT

Following review of the final scoping report, all comments received have been included and address in the draft EIA. The draft EIA was made available for public comment and review from 02 April 2016 to 03 May 2016. Full copies of the EIA and EMP report and summaries were made available for public review at the same venues that the scoping report was made available (Section E). Electronic copies of the EIA and EMP report were made available on the SLR website. CD copies were made available on request. Comments received on the draft EIA will be addressed in the final EIA, which will be submitted to the DMR for consideration. IAPs were notified of the availability of the draft EIA via email, fax, registered post and/or sms.

7.2.10 AUTHORITY REVIEW OF DRAFT EIA REPORT

Following review of the final scoping report, all comments received have been included and address in the draft EIA. The draft EIA was made available for authority comment and review from 02 April 2016 to 03 May 2016. Full copies of the EIA and EMP report and summaries were made available for authority review at the same venues that the scoping report was made available (Section E). Electronic copies of the EIA and EMP report were made available on the SLR website. CD copies were made available on request. Comments received on the draft EIA will be addressed in the final EIA, which will be submitted to

the DMR for consideration. Authorities were notified of the availability of the draft EIA via email, fax, registered post, sms and/or courier where applicable.

7.2.11 EIA FEEBACK MEETINGS

Notifications

Invitations to the EIA public feedback meetings were distributed on the 18th April 2016 via email, fax and SMS. In addition, site notices were placed around Phatsima and Ledig in English, Setswana and Zulu. These were placed at the following locations:

- A secondary school in Phatsima;
- A secondary school in Ledig;
- Near the postboxes in Ledig and Phatsima;
- The Bakubung Tribal Hall;
- The Rustenburg Local Municipality (Phatsima) community centre;
- The Moses Kotane Local Municipality notice board;
- A shop in Phatsima;
- At the corner of the R565 and R556 – at the general dealer
- At the Spar at Sun Village shops
- At the security office at Bakubung Platinum Mine

The Phatsima and Ledig Ward councillors and the Bakubung Tribal Authority were contacted to spread the word of the meeting to their communities. Copies of the notifications and photographs are contained in Appendix E.

Meeting

The EIA feedback meetings were planned for the 29th April 2016 at the Bakubung Tribal Hall and the Phatsima Community Centre at the Library. The meeting at the Bakubung Tribal Hall had to be cancelled following liaison with the Bakubung baRatheo Tribal Authority and the meeting at Phatsima Community Centre at the Library proceeded as planned (refer to Appendix E for further details). The meeting facilitator assisted with queries in various languages. Meeting minutes, the presentation and registers are contained in Appendix E.

7.3 SUMMARY OF ISSUES RAISED BY IAPS

A summary of the issues and concerns raised by IAPs and regulatory authorities is provided in Table 7-1 below.

TABLE 7.1: SUMMARY OF ISSUES RAISED BY IAPS AND REGULATORY AUTHORITIES

IAPs details		Date of comment	Issue raised	EAP/Project team's response	Section and paragraph reference in this report where the issues and or the responses were incorporated
Name	Affiliation				
Affected Parties					
Land owners					
Kgosigadi of the Bakubung Tribe	Bakubung Tribal Authority	4 August 2015	Public consultation also to be done in Zulu from now on as there are Zulu speaking people in the community.	This will be done. Summaries of the reports are available in Zulu as well.	Appendix E – refer to the scoping summaries.
Kgosigadi of the Bakubung Tribe	Bakubung Tribal Authority	13 October 2015	Thank you so much for the report. We have received all your emails, faxes and hard copy of the report. We will look at it and come back to you before closing date.	Comment is noted	Appendix E for a copy of the correspondence.
Lawful occupiers of the land (Wesizwe are lawful land occupiers)					
Land owners and occupiers of adjacent land					
Mzamani Mdaka	Sinvent Investments 182 (Pty) Ltd	27 October 2015	Sinvent Investments 182 (Pty) Ltd has been granted a prospecting right on portion 1 of Mimosa 81 JQ and remaining extent of Dorskry 95 JQ. Sinvent kindly request a site plan showing the demarcations of Wesizwe Platinum's current and future operations, specifically the location of the slimes dams, and their boundary limits in relation to portion 1 of Mimosa 81 JQ and R/E of Dorskry 95 JQ. Should this site plan be made available and prove that there will be no encroachment of Wesizwe's planned activities on Sinvent's prospecting right area, then there will be no objection from Sinvent Investments in this regard.	A map showing cadastral boundaries was provided to Mr Madaka. The map showed that the Bakubung project does not fall on portion 1 of Mimosa 81. We are uncertain where R/E of Dorskry 95 JQ is located, as on the map there is no farm called R/E of Dorskry 95 JQ near the project site.	Appendix E for a copy of the correspondence.
Malebabo Tsolo	Royal Bafokeng Platinum	11 November 2015	It is noted from your documentation that some of the proposed infrastructure are in close proximity to the Elands River and may be within the 100m flood lines. Please advise how these impacts would be mitigated. Further the mining operations of RBPlat, Maseve 11 Investments (Pty) Ltd and the BPM are in close proximity, which may result in cumulative environmental impacts. RBPlat would be interested in understanding your monitoring plans, especially with regards to surface and groundwater. It is therefore advisable that further discussions are undertaken to determine the way forward with respect to environmental impacts associated with the proposed changes and the proposed mitigation measures in this regard.	Impacts from the project and mitigation measures have been addressed in this report.	Refer to Appendix F for the impact assessment. The monitoring requirements are contained in the EMP Report in Section 28. The mitigation measures are provided in the EMP in Table 28.1
Malebabo Tsolo	Royal Bafokeng Platinum	29 April 2016, EIA feedback Meeting	1. Is the tailings storage facility (TSF) and Return Water Dam existing infrastructure?	1. They are not yet built but changes would be made to what was previously approved for the TSF and return water dam. The TSF would now decrease in height and increase in footprint. There	Appendix E for a copy of the correspondence.

IAPs details		Date of comment	Issue raised	EAP/Project team's response	Section and paragraph reference in this report where the issues and or the responses were incorporated
Name	Affiliation				
			2. How long is the construction phase expected to last? 3. Where is the sewage going to be discharged? 4. Are you conducting monitoring where the infrastructure will be crossing the stream? 5. How many people will be employed during construction	was a return water dam as part of the approved project, but would change in relation to changes in the TSF 2. Three years 3. The sewage will be sent to the sewage treatment plant and all the clean water will be sent back into the plant for re-use 4. At the moment, the monitoring network at the Elands River is conducted downstream and upstream but the monitoring network will be extended upon approval. 5. 570 people additional people will be employed for the construction phase and no additional employment for the operational phase from the approved project.	
Micheal Wasserfall	Maseve Mine	03 May 2016	1. In the report to which our comments are directed Maseve notes that a casing on the tailings line is provided as the only mitigation of the proximity of the tailings area and pipeline to the Elands River. The design of the casing and its performance in the case of a tailings line or tailings line joint failure is critical and is suspected to create unacceptable risk. In the Maseve management experience, tailings lines failures are common. Maseve therefore records its concern that a casing may not be sufficient to prevent a spill. A long tailings line will require significant pressure and a failure of the line would result in a dramatic failure and significant volume of contamination with no opportunity to protect the river if the tails line is in close proximity. The dam position Maseve further notes is also very close to the Elands River and this also creates risk to the Elands River. 2. The engineering of the protection of the Elands River is important to the communities and all people situated in the area. Maseve therefore contends that this disclosure of the protection measures is not sufficient in this report to which Maseve's comments are directed. Mining operators would be severely negatively affected and	1-3 For river crossings, the design for the pipeline includes a pipe within a pipe following DWS recommendations. In terms of TSF and return water dam position, the locations are limited by various factors including roads, property boundaries and engineering design. The applicant has indicated that the TSF location has already been shifted as far as possible to the east to be further away from Phatsima community to decrease the noise and air pollution impacts. Therefore, the chosen location for the TSF and the return water dam is the only feasible option. The TSF and the return water dam are also outside of the 1:100 floodline of the Elands River. The EMP includes commitment measures for monitoring the tailings pipeline to reduce the risk of spillage	Section 28

IAPs details		Date of comment	Issue raised	EAP/Project team's response	Section and paragraph reference in this report where the issues and or the responses were incorporated
Name	Affiliation				
			unfairly caught up in collateral damage to a spill into the Elands River or its tributaries. Maseve is the operator of the Maseve Mine adjacent to the Wesizwe Mine and Maseve are also owners of the river front surface rights. Maseve would be severly and irreparably harmed by a tailings spill and for this reason Maseve object's to the activity proposed. 3. Monitoring of the pipeline and casing will have to be conducted on a regular basis to ensure integrity.	events. These measures have been expanded to specify monitoring of casing and joints. To further mitigate the impacts to possible spills from the tailings pipeline, the EMP has been updated to include additional measures and monitoring. The additional commitments and monitoring include: **Spill containment** Bakubung Platinum Mine are to implement containment measures along the length of the tailings pipeline route, at locations where there is the potential for the pipe to leak or burst, to ensure spills or leaks from the pipeline do not enter watercourses, these can include berms, containment ponds or other suitable measures. These designs are to be completed prior to construction. It must be ensured that measures implemented do not impede cattle access to watercourses. **Monitoring of the tailings pipeline** • Daily inspections of the tailings pipeline, joints and casing are to ensure integrity and to check for leaks. • Montly inspections to check thickness of the tailings pipeline.	
Municipal councillors and Municipality					
Chonko Monnakgotla (Ledig ward 14)	Moses Kotane Local Municipality	13 August 2015 at the Authorities Meeting, Ledig	Please distribute the background information documents to the various schools and community centres	At the meeting it was indicated this would be considered. BIDs had been distributed at the public open days held at the Phatsima Hall and Bakubung Hall, where the community had the opportunity throughout the day to come and receive information. The scoping report was distributed to the Bakubung Tribal Hall, the Phatsima Library and the Wesizwe Community (Information) centre which were	Section 7.2.5 – locations for reports

IAPs details		Date of comment	Issue raised	EAP/Project team's response	Section and paragraph reference in this report where the issues and or the responses were incorporated
Name	Affiliation				
				considered appropriate locations to cater for the communities in Ledig and Phatsima.	
Jafta Masilo (Ledig ward 30)	Moses Kotane Local Municipality	13 August 2015 at the Authorities Meeting, Ledig	I would like to know whether the housing will be for the communities or mine workers?	The housing is intended for the operation employees at the mine.	Section 4.3.15
Nokwaka Mmemezi	Rustenburg Local Municipality- IGR Co-ordinator	13 August 2015 at the authorities site visit, Ledig	How many houses are going to be built?	400 additional houses will be built as part of this project (Phase 1a).	Section 4.3.15
Kelebogile Mekgoe	Rustenburg Local Municipality	22 October 2015	We have received a copy of the Scoping Report for the EIA for changes to infrastructure at BPM, Ledig. The Rustenburg Local Municipality, Environmental Office would like to conduct the site inspection for the proposed project. Can we arrange a site inspection for first week November (2-6 November 2015).	We suggest that a site visit take place during the EIA Phase of the project which will be in the first quarter of 2016, by this stage the specialist studies would have been conducted and more detailed information will be available and can be presented. We will organise a site visit for this and send through an invitation to you and the Environmental office (please provide the email address of the officer) in early 2016.	Appendix E for a copy of the correspondence.
Kelebogile Mekgoe	Rustenburg Local Municipality	26 October 2015	Thanks for your response. I also think it will be appropriate to conduct the site inspection once the EIA report is available, in 2016. The contact official responsible is Kelebogile Mekgoe- EIA Officer (014) 590 3185 / kmekgoe@rustenburg.gov.za	Comment is noted.	Appendix E for a copy of the correspondence.
Kelebogile Mekgoe	Rustenburg Local Municipality	18 November 2015	The following should be noted: 1. All mitigation measures and the recommendations contained in the scoping report for this activity must be implemented.	1. As specified in the scoping report, mitigation measures in the scoping report needed to be refined. Mitigation at scoping level is more high level as specialist studies had not yet been conducted . The mitigation measures as prescribed by specialists and the approved mine EMP have been incorporated into the EMP in this document. These measures are the ones to be implemented and are more specific to the project.	Table 28.1 – mitigation (EMP)

IAPs details		Date of comment	Issue raised	EAP/Project team's response	Section and paragraph reference in this report where the issues and or the responses were incorporated
Name	Affiliation				
			2. The stripped and stockpiled topsoil may be chemically altered due to storage, this can potentially alter the nutrients level in the soul and result in a loss of fertility, therefore proper management of topsoil must be ensured. 3. During the operational phase, the tailings disposal facility is susceptible to wind entrainment and can lead to some environmental impacts especially if there are sensitive receptors downwind. It is therefore recommended that proper rehabilitation measures be put in place (i.e. slopes well managed). 4. Dust generated by construction activities must be effectively controlled by water spraying and/or other dust-allaying agents. 5. An integrated waste management approach that is based on best practices which incorporates reduction, recycling, re-use and disposal must be used. 6. A storm water management plan (i.e. storm water diversion channel) must be put in place and the project must take into account the storm water drainage system in the area and how the project could possibly affect it, 7. Any complaint from the public during the construction and operation of this project must be attended to by the person involved as soon as possible to the satisfaction of the parties concerned. A complaints register must be kept up to date and shall be produced upon request. 8. As far as possible, employment opportunities should be given to the local skilled, semi-skilled and unskilled labour force during the construction and operation phases to stimulate the local and regional economy as per the Social and Labour Plan.	2. A soil conservation plan is included in this report. 3. A rehabilitation plan will be implemented and mitigation has been provided by specialists for management of the TSF. 4. The existing and updated EMP incorporate measures for dust suppression. 5. Waste management on site takes cognisance of this and is also incorporated in the waste management procedure 6. A stormwater management plan is included in the baseline section of the EIA. 7. Grievance mechanisms are in place at BPM and are included in the EMP. 8. The EMP highlights this requirement for employing local labour as far as possible.	Table 28.4 Section 29.1.3 and Table 28.1 Table 28.1 - EMP Section 4.3.11 and Table 28.3 – waste management Figure 4-2 - stormwater management plan Table 28.1 (Economic section) Table 28.1 (Economic and Inward migration sections)
Kelebogile Mekgoe	Rustenburg Local Municipality	11 April 2016	The 29th April 2016 was confirmed for the site visit.	The proposed site visit date was provided and confirmation of suitability was requested.	Appendix E for a copy of the correspondence.
Kelebogile Mekgoe	Rustenburg Local Municipality	29 April 2016 Site visit	1. Asked if the water was coming from the river or from boreholes.	1. Water is coming from Magalies Water and that Bakubung Platinum Mine will not be abstracting any water from surface or	Appendix E for a copy of the site visit summary.

IAPs details		Date of comment	Issue raised	EAP/Project team's response	Section and paragraph reference in this report where the issues and or the responses were incorporated
Name	Affiliation				
			2. Asked if the housing would be for mining employees only, or open to the public. 3. Asked where Bakubung Platinum Mine would be getting power from. 4. Asked what the Run of Mine Stockpiles were near the Eskom sub-station It was indicated there were no concerns from the site visit and that she would review the EIA during the following week.	groundwater resources. 2. At this stage it is for mining employees only. there is a slight possibility that some of the housing may be handed over to Moses Kotane Local Municipality for housing, but no final decision has been made. 3. Eskom is providing power in three phases; two of which are currently supplied and third is coming at a later stage. 4. It was explained that they were reef from underground used during the pilot plant test work at Mintek. The rock would be lifted and placed on the waste rock dump.	
Organs of State					
Sebenzlle Ntshangase	DWS	12 May 2015	DWS provided detailed information regarding what they require for the WUL application process. Please refer to the notes of the meeting in Appendix E for the full comments.	These comments will be addressed as part of the IWULA, the WULA process is being conducted by GGES. The pre-application meeting notes submitted to the DWS highlighted the following relevant to this report: 1. The EMP is to include plans to minimise pollution. 2. For the tailings pipeline routes, list all alternatives to the proposed route in the EMP. 3. The EMP must mention emeregency issues.	1. Section 28. 2. Section 7.1.1 3. Section 31.2.2
Pieter Ackerman	DWS	24 July 2015	DWS Regional Office will be entry and exit for WUL. Options must include the exclusion of watercourses. (i.e. options which will not impact watercourses).	Comment is noted, however all tailings and return water pipeline alternatives require the crossing of watercourses as the TSF is west of the Sandspruit and the plant area is east of the Sandspruit. Alternatives have considered reducing the amount of crossings and floodline width crossings.	Section 7.1.1 – alternatives
Pieter Ackerman	DWS	06 April 2016	Requested that the summaries also be forwarded to the Regional Officer.	The summaries had already been sent to the regional officer.	Appendix E for a copy of the correspondence.

IAPs details		Date of comment	Issue raised	EAP/Project team's response	Section and paragraph reference in this report where the issues and or the responses were incorporated
Name	Affiliation				
Oleteng Mokate	Dept of Health	11 August 2015	The receipt of the BID was noted and passed on to a colleague.	Comment is noted.	Not applicable
Oleteng Mokate	Dept of Health	30 October 2015	The receipt of the draft scoping report was noted and comments will be provided where necessary.	Comment is noted	Appendix E for a copy of the correspondence.
C. Theunissen	DWS	20 August 2015	Acknowledgement of receipt of Notice of intent to submit WULA	Comment is noted.	
Ragna Redelstorff and Colette Scheermeyer	South African Heritage Resources Agency	29 July 2015	Ensure that a Heritage Impact Assessment is done. This must include the archaeological component (Phase 1) and any other applicable heritage components. Appropriate (Phase 2) mitigation, which involves recording, sampling and dating sites that are to be destroyed, must be done as required. A Palaeontological Assessment is not necessary for the proposed footprint area as it lies within an area of insignificant palaeontological sensitivity according to the Palaeo Sensitivity Map on SAHRIS.	A heritage impact assessment has been conducted and is included in this EIA and EMP report.	Appendix Q – Phase 1 Heritage impact assessment
Ragna Redelstorff	South African Heritage Resources Agency	20 October 2015	Thank you for uploading additional documents to your application on SAHRIS. Unfortunately, I could not find a Heritage Impact Assessment (HIA) in any of the attachments. Please ensure to upload an HIA for SAHRA to be able to comment on your application.	The report which was completed and loaded onto SAHRIS is a scoping report. That was the initial environmental report which is required by the DMR for mining projects. The scoping report gives the project background etc., and explains which specialist studies will be completed during the EIA. Thus the heritage report would only be done during the EIA Phase (next phase) of the project. A heritage impact assessment has now been conducted and is included in this EIA and EMP report which has been uploaded to the SAHRA website as requested.	Appendix Q – Phase 1 Heritage impact assessment
Natasha Higgit and Philip Hine	South African Heritage Resources Agency	03 May 2016	1. No further palaeontological impact assessment is required for the project; 2. A Watching Brief must be conducted for sites MHC005, MHC019 and MHC021. A Watching Brief Report must be compiled and submitted to SAHRA upon completion. Additionally, a Conservation Management Plan (CMP) must be developed for site MHC021, following a social consultation process in terms of section 36 of the National Heritage Resources Act, 1999 (NHRA) and Chapter XI of the NHRA Regulations;	1. This comment is noted 2-4. The EMP has been updated with this information.	Table 28.1 – mitigation measures for heritage Appendix E for a copy of the correspondence.

IAPs details		Date of comment	Issue raised	EAP/Project team's response	Section and paragraph reference in this report where the issues and or the responses were incorporated
Name	Affiliation				
			3. A social consultation process in terms of section 36 of the NHRA and Chapter XI of the NHRA Regulations must be completed for sites MHC025, MHC026, MHC027A, C, D, E, F and G, thereafter a permit for relocation may be applied for; 4. Permits for mitigation in terms of Section 35 of the NHRA must be applied for MHC003, MHC018 and MHC020. Mitigation measure should include Shovel Test Pits and test pit excavations. These excavations must be documented by means of a Phase 2 Archaeological Investigation Report that must be submitted to SAHRA for further comment. An agreement with a recognised repository must be sought to house excavated artefacts for long term curation. 5. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Itumeleng Masiteng/Mimi Seetelo 012 320 8490), must be alerted immediately. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required.		
Precious Moalahi	Department of Roads and transport	29 October 2015	Requested a copy of the draft scoping report to be emailed.	Draft scoping report was emailed.	Appendix E for a copy of the correspondence.
J van Wyk	Department of Roads and transport	18 November 2015	The existing road R565 (P115-1). This road falls within the jurisdiction of SANRAL and they must comment. The Department has no objections to the proposed changes to the infrastructure.	SANRAL were notified of the availability of the scoping report for review.	Appendix E for a copy of the correspondence.
Director	Department of Roads and	18 April 2016	This Department has no objections to the above-mentioned proposed development, since none of the existing and	This comment has been noted. SANRAL have been notified of the project.	Appendix E for a copy of the correspondence.

IAPs details		Date of comment	Issue raised	EAP/Project team's response	Section and paragraph reference in this report where the issues and or the responses were incorporated
Name	Affiliation				
	transport	(received 04 May 2016)	future/planned provincial roads are affected. The R565 and R556 forms part of the National Road Network, it is therefore under SANRAL jurisdiction and they should be contacted in this regard. The future/planned provincial road should be excuded from the proposed developments. No structure (poles, struts, stays, manholes etc) will be erected or allowed inside any provincial road reserve, without the approval from this Department indicating the correct position.		
Communities					
Mmatsheko Segoai	Phatsima community	11 August 2015 at Phatsima Public Open Day	I am concerned about the health and safety of our community.	The health related impact were considered, particularly with reference to water quality and air quality. Mitigation measures are considered in the EMP report which aim to prevent water pollution, air quality pollution as well as impacts that relate to social ills linked with influx of people for work opportunities.	Table 7.37 – summary of mitigation to address IAP concerns. Table 28.1- Mitigation measures: Air quality, groundwater, surface water, inward migration and associated social ills sections Appendix F – assessment: Air quality, groundwater, surface water, inward migration and associated social ills sections
Dorah Motlhajo	Phatsima community	11 August 2015 at Phatsima Public Open Day	Could we please be given jobs from this particular project. Whenever we take our CV's to Wesizwe, we never receive feedback. This project can bring change to the state of the economy. The construction of building and houses will reduce poverty and crime because there will be employment. I hope that we will not have any more problems with water cuts. If only the dispersion of dust can be decreased as well as the construction of houses in order to improve our living conditions. I think that the land has been degraded and I don't know what the state of the environment the site is in. I don't know what the final state of the environment will be and the physical extent to which it will have an impact (in km's).	Comments are noted. During the EIA, the possible impacts on the community and environment were considered and assessed. This included the potential impact on ground and surface water, employment and health caused by dust and mitigation with regard to these to manage the impacts to acceptable levels. Specialists also considered the physical extent of impacts.	Table 7.37 – summary of mitigation to address IAP concerns. Table 7.34 – summary of impacts Table 28.1- Mitigation measures: Air quality, groundwater, surface water, inward migration and associated social ills sections Appendix F – assessment: Air quality, groundwater, surface water, inward migration and associated social ills sections

IAPs details		Date of comment	Issue raised	EAP/Project team's response	Section and paragraph reference in this report where the issues and or the responses were incorporated
Name	Affiliation				
					Appendix H- groundwater specialist report Appendix R - Air quality specialist report Appendix P - socio-economic specialist report.
Rebeccah Dipolelo Chaike	Phatsima community	11 August 2015 at Phatsima Public Open Day	The project will help to reduce unemployment and poverty in Phatsima. The environmental assessment needs to ensure that we don't experience any negative impacts. Phatsima is far from the plant therefore I am assuming that the impacts will be minimal.	The mitigation measures include in the approved EMP and as proposed by the specialists aim to minimise the potential impacts. With mitigation measures implemented it is expected that impacts can be managed /mitigated to acceptable levels. Phatsima was considered as part of the specialist studies i.e. the noise and air quality studies to determine impacts that will be experienced.	Table 9.1 – summary of impacts identified and degree to which impact can be managed. Appendix F- assessment: air quality and noise impact Appendix R - Air quality specialist report Appendix N – Noise specialist study
Veronica Kedibone	Phatsima community	11 August 2015 at Phatsima Public Open Day	This project will benefit our community. Our children will be educated and informed about what is happening in our community. 1. There will be an improvement in the local economy. 2. I trust that SLR know their job and they will execute it well. There will be progress and improvement. 3. I would like to learn a lot more about how the environment could be potentially impacted and how land is utilised for this particular development. 4. The current state of the environment is not good, SLR will need to do whatever is necessary to ensure that the environment is protected. 5. I am hoping that jobs will be available; the local economy will grow, schools will be built, there will be sufficient water and the improvement of our roads. 6. SLR will need to assess the state of the land and houses before they initiate the construction of facilities required for the mine. I wish for prosperity. May God bless you with wisdom to continue with the project	Comments are noted. The EIA and EMP have considered the socio-economic and environmental impacts of this project. Information on how the cultural, socio-economic and biophysical environment will be impacted is contained in the EIA and the specialist assessments. The mitigation measures as provided in the EMP aim to minimise negative impacts to the environment and maximise the benefits to the economy.	Appendix F - includes information on the impacts to the cultural, socio-economic and biophysical environment. Table 28.1 – mitigation measures
Sophy Femele	Phatsima community	11 August 2015 at Phatsima Public	I hope the project grows in order to bring about change in our community by providing employment and reducing crime.	During the EIA, the possible impacts on the community were considered in terms of employment and social ills related to inward migration.	Table 7.37 – summary of mitigation to address IAP concerns. Table 28.1 – EMP:

IAPs details		Date of comment	Issue raised	EAP/Project team's response	Section and paragraph reference in this report where the issues and or the responses were incorporated
Name	Affiliation				
		Open Day			economic and inward migration and associated ills. Appendix F – Assessment: economic and inward migration and associated ills. Appendix P - socio-economic specialist report
Petrus Kandile	Phatsima community	11 August 2015 at Phatsima Public Open Day	1. As the grazing land of the Phatsima Community was sold to the mine. We, the owners of the animals made an informal agreement with some of the mine employees to allow us to graze until the time they would decide to use it. We requested grazing land from the municipality as they have also taken the remaining piece of land for another project and left us with no grazing land. We informed the municipality about this and they instructed us to talk to the mine in order for them to allow us to graze until we had found alternative land for grazing. We requested to be informed timeously about any changes that would take place, which we, the mine and municipality had all agreed on. 2. We are very concerned about the tailings dam that is going to be erected so close to our location because it will contain acid water and sand which will dry up and cause dust, causing some illnesses to the kids. Could you please review this process.	1. The EIA gives indicative timeframes for the overall mine for construction. This comment has been forwarded on to Wesizwe. 2. The geochemistry studies conducted concluded that the TSF is non-acid generating. Impacts on air quality were assessed as part of the EIA and its possible impact on surrounding areas including Phatsima was considered. Mitigation measures to decrease dust generation on site were recommended by the air quality specialist and included in the EMP.	Table 4.1 – estimated project timeframes Section 7.3.1.2- geochemistry paragraph: non-acid generating Table 7.37 – summary of mitigation to address IAP concerns. Table 28.1- mitigation: Air quality section Appendix F – assessment: air quality section Appendix R - Air quality specialist study
Aubrey Botswe	Phatsima	11 August	How this information was taken to the people was really not	Comments are noted. SLR will improve	Table 7.37 – summary of

IAPs details		Date of comment	Issue raised	EAP/Project team's response	Section and paragraph reference in this report where the issues and or the responses were incorporated
Name	Affiliation				
	community	2015 at Phatsima Public Open Day	appreciated. Not everyone in the community of Phatsima was aware of this information meeting. This is something which needs to be addressed and taken very seriously. Please respect the community when it comes to matters that will affect them. We all know that to every mining industry there is a lot of corruption in terms of how the jobs are allocated and how the royalties are being given out. This is something that the chairs and executives are aware of but they are not doing anything about it because it benefits them even informing us about the changes that are going to be made is just a formality- the decision has already been made. The authorisation has already been given. If you can only employ the youth and develop them, you will be doing the major thing that is positive to us as youth. (*Responses by the IAP to the numbered questions are recorded below*) *How is this project going to benefit the community?* 1. Please provide information as to how your interests (socio-economic, cultural, heritage or environment) will be affected by the proposed project: As you know mines produce minerals and for those minerals to be reached, chemicals are used, land is taken and graves are going to destroyed-that's how it's going to be affected. 2. *How do you consider that the proposed activities will impact on your socio-economic conditions?* Hopefully jobs will be created from this project. 3. *What are your suggestions to mitigate the anticipated impacts on you or your socio-economic conditions?* This is not going to benefit us in any way. Its going to benefit the mines. 4. *According to you, what are the current land uses and their location within the project area?* The land is being used in such a way that the mines benefit, they don't care about people or their assets.	communication methods for future meetings in the Phatsima community. This will include holding a public meeting for future public consultation if required. Authorisation has been given for the existing mine, but the changes to infrastructure still need to be authorised through the EIA process. Impacts on employment and graves were considered. The EMP provides mitigation measures regarding maximising local employment as far as possible. A heritage impact assessment was also conducted to identify graves on site and provided management measures should relocation of graves be required. Locations of identified graves are provided in the heritage impact assessment. Graves will not be destroyed but either be fenced off or relocated depending on where they are located. Details on this process are provided in the EMP and the heritage assessment.	mitigation to address IAP concerns. Table 28.1- mitigation: heritage section Appendix Q – Phase 1 Heritage impact assessment

IAPs details		Date of comment	Issue raised	EAP/Project team's response	Section and paragraph reference in this report where the issues and or the responses were incorporated
Name	Affiliation				
			5. *What are the locations of environmental features on site?* Water dams, farms and air. 6. *How can the potential environmental impacts be remediated, and to what standard?* This can be stopped only if you don't put your plans into action. Stop whatever you are trying to do, that's a permanent solution! 7. *How can the potential impacts on your socio-economic conditions be mitigated (reduced)?* By paying the royalties to the communities, not dealing under the table and creating jobs. Don't place jobs on sale. 8. *How can the potential environmental impacts on your infrastructure be managed, avoided or remedied?* By not doing anything to it.		
Eunice Tladinyana	Phatsima community	12 August 2015 at Ledig Public Open day	I want to see this project going far and I want to see this project be big and to be known throughout South Africa. I really like it. I want to work at BPM. I would be really pleased if SLR could help us with jobs.	Impacts relating to employment were considered in this EIA. The EMP provides mitigation measures regarding maximising local employment as far as possible.	Table 7.37 – summary of mitigation to address IAP concerns. Table 28.1- mitigation: economic section Appendix F- assessment: economic section
Gomolemo Molefe	Phatsima community	11 August 2015 at Phatsima Public Open Day	I hereby comment and question how you are going to get information pertaining your learnerships and internships - when and how will Wesizwe be hiring us? (*Responses by the IAP to the numbered questions are recorded below*) 2. *How do you consider that the proposed activities will impact* on your socio-economic conditions? By providing more jobs to our community 3. *What are your suggestions to mitigate the anticipated impacts on you or your socio-economic conditions?*	Information on recruitment procedures are contained in the EMP	Table 7.37 – summary of mitigation to address IAP concerns. Table 28.1- mitigation: economic section(for recruitment information) Appendix F- assessment: economic section

IAPs details		Date of comment	Issue raised	EAP/Project team's response	Section and paragraph reference in this report where the issues and or the responses were incorporated
Name	Affiliation				
			By including all the community members. 4. *According to you, what are the current land uses and their location within the project area?* Sports and recreation		
Gomolemo Molefe	Phatsima community	13 October 2015	Wesizwe info CDs: May you please forward the info I can't get it online.	An email response was sent: please send through an address for us to send a copy of the CD. Alternative methods for viewing the report were also provided. Response from IAP for delivery address for the CD was never received.	Appendix E for a copy of the correspondence.
Thabo Tladinyana	Phatsima community	12 August 2015 at Ledig Public Open day	I would like to see the project expand into other areas of South Africa so it can help to combat unemployment.	The comment is noted.	Appendix E for a copy of the correspondence.
Petronela Molekwa	Phatsima community	11 August 2015 at Phatsima Public Open Day	I do not have a problem with the project but the leaders of the community should have been notified properly - we would have really appreciated that.	Comments are noted. SLR did communicate with the ward councillor and local municipality regarding the Open Day. SLR will improve communication methods for future meetings in the Phatsima community, if required.	Appendix E for a copy of the correspondence.
Monki Masisi	Phatsima community	11 August 2015 at Phatsima Public Open Day	I am happy that we were notified about this development, especially because it is close to our community. I am hoping there will be some kind of change in our community because we really need jobs. I am concerned that the blasting impacts will have a negative impact on our community.	Impacts relating to employment were considered in this EIA. The EMP provides mitigation measures regarding maximising local employment as far as possible. Blasting does not form part of this project (only the approved project). The mitigation measures as part of the approved EMP have been included in this EIA and EMP report.	Table 7.37 – summary of mitigation to address IAP concerns. Table 28.1- mitigation: economic and blasting section Appendix F- assessment: economic section Appendix F- Blasting discussion
Zelda Pooe	Phatsima community	11 August 2015 at Phatsima Public Open Day	I have concerns about the project.	During the EIA, the possible impacts on the community and environment were considered and assessed. This included, impacts to air quality, groundwater, surface water, biodiversity, socio-economic, soils,	Table 7.37 – summary of mitigation to address IAP concerns. Table 7.34 – summary of

IAPs details		Date of comment	Issue raised	EAP/Project team's response	Section and paragraph reference in this report where the issues and or the responses were incorporated
Name	Affiliation				
				traffic, heritage, noise, land use and visual. With mitigation measures implemented it is expected that impacts can be managed /mitigated to acceptable levels.	impacts Table 28.1- Mitigation measures Appendix F- assessment
Noli Makhubo	Phatsima community	11 August 2015 at Phatsima Public Open Day	Please email me your word document (BID) so that I can email my feedback to you.	This will be done for the comment sheet (in word). The full BID can only be sent in PDF. The email address has been added to our database and you will be informed of project progress.	Appendix E for a copy of the correspondence
Anonymous	Phatsima community	11 August 2015 at Phatsima Public Open Day	What kind of jobs will be available? Will the Phatsima people benefit something from the project of Wesizwe. How will we know if the project is on? Will you come to us to tell us all the details about these projects. Lastly, as a community member, I would like all the people from Wesizwe to arrange a meeting with all the people from Phatsima that we can understand what these documents actually mean and therefore be able to answer questions.	Information on recruitment procedures are contained in the EMP. The economic impact of the project, including employment, was assessed. The EMP provides mitigation measures regarding maximising local employment as far as possible. The purpose of the Open Day was to explain the information in the BID to the community. This was done for the community members who were interested. Setswana translators were present at both Open Days. The documents were also available in Setswana for ease of understanding. Further public participation will be conducted during the EIA and this will likely include a public meeting in Phatsima, if required.	Table 28.1- mitigation: economic section(for recruitment information) Appendix F- assessment: economic section
Anonymous	Phatsima community	11 August 2015 at Phatsima Public Open Day	Seeing that the project area is close to Phatsima, will preference for hiring be given to the inhabitants of Phatsima? How will our lives be endangered? How are we going to benefit from the project?	Information on recruitment procedures are contained in the EMP. The economic impact of the project, including employment, was assessed. The EMP provides mitigation measures regarding maximising local employment as far as possible.	Table 28.1- mitigation: economic section(for recruitment information) Appendix F- assessment: economic section

IAPs details		Date of comment	Issue raised	EAP/Project team's response	Section and paragraph reference in this report where the issues and or the responses were incorporated
Name	Affiliation				
Lawrence Loeto	Ledig community	12 August 2015 at Ledig Public Open Day	1. Please inform the Parks Board and Pilanesberg Game Reserve directors. Ledig farmers and restaurants union must also be informed. Sun City Resort, BnB and Bakubung hotel directors must be informed. 2. The government must ensure that air pollution from dust at the mine does not affect the plants growing within the community. 3. The animals in the game reserve must not be affected by the dust- they must also be taken care of. 4. Water must not be polluted by the mining activities. 5. Our youth must not be affected by pollution especially in giving birth?	1. This has been done. 2-3 Information on dust impacts on plant and animal life are included in the air quality impact assessment. 4-5 Mitigation measures are provided in the EMP to manage water resource and a monitoring programme is also provided.	Appendix R - Air quality specialist study Table 7.37 – summary of mitigation to address IAP concerns. Table 28.1- Mitigation measures Table 30.1- monitoring
Tshireletso Mjala	Phatsima community	12 August 2015 at Ledig Public Open Day	You can inform the community in the following ways: -You can explain everything to the ward councillor and ask him to inform the community -You can advertise your meeting details on the radio -You can send out letters to the community members to make them aware	Noted. The ward councillor was informed of the Open Day and he will also be informed of future meetings. Letters were sent to community members on the existing IAP database and in future will be send to everyone on the updated IAP database (updated after the public open days). Radio advertising will also be considered.	Appendix E for a copy of the correspondence
Magdeline Mogobaladi	Phatsima community	12 August 2015 at Ledig Public Open Day	I'm interested in the project.	You will be kept informed of the project progress.	Appendix E for a copy of the correspondence
Elias Mokwena	Ledig community	12 August 2015 at Ledig Public Open Day	I'm looking for a job.	Information on recruitment procedures are contained in the EMP. The economic impact of the project, including employment, was assessed. The EMP provides mitigation measures regarding maximising local employment as far as possible.	Table 28.1- mitigation: economic section(for recruitment information) Appendix F- assessment: economic section
Mike Wasserfall	Platinum Group metals	18 & 19 April 2016	Requested anotherelectronic lin k to the EIA. Indicated that in future all communication to Platinum Group Metals must only be sent to Mike Wasserfall and Gert Pretorius. All other people receiving correspondence in relation to Platinum Group Metals were to be removed from	An alternative link to accessing the report was sent and details on the database were updated accordingly.	Appendix E for a copy of the correspondence..

IAPs details		Date of comment	Issue raised	EAP/Project team's response	Section and paragraph reference in this report where the issues and or the responses were incorporated
Name	Affiliation				
			the database to streamline communication. Confirm his attendance to the public meeting.		
Dept. of Land Affairs (Dept. of Rural Development and Land Reform)					
None received to date.					
Traditional Authorities					
Kgosigadi of the Bakubung Tribe	Bakubung Tribal Authority	Meeting on 4 August 2015 (full notes of the meeting are included in Appendix E)	Public consultation also to be done in Zulu from now on as there are Zulu speaking people in the community. The Kgosigadi will sign the landowner forms for the EIA and WUL processes. Wesizwe needs community buy-in. The Kgosigadi will arrange the Bakubung Tribal Hall for the open day and will announce the meeting.	Public consultation will also be done in Zulu from now on. Comments are noted.	Appendix E – refer to the scoping summaries (Zulu)
Dept. Environmental Affairs					
None received to date.					
Other Competent Authority (DMR)					
Lorraine Nobela and Tshilidzi Phalala	DMR	Meeting on 6 July 2015 (full minutes of the meeting are included in Appendix E)	1. These changes to the EA require a scoping and EIA process and will need to be approved under NEMA by the DMR. To change the MR it will be necessary to get an EA in terms of Section 25 of the MPRDA if the footprint is changing. 2. The Mine Works Programme will need to be updated. 3. The original EA must be attached to the application to the DMR. 4. What is the additional material that Wesizwe want included in the MR. This must be specified in the application, the DMR would then need to confirm if the mining right for this mineral is available in that area. 5. DMR is only the competent authority for activities within the MR area. Anything outside the boundary is to be submitted to the North West Rural, Environment and Agriculture Development (READ). The whole pipeline will need be authorised by the DMR and not READ. 6. Will more water be required if there is an increase in plant capacity.	1. The capacity of the plant will increase but the footprint will remain the same. 2. This was done in 2014. 3. This will be done. 4. It is aggregate. 5. The pipeline will cross over an area that is not in the MR. However, this area will be registered as a servitude. 6. In the original application 8 mega litres were requested from Magalies Water. The plan is to recirculate water from TSF and sewage treatment plant instead of disposing water, therefore additional	Appendix E for a copy of the correspondence

IAPs details		Date of comment	Issue raised	EAP/Project team's response	Section and paragraph reference in this report where the issues and or the responses were incorporated
Name	Affiliation				
			7. Who is the landowner? 8. The Bakubung would need to be consulted separately as the landowner.	water should not be needed. 7. The plant area and pipeline area is owned by Bakubung Tribal Authority. The TSF area is owned by Wesizwe. 8. This has been done.	
Interested Parties					
Chris De Bruyn		22/07/2015	A Noise study with specific reference to the additional noise generated by the above ground Crusher plant. A full Air study taking into account the cumulative impacts in the area.	1. The noise impact assessment took into consideration the additional noise impact from this project which included the above-ground crusher. 2. The air quality impact assessment considered the cumulative impact of the site and took into consideration baseline air quality in the surrounding area. The baseline monitoring data gives an idea of the impacts as a result of activities in the area from when monitoring started to date. The study discussed the probable cumulative impacts taking into account the monitored data.	Appendix N – noise impact assessment Appendix R - Air quality impact assessment

7.4 ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE PROJECT AND ALTERNATIVES

The baseline information provided is aimed at giving the reader perspective on the existing status of the cultural, socio-economic and biophysical environment. Where appropriate it includes the detail derived from the specialist reports and other research undertaken for the EIA.

7.4.1 BASELINE ENVIRONMENT AFFECTED BY THE PROPOSED ACTIVITY

7.4.1.1 Topography

INTRODUCTION AND LINK TO ANTICIPATED IMPACT

The topography of a project area influences surface water flow, safety of third parties and animals, the location of soils and the visual character of a landscape. Existing mining infrastructure and activities have altered the topography of the site. The project components have the potential to contribute to the alterations. This in turn could result in changes to drainage patterns, landforms which could prove hazardous to people and animals, as well as changes to the visual character of the site. As a baseline, this section provides an understanding of the topographical features relevant to the project site and surrounding area from which to measure potential change.

DATA SOURCES

The information for this section was sourced from approved mine EIA, housing BAR, and through the studying of topographical maps and site observations by the vegetation specialist (De Castro and Brits, 2016a). Refer to Appendix K.

RESULTS

The topography of the Frischgewaagd and Mimosa areas is generally flat with moderate slopes leading down to the Elands River in the southern parts. The pipeline is situated mostly on a gentle south-west facing slope. The elevation of the project area ranges from 1031 to 1073 mamsl (De Castro and Brits, 2016a).

The topography is characterised by various ephemeral drainage lines, channels and wetlands, the Sandspruit and the Elands River (TWP, 2008; ABEC, 2014 and De Castro and Brits, 2016a). The topography within the project area has been partially altered by the development of mine infrastructure, not all approved infrastructure has yet been developed.

Within a 5km radius to the north of the project area is the Pilanesberg mountain range which is remnant of an ancient volcano, reaching an approximate height of 1480 mamsl (Airshed, 2016). Isolated ridges between 80 m and 100 m above the surrounding plains occur to the south and to the east of the project area. These mountains and ridges have steep slopes and are highly visible from the proposed site (TWP, 2008).

CONCLUSION

The topography of the site has been altered by approved mining activities that range from clearing and flattening of areas for the shaft bank, construction of roads, noise berms and establishment of the waste rock dump. Not all of the approved facilities have been constructed as yet. The project components include the tailings storage facility, housing, soil berms and topsoil stockpiles. These changes to the approved mining operations need careful consideration with respect to safety, water and visual aspects.

7.4.1.2 Geology

INTRODUCTION AND LINK TO ANTICIPATED IMPACT

The assessment of the proposed project presents the potential for significant negative impacts to occur (in the unmitigated scenario in particular) on the bio-physical, cultural and socio-economic environments both on the project sites and in the surrounding area. With mitigation these potential impacts can be prevented or reduced to acceptable levels.

It follows that provided the EMP is effectively implemented there is no environmental, social or economic reason why the project should not proceed.

DATA SOURCES

The information for this section was sourced from approved mine EIA, the housing BAR and the TSF design report (Knight Piesold, 2016)

RESULTS

Regional geology

The project area is underlain by the Rustenburg Layered Suite (RLS) of the Bushveld Igneous Complex in which the PGM bearing Merensky Reef and UG2 Reef occur. The RLS comprises five stratigraphic zones representing the sequential fractional crystallisation that accompanied the cooling of this magmatic body:

- The Marginal Zone, which comprises pyroxenites and norites with no economic potential
- The Lower Zone which comprises ultramafic rocks, such as pyroxenites and harzburgites, containing thin, high-grade chromitite seams
- The Critical Zone pyroxenites, norites and anorthosites that host all the significant platinum group metals chromite deposits
- The Main Zone, which consists mainly of homogeneous norites and gabbros that are locally exploited as dimension stone
- The Upper Zone norites, gabbros and diorites, which host over 20 massive magnetite seams, some of which are exploited for vanadium and iron ore.

The Pilanesberg mountain range north of the project area is made up of an isolated ring of alkaline hills covering over 500 km2. It was formed by the coalescence of a number of small volcanoes and the welling up of successive ring dykes around the collapsed crown. The overlying layer, which is largely eroded, consists of alkaline volcanic and pyroclastic rocks. The pyroclastic rocks consist of fragmental volcanic material blown into the atmosphere by explosive activity. There are also small outcrops of quartz-rich rocks belonging to the Magaliesberg Quartzite Formation that are related to fracture events (TWP, 2008).

Local geology

The Merensky Reef is a regular and complete cyclic unit within the Critical Zone and is a persistent magmatic sedimentary entity. It is located 60 m to 100 m below the top of the Critical Zone and grades upward in the cycle to norite, a 'spotted' anorthosite and then into a 'mottled' anorthosite at the top of the cycle.

The Merensky Reef occurs over the project area in three types. These three types are based on the physical appearance, mineralisation and immediate footwall stratigraphy of the Merensky Reef. These are the Normal Merensky (approximately (~) 1.19 m thick), the Single Chromitite Merensky (~ 0.08 m thick) and the Normal Footwall Merensky (~ 0.69 m thick). They vary in mineralogy and thickness but are bounded within the Critical Zone.

The UG2 Chromitite Layer is composed of a chromitite layer and generally has a basal feldspathic pyroxenite pegmatoid and some overlying chromitite layers. The UG2 reef is often underlain by a pegmatoidal feldspathic pyroxenite with the greatest concentration of PGMs occurring at the base of the UG2 chromitite (TWP, 2008).

The depths below surface of the Merensky and UG2 reefs are in Table 7.2.

TABLE 7.2: DEPTH BELOW THE SURFACE OF MERENSKY AND UG2 REEFS AT THE BPM MINING AREA (TWP, 2008)

	Depth below surface	
Reef	**Deepest Point**	**Shallowest Point**
Merensky Reef	1 234 m	584 m
UG2 reef	1 272 m	616 m

Structural Features

There are numerous faults and north-south striking dykes that cut through and across the area. These include the Rustenburg and Caldera faults, as well as many other minor faults. The Rustenburg fault line bisects the farm Mimosa, and the Caldera fault line bisects the farms Frischgewaagd and Ledig.

Quartz veins are also known to be present in the lithologies on site. The in-situ nature of the soils on site increases the likelihood that residual quartz veins may be present close to surface. These quartz veins can act as preferential flow paths for water and potential contaminants into the underlying aquifers (Knight Piesold Consulting, 2016).

Geochemistry

As part of the updated TSF design and waste classification, laboratory scale tests such as acid base accounting, acid digest, XRD analysis and leach testing and mineralogical examination were used to determine whether the TSF was potentially acid generating. The results found that the tailings material is considered to be non-acid forming. The leach testing indicated that the total concentrations of barium, copper and nickel classify the tailings as a Type 3 hazardous waste, although both copper and barium were only marginal exceedances. The supernatant water was marked by having moderately high sulphate content but very low concentrations of heavy metals (Knight Piesold Consulting, 2016). The approved EIA and EMP indicated that the waste rock was also considered to be non-acid forming. Although acid production may not occur, the sulphide content may be sufficient to produce some soluble sulphates under oxidising conditions.

CONCLUSION

The structures that are present in the area may influence groundwater flow by forming preferential flow paths for groundwater. Laboratory testing showed that the TSF waste stream was not considered to generate acid leachate. Under oxidising conditions without appropriate buffering there could be soluble sulphates impacting water quality. It follows that short and long term pollution prevention and/or treatment measures must be considered.

7.4.1.3 Climate

INTRODUCTION AND LINK TO ANTICIPATED IMPACT

As a whole, the various aspects of the climate that are discussed influence the potential for environmental impacts and related mine/infrastructure design. Specific issues are listed below.

- Rainfall could influence erosion, evaporation, vegetation growth, rehabilitation planning, dust suppression, and surface water management planning
- Temperature could influence air dispersion through impacts on atmospheric stability and mixing layers, vegetation growth, and evaporation which could influence rehabilitation planning
- Wind could influence erosion, the dispersion of potential atmospheric pollutants, and rehabilitation planning.

To understand the basis of these potential impacts, a baseline situational analysis is described below.

DATA SOURCES

Information in this section was sourced from the approved EIA, BAR and EMP reports, the air quality impact assessment (Airshed, 2016) and the annual water monitoring report (SLR, 2015).Rainfall and temperature data were sourced from the on-site weather station for May 2014 (when it started to operate) to October 2015.

RESULTS

Regional Climate

The North West province has varying climatic conditions across the province. The western region is arid while the central region typically has semi-arid conditions and the eastern region of the province (where the project area is located) is largely temperate. Rainfall over the province is highly variable over space and time.

The approved EIA and EMP indicated that rainfall occurs predominantly in the summer months, with the western region of the Province receiving less than 300 mm per annum, mainly during the mid-summer period. The central region receives approximately 550 mm per annum during the late summer season, while the eastern and south-eastern region receives over 600 mm per annum in the early season (spring). With the exception of the south-eastern region, evaporation exceeds precipitation in the province.

The approved EIA and EMP indicated that temperature patterns are characterised by great seasonal and daily variations, where the summers are hot and the winters are mild to cold. The seasonal fluctuations in mean temperatures between the warmest and the coldest months vary between 12ºC and 15ºC. Windy months occur between August and November.

Local climate

The site falls within the Highveld climatic zone which is characterised by warm temperatures, dry winters and summer rainfall which are erratic and extremely variable (SLR, 2015).

Rainfall and evaporation

Rainfall represents an effective removal mechanism of atmospheric pollutants. The project area experiences rainfall mainly between September and January, with maximum monthly rainfall occurring in December (Table 7.3).

TABLE 7.3: MONTHLY RAINFALL IN MM (MEASURED DATA, MAY 2014 TO OCTOBER 2015) (AIRSHED, 2016)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2014					0	0	0	0	0	8.1	40.5	45.5
2015	20.3	8.3	21.1	7.4	0	0.7	1.6	0	33.1	0		

The floodline determination report in the approved BAR and EMP indicated that the Mean Annual Precipitation measured at the Rustenburg weather station was estimated at 630 mm.

Temperature

Air temperature is important, both for determining the effect of plume buoyancy (the larger the temperature difference between the plume and the ambient air, the higher a pollution plume is able to rise), and determining the development of the mixing and inversion layers. Minimum, maximum and mean temperatures for the project area were obtained from on-site data. Maximum, minimum and average temperatures were 36.8°C, -2.3°C and 19.9°C, respectively. The month of June had the lowest temperature of -2.3°C while the maximum temperature of 36.8°C occurred in February. Temperatures reached their minimum just before sunrise and their maximum between midday and sunset (Airshed, 2016) (Table 7.4).

TABLE 7.4: MINIMUM, MAXIMUM AND AVERAGE TEMPERATURES (MEASURED DATA, OCTOBER 2014 TO OCTOBER 2015) (AIRSHED, 2016)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average	24.8	25.7	23.6	20.0	17.3	12.0	12.9	17.1	20.9	24.1	22.2	23.7
Minimum	35.7	36.8	35.0	30.7	31.8	24.4	25.7	32.3	35.7	36.1	35.0	35.7
Maximum	15.7	13.3	14.4	9.4	3.9	-1.1	-1.1	-2.3	6.8	12.3	11.1	13.9

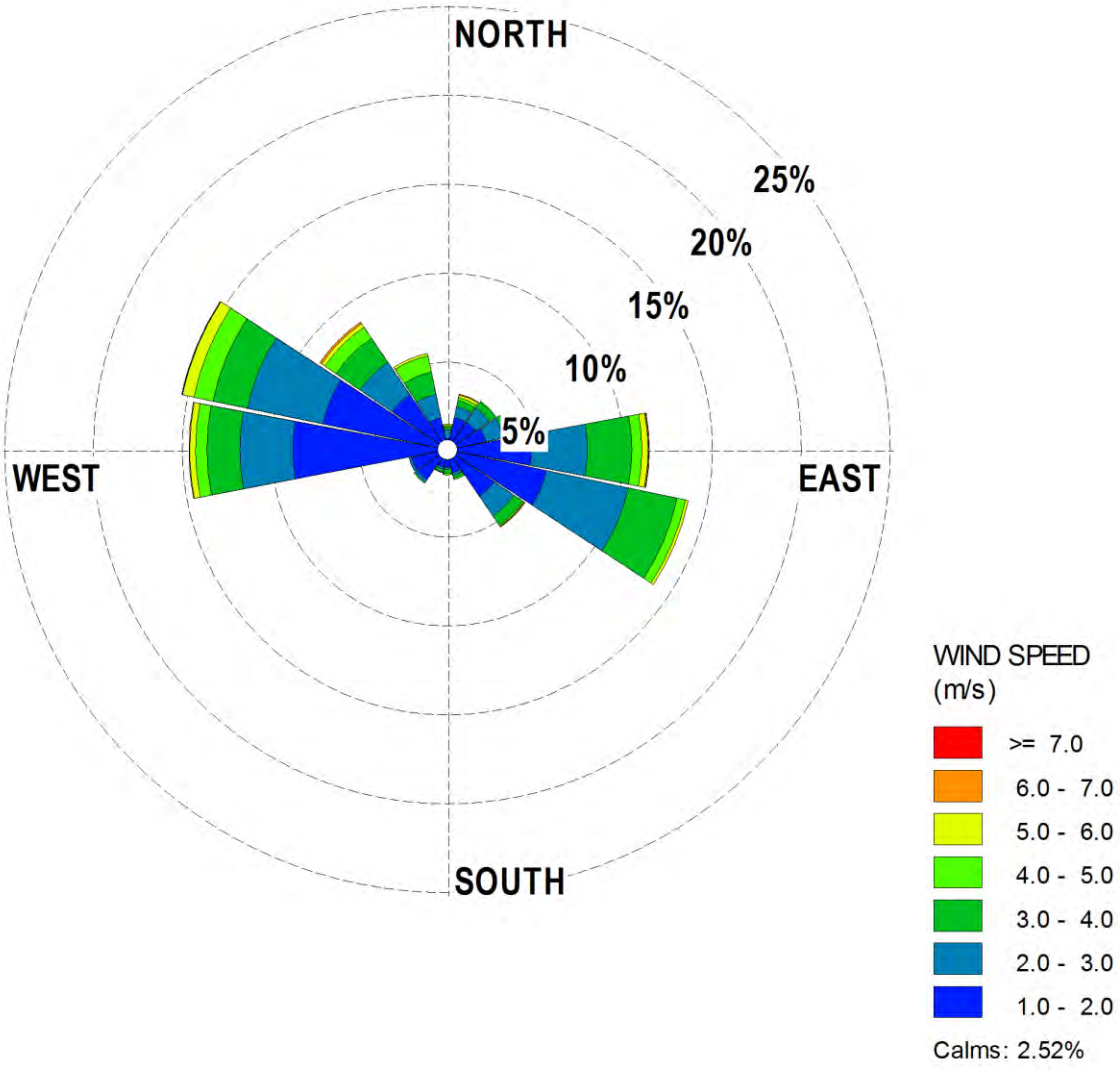
Wind Data

The wind field determines both the distance of downward transport and the rate of dilution of pollutants.

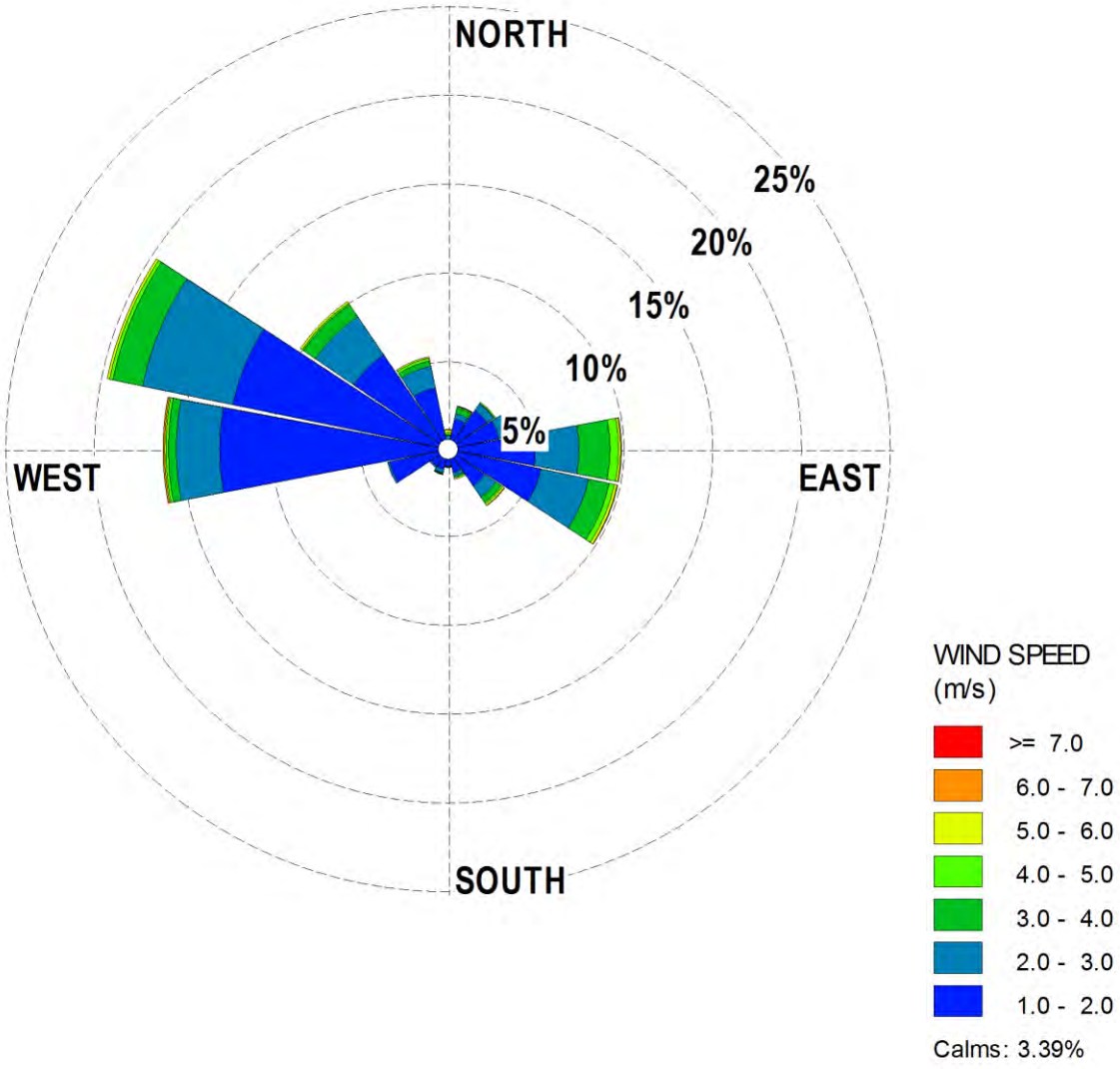
Wind roses comprise 16 spokes which represent the directions from which winds blew during the period. The colours reflect the different categories of wind speeds, the yellow area, for example, representing winds of 5 m/s to 6 m/s. The dotted circles provide information regarding the frequency of occurrence of wind speed and direction categories. The frequency, at which calms occurred, i.e. periods during which the wind speed was below 1 m/s, is also indicated.

Based on data from the weather station at BPM from 7 October 2014 to 6 October 2015, wind roses generated show that the wind field was dominated by winds from the west-north-west and west (Figure 7-2). Calm conditions occurred approximately 3% of the time. During the day and night, frequent winds occurred from the west-north-westerly and westerly sectors with almost 3% calm conditions. Night-time airflow had less frequent winds from the east-south-easterly sector than the day-time and lower wind speeds. At night the percentage calm conditions increased to almost 4% (Airshed, 2016).

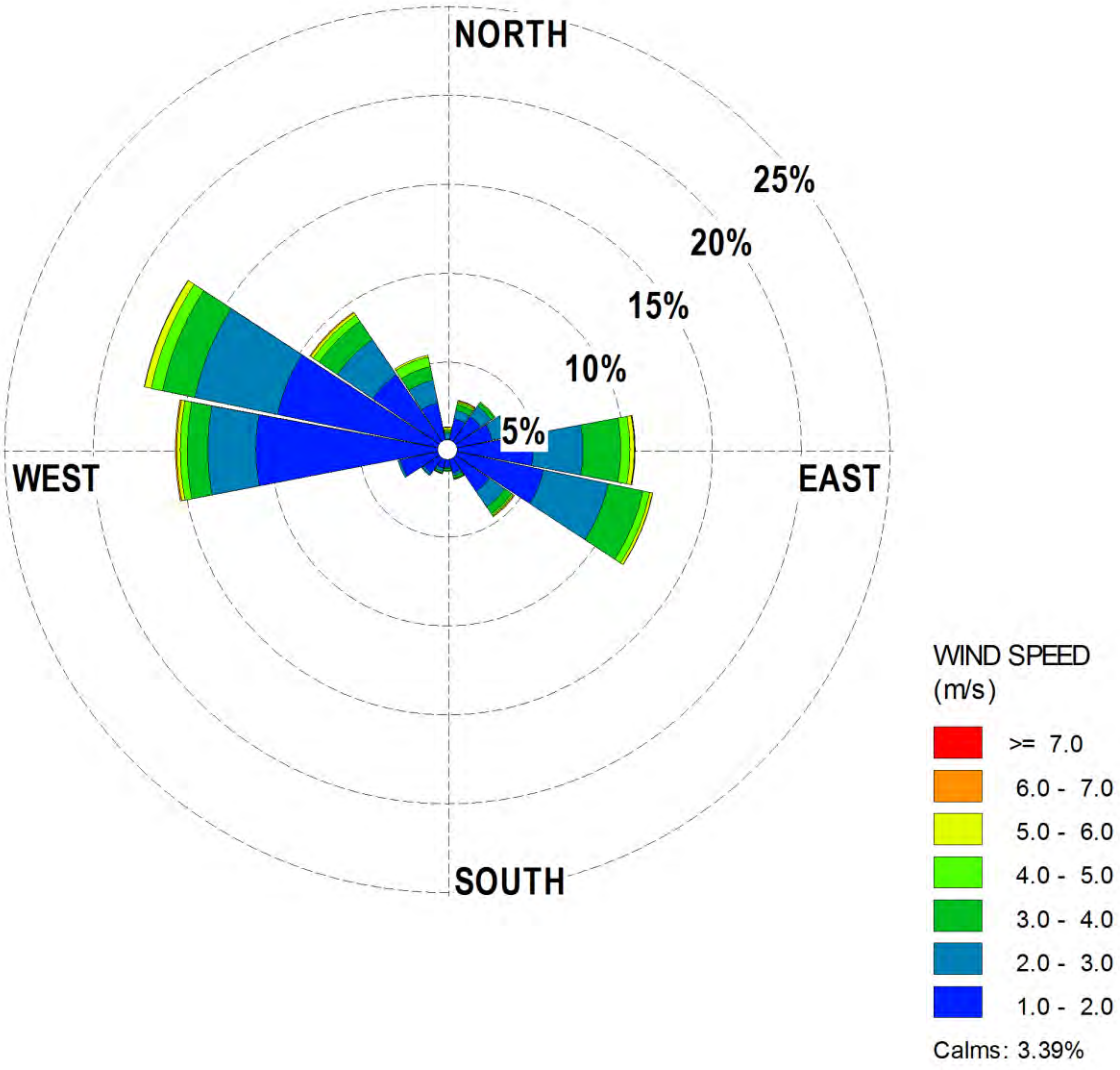
DAY WIND ROSE



NIGHT WIND ROSE



PERIOD WIND ROSE



Extreme weather conditions

The incidences of extreme weather were deduced from data from the Rustenburg weather station 05115234 for the period 1961-1990 as there was a lack of data for the period of 1994-2004. The mean annual average for thunderstorms was 71 days, for hail storms was 3 days, and for fog was 1 day (TWP, 2008). The approved BAR and EMP indicated that fairly frequent frosts occur during winter.

CONCLUSION

BPM falls within bushveld climatic conditions, with hot and wet summers and cold and dry winters. On average, winds blow from the west-north-west with less frequent winds from the east-southeast. Wind speeds hardly reach speeds higher than 5m/s. Wind direction, speed and atmospheric conditions influence the area of impact and the extent to which pollution can occur. The highest concentrations for low level releases would occur during weak wind speeds and stable (night-time) atmospheric conditions. These climatic aspects need to be taken into consideration during the assessment of impacts and the design and implementation of the mitigation measures

7.4.1.4 Soils and land capability

INTRODUCTION AND LINK TO ANTICIPATED IMPACT

Soils are important natural resources that provide ecosystem services that are critical for life. As an ecological driver, soil is the medium in which most vegetation grows, which in turn provides food for plant-eating animals and provides habitat for a wide variety of life forms. Soil is also important for water filtration. In the context of mining related operations, soil is even more significant if one considers that mining is a temporary land use where after rehabilitation (using soil) is the key to re-establishing post closure land capability that will support post closure land uses. Soil forms rather slowly by the breaking down of rock material. Soil determines the type of land use the area is suitable for, for example, soil with low nutrients may not be able to support unassisted crop farming. Soil resources are often vulnerable to pollution, erosion and compaction, which could be caused by project-related activities.

Mining related projects have the potential to damage soil resources through physical loss of soil and/or the contamination of soils, thereby impacting on the soils' ability to sustain natural vegetation and altering land capability. Contamination of soils may in turn contribute to the contamination of surface and groundwater resources. Loss of the topsoil resource reduces chances of successful rehabilitation and restoration.

To understand the basis of the potential impacts, a soil baseline situational analysis is described below.

DATA SOURCES

The pipeline information for this section was sourced from the soil, agricultural potential, land capability and land use study by De Castro and Brits CC (De Castro and Brits, 2016d) (Appendix J). The TSF and plant information was sourced from the soil, land use and land capability study conducted by Rehab Green CC (2007) as part of the approved EIA and EMP (2008), as the 2007 specialist study covered a study area that is also relevant to the new and extended infrastructure area. A small southern section of the return water dam falls outside of the area covered in 2007 but the sampling conducted by Knight Piesold for the TSF design confirmed that the soils in that section are the same as the soils falling within the TSF area. The baseline findings of the 2007 study are thus still deemed applicable for the purposes of this report.

RESULTS

The area where the expanded TSF and additional plant infrastructure is to be placed is characterised by gabbro and norite rock. Five soil forms are present where the new and extended infrastructure is to be placed; these include Oakleaf, Shortlands, Mispah, Arcadia and Valsrivier (Rehab Green, 2007); refer to Figure 7-3 and Figure 7-4.

Seven soil forms occur along the route of the pipeline; these include Oakleaf, Shortlands, Mispah, Arcadia, Valsrivier, Sepane and Glenrosa (De Castro and Brits, 2016d). Shortlands was the most dominant and the Mispah, Sepane and Glenrosa being the least (Figure 7-5).

A description of the soil forms and associated land capabilities is provided in Table 7.5 (plant area), Table 7.6 (TSF area) and Table 7.7 and Table 7.8 (pipeline route). The distribution of the soils is shown in Figure 7-3 for the plant area, Figure 7-4 for the TSF area and Figure 7-5 for the pipeline route.

TABLE 7.5:SOIL FORMS AND ASSOCIATED LAND CAPABILITIES IN THE PLANT AREA (REHAB GREEN, 2007)

Soil Unit	Dominant Soil Form and Family	Average Depth (mm)	Summarized Description of Dominant Soil Form	Land capability	Area (ha)	% Of Total Area
Sd1	Shortlands 2210	900-1500+	Deep, well drained, red, moderate to strongly fine structured, sandy clay loam soils with occasional surface stones and stone layers within the soil profile. Gently slopes (1.5%).	Arable	102.01	20.67
E-Sd1	Shortlands 2210	100-300	Highly eroded area with similar soil properties as unit Sd1.	Grazing	0.59	0.12
Sd2	Shortlands 2210	100-400	A shallow phase of soil unit Sd1 with similar soil properties but with shallow underlying weathered or hard rock.	Grazing	5.73	1.16
Sd-S	Shortlands 2210	100-300	Similar soil properties as unit Sd1 but with scattered to dense stone layers on the surface and in the soil profile. Stones are rounded river pebbles with 30-200 mm diameter.	Grazing	16.52	3.34
E-Sd-S	Shortlands 2210	0-300	Highly eroded drainage zone with similar soil properties as unit Sd-S. Approximately 90% of the topsoil has been lost.	Wilderness	10.31	2.09
Ar1	Arcadia 1100	900-1300	Deep, strongly structured black clay soils with shrink and expand properties underlain by highly weathered rock; Occurs on flat to gently slopes (1.5%).	Grazing	122.88	24.89
E-Ar1	Arcadia 1100	400-1300	Highly eroded area with similar soil properties as unit Ar1	Wilderness	15.97	3.24
Ar1-S	Arcadia 1100	900-1300	Deep, strongly structured black clay soils with shrink and expand properties underlain by highly weathered rock with scattered river pebbles on the surface and in the soil profile; flat to gently slopes (1.5-2.5%).	Grazing	70.30	14.24
Ar1-R	Arcadia 1100	700-1200	Deep, strongly structured black clay soils with shrink and expand properties underlain by highly weathered rock frequent small rock outcrops; flat to gently slopes (1.5%)	Grazing	0.31	0.06
Bo1	Bonheim 1110	600-900	Deep, brown to dark coloured, strongly structured, clay loam to clay soils with somewhat shrink and expand properties; Occurs on gently slopes (1.5%).	Grazing	13.11	2.65
Oa1	Oakleaf 1220	600-900	Deep, well-drained, reddish brown, weekly structured, sandy clay loam, colluvial soils, characterised by many, black manganese concretions in subsoil. Flat to gently slopes (1.5%).	Arable	58.77	11.90
E-Oa1	Oakleaf 1220	400-1300	A highly eroded drainage zone with similar soil properties as unit Oa1. Consists of a deep narrow cutting of which more than 90% of the topsoil has been lost.	Wilderness	4.30	0.87
E-Oa2	Oakleaf 1220	1500+	Very steep (10-38% slopes) and highly eroded northern edge of the Elandsriver with similar soil properties as unit Oa2.	Riparian	13.18	2.67
Va1	Valsrivier 1111	600-900	Deep, well-drained, brown, moderately structured, sandy clay loam to clay loam soils on gently slopes (1.5%).	Grazing	17.70	3.58
Va2	Valsrivier 1221	600-900	Deep, well-drained, brown, strongly structured, sandy clay loam to clay loam soils on mild slopes (2-3%).	Grazing	28.67	5.81
E-Va2	Valsrivier 1221	400-700	Highly eroded drainage zones with similar soil properties as unit Va2	Wilderness	10.08	2.05
R/Ms	Mispah 1100	0-300	Rock outcrops with 10-70% surface rock. Shallow, reddish brown, sandy clay loam soils within soil rock complex.	Wilderness	2.35	0.48
Exc	-	0	Excavated areas where all topsoil has been removed.	Wilderness	0.97	0.20
				TOTAL	493.75	100.02

TABLE 7.6: SOIL FORMS AND ASSOCIATED LAND CAPABILITIES IN THE TSF AREA (REHAB GREEN, 2007)

Soil Unit	Dominant Soil Form and Family	Average Depth (mm)	Summarized Description of Dominant Soil Form	Land capability	Area (ha)	% Of Total Area
Sd1	Shortlands 2210	900-1500+	Deep, well drained, red, moderate to strongly fine structured, sandy clay loam soils with occasional surface stones and stone layers within the soil profile. Gently slopes (1.5%).	Arable	480.15	61.17
E-Sd1	Shortlands 2210	100-300	Highly eroded area with similar soil properties as unit Sd1.	Grazing	6.79	0.87
Sd2	Shortlands 2210	100-400	A shallow phase of soil unit Sd1 with similar soil properties but with shallow underlying weathered or hard rock.	Grazing	8.29	1.06
Ar1	Arcadia 1100	900-1300	Deep, strongly structured black clay soils with shrink and expand properties underlain by highly weathered rock; Occurs on flat to gently slopes (1.5%).	Grazing	255.83	32.59
E-Ar1	Arcadia 1100	400-1300	Highly eroded area with similar soil properties as unit Ar1	Wilderness	2.86	0.36
Oa2	Oakleaf 1110	1500+	Very deep, well-drained, brown, weakly structured, sandy loam to loam alluvial soils deposits on gently slopes (1.5%).	Arable	13.97	1.78
E-Oa2	Oakleaf 1220	1500+	Very steep (10-38% slopes) and highly eroded northern edge of the Elandsriver with similar soil properties as unit Oa2.	Riparian	8.19	1.04
Va1	Valsrivier 1111	600-900	Deep, well-drained, brown, moderately structured, sandy clay loam to clay loam soils on gently slopes (1.5%).	Grazing	2.94	0.37
R/Ms	Mispah 1100	0-300	Rock outcrops with 10-70% surface rock. Shallow, reddish brown, sandy clay loam soils within soil rock complex.	Wilderness	3.80	0.48
Exc	-	0	Excavated areas where all topsoil has been removed.	Wilderness	2.16	0.27
				TOTAL	784.98	100.0

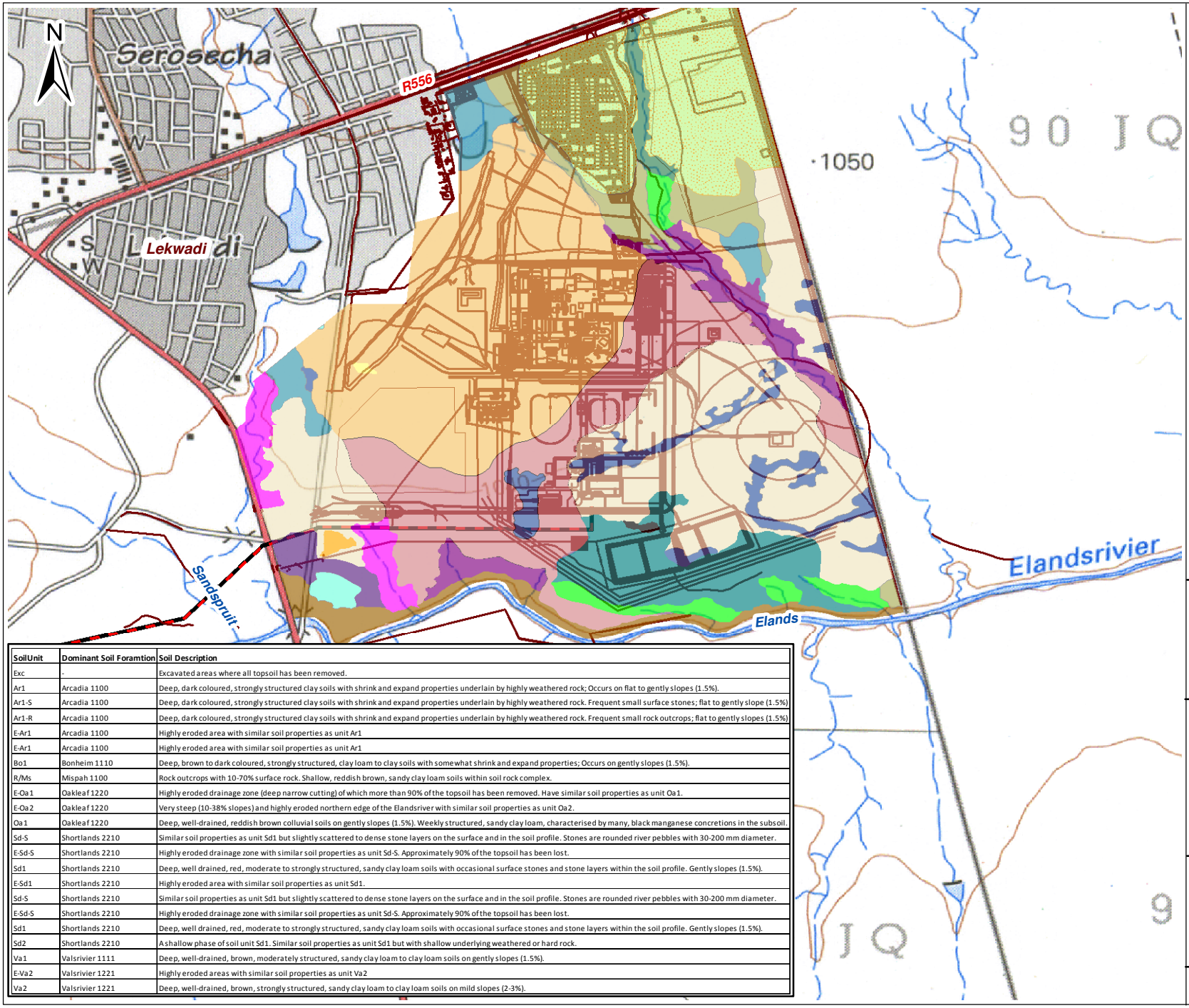
TABLE 7.7: SOIL FORMS AND ASSOCIATED LAND CAPABILITIES IN THE PIPELINE AREA (DE CASTRO AND BRITS, 2016D)

Dominant Soil Form	Average depth (mm)	Summarised description of dominant soil form	Land capability
Oakleaf	1200	The Oakleaf soil form comprises an orthic A-horizon that overlies a neocutanic B-horizon and unspecified material. The neocutanic B-horizon is characterised by colour variation due to clay movement and accumulation and exhibits an apedal or weakly developed structure.	Grazing and drainage complex
Shortlands	>1200	The Shortlands soil form comprises an orthic A-horizon that overlies a red structured B-horizon. The red structured B-horizon exhibits a uniform red colour that is not directly inherited from the rock, but is the result of the relative accumulation of iron oxides following mineral weathering. The horizon has strong rather than moderate blocky structure in the dry state.	Arable
Mispah	<300	The Mispah soil form comprises an orthic A-horizon on hard rock and is associated with the Glenrosa soil form and outcrops.	Grazing
Arcadia	150 -1200	The Arcadia soil form comprises a vertic A-horizon that overlies unspecified material. The vertic A-horizon has strongly developed structure and exhibits clearly visible, regularly occurring slickensides in some part of the horizon or in the transition to an underlying layer. The horizon has a high clay content, is dominated by smectite clay minerals and possess the capacity to swell and shrink markedly in response to moisture changes.	Arable

Dominant Soil Form	Average depth (mm)	Summarised description of dominant soil form	Land capability
Valsrivier	1500	The Valsrivier soil form comprises an orthic A-horizon which overlies a pedocutanic B-horizon and unconsolidated material without signs of wetness. The pedocutanic B-horizon has well developed angular or sub-angular structure with cutanic characteristics. Clay illuviation is common in these soils as is the presence of preferential water flow channels. These soils exhibit a sandy clay texture and are in many cases deeper than 150 cm. Calcium-magnesium carbonates nodules are present in the pedocutanic B-horizon and indicate a soil with neutral to slightly alkaline pH conditions. The calcium-magnesium carbonates nodules, in this case, is not a function of soil wetness (regular periods of inundation) but rather an indication of the parent material of the soils being of a basic igneous rock type.	Grazing (high potential) and Arable (low potential)
Sepane	500	The Sepane soil form comprises an orthic A-horizon which overlies a pedocutanic B-horizon and unconsolidated material with signs of wetness. The A- and B-horizons differ markedly in terms of texture and structure with the former being apedal and sandy while the latter is highly structured and sandy clay in texture. Manganese mottling and concretions are encountered at the transition of B- and C-horizons	Wetland / drainage line
Glenrosa	100 - 500	The Glenrosa soil form comprises an orthic A-horizon overlying a lithocutanic B-horizon. The lithocutanic B-horizon is a pedologically young horizon where clay illuviation has occurred. Soil depth ranges from 10 to 50 cm. These soils are encountered in the vicinity of rock outcrops.	Grazing

TABLE 7.8: AREA COMPRISED BY EACH SOIL FORM FOR THE PIPELINE ROUTE (DE CASTRO AND BRITS, 2016D)

Unit number	Soil Form (Soil Complex)	Area (ha)	% of total area
1	Valsrivier	11.2	14.93
2	Arcadia/Valsrivier	16.6	22.13
3	Glenrosa/Mispah	0.4	0.53
4	Glenrosa/Mispah/Valsrivier	0.6	0.80
5	Sepane/ Glenrosa/Mispah	0.1	0.13
6	Shortlands	42.9	57.20
7	Acadia	2.9	3.87
8	Oakleaf/Mispah/Valsrivier	0.3	0.40
Total		75	100



SoilUnit	Dominant Soil Foramtion	Soil Description
Exc	-	Excavated areas where all topsoil has been removed.
Ar1	Arcadia 1100	Deep, dark coloured, strongly structured clay soils with shrink and expand properties underlain by highly weathered rock; Occurs on flat to gently slopes (1.5%).
Ar1-S	Arcadia 1100	Deep, dark coloured, strongly structured clay soils with shrink and expand properties underlain by highly weathered rock. Frequent small surface stones; flat to gently slope (1.5%)
Ar1-R	Arcadia 1100	Deep, dark coloured, strongly structured clay soils with shrink and expand properties underlain by highly weathered rock. Frequent small rock outcrops; flat to gently slopes (1.5%).
E-Ar1	Arcadia 1100	Highly eroded area with similar soil properties as unit Ar1
E-Ar1	Arcadia 1100	Highly eroded area with similar soil properties as unit Ar1
Bo1	Bonheim 1110	Deep, brown to dark coloured, strongly structured, clay loam to clay soils with somewhat shrink and expand properties; Occurs on gently slopes (1.5%).
R/Ms	Mispah 1100	Rock outcrops with 10-70% surface rock. Shallow, reddish brown, sandy clay loam soils within soil rock complex.
E-Oa1	Oakleaf 1220	Highly eroded drainage zone (deep narrow cutting) of which more than 90% of the topsoil has been removed. Have similar soil properties as unit Oa1.
E-Oa2	Oakleaf 1220	Very steep (10-38% slopes) and highly eroded northern edge of the Elandsriver with similar soil properties as unit Oa2.
Oa1	Oakleaf 1220	Deep, well-drained, reddish brown colluvial soils on gently slopes (1.5%). Weekly structured, sandy clay loam, characterised by many, black manganese concretions in the subsoil.
Sd-S	Shortlands 2210	Similar soil properties as unit Sd1 but slightly scattered to dense stone layers on the surface and in the soil profile. Stones are rounded river pebbles with 30-200 mm diameter.
E-Sd-S	Shortlands 2210	Highly eroded drainage zone with similar soil properties as unit Sd-S. Approximately 90% of the topsoil has been lost.
Sd1	Shortlands 2210	Deep, well drained, red, moderate to strongly structured, sandy clay loam soils with occasional surface stones and stone layers within the soil profile. Gently slopes (1.5%).
E-Sd1	Shortlands 2210	Highly eroded area with similar soil properties as unit Sd1.
Sd-S	Shortlands 2210	Similar soil properties as unit Sd1 but slightly scattered to dense stone layers on the surface and in the soil profile. Stones are rounded river pebbles with 30-200 mm diameter.
E-Sd-S	Shortlands 2210	Highly eroded drainage zone with similar soil properties as unit Sd-S. Approximately 90% of the topsoil has been lost.
Sd1	Shortlands 2210	Deep, well drained, red, moderate to strongly structured, sandy clay loam soils with occasional surface stones and stone layers within the soil profile. Gently slopes (1.5%).
Sd2	Shortlands 2210	A shallow phase of soil unit Sd1. Similar soil properties as unit Sd1 but with shallow underlying weathered or hard rock.
Va1	Valsrivier 1111	Deep, well-drained, brown, moderately structured, sandy clay loam to clay loam soils on gently slopes (1.5%).
E-Va2	Valsrivier 1221	Highly eroded areas with similar soil properties as unit Va2
Va2	Valsrivier 1221	Deep, well-drained, brown, strongly structured, sandy clay loam to clay loam soils on mild slopes (2-3%).

Legend

- Mine Layout
- Proposed Pipeline

Soil Types

Ar1	E-Va2
Ar1-R	Exc
Ar1-S	Oa1
Bo1	R/Ms
E-Ar1	Sd-S
E-Oa1	Sd1
E-Oa2	Sd2
E-Sd-S	Va1
E-Sd1	Va2

Data Source: Rehab Green CC (2007)

Kilometers

0 0.5 1

Scale: 1:24 000 @ A4

SA Grid WGS84

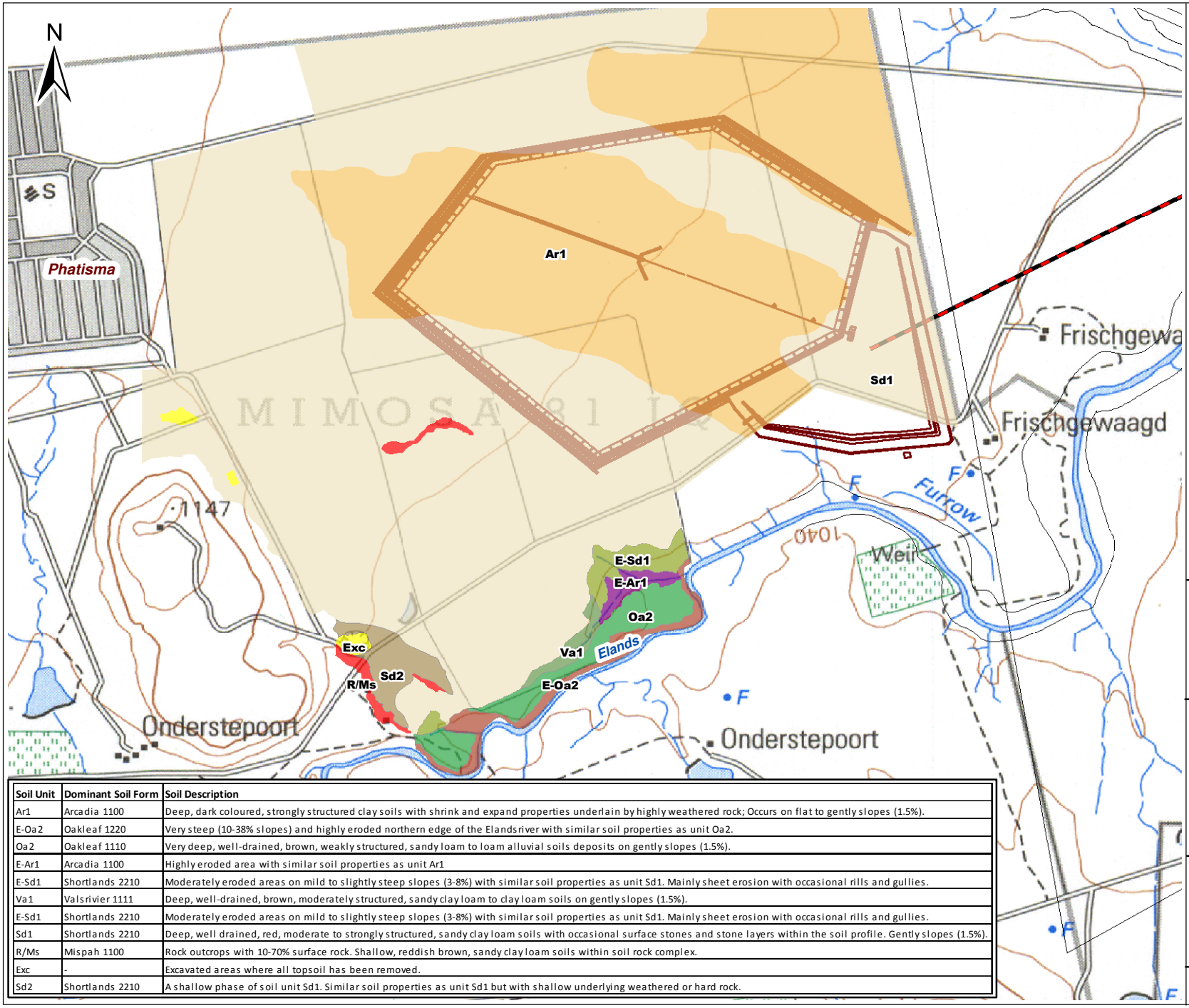
BAKUBUNG PLATINUM MINE (PTY) LTD

Figure 7.3

Soil Types in the Plant Area

SLR Consulting (Africa) (Pty) Ltd
P O Box 1596,Cramerview, 2060, South Africa
Tel: +27 (11) 467-0945 Fax: +27 (11) 467-0978

710.23001.00006 | March 2016



Soil Unit	Dominant Soil Form	Soil Description
Ar1	Arcadia 1100	Deep, dark coloured, strongly structured clay soils with shrink and expand properties underlain by highly weathered rock; Occurs on flat to gently slopes (1.5%).
E-Oa2	Oakleaf 1220	Very steep (10-38% slopes) and highly eroded northern edge of the Elandsriver with similar soil properties as unit Oa2.
Oa2	Oakleaf 1110	Very deep, well-drained, brown, weakly structured, sandy loam to loam alluvial soils deposits on gently slopes (1.5%).
E-Ar1	Arcadia 1100	Highly eroded area with similar soil properties as unit Ar1
E-Sd1	Shortlands 2210	Moderately eroded areas on mild to slightly steep slopes (3-8%) with similar soil properties as unit Sd1. Mainly sheet erosion with occasional rills and gullies.
Va1	Valsrivier 1111	Deep, well-drained, brown, moderately structured, sandy clay loam to clay loam soils on gently slopes (1.5%).
E-Sd1	Shortlands 2210	Moderately eroded areas on mild to slightly steep slopes (3-8%) with similar soil properties as unit Sd1. Mainly sheet erosion with occasional rills and gullies.
Sd1	Shortlands 2210	Deep, well drained, red, moderate to strongly structured, sandy clay loam soils with occasional surface stones and stone layers within the soil profile. Gently slopes (1.5%).
R/Ms	Mispah 1100	Rock outcrops with 10-70% surface rock. Shallow, reddish brown, sandy clay loam soils within soil rock complex.
Exc	-	Excavated areas where all topsoil has been removed.
Sd2	Shortlands 2210	A shallow phase of soil unit Sd1. Similar soil properties as unit Sd1 but with shallow underlying weathered or hard rock.

Legend

Mine Layout

Proposed Pipeline

Soil Types

- Ar1
- E-Ar1
- E-Oa2
- E-Sd1
- Exc
- Oa2
- R/Ms
- Sd1
- Sd2
- Va1

Data Source: Rehab Green CC (2007)

Kilometers

0 0.5 1

Scale: 1:25 000 @ A4

SA Grid WGS84

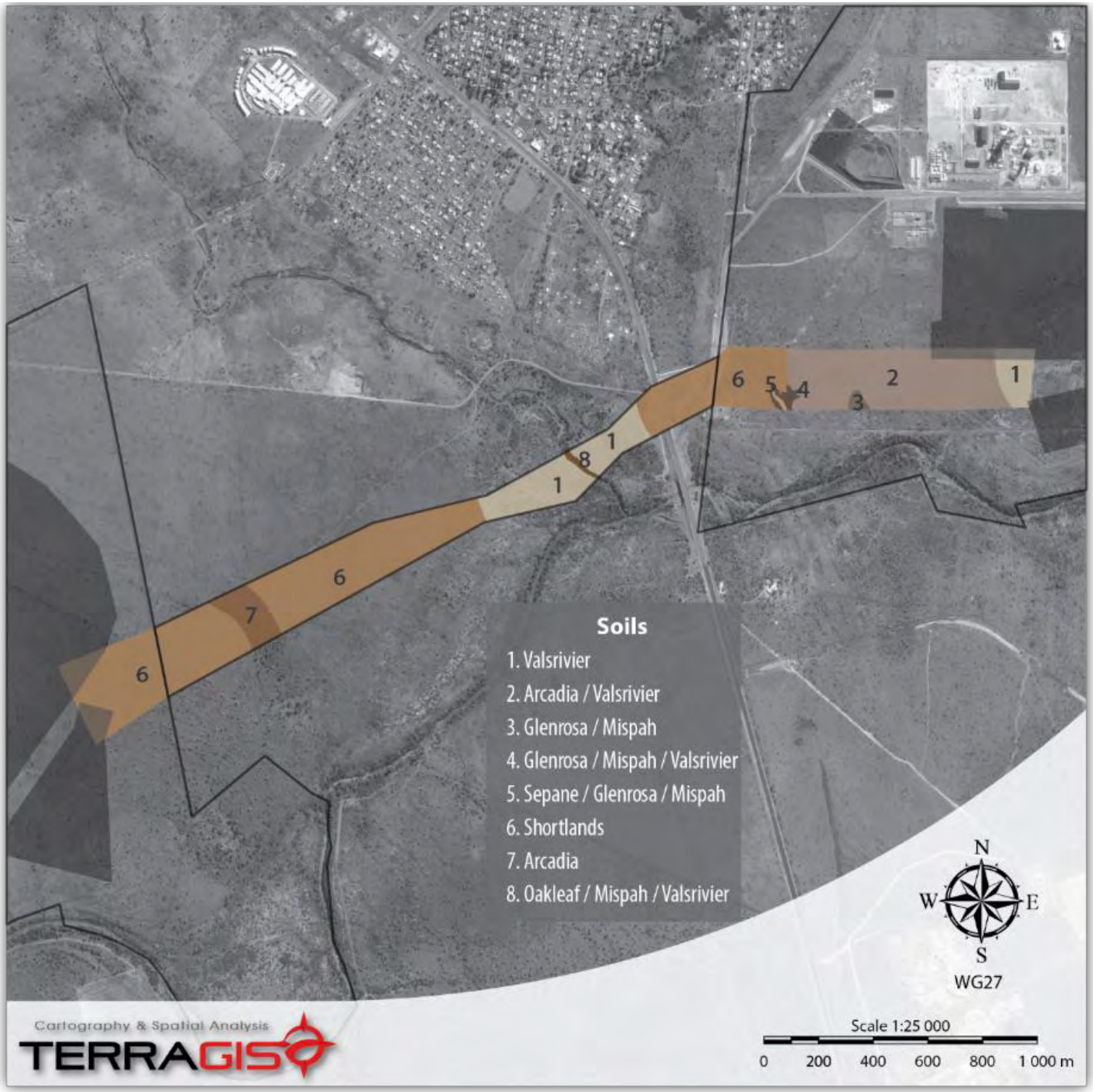
BAKUBUNG PLATINUM MINE (PTY.) LTD

Figure 7.4

Soils Types in the TSF Area

SLR Consulting (Africa) (Pty) Ltd
P O Box 1596,Cramerview, 2060, South Africa
Tel: +27 (11) 467-0945 Fax: +27 (11) 467-0978

710.23001.00006 | March 2016


6
5
4
3
2
1
1
8
1
6
7
6
Soils
1. Valsrivier
2. Arcadia / Valsrivier
3. Glenrosa / Mispah
4. Glenrosa / Mispah / Valsrivier
5. Sepane / Glenrosa / Mispah
6. Shortlands
7. Arcadia
8. Oakleaf / Mispah / Valsrivier
N
W
E
S
WG27
Cartography & Spatial Analysis
TERRAGIS
Scale 1:25 000
0
200
400
600
800
1 000 m

Soil chemical properties

The general chemical properties of the soils located within the study area are discussed below.

From the 2007 soil assessment, the average pH values of the black clay soils (Arcadia form) varied from 7.1-8.4 indicating neutral to fairly alkaline conditions. Free lime was not found in the soil matrix during the field assessment although small lime nodules were frequently found at depths below 700 mm. The average pH values of the red, fine structured soils (Shortlands form) varied from 6.0-6.9 indicating slightly acid to neutral conditions. The average pH values of alluvial and colluvial soils along the Elands River (Oakleaf and Valsrivier forms) varied from 6.5-8.1, which indicated slightly acid to fairly alkaline conditions.

The average phosphorus values varied from 0.09-4.38 mg/kg indicating very low concentrations. The average cation values for K, Ca and Mg indicated moderate to high concentrations, thus moderate to high fertility. The average Na concentrations and calculated exchangeable sodium percentage was low and indicated the absence of sodic soils. The cation exchange capacity (CEC) values of the black clay soils were high (27.5-57.2 cmol(+)/kg) and indicated fairly unstable conditions which can lead to serious soil erosion in sensitive landscapes. The CEC values of the other soils varied from 6.2-18.2 cmol(+)/kg) which is fairly low to moderate and indicated low to moderate erodibility.

The 2016 assessment indicated that the soils of the study area do have the capacity to buffer chemical change. The soils are high in 2:1 swelling-shrinking clays which have the capacity to sorb high levels of cationic heavy metals, especially under near neutral to slightly alkaline pH values and oxidising conditions. However, these soils can reach a saturation point in terms of metal sequestration.

Sensitivity

High potential arable land, drainage lines and wetland soils prone to erosion are considered by the specialists to be sensitive soil resources. For the plant and TSF areas, the sensitive landscapes are near and around the drainage lines and the Eland River. For the pipeline route, the areas allocated as 3, 4 and 6 (Figure 7-5) were considered as having high sensitivity.

Land Use

The pipeline and TSF area is used for grazing. BPM is currently allowing cattle to graze within the TSF footprint until such time as construction of the TSF commences. Construction has already started at the plant area and thus is used for mining related activities. The surrounding land uses include mining, grazing, cultivation, natural vegetation, and residential (formal and informal).

Land capability and Agricultural potential

With reference to Table 7.5 and Table 7.6, four land capability classes were identified for the plant and TSF areas; these include arable, grazing, riparian and wilderness. At the TSF site, arable was the dominant land capability and at the plant area grazing was dominant. Along the pipeline route Table 7.7, the land capability includes arable, grazing and riparian areas (drainage complexes). Soils were grouped into the following land