



Sibanye-Stillwater: Western Platinum (Pty) Ltd
K4 Shaft Parking Area
Draft Basic Assessment Report
DMRE Mining Right Reference Number: MR106

August 2022

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Sibanye-Stillwater: Western Platinum (Pty) Ltd

K4 Shaft Parking Area

Draft Basic Assessment Report

August 2022

Project Ref: 005 - 1020937

Prepared by: Suzanne van Rooy



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VERSION CONTROL

Alta van Dyk Environmental cc

Version: Draft

Approved by: Alta van Dyk

Signed:

Position: Environmental Specialist

Date: August 2022

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ABBREVIATIONS

AEL	Air Emissions Licence
AVDE	Alta van Dyk Environmental Consultants
BAR	Basic Assessment Report
BIL	Background Information Letter
CARA	Conservation of Agricultural Resources Act
CRR	Comment and Response Report
DEM	Digital Elevation Model
DMRE	Department of Mineral Resources and Energy
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioners Association of South Africa
EIA	Environmental Impact Assessment
HGM	Hydrogeomorphic
HIA	Heritage Impact Assessment
IS	Importance and Sensitivity
MAP	Mean Annual Precipitation
MAPE	Mean Annual Potential Evapotranspiration
masl	Metres above sea level
MPRDA	Mineral and Petroleum Resources Development Act
NEM:AQA	National Environmental Management: Air Quality Act
NEM:BA	National Environmental Management: Biodiversity Act
NEM:PAA	National Environmental Management: Protected Areas Act
NEM:WA	National Environmental Management: Waste Act
NEMA	National Environmental Management Act
NFA	National Forests Act
NHRA	National Heritage Resources Act
NWA	National Water Act
NWBSP	North West Biodiversity Sector Plan
PES	Present Ecological State
PGM	Platinum Group Metals
S&EIR	Scoping & Environmental Impact Reporting
SACNASP	South African Council for Natural Scientific Professions
SANBI	South African National Biodiversity Institute
SAWS	South African Weather Services
SCC	Species of Conservation Concern

SPLUMA	Spatial Planning and Land Use Management Act
SWSA	Strategic Water Source Areas
UG2	Upper Group 2
WMA	Water Management Area

1 INTRODUCTION AND BACKGROUND

1.1 Background

Sibanye-Stillwater owns and operates the Marikana Operations located near Marikana Town, in the North West Province. The Marikana Operations are divided into Western Platinum (Pty) Ltd and Eastern Platinum (Pty) Ltd, each with its own set of mining rights. The Marikana Operations are currently mining both the Merensky and Upper Group 2 Reef (UG2) for Platinum Group Metals (PGMs).

The K4 Shaft is included in Western Platinum Mine's approved Final Environmental Impact Assessment and Environmental Management Programme (approved on 21 October 2014, Reference Number NW30/5/1/2/3/2/2/105 EM). K4 Shaft is currently not operational and on care and maintenance. Sibanye-Stillwater is planning to ramp up operation in the near future. In order to accommodate additional mine personnel, the shaft is planning to upgrade its mine entrance and develop an additional parking area. The proposed upgrades include provision for new access roads for taxis, busses, and employee vehicles. Planned structures include a refuse area, hawker stall, ablution facility, covered walkways and street furniture. The parking area will be covered, and brick paved. Refer to Figure 1:1 of the regional locality of the proposed project.

1.2 Purpose of the Report

The Draft Basic Assessment Report (BAR) has been compiled in support of the environmental authorisation process required before the proposed project may commence. The Draft BAR documents the steps undertaken during the basic assessment environmental authorisation process to assess the significance of impacts and determine measures to mitigate the potential negative impacts identified and enhance the benefits (or positive impacts) of the proposed project. The report presents the findings of the impact assessment and a description of the public participation undertaken that forms part of the Basic Assessment process. More specifically, the objectives of this BAR are to:

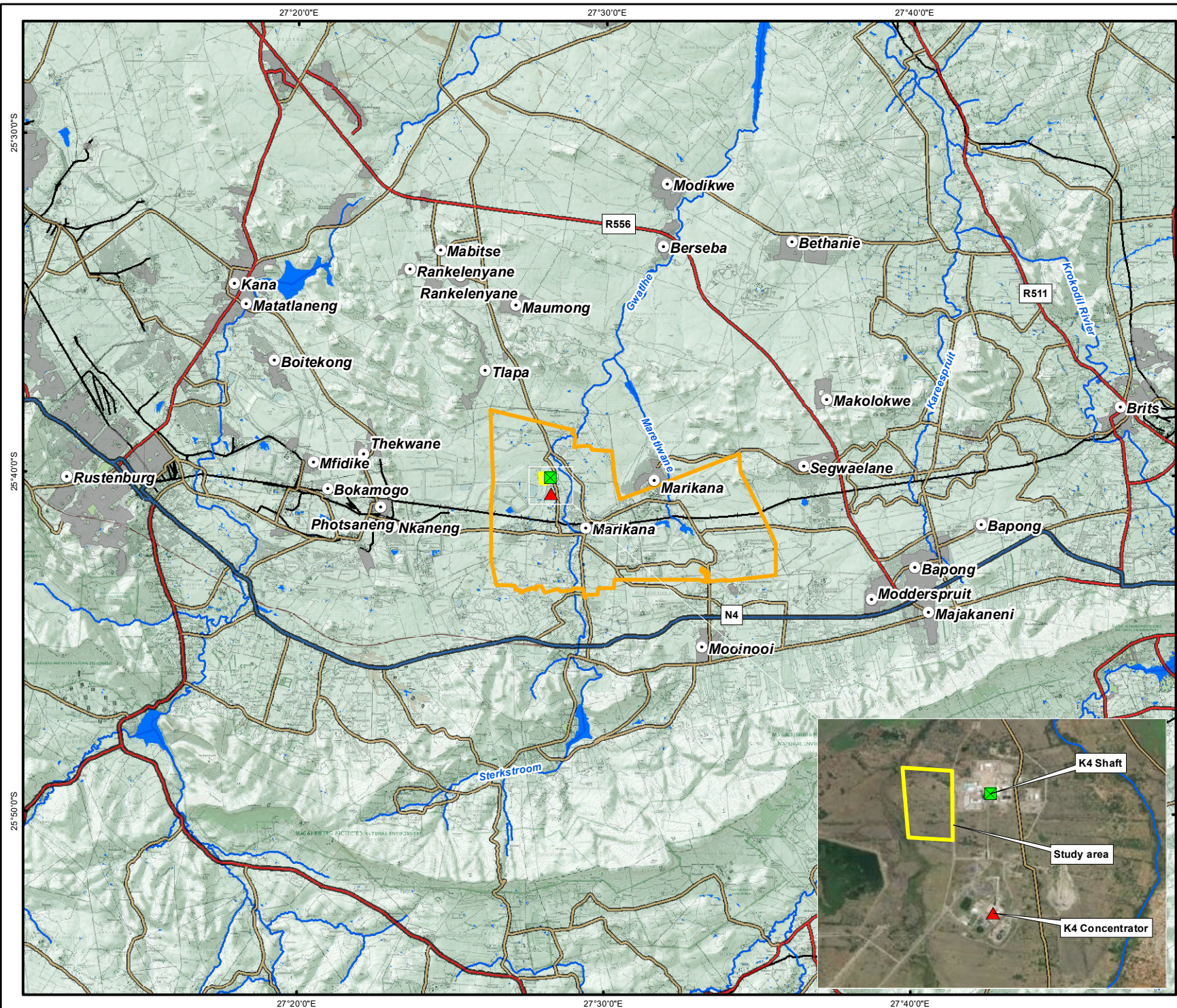
- Inform the stakeholders about the proposed project and the basic assessment process followed;
- Obtain contributions from stakeholders (including the applicant, consultants, relevant authorities and the public) and ensure that all issues, concerns and queries raised are fully documented and addressed;
- Assess in detail the potential environmental and socio-economic impacts of the project;
- Identify environmental and social mitigation measures to address the impacts assessed; and
- Produce a BAR that will assist the competent authority, the North West Department of Mineral Resources and Energy (DMRE), to decide whether (and under what conditions) to authorise the proposed project.

1.3 Applicant

The applicant for the project is Western Platinum (Pty) Limited. The details of the applicant are shown in Table 1:1.

Table 1:1 Details of the applicant

Applicant	Western Platinum (Pty) Ltd
Contact person	Mandy Jubileus
Postal Address	Private Bag X508 Marikana, North West Province 0284
Telephone number:	014 571 2000
Fax number:	014 571 2037
Email address	mandy.jubileus@sibanyestillwater.com

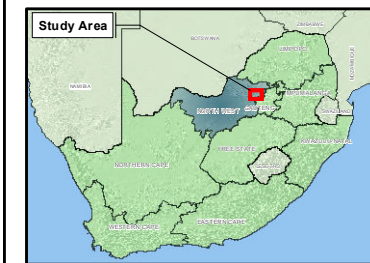


Legend

- MR106 (mining right area)
- Study area
- K4 Concentrator
- K4 Shaft
- Towns
- Buildings/Ruins

- National Freeway Route
- Arterial Route
- Main Road
- Secondary Road
- Railway
- Contours
- Rivers
- Cadastral Farms

- Built Up Areas
- Open Areas
- Water Area



SCALE: 1: 280 000



TITLE:

Locality map of K4 Shaft Parking Area Project

CLIENT:

Sibanye-Stillwater

DATE: Mar 2022

PROJECT: K4_SHAFT_PA

DRAWN: THURLOW MAPPING

APPROVED: KP

MAP

K4_SHAFT_PA_REV1.mxd

REV:

0

Alta van Dyk Environmental Consultants cc (2011/059764/23)

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Cell: 082 782 4005



Projection: Transverse Mercator CM: 27 Datum: WGS 84
Source: Chief Directorate National Geo-Spatial Information,
NGI_TOPO50_Mosaic_latest_Editions_Jan-2017.ecw
DWA - NGA Geosites Inset: ESRI Data and Maps

SIZE:

A4

1.4 Details of the Environmental Assessment Practitioner

Table 1:2 provides the details of the Environmental Assessment Practitioner (EAP) for the project.

Table 1:2: Details of the EAP

Environmental Assessment Practitioner	Suzanne van Rooy
Company	Alta van Dyk Environmental Consultants cc (AVDE)
Qualifications	MPhil Environmental Management (University of Stellenbosch)
Professional Registrations	Pr.Sci.Nat (Reg nr.400378/11) EAPASA Registered EAP (Ref 2019/1079)
Postal Address	Postnet Suite # 745 Private Bag X 1007 Lyttelton 0140
Telephone number:	012 940 9457
Fax number:	086 634 3967
Email address	suzanne@avde.co.za

1.4.1 Qualifications of the EAP

Suzanne van Rooy's qualifications include the following:

- Bachelor of Science in Geography and Zoology;
- Bachelor of Science with Honours in Aquatic Health; and
- Master of Philosophy in Environmental Management.

1.4.2 Summary of the EAP's experience

Suzanne van Rooy holds a Master's Degree in Environmental Management from the University of Stellenbosch. In terms of professional affiliation, Suzanne is registered with the South African Council for Natural Science Professions (SACNASP - 400378/11) in Environmental Science field of practice, as well as a registered EAP with the Environmental Assessment Practitioners Association of South Africa (EAPASA). Suzanne's expertise is in the mining industry sector, focussing on Environmental Impact Assessments, Water Use Licence Applications, environmental performance assessments, water use licence audits, public participation and closure cost assessments. Her involvement in such projects varies from project management and co-ordination to the compilation and review of technical and environmental documents and reports. She has been involved in environmental authorisations for both underground and open cast mining operations, as well as the associated activities such as waste disposal facilities, conveyor routes, access roads, pollution control and other dams, undermining of wetlands and river crossings. She has also conducted various environmental feasibility reporting for potential mining projects.

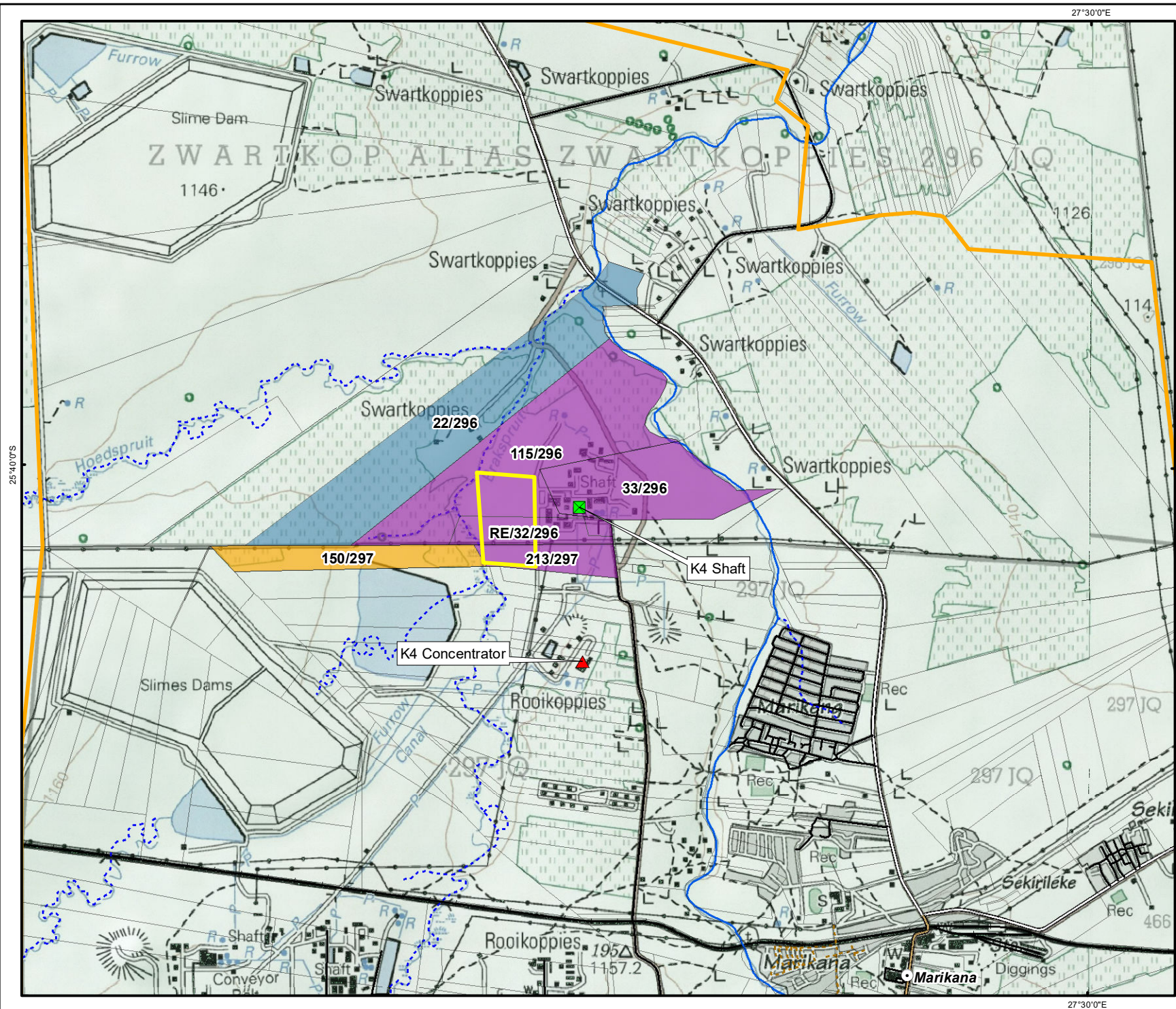
Refer to Appendix A for the Curriculum Vitae of the EAP.

1.5 Locality

The proposed K4 Shaft parking area is located approximately 7 km west of Marikana Town, within Rustenburg Local Municipality in the North West Province. The proposed parking area is located on portions 15 and 32 of the farm Zwartkoppies 296 JQ. Table 1:3 outlines the details relating to the location of the proposed project and Figure 1:2 shows the properties and relevant landowners.

Table 1:3 Project location details

Site specific details	Description	
Magisterial district	Rustenburg Local Municipality Bojanala Platinum District Municipality	
Distance and direction from nearest town	7km west of Marikana	
Ward number	31	
Properties affected	Farm name	Landowner
	Zwartkoppies 296 JQ Portion 115	Western Platinum Limited
	Zwartkoppies 296 JQ Portion 32	Western Platinum Limited
Adjacent properties	Zwartkoppies 296 JQ portion 22	Louwrens Robinson
	Zwartkoppies 296 JQ portion 33	Western Platinum Limited
	Rooikoppies 297 JQ portion 150	Western Platinum (Pty) Ltd
	Rooikoppies 297 JQ portion 213	Western Platinum Limited
SG code	Zwartkoppies 296 JQ Portion 15: T0JQ00000000029600115	
	Zwartkoppies 296 JQ Portion 32: T0JQ00000000029600032	
Site coordinates for proposed parking area	Latitude	Longitude
	25°40'8.06"S	27°28'1.57"E

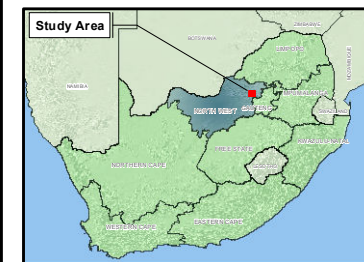


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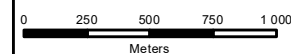
- MR106 (mining right area)
- Study area
- ▲ K4 Concentrator
- K4 Shaft
- Towns
- Secondary Road
- Tertiary Road
- Street/Road
- Track
- Railway
- Perennial River
- Non-Perennial River

Landowner Details

- Western Platinum (Pty) Ltd
- Western Platinum Limited
- Louwrens Robinson
- Other Farm Portions



SCALE: 1: 280 000



TITLE:

Figure 1:2 Landowner map for the K4 Shaft parking area project

CLIENT:

Sibanye-Stillwater

DATE: June 2022 PROJECT: K4_SHAFT_PA

DRAWN: THURLOW MAPPING APPROVED: KP

MAP LAND_OWNER_K4_SHAFT_PA_REV1.mxd REV: 0

Alta van Dyk Environmental Consultants cc (2011/059764/23)

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Cell: 082 782 4005



Projection: Transverse Mercator CM: 27 Datum: WGS 84
Source: Chief Directorate National Geo-Spatial Information,
NGI TOPOS0_Mosaic_latest_Editions_Jan-2017.ecw
DWA - NGA Geosites Inset: ESRI Data and Maps

SIZE:
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1.6 Site sensitivity verification

In accordance with the Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, this Site Sensitivity Verification has been compiled to provide a rationale for the specialist studies undertaken as part of the environmental authorisation process and appended to the Draft BAR. This section addresses the findings of the Screening Tool Report (Appendix B), generated from the National Web Based Environmental Screening Tool, and provides a motivation for the various specialist studies identified to be conducted.

As per the Screening Tool Report, the proposed site is located within the following areas of sensitivity:

- Agriculture theme: High sensitivity
- Animal species theme: Medium sensitivity
- Aquatic biodiversity theme: Very high sensitivity
- Archaeological and cultural heritage theme: Low sensitivity
- Civil aviation theme: Low sensitivity
- Defence theme: Low sensitivity
- Palaeontology theme: Medium sensitivity
- Plant species theme: Low sensitivity
- Terrestrial biodiversity theme: Very high sensitivity

Other than the specialist studies that have been commissioned and the impacts identified and assessed, the other specialist studies suggested by the Screening Tool Report are not considered as required for this study. A motivation is provided in Table 1:4.

Table 1:4 Specialist studies required as per the Screening Tool Report and relevant motivations

Specialist study	Included/not included	Motivation
Landscape/Visual Impact Assessment	Not included	Currently, it is not deemed necessary to undertake a landscape/visual impact assessment. The development will take place adjacent to an existing shaft area and is located on the property of the applicant.
Archaeological and cultural heritage impact assessment	Included	A heritage impact assessment was undertaken by Beyond Heritage. Refer to Appendix E4.
Palaeontology Impact Assessment	Not included	Based on the South African Heritage Resources Agency's paleontological sensitivity map, the area is of insignificant paleontological sensitivity and no further studies are required. Refer to Section 7.7 of this Draft BAR.
Terrestrial Biodiversity Impact Assessment	Included	A terrestrial biodiversity assessment was undertaken by The Biodiversity Company. Refer to Appendix E2.

Specialist study	Included/not included	Motivation
Aquatic Biodiversity Impact Assessment	Included	A wetland assessment was undertaken by The Biodiversity Company. Refer to Appendix E3.
Socio-Economic Assessment	Not included	The positive and negative socio-economic impacts of the proposed development are assessed in the Draft BAR. It is not deemed necessary that a separate Socio-Economic Assessment be undertaken at this time.
Plant Species Assessment	Not included	Included in the Terrestrial Biodiversity Impact Assessment (Appendix E2).
Animal Species Assessment	Not included	Included in the Terrestrial Biodiversity Impact Assessment (Appendix E2).

1.7 Specialists

Table 1:5 details the specialist studies undertaken for the proposed K4 Shaft Parking Area project.

Table 1:5 Specialist studies undertaken for the proposed K4 Shaft parking area project

Specialist study	Specialist	Expertise of specialist
Heritage Impact Assessment (HIA)	Jaco van der Walt <i>Beyond Heritage</i>	MA Archaeology
Storm Water Management Plan	Deon van der Merwe <i>Hydrological Environmental Engineering Solutions</i>	B. Eng (Agric), MBL <i>Pr Eng</i>
Wetland assessment	Ivan Baker <i>The Biodiversity Company</i>	MSc Environmental Science and Hydropedology <i>Pr.Sci.Nat</i>
Terrestrial Biodiversity Assessment	Michael Schrenk <i>The Biodiversity Company</i>	BSc Civil and Environmental Engineering
Agricultural Potential Assessment	Ivan Baker <i>The Biodiversity Company</i>	MSc Environmental Science and Hydropedology <i>Pr.Sci.Nat</i>
Hydropedological Assessment	Ivan Baker <i>The Biodiversity Company</i>	MSc Environmental Science and Hydropedology <i>Pr.Sci.Nat</i>

1.8 Assumptions, qualifications and limitations

The assumptions and limitations pertaining to this Draft BAR are presented in Table 1:6 below.

Table 1:6: Qualifications, assumptions and limitations

Aspect	Qualifications, assumptions and limitation
General	It is assumed that AVDE has been provided with all relevant project information and that it was correct and valid at the time it was provided. There will be no significant changes to the project description or surrounding environment between the completion of the Basic Assessment process and

Aspect	Qualifications, assumptions and limitation
	<p>implementation of the proposed project that could substantially influence findings and recommendations with respect to mitigation and management.</p> <p>The assessment of the mitigated scenario assumes that the design controls and recommended mitigation would be implemented adequately.</p> <p>Specialist information was obtained from previous specialist studies undertaken for the LWUA pipeline and the Maintenance Management Plan. Specialist studies were undertaken for the project were a heritage impact assessment, the floodline delineation and geotechnical assessment.</p>
Soils, land use and land capability	The handheld GPS used potentially could have inaccuracies up to 5 m. Any and all delineations therefore could be inaccurate within 5 m.
Terrestrial Biodiversity	<p>All datasets accessed and utilised for this assessment are considered to be representative of the most recent and suitable data for the intended purposes;</p> <p>The handheld GPS utilised for the fieldwork had a maximum accuracy of 5 m. As such, any features spatially logged and mapped as part of this report may be offset by approximately 5 m; and</p> <p>Only a single season survey was conducted for this assessment, and this constitutes a wet season survey.</p>
Wetland	The GPS used for water resource delineations is accurate to within five meters. Therefore, the wetland delineation plotted digitally may be offset by at least five meters to either side.
Hydropedological assessment	<p>Only the slopes and sub-quaternary basins affected by the proposed development have been assessed.</p> <p>The hydropedological assessment should not replace any ground or surface hydrology assessments, but rather supplement these studies.</p> <p>It has been assumed that the extent of the development area provided by the responsible party is accurate.</p>
Heritage	<p>The authors of the HIA acknowledge that their brief literature review is not exhaustive on the literature of the area. Due to the nature of heritage resources and pedestrian surveys, the possibility exists that some features or artefacts may not have been discovered/recorded and the possible occurrence of graves and other cultural material cannot be excluded. Their report only deals with the footprint area of the proposed development and consisted of non-intrusive surface surveys. The HIA did not assess the impact on medicinal plants and intangible heritage as it is assumed that these components would have been highlighted through the public consultation process if relevant. It is possible that new information could come to light in future, which might change the results of this Impact Assessment.</p> <p>Due to the altered character of the study area and the often-ephemeral nature of heritage resources, the possibility of discovery of heritage resources during the construction phase cannot be excluded. This limitation is successfully mitigated with the implementation of a chance find procedure and monitoring of the study area by the environmental control officer.</p>
Cumulative assessment	All identified impacts are considered in a cumulative manner such that the impacts of the current activities on and surrounding the site and those potentially associated with the proposed project are discussed and assessed together. The baseline conditions reflect the effects of these current activities.

1.9 Content of the Draft Basic Assessment Report

The Draft BAR has been compiled in accordance with the requirements of Government Notice R982 dated 4 December 2014 (as amended), Section 3 of Appendix I. These requirements and the sections of this Draft BAR in which they are addressed, are summarised in Table 1:7.

Table 1:7: Requirements of the BAR

No	Description	Reference
3 (1)	A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include-	
a)	details of:	
	(i) the EAP who prepared the report; and	Section 1.4
	(ii) the expertise of the EAP, including a Curriculum Vitae;	Section 1.4 Appendix A
b)	The location of the activity, including:	
	(i) the 21-digit Surveyor General code of each cadastral land parcel	Table 1:3
	(ii) where available, the physical address and farm name;	Table 1:3
	(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties.	N/A
c)	A plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale	Figure 1:1 Figure 4:1
d)	A description of the scope of the proposed activity, including:	
	(i) All listed and specified activities triggered and being applied for	Table 5:2
	(ii) A description of the associated structures and infrastructure related to the development	Section 4
e)	A description of the policy and legislative context within which the development is proposed including	
	(i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report;	Table 5:1
	(ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	Table 5:1
f)	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 2
g)	A motivation for the preferred site, activity and technology alternative	Section 3
h)	A full description of the process followed to reach the proposed development footprint within the approved site, including:	
	(i) Details of all the alternatives considered;	Section 3
	(ii) Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 6
	(iii) 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	Appendix C1
	(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 7

No	Description	Reference
	(v) 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 or mitigated	Table 8:3 Table 8:4 Table 8:5
	(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives	Section 8.1
	(vii) 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	Table 8:3 Table 8:4 Table 8:5
	(viii) The possible mitigation measures that could be applied and level of residual risk;	Table 8:3 Table 8:4 Table 8:5
	(ix) The outcome of the site selection matrix	Section 3
	(x) If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	N/A
	(xi) A concluding statement indicating the preferred alternatives, including preferred location of the activity	Section 3
i)	A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity, including:	
	(i) A description of all environmental issues and risks that were identified during the environmental impact assessment process	Section 8.2 Table 8:3 Table 8:4 Table 8:5
	(ii) 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 8.2 Table 8:3 Table 8:4 Table 8:5
j)	An assessment of each identified potentially significant impact and risk, including:	
	(i) Cumulative impacts	Section 8.2 Table 8:3 Table 8:4 Table 8:5
	(ii) The nature, significance and consequences of the impact and risk	
	(iii) The extent and duration of the impact and risk	
	(iv) The probability of the impact and risk occurring	
	(v) The degree to which the impact and risk can be reversed	
	(vi) The degree to which the impact and risk may cause irreplaceable loss of resources; and	
	(vii) The degree to which the impact and risk can be avoided, managed or mitigated	
k)	Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	Section 10.2
l)	An environmental impact statement which contains-	
	(i) A summary of the key findings of the environmental impact assessment	Section 10.1
	(ii) A map at an appropriate scale which superimposes the proposed activity and its associated structures and the infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers	Figure 10:1

No	Description	Reference
	(iii) A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives	Table 10:1
m)	Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr;	Section 10
n)	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 10
o)	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Table 1:6
p)	A 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 10:5
q)	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 10:4
r)	An undertaking under oath or affirmation by the EAP in relation to (i) The correctness of the information provided in the reports (ii) The inclusion of comments and inputs from stakeholders and I&APs (iii) The inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties; and	Section 11
s)	Where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	Section 9
t)	Where applicable, any specific information required by the competent authority; and	N/A
u)	Any other matter required in terms of section 24(4)(a) and (b) of the Act.	N/A

2 PROJECT MOTIVATION

2.1 About Sibanye-Stillwater

Sibanye-Stillwater is a multinational mining and metals processing Group with a diverse portfolio of mining and processing operations and projects and investments across five continents. The Group is also one of the foremost global Platinum Group Metals (PGMs) auto catalytic recyclers and has interests in leading mine tailings retreatment operations.

Sibanye-Stillwater has established itself as one of the world's largest primary producers of platinum, palladium, and rhodium and is also a top tier gold producer. It produces other PGMs, such as iridium and ruthenium, along with chrome, copper and nickel as by-products. The Group has recently begun to build and diversify its asset portfolio into battery metals mining and processing and is increasing its presence in the circular economy by growing and diversifying its recycling and tailings reprocessing operations globally (Sibanye-Stillwater 1, 2022).

2.2 Use of Platinum Group Metals

The PGMs, consist of platinum, palladium, rhodium, iridium, ruthenium and osmium. They have similar physical and chemical properties and tend to occur, in varying proportions, together in the same geological deposit. The usefulness of PGMs is determined by their unique and specific shared chemical and physical properties (Sibanye-Stillwater 2 2022).

While certain of these properties are shared by other materials, it is the particular combination of their chemical and physical properties that make the PGMs so valuable in their end-markets. PGMs have high and specific catalytic activity, possess high thermal resistance, are chemically inert and biocompatible, as well as being hard but malleable for forming into shapes (Sibanye-Stillwater 2, 2022).

Platinum, palladium and rhodium are used in higher-volume industrial and medical applications, while iridium and ruthenium have niche high-technology applications (Sibanye-Stillwater 2, 2022).

The automotive sector is the leading end-user for platinum, palladium and rhodium. All three metals are used in varying proportions in autocatalysts, which form part of the automotive exhaust systems of both gasoline and diesel internal combustion engines in light-and heavy-duty vehicles, both on- and off-road. The unique properties of PGMs help convert harmful exhaust pollutant emissions to harmless compounds, improving air quality and thereby enhancing health and wellbeing. PGMs have accordingly been the main metals used in catalytic converters to date since the imposition of emission controls (Sibanye-Stillwater 2, 2022).

Vehicle exhaust emission controls began in the US in 1975, with the use of PGM-containing catalysts on light-duty vehicles. Subsequently, most other countries adopted similar legislation, notably Japan (1976), South Korea (1987), Mexico (1989), Europe (1993), Brazil (1994) and China (2000). Over time, emissions standards have continued to tighten globally, resulting in higher loadings of PGMs per catalyst in most instances, or else varying formulations and technologies, to ensure compliance with regulations (Sibanye-Stillwater 2, 2022).

Despite the recent increase in PGM prices, platinum, palladium and rhodium face little foreseeable competition in autocatalysts, although extensive substitution of one PGM for another is possible, driven by pricing and supply constraints. Several other metals act as good oxidation catalysts in other environments, but generally lack the thermal durability and resistance to poisoning necessary to survive in the harsh automotive tailpipe environment. An increasingly viable low emissions alternative to the combustion engine exists in the shape of the battery electric vehicle which requires no autocatalyst and hence utilises no PGMs (Sibanye-Stillwater 2, 2022).

However, fuel cell technologies are becoming increasingly prominent across many sectors, including transport, as part of the global push to improve air quality and reduce global warming (Sibanye-Stillwater, 2022).

Investment is an important driver of demand for PGMs, particularly platinum. Investment demand ranges from physical holdings of bullion bars and coins to complex investment vehicles, through exchange traded funds (ETFs) and the futures markets. Physical investments, along with global stocks, are treated as above-ground stocks that are not considered as an end-use as they could be either allocated or returned to the market, depending on price levels and investor strategy (Sibanye-Stillwater, 2022).

2.3 K4 Shaft

The mining method utilised at K4 Shaft will be underground mining methods. Underground mining works are accessed from the surface by means of vertical and/or incline shaft. Breast mining, up-dip mining, down-dip mining, conventional and mechanical mining methods are employed although mechanised mining is being phased out. Underground mining works range between several hundred metres to 1.2 km deep and reefs are drilled, blasted, support structures is installed to support and control the hanging wall. The ore is then removed from the slopes by scrapers which are attached to winches. The ore is transported to the bottom of the shafts and brought up to the surface.

From the surface, ore is stockpiled before being transported to the relevant concentrators by means of haul roads. Water is pumped from the underground and storm water drains into settling dams located at each shaft for re-use as process water.

2.4 Need and desirability of the project

The three main economical drivers of revenue are Platinum, Palladium and Rhodium. There is a rising tide of concern that the underinvestment in mining from South Africa will lead to severe supply side constraints from 2020 onwards and that the mediocre but growing existing demand especially in the years leading up to the next decade is resulting in markets unduly discounting PGM metal prices which, in turn, could fuel further cutbacks.

Once the K4 Shaft is fully operation, mine activities will be performed predominantly using mine employees and staff. Most maintenance staff (underground and surface) will be mine employees. Additional parking space is required to accommodate the increase in staff members, and to streamline alternative transport options such as buses and taxis. The construction and operation of a dedicated parking facility will have the following advantages:

- Reducing impacts to soils and surface water resources as it will be well designed with a stormwater management plan to prevent erosion and oil spills onto soil and into the surrounding environment;
- Reduction in the generation of nuisance dust due to the parking area being covered; and
- Increased road safety around the K4 Shaft area.

3 ALTERNATIVES CONSIDERED

3.1 Introduction

Alternatives should include consideration of all possible means by which the purpose and need of the proposed activity could be accomplished. In all cases, the no-go alternative must be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. The determination of whether sit or activity (including different processes) or both is appropriate needs to be informed by the specific circumstance of the activity and its environment.

Alternatives, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity. Generally, several alternative aspects are considered when planning a project. Table 3:1 indicates several alternative aspects that could be considered, and reasons for considering those or not as part of this assessment.

Table 3:1 Alternative aspects considered

Alternative aspects	Reason for consideration or not
Property/location	Location alternatives were considered for this assessment, taking into consideration the area required, proximity to the current shaft entrance, locality to sensitive areas and existing infrastructure.
Type of activity	The parking area and associated infrastructure were the only type of activity considered for this assessment, as no other options for parking is currently available.
Design or layout	Options for the layout of the parking area were considered, taking into consideration topography and location of sensitive areas such as wetlands, heritage features and biodiversity.
Technology	Brick paving and asphalt paving of the parking area was considered.
Operational aspects	Not considered, as the operational aspect of a parking area is the only option.
No-go alternative	The no-go alternative was considered.

3.2 Alternative assessment

Table 3:2 provides an assessment of the various alternatives considered for the proposed K4 Shaft parking area. The alternative parking area locations are shown in Figure 3:1, and alternative layouts considered are shown in Figure 3:2.

Table 3:2 Alternatives considered for the proposed K4 Shaft Parking Area project

Aspect	Alternative	Advantages	Disadvantages	Reasonable & Feasibility	Comment
<p>Location</p> <p><i>An area of approximately 6 ha is required for the proposed parking area</i></p>	<p>Alternative Location 1</p> <p><i>Proposed site and preferred alternative</i></p>	<ul style="list-style-type: none"> Area located more than 100m from the nearest delineated wetland Are located more than 100m from the nearest drainage line Area is not traversed by any linear infrastructure Area is located adjacent to the current parking area and entrance to the shaft 	<ul style="list-style-type: none"> Area located within a Critical Biodiversity Area as per the North West Biodiversity Sector Plan 	Yes	Although the proposed parking area falls within a Critical Biodiversity Area, as per the NWBSP, the terrestrial biodiversity study confirmed that the majority of the study area no longer represents a Critical Biodiversity Area, as most of the area has experienced long term and continuous disturbance. No protected or Species of Conservation Concern flora species were observed, however it is suspected that these species may occur in certain sections of the sensitive ridge area. This area has been indicated as a no-go area.
	Alternative Location 2	<ul style="list-style-type: none"> Area located more than 100m from the nearest delineated wetland 	<ul style="list-style-type: none"> A powerline traverses the area which requires a buffer of at least 15m A drainage line traverses the proposed parking area in the south Area located within a Critical Biodiversity Area as per the North West Biodiversity Sector Plan 	No	This alternative option is not preferred.
	Alternative Location 3	<ul style="list-style-type: none"> Area located more than 100m from the nearest delineated wetland 	<ul style="list-style-type: none"> A powerline traverses the area which requires a buffer of at least 15m Area located within in 100m of the nearest drainage line Area located within a Critical Biodiversity Area as per the North West Biodiversity Sector Plan Area is located a significant distance from the current parking area and entrance to the shaft 	No	This alternative option is not preferred.

Aspect	Alternative	Advantages	Disadvantages	Reasonable & Feasibility	Comment
Layout	Alternative Layout 1 <i>Proposed layout and preferred alternative</i>	<ul style="list-style-type: none"> Layout takes into consideration vegetation areas to be avoided if possible Layout area takes into consideration identified graveyard and associated buffer area Parking area more than 100m from delineated wetlands 	<ul style="list-style-type: none"> None 	Yes	Preferred alternative.
	Layout 2	<ul style="list-style-type: none"> Parking area more than 100m from delineated wetlands 	<ul style="list-style-type: none"> Layout covers vegetation areas recommended to avoid if possible Part of parking area within 50m of identified graveyard 	No	This alternative option is not preferred.
Technology	Brick paving <i>Proposed technology and preferred alternative</i>	<ul style="list-style-type: none"> Brick paving is exceedingly durable and is capable of withstanding extreme weather fluctuations without becoming brittle and cracking Brick paving is capable of withstanding constant heavy loads Repairing or replacing (i.e. maintenance) damaged brick paving is inexpensive and simple Concrete brick paving maintenance typically requires only pressure washing Ease of installation Pavers can be repurposed on closure Brick contaminated with oil can be removed easily and be disposed of. 	<ul style="list-style-type: none"> When block paving is not cleaned for long period, circular spots occur on the top surface of paver as the stain is present for long period, and these spots give an invitation to lichen (a simple slow-growing plant) While installing interlocking paver, the proper drainage system is a must. When paver blocks are installed without edging restraints, it causes the blocks to move from their original place and eventually open the gaps, resulting in loss of interlock and cause sliding or sinking. 	Yes	Preferred alternative.
	Asphalt paved	<ul style="list-style-type: none"> Asphalt pavements offer high skid resistance 	<ul style="list-style-type: none"> Asphalt paving does not last as long as brick paving 	No	This alternative option is not preferred.

Aspect	Alternative	Advantages	Disadvantages	Reasonable & Feasibility	Comment
		<ul style="list-style-type: none"> Asphalt pavements provide a more uniform surface unmatched by other pavements. 	<ul style="list-style-type: none"> Maintenance of asphalt paving – seal coating should be performed every three years. 		

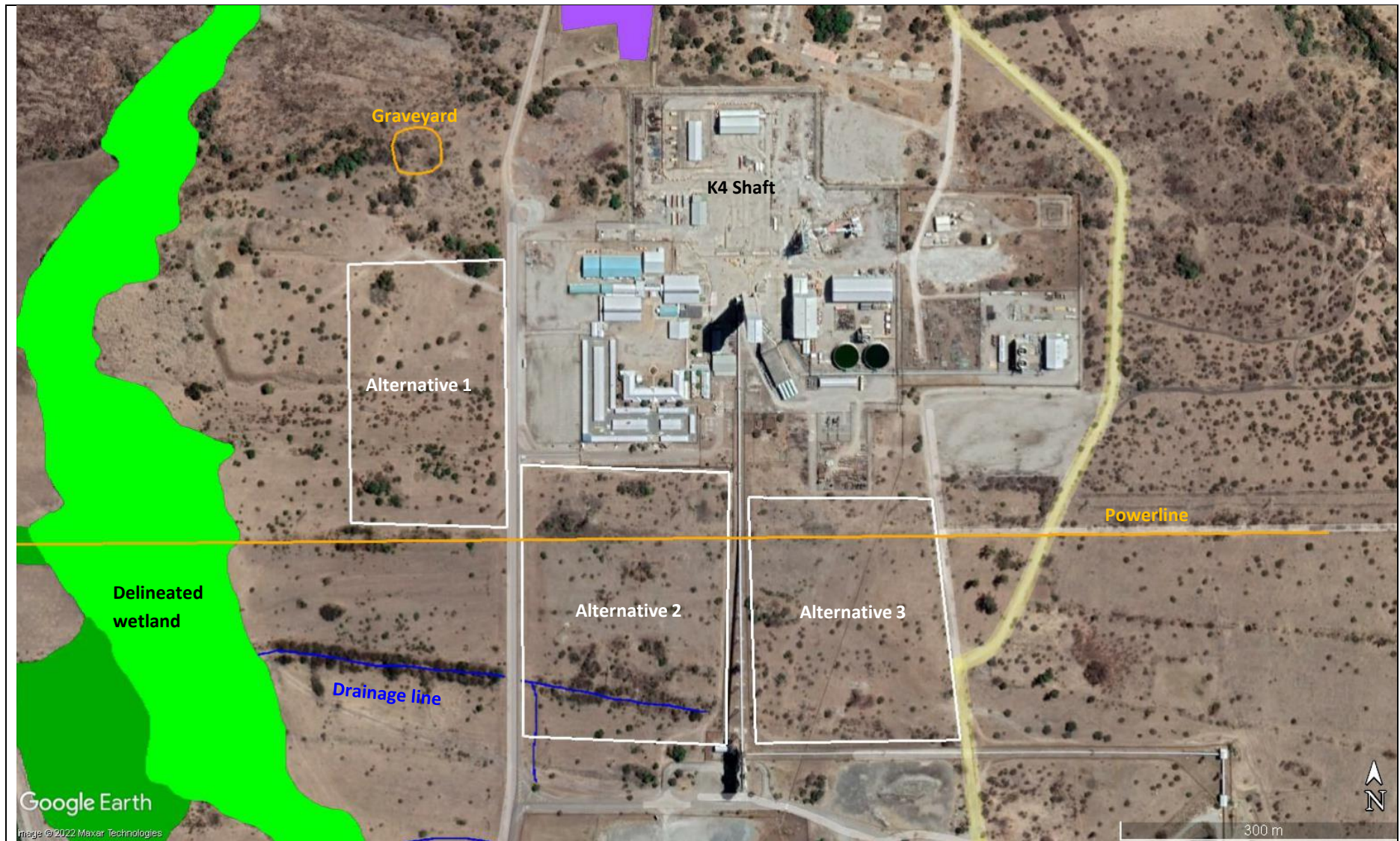


Figure 3:1 Alternative locations considered for the proposed K4 Shaft Parking area project

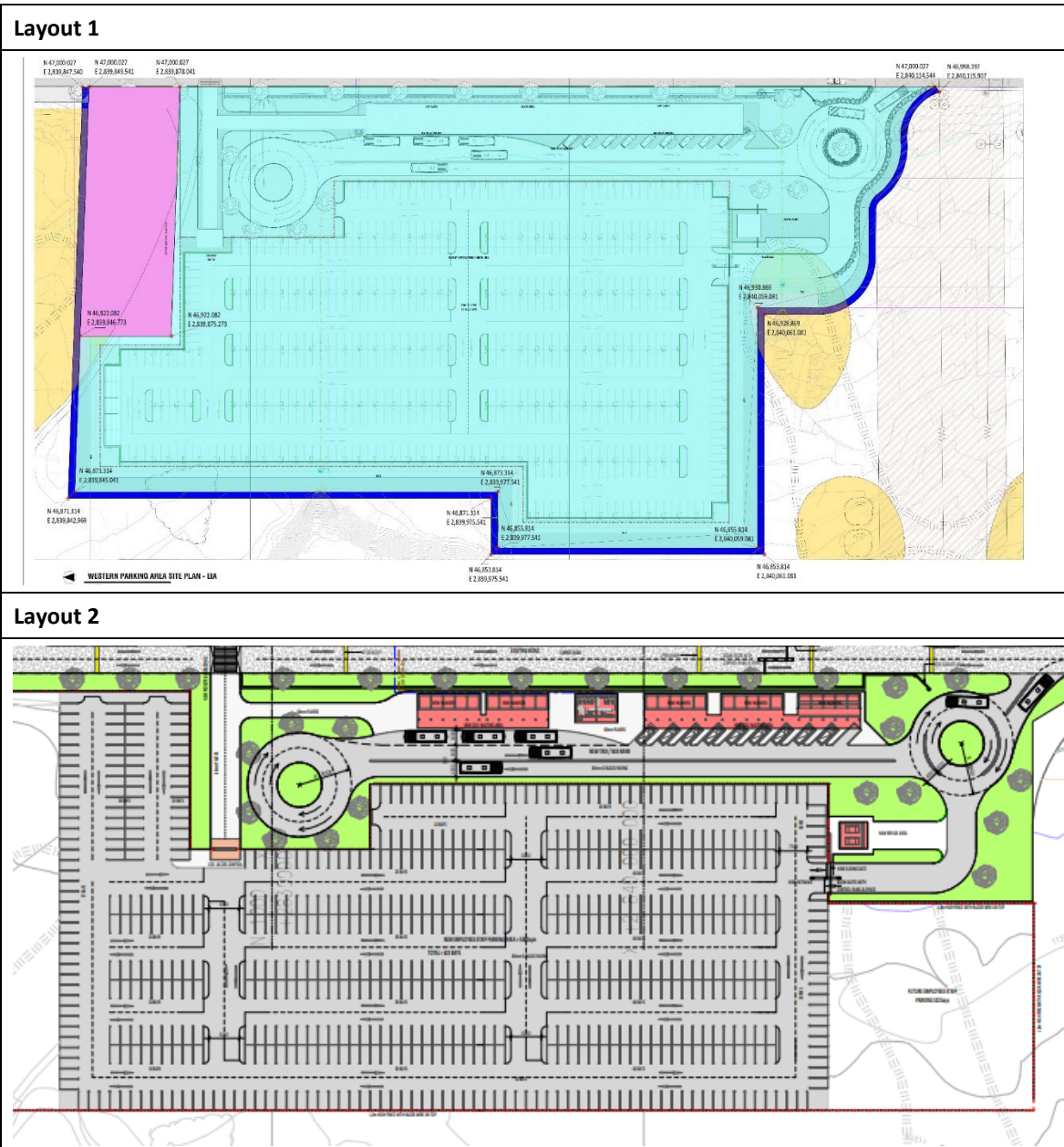


Figure 3:2 Layouts considered for the K4 Shaft parking area

3.3 No-go alternative

The no-go option will entail not constructing the proposed K4 Shaft parking area, or the associated infrastructure and to continue as per the current status quo and environmental baseline. In addition, the environmental impacts identified in Section 8, would not occur.

Should the proposed K4 Shaft parking area project not go-ahead, there will not be adequate parking space for vehicles of personnel working at K4 Shaft once the mine has ramped up to full production. This will mean that personnel would have to make alternative arrangements for transport, or that they will park on side of the road close to the mine entrance, as the current parking area at the shaft is not sufficient for the expected increase in personnel. This may lead to the following negative environmental impacts:

- Uncontrolled and possible sprawling denuding and compaction of soils;
- Increased erosion and lack of proper stormwater management;
- Potential oil spills (hydrocarbon) on soils; and

- Creation of depression by vehicles, specifically during wet weather.

In addition, buses and taxis will stop at the mine entrance to drop-off personnel working at the mine. This could potentially create congestion on the road and entrance to the mine area, and could create an unsafe environment for other vehicles and pedestrians using the road.

Although the proposed parking area falls within a Critical Biodiversity Area, as per the NWBSP, the terrestrial biodiversity study confirmed that the majority of the study area no longer represents a Critical Biodiversity Area, as most of the area has experienced long term and continuous disturbance.

As indicated in Section 8 of this report, all negative environmental impacts identified during the basic assessment can be reduced to low significance with the implementation of various mitigation measures. The no-go option is therefore not preferred.

4 PROJECT DESCRIPTION

4.1 Introduction

Sibanye-Stillwater intends to develop an additional parking area adjacent to their current K4 Shaft. proposed parking area is situated on portions 32 and 115 of the farm Zwartkoppies 296 JQ in the Rustenburg Local Municipality. The proposed parking area will include almost 600 parking spaces, a hawkers area, ablution facilities, a refuse area, refuse area, walkways, street furniture, an access road and turning circles. The parking area will be covered, and brick paved.

4.2 Layout plan

Refer to Figure 4:1 for the proposed layout plan as drafted by LYT Architecture. The proposed parking area will cover approximately 6 ha of the total study area (16 ha).

4.3 Services required

4.3.1 Access

As indicated in Figure 4:1, access to the parking area will be obtained from the current tar road providing access to the K4 Shaft from Karee Road to the south of the shaft.

A temporary gravel road for delivery of construction materials will be constructed north of the proposed parking area and taxi/bus rank.

4.3.2 Water

During the construction phase, potable water will be required for construction workers. Potable water will be obtained from K4 Shaft, which receives its potable water from the Rustenburg Local Municipality. During the operational phase, the constructed ablution facilities will provide potable water for personnel making use of the facilities. The potable water lines from the ablution facilities will tie in with the existing potable water lines received by K4 Shaft.

4.3.3 Sewage

During the construction phase, the contractor would have to provide chemical toilets on site. These will be located at the proposed laydown area (Figure 4:1). During the operational phase, the development will connect to the existing sewer network of K4 Shaft.

4.3.4 Waste management

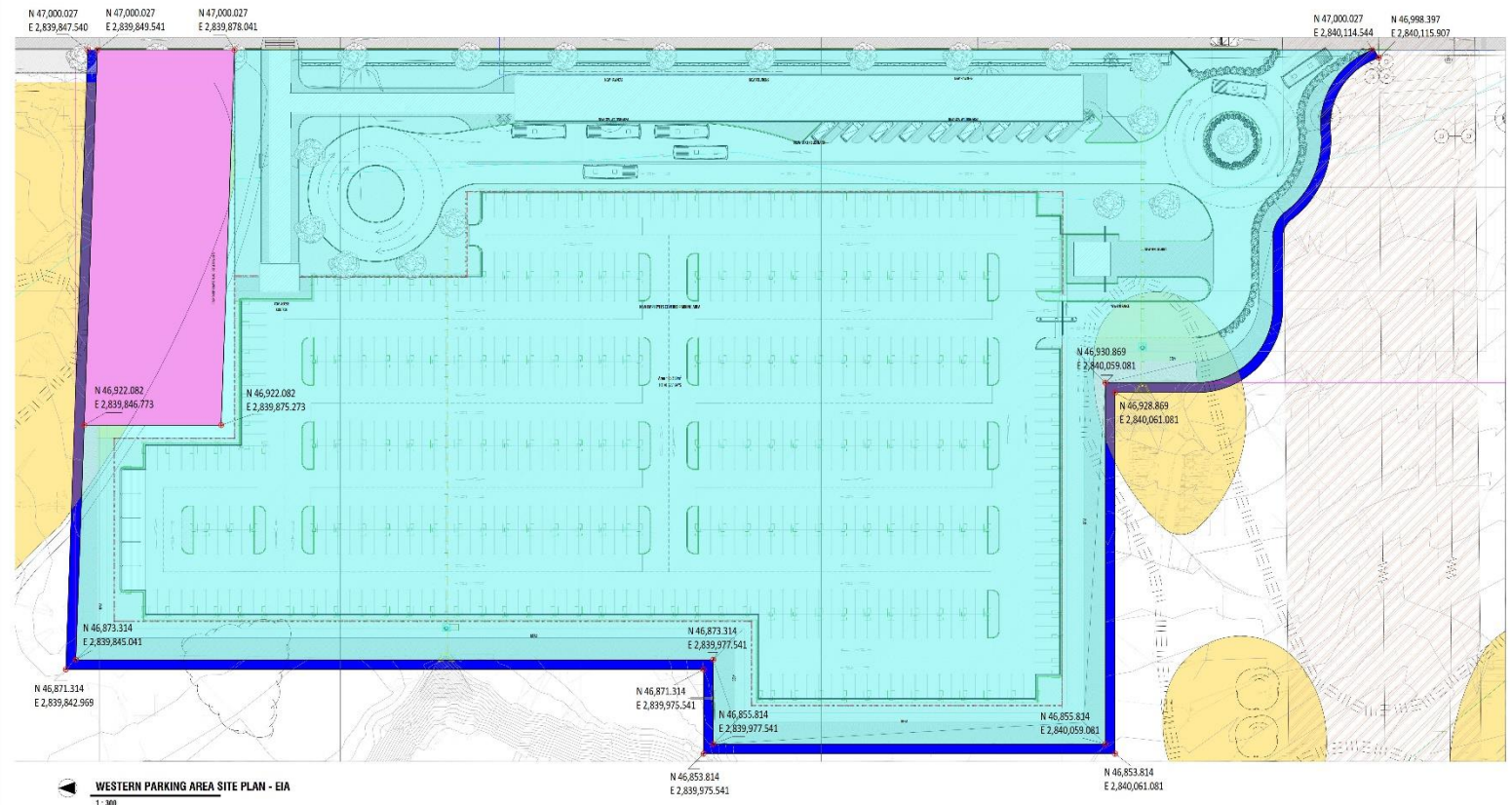
During the construction phase, building rubble and a small amount of domestic waste would be generated. The contractor would have to provide adequate containers for the collection of waste. Sibanye-Stillwater will have to ensure that the contractors remove the said building rubble and domestic waste to a registered landfill site.

Any hazardous waste (e.g. soil contaminated with fuel/oil, paint tins, etc.) would have to be disposed at a Hazardous Waste Disposal Facility by a company dealing with such waste.

During the operational phase, the refuse will be collected by the contracted waste removal company and disposed of at a registered landfill site.

The purpose of this plan is to show the layout of the proposed new parking area at K4 Shaft. The plan includes the construction area, laydown area, and 3m wide possible disturbance area. The plan also shows the location of the K4 Shaft and the surrounding area.

WESTERN PARKING - EIA LEGEND		
	CONSTRUCTION AREA	28 750 m ²
	LAYDOWN AREA	2221 m ²
	3m WIDE POSSIBLE DISTURBANCE AREA	1082 m ²



WESTERN PARKING AREA SITE PLAN - EIA
 1:300

FOR INFORMATION


SIBANYE STILLWATER		
K4 SURFACE UPGRADE		
		
WESTERN PARKING AREA SITE PLAN EIA		
REVISIONS	NO	DATE
Design	Author	Checker
3159	1104	0

Figure 4:1 Layout of proposed new parking area at K4 Shaft

4.3.5 Stormwater management

4.3.5.1 Current conditions

There are two stormwater outlets, one North and one South. The Southern outlet flows into the new staff parking area. The pipes have a diameter of 0.6m. There are no trenches or kerbs along the road separating the covered staff parking area from the new staff parking area.

According to the existing SWMP (Highlands Hydrology, 2012) the typical infrastructure contained at the shafts include: shaft headgear, winder rooms, change house facilities, stores, offices, waste sorting and storage facilities, “settling ponds” for water pumped up from underground and concrete storage dams for water to be sent underground as mine service water. Shafts also contain stocks of diesel, oils and chemicals as well as having facilities for separation and storage of different waste streams.

Clean water flows into the area of the new parking lot through a stormwater pipe with an outlet. Provision must be made to redirect this clean water away from the parking area.

4.3.5.2 Drainage structures

The access roads around the K4 Shaft area are classified as class 5 roads and therefore the design flood for the drainage structures was determined as the 1:10 year flood. The drainage structures should be able to accommodate twice the design flood, thus the 1:20 year flood event. To be conservative, the 1:50 year flood was used to design the drainage structures. Class 5 roads are described as rural local roads with very low mobility and high levels of access for low traffic volumes in urban and rural areas. The road crossfall and road gradient was assumed as 0.2%, as estimated by the contours and the road width was assumed as 8m.

Kerb channels will be constructed on both sides of the roads and on the higher side of the traffic circles. This will allow run-off to collect and flow into the clean water trenches. It will also prevent excess rain run-off from the area above to flow over the road.

V-shaped lined kerb channels are proposed inside the parking lot to allow cars to cross the channels and triangular lined channels will be used on the shoulders of the roads.

Where triangular or V-shaped channels intersect, and the water volumes are great, trapezoidal trenches are proposed. A suitable downwards slope is designed to the trapezoidal trenches to allow a smooth transition into the box culverts.

5 POLICY AND LEGISLATIVE CONTEXT

5.1 Relevant legislation

Table 5:1 details the legislation, policies and guidelines that are relevant to the proposed K4 Shaft Parking Area project.

Table 5:1 Relevant legislation, policies and guidelines

Legislation, policy and guideline	Relevance to the proposed project
National Environmental Management Act (Act No. 107 of 1998) (NEMA)	<p>The NEMA Environmental Impact Assessment (EIA) Regulations (2014, as amended) govern the process, methodologies and requirements for the undertaking of environmental authorisations. Listing Notices 1-3 in terms of NEMA list activities that require an environmental authorisation. The EIA Regulations lay out two alternative authorisation processes. Depending on the type of activity that is proposed, either a Basic Assessment or a Scoping and Environmental Impact Reporting (S&EIR) environmental authorisation process is required. Listing Notice 1 lists activities that require a Basic Assessment process, while Listing Notice 2 lists activities that require S&EIR process. Listing Notice 3 lists activities in certain sensitive geographic areas that require a Basic Assessment process.</p> <p>The proposed project triggers listed activities in terms of Listing Notice 1 and 3 of the NEMA EIA Regulations. Environmental Authorisation is required from the North West Department of Mineral Resources and Energy (DMRE) (competent authority) prior to the commencement of construction. Refer to Section 5.2 and Table 5:2 for further detail regarding listed activities triggered by the proposed project.</p>
National Environmental Management: Waste Act (Act No. 59 of 2008) (NEM:WA)	<p>The NEM:WA was promulgated to reform the law regulating waste management in South African in order to protect health and environment by providing reasonable measures for the prevention of pollution and ecological degradation. A list of waste management activities which have, or are likely to have a detrimental effect on the environment were published Government Notice (GN) 718.</p> <p>No listed activities in terms of the NEM:WA is triggered by the proposed K4 Shaft Parking Area project.</p>
National Environmental Management: Air Quality Act (Act No. 39 of 2004) (NEM:AQA)	<p>The National Environmental Management Air Quality Act (NEM:AQA) came into effect in April 2010 and is applied in accordance with the principals stipulated in NEMA. The Act outlines norms and standards with regards to air quality management planning, monitoring, compliance and management measures in order to protect and enhance the quality of air and reduce risks to human health. NEM:AQA also promotes sustainable development.</p> <p>No Air Emissions Licence (AEL) is required for this project.</p>
National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEM:BA)	<p>The National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEM:BA) provides for the management and conservation of South Africa's biodiversity within the framework of NEMA, as well as the protection of species and ecosystems that warrant national protection and the sustainable use of indigenous biological resources.</p> <p>The study area falls within the Endangered Marikana Thornveld ecosystem.</p>
The National Environmental Management: Protected Areas Act (Act No. 57 of 2003) (NEM:PAA)	<p>The NEM:PAA ensures the protection and conservation of ecologically viable areas characteristic of South Africa's biological diversity and its natural areas in order to create a national register of all national, provincial and local protected areas.</p> <p>The proposed project area does not fall within a protected area.</p>

Legislation, policy and guideline	Relevance to the proposed project
National Forest Act (Act No. 84 of 1998) (NFA)	<p>The NFA provides for list of protected tree species. Should any protected tree species need to be relocated or removed from the development area, a permit must be obtained from the Department of Forestry, Fisheries and Environment (DFFE)</p> <p>No protected tree species were observed during the biodiversity specialist assessment, however it is suspected that these species may occur in certain sections of the sensitive ridge area. Refer to Section 7.5.4.</p>
Conservation of Agricultural Resources Act (Act No. 43 of 1983) (CARA)	<p>This Act ensures control over the utilisation of the natural agricultural resources of South Africa. This project will need to ensure that (in terms of the Act) that the following are adhered to:</p> <ul style="list-style-type: none"> • Conservation and protection of the soil layer • Protection of natural water resources • Conservation of vegetation cover and the removal of alien/exotic/invaser plant species
National Water Act (Act No. 36 of 1998) (NWA)	<p>The purpose of the NWA is to ensure that the South Africa's water resources are protected, used, developed, conserved, managed and controlled. Use of water for mining and related activities is also regulated through regulations that were updated after the promulgation of the NWA (Government Notice No. GN704 dated 4 June 1999).</p> <p>Water uses that are not permissible in terms of Schedule 1 of the NWA need to be authorised under a tiered authorisation system as a General Authorisation in terms of the General Authorisations as published under section 39 of the NWA or as a water use licence, as provided for in terms of Section 21 of the NWA.</p> <p>Refer to Table 5:3 for water uses triggered by the proposed project.</p>
National Heritage Resources Act (Act No. 25 of 1998) (NHRA)	<p>The National Heritage Resources Act (NHRA) controls the protection and management of South Africa's heritage resources.</p> <p>Section 38 of the NHRA requires that heritage assessments are required for certain kinds of development such as the construction of a pipeline exceeding 300m in length, the construction of a bridge or similar structure exceeding 50m in length, rezoning of land greater than 10,000m² in extent or exceeding three or more sub-divisions, or for any activity that will alter the character of a site greater than 5 000 m². The South African Heritage Resources Agency (SAHRA) administers heritage in the province particularly where archaeology and palaeontology are the dominant concerns.</p> <p>As the proposed K4 Shaft Parking Area will alter the character of a site great than 5 000m², a Section 38 application to SAHRA is required.</p>
Spatial Planning and Land Use Management Act (Act No. 16 of 2013) (SPLUMA)	<p>SPLUMA provides broad principles for provincial laws that regulate planning. SPLUMA also provides clarity on how planning law interacts with other laws and policies. SPLUMA delegates the responsibility for land use and zoning applications to the municipality. The land use, zoning and spatial planning is therefore driven by the municipal level IDP and SDF which, according to SPLUMA, must be aligned with the provincial IDP and SDF.</p>

5.2 NEMA Listed Activities

Table 5:2 details the NEMA listed activities triggered by the proposed development of the K4 Shaft Parking Area.

Table 5:2: Triggered listed activities for the proposed K4 Shaft Parking Area project

List and activity number	Listed activity	Description of activity
Listing Notice 1: Activity 27	The clearance of an area of 1 ha or more, but less than 20ha of indigenous vegetation	The parking area and associated infrastructure footprint is ~6ha and will require the clearance of indigenous vegetation.
Listing Notice 3: Activity 4	<p>The development of a road wider than 4 metres with a reserve of less than 13.5 meters</p> <p><u>North West:</u></p> <p>iv) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority</p> <p>vi) Areas within 5 kilometres from protected areas identified in terms of NEMPAA or from a biosphere reserve</p> <p>viii) All Heritage Sites proclaimed in terms of National Heritage Resources Act, 1999 (Act No. 25 of 1999)</p>	<p>A new bus/taxi access road will be constructed that will be 12m wide.</p> <p>A temporary gravel access road will be used for delivery access to the laydown area.</p> <p>The proposed roads fall within a Critical Biodiversity Area in terms of the NWBSP.</p> <p>The proposed roads are located 3 km from the transition area of the Magaliesberg Biosphere.</p> <p>A heritage site has been identified adjacent to the site.</p>
Listing Notice 3: Activity 12	<p>The clearance of an area of more than 300m² or more of indigenous vegetation</p> <p><u>North West:</u></p> <p>iii) All Heritage Sites proclaimed in terms of National Heritage Resources Act, 1999 (Act No. 25 of 1999)</p> <p>iv) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority</p>	<p>The parking area footprint is ~6ha and will require the clearance of indigenous vegetation.</p> <p>A heritage site has been identified adjacent to the site.</p> <p>The area to be cleared falls within a Critical Biodiversity Area in terms of the NWBSP.</p>

5.3 NWA Water Uses

Table 5:3 list the water uses that require authorisation in terms of Section 21 of the National Water Act for the proposed development:

Table 5:3 List of Section 21 Water Uses to be applied for

Section 21 Water Use	Activities which require the Water Use Licence
<p>(c) – impeding or diverting the flow of water in a watercourse</p> <p>(i) – altering the bed, banks, course or characteristics of a watercourse</p>	<ul style="list-style-type: none"> Activities to be undertaken with a horizontal distance within 500m of a delineated wetland.

6 PUBLIC PARTICIPATION PROCESS

Stakeholder engagement forms a key component of the Basic Assessment process. The following sections details the public participation process followed during each phase of the environmental authorisation process, in compliance with Chapter 6 of the NEMA EIA Regulations, 2014.

6.1 Pre application consultation

Pre-application meetings were held with the following authorities:

- North West Department of Mineral Resources and Energy (DMRE) (competent authority for environmental authorisation) on 1 March 2022;
- Department of Water and Sanitation (DWS) (competent authority for water use licence application) on 8 April 2022.

During these meeting the proposed project was introduced, and attendees were given the opportunity to raise any comments or concerns about the proposed project. Comments raised during these meetings were minuted and is included in the Comment and Response Report (CRR) (Appendix C1). The minutes of the meetings are available in Appendix C2.

6.2 Project announcement

The proposed project was announced as follows:

- Placing site notices at the boundary of the proposed K4 Shaft parking area project on 2 March 2022 (English). Refer to Appendix C3 for proof of site notices; and
- Distribution of Background Information Letters (BIL) to identified stakeholders (English) via email. Refer to Appendix C4 for a copy of the BIL and Appendix C5 for emails sent.
- Advertisement in the Platinum Weekly on 2 September 2022. Refer to Appendix C6 for a copy of the advertisement.

Comments received during the project announcement period are included in the Comment and Response Report (Appendix C1).

6.3 Availability of the Draft Basic Assessment Report

The Draft Basic Assessment Report (BAR) is currently available for public comment for a period of 30 days from 2 September to 3 October 2022. The availability of the report for comment was advertised in the Platinum Weekly on 2 September 2022 and notification letters of its availability were sent to stakeholders. Please refer to Appendix C7 for the notification letters, and Appendix C8 for emails sent. The report is available at the following public places:

- Security Office at K4 Shaft Entrance; and
- Alta van Dyk Environmental Consultants Office.

The Draft BAR is also available electronically on the AVDE website:

<https://www.altavandykenvironmental.co.za/public-documents/>

Comments received during the comment period of the Draft BAR will be included in the CRR and will be submitted as an Appendix with the Final BAR, to be submitted to the DMRE for decision making.

6.4 Final Basic Assessment Report

All comments obtained from stakeholders during the pre-application, announcement and Draft BAR comment periods, will be captured and addressed in the CRR. The CRR will be submitted as an Appendix to the Final BAR, to be submitted to the competent authority for review.

6.5 Decision

Once a decision regarding the environmental authorisation has been received from DMRE, all registered stakeholders will be informed via email.

6.6 Summary of comments received

All comments received from stakeholders during the pre-application and project announcement phase of the project has been documented in the CRR (Appendix C1). Table 6:1 provides a summary of the comments received from stakeholders to date.

Table 6:1 Summary of comments received from stakeholders

Comment	Organisation
Will the agricultural potential assessment include a land assessment?	DMRE
Will commenting authorities be included as stakeholders?	DMRE

6.7 Legal requirements for public participation

Table 6:2 provides a review of the legal requirements for public participation in terms of the NEMA EIA Regulations.

Table 6:2: Legal requirements for public participation

NEMA Regulation	Public Participation Regulation	Process followed
39 (1)	If the proponent is not the owner or person in control of the land on which the activity is to be undertaken, the proponent must, before applying for an environmental authorisation in respect of such activity, obtain the written consent of the landowner or person in control of the land to undertake such activity on that land.	The proponent is also the owner of the land on which the activity is to be undertaken (Western Platinum (Pty) Ltd). Refer to Table 1:3.
40(1)	The public participation process to which the- (a) basic assessment report and EMPr, and the closure plan in the case of a closure activity, submitted in terms of regulation 19; and (b) scoping report submitted in terms of regulation 21, the environmental impact assessment report, EMPr, and the closure plan in the case of a closure activity, submitted in terms of regulation 23; was subjected to must give all potential or registered interested and affected parties, including the competent authority, a period of at least 30 days to submit comments on each of the basic assessment report, EMPr, scoping report and environmental impact assessment report, and the closure plan in the case of a closure activity, as well as the report contemplated in regulation 32, if such reports or plans are submitted at different times.	The Draft BAR is currently available for public comment for a period of 30 days, from 2 September to 3 October 2022.
40(2)	The public participation process contemplated in this regulation must provide access to all information that reasonably has or may have the potential to influence any decision with regard to an application unless access to that information is protected by law and must include consultation with-	The following state departments have been informed of the proposed project and is provided with an opportunity to comment on the Draft BAR: <ul style="list-style-type: none">• DMRE (competent authority)• DWS

NEMA Regulation	Public Participation Regulation	Process followed
	(a) the competent authority; (b) every State department that administers a law relating to a matter affecting the environment relevant to an application for an environmental authorisation; (c) all organs of state which have jurisdiction in respect of the activity to which the application relates; and (d) all potential, or, where relevant, registered interested and affected parties.	<ul style="list-style-type: none"> • South African Heritage Resources Agency • North West Department of Economic Development, Environment, Conservation and Tourism • North West Department of Agriculture and Rural Development • Department of Rural Development and Land Reform • Rustenburg Local Municipality • Bojanala District Municipality Refer to Appendix C5 for emails sent.
40(3)	Potential or registered interested and affected parties, including the competent authority, may be provided with an opportunity to comment on reports and plans contemplated in subregulation (1) prior to submission of an application but must be provided with an opportunity to comment on such reports once an application has been submitted to the competent authority	The Draft BAR is made available for comment only after the submission of the environmental authorisation application form.
41(2)	The person conducting a public participation process must take into account any relevant guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of an application or proposed application which is subjected to public participation by- (a) fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of— (i) the site where the activity to which the application or proposed application relates is or is to be undertaken; and (ii) any alternative site;	A2 notice boards were placed at the proposed project site as part of the project announcement. Refer to Appendix C3 proof of site notices placed.
41(2)	(b) giving writing notice, in any of the manners provided for in Section 47D of the Act, to-	
	(i) the occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;	Not applicable
	(ii) owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;	Adjacent landowners were notified of the proposed project. Refer to Table 1:3 and Appendix C5.
	(iii) the municipal councillor of the ward in which the site and alternative site is situated and any organisation of ratepayers that represent the community in the area;	A BIL was emailed to Cllr Cllr Vuyiswa Shomang who is the councillor for Ward 31. Refer to Appendix C5 for emails sent.

NEMA Regulation	Public Participation Regulation	Process followed
	(iv) the municipality which has jurisdiction in the area;	A BIL was emailed to Kelebogile Mekgoe and Lilian Sefike, both Environmental Officers at Rustenburg Local Municipality. In addition, BILs were emailed to Amanda Bubu, Environmental Director and Tshepo Lenaka, Acting Municipal Manager at Bojanala Platinum District Municipality. Refer to Appendix C5 for emails sent.
	(v) any organ of state having jurisdiction in respect of any aspect of the activity	<p>BILs were distributed via email to the following authorities:</p> <ul style="list-style-type: none"> • DMRE; • DWS; • North West Department of Economic Development, Environment, Conservation and Tourism; • North West Department of Agriculture and Rural Development; • Department of Rural Development and Land Reform <p>The Draft BAR was uploaded onto the South African Heritage Resources Information System (SAHRIS) website for comment from the South African Heritage Resources Agency (SAHRA).</p>
	(vi) any other party as required by the competent authority;	None required to date
41(2)	(c) placing an advertisement in- (i) one local newspaper; or (ii) any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;	An advert was placed in the Platinum Weekly on 2 September 2022 to announce the proposed project and availability of the Draft BAR for comment. Refer to Appendix C6 for proof of advertisement.
41(2)	(d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in paragraph (c)(ii); and	Not applicable. The activity does not have an impact that extends beyond the boundaries of the metropolitan.
41(2)	(e) using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desirous of but unable to participate in the process due to- (i) illiteracy; (ii) disability; or (iii) any other disadvantage.	None required to date.
41(3)	A notice, notice board or advertisement referred to in subregulation (2) must-	A2 notice boards were placed at the proposed project site as part of the

NEMA Regulation	Public Participation Regulation	Process followed
	<p>(a) give details of the application or proposed application which is subjected to public participation; and</p> <p>(b) state-</p> <p>(i) whether basic assessment or S&EIR procedures are being applied to the application;</p> <p>(ii) the nature and location of the activity to which the application relates;</p> <p>(iii) where further information on the application or proposed application can be obtained; and (iv) the manner in which and the person to whom representations in respect of the application or proposed application may be made.</p>	project announcement. Refer to Appendix C3 proof of site notices placed.
41(4)	<p>A notice board referred to in subregulation (2) must-</p> <p>(a) be of a size of at least 60 cm by 42 cm; and</p> <p>(b) display the required information in lettering and in a format as may be determined by the competent authority.</p>	

7 ENVIRONMENTAL STATUS QUO

The following chapter presents an overview of the biophysical and socio-economic environment in which the proposed project is located. The greater area has previously been studied to some extent and is recorded in various sources, particularly during the environmental authorisation process for the existing K4 Shaft (2012). Consequently, aspects of the baseline have been generated based on literature review.

Refer to Appendix D for colour photographs from the centre of the site taken in at least eight major compass directions with a description of each photograph.

7.1 Topography

The majority of the study area is characterised by a slope percentage between 0 and 5%, with some smaller patches within the study area characterised by a slope percentage up to 11%. This illustration indicates a uniform topography with gentle slopes being present. The Digital Elevation Model (DEM) of the project area (Figure 7:1) indicates an elevation of 1 125 to 1 137 Metres Above Sea Level (masl) (TBC1, 2022).

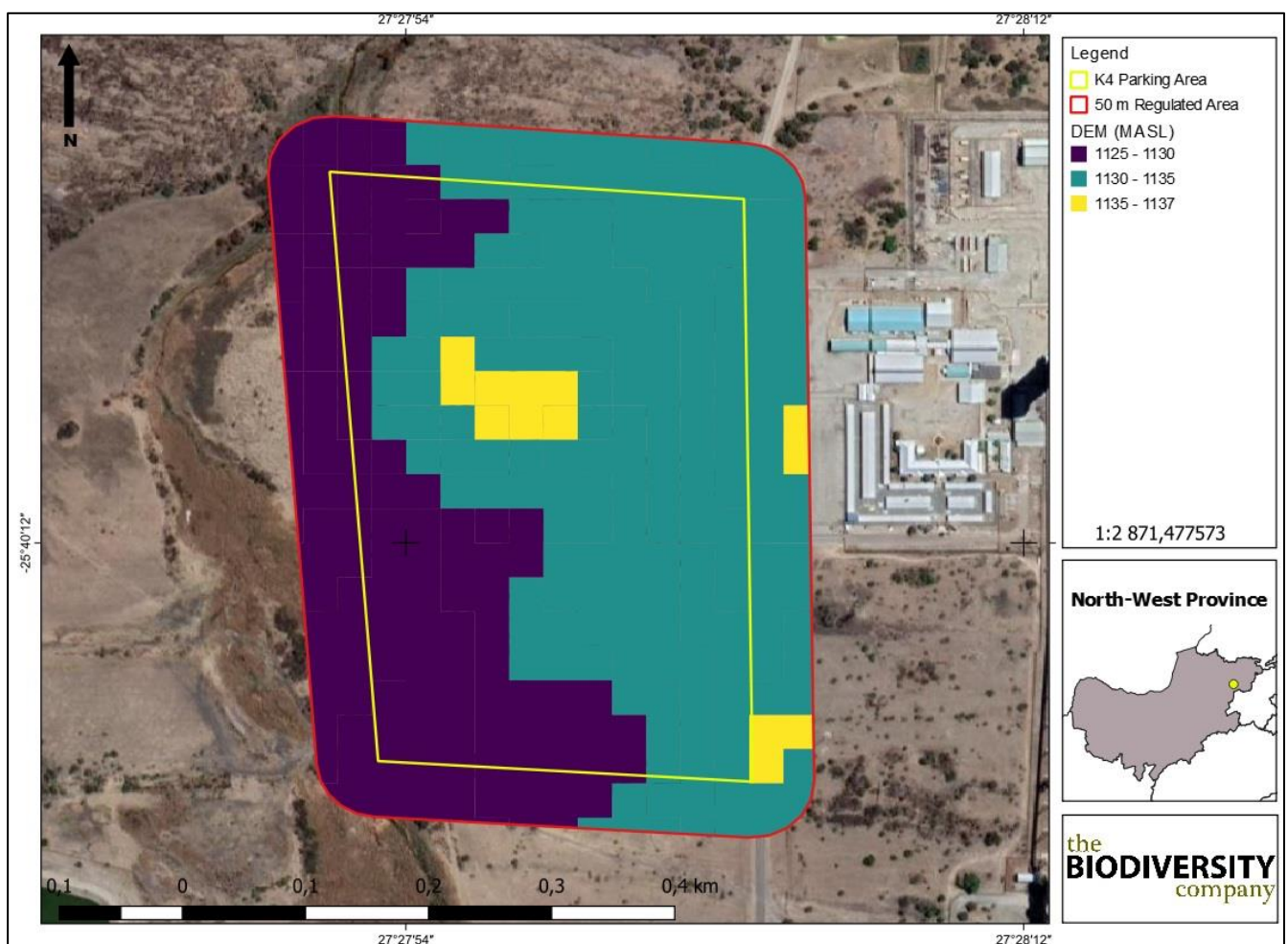


Figure 7:1 Digital Elevation Model of the study area (TBC1, 2022)

7.2 Climate

The climate of the North West Province is characterised by hot summers and cool sunny winters, with the rainy season usually occurring from October through to March. The long term annual rainfall for the Rustenburg region is 630 mm to 740 mm. The average monthly temperatures as measured at Western Platinum range between 16°C and 30°C during summer months and 7°C to 19°C during the winter months (SEF, 2012).

Various weather stations managed by both the South African Weather Services (SAWS) and the DWS were considered in this project. These, together with their proximity to site can be seen in Figure 2-2. The most appropriate rainfall station selected for its available data was SAWS station 0511855 (Buffelspoort) located to the South of the Karee K4 shaft with a rainfall record length of 71 years (Highlands Hydrology, 2012).

Table 7:1 provides a summary of the monthly rainfall distribution at this station.

Table 7:1 Monthly rainfall distribution at SAWS station 0511855 (Highlands Hydrology, 2012)

Month	Rainfall (mm)
January	125
February	96
March	85
April	46
May	15
June	9
July	4
August	6
September	18
October	62
November	88
December	115
Total	669

7.3 Soils and land capability

7.3.1 Baseline findings

Information for soils was obtained from The Biodiversity Company's Agricultural Compliance Statement (TBC1, 2022) (Appendix E1).

Land capability and agricultural potential is determined by a combination of soil, terrain and climate features. Land capability is defined by the most intensive long-term sustainable use of land under rain-fed conditions. Land capability is divided into eight classes and these may be divided into three capability groups. The land potential classes are determined by combining the land capability results and the climate capability of a region.

Two main soil forms were identified throughout the 50 m regulated area, namely the Arcadia and the Champagne soil form (see Figure 7:2). The Arcadia soil forms consists of a vertic topsoil on top of a lithic horizon. The land capability of the abovementioned soil has been determined to be "II" with a climate capability level 8 given the low Mean Annual Precipitation (MAP) and the high Mean Annual Potential Evapotranspiration (MAPE) rates. The combination between the determined land capabilities and climate capabilities results in a land potential "L5". The "L5" land potential level is characterised by a restricted agricultural potential. Regular and/or severe to moderate limitations occur due to soil, slope, temperatures or rainfall.



Figure 7:2 Example of a vertic topsoil from the Arcadia soil form (TBC1, 2022)

7.3.2 Sensitivity verification

The following land potential level has been determined;

- Land potential level 5 (this land potential level is characterised by a restricted potential. Regular and/or severe to moderate limitations occur due to soil, slope, temperatures or rainfall).

Fifteen land capabilities have been digitised by DAFF, 2017 across South Africa, of which five potential land capability classes are located within the proposed footprint area's assessment corridor, including;

- Land Capability 6 to 8 (Low/Moderate to Moderate Sensitivity); and
- Land Capability 9 to 10 (Moderately High).

The baseline findings and the sensitivities as per the Department of Agriculture, Forestry and Fisheries (DAFF, 2017) national raster file concur with one another. It therefore is the soil specialist's opinion that the land capability and land potential of the resources in the regulated area is characterised by "Moderate" sensitivities (Figure 7:3), which conforms to the requirements of an agricultural compliance statement only.

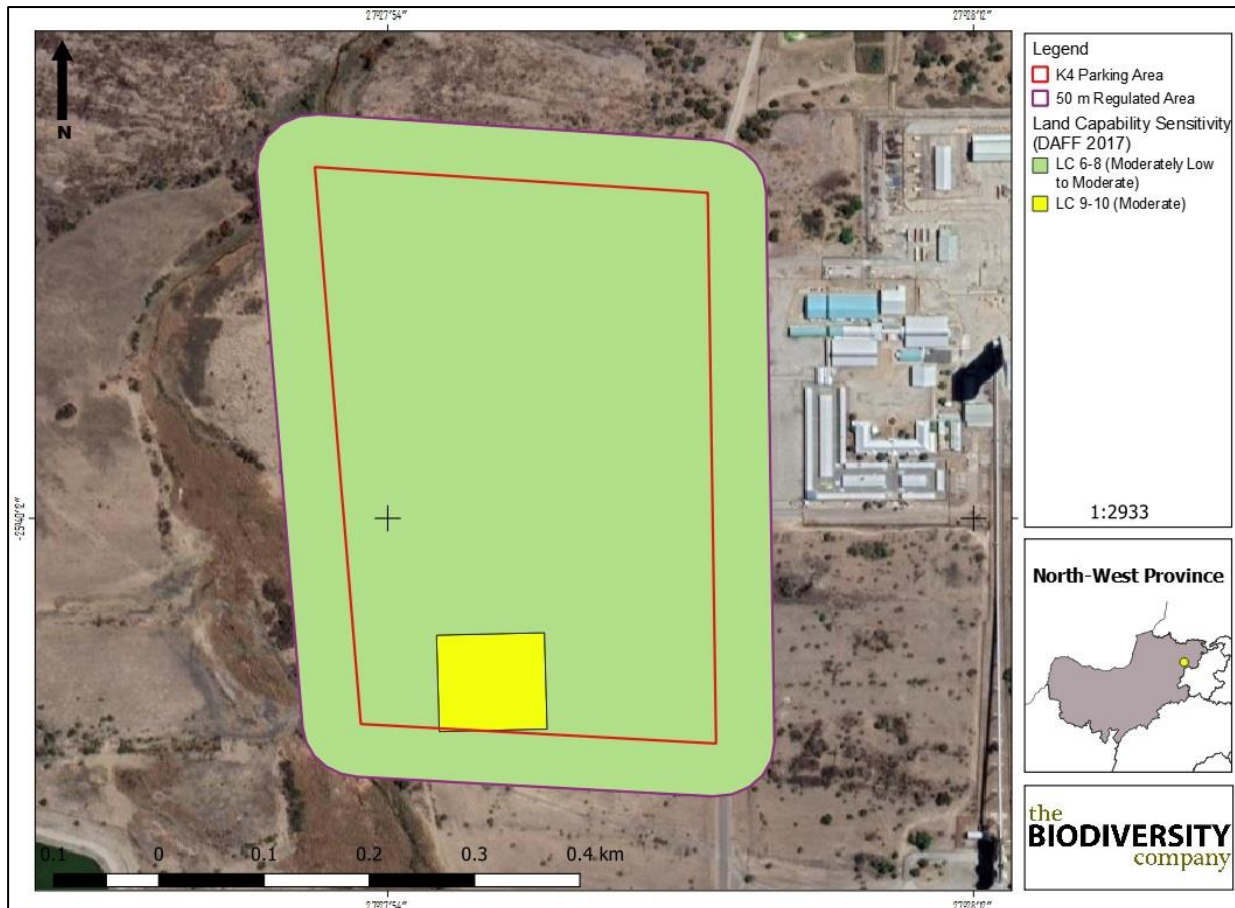
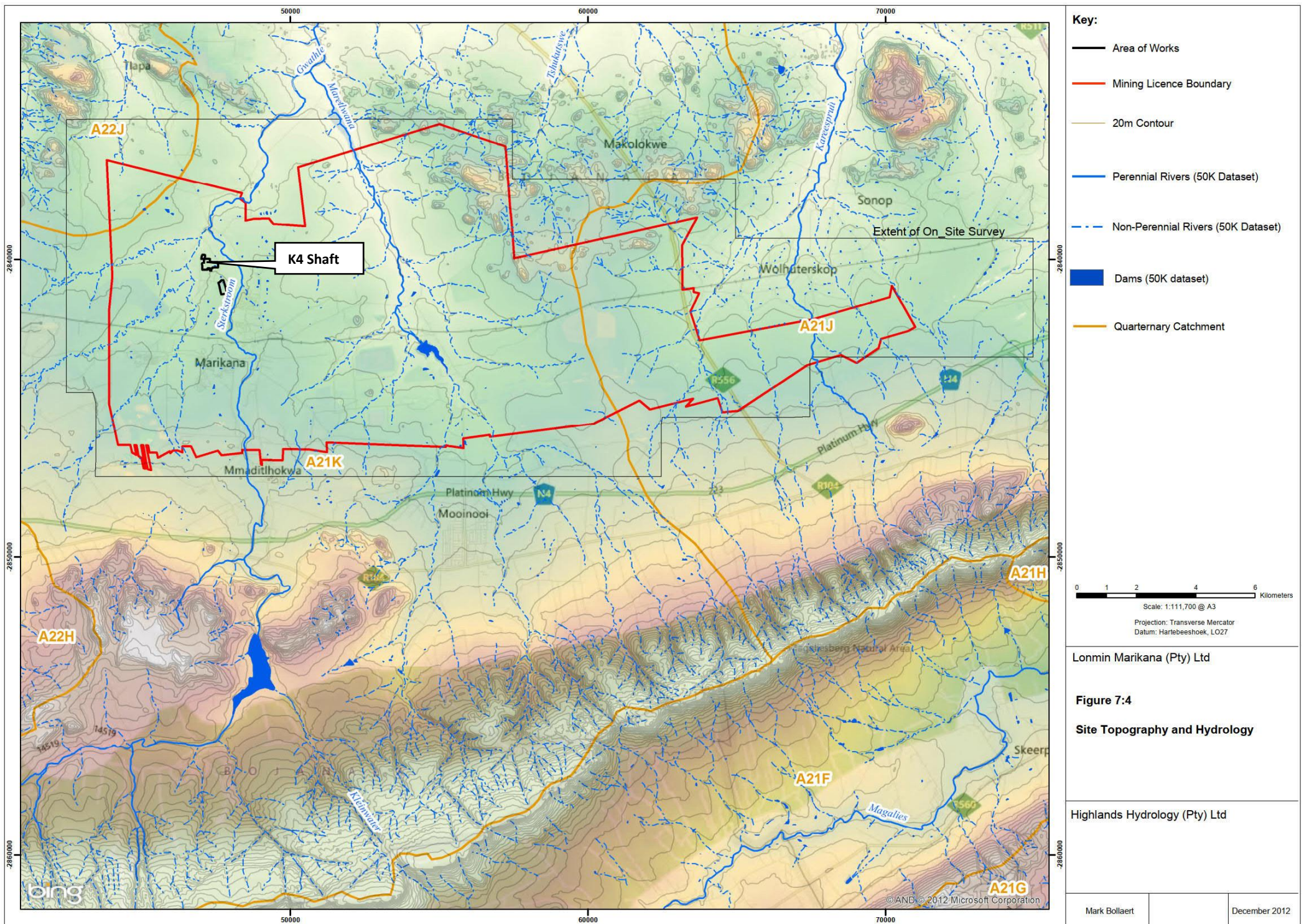


Figure 7:3 Land capability sensitivity (TBC1, 2022)

7.4 Surface water

Figure 7:4 illustrates the topographical and hydrological setting of the K4 Shaft within the greater region. The network of non-perennial and perennial streams in the greater area indicates that surface water flows in a northerly direction with the source of numerous non perennial streams located in the Magalies mountain range. The K4 shaft drains towards the Sterkstroom and is located within quaternary catchment A21.

The study area is located in Water Management Area (WMA) 3: Crocodile and Marico (West) and in Quaternary Catchment Area A21K. Water drainage on site occurs in a westerly as well as an easterly direction due to the K4 Shaft's positioning relative to two tributaries of the Sterkstroom River. The tributaries drains in a northern direction towards Sterkstroom River which eventually discharges into the Roodekoppies Dam (HEES, 2022).



7.5 Terrestrial biodiversity

Information for terrestrial biodiversity was obtained from the Biodiversity Company's terrestrial biodiversity report (TBC3, 2022) (Appendix E2).

7.5.1 Desktop spatial assessment

Table 7:2 provides a summary of the spatial data collected and analysed as provided by various sources such as the national and provincial environmental authorities and South African National Biodiversity Institute (SANBI). It presents a summative breakdown of the ecological boundaries considered and the associated relevance that each has to the region or project area. Where a feature is regarded as relevant it is considered an ecologically important landscape feature and discussed further as part of the sub-sections that follow.

Table 7:2 Desktop spatial features examined (TBC3, 2022)

Desktop Information Considered	Relevant	Motivation and finding
North West Biodiversity Sector Plan (NW BSP), 2015	Yes	<p>The study area overlaps with a Critical Biodiversity Area (CBA2) area, and the western portion overlaps with an aquatic ESA1 area, as per the NW BSP (Figure 7:5)</p> <p>According to the NW BSP, a CBA2 area contains ecosystems and/or species fully or largely intact and undisturbed, and these areas have an intermediate irreplaceability, or some flexibility in terms of meeting biodiversity targets. These are biodiversity features that are approaching but have not passed their limits of acceptable change and any further modification of these vegetation types should be limited to existing irreversibly modified or heavily degraded areas. The land management objective for a CBA2 area is to maintain it in a natural or near-natural state that maximises the retention of biodiversity pattern and ecological processes.</p> <p>According to the NW BSP, an ESA1 area contains ecosystems still in a natural, near-natural, or semi-natural state, and has not been previously developed. The system is considered moderately to significantly disturbed but still able to maintain basic functionality, but individual species or other biodiversity indicators may be severely disturbed or reduced. The land management objective for an ESA1 area is to maintain it in at least a semi-natural state to ensure that it remains an ecologically functional landscape that retains basic natural attributes.</p>
Ecosystem Threat Status (NBA, 2018)	Yes	<p>The study area falls within the Endangered Marikana Thornveld ecosystem</p> <p>This means that most of the ecosystem type associated with the project area, Marikana Thornveld is considered to be at a very high risk of collapse (SANBI, 2019).</p>
Ecosystem Protection Level (NBA, 2018)	Yes	<p>The Marikana Thornveld is Poorly Protected. This means that only a low portion of the ecosystem (between 5% and 50% of its biodiversity target) is protected within the national protected areas network.</p>
South African Protected and Conservation Areas Databases, 2021	Yes	<p>The study area is just over 3 km from the Magaliesberg Biosphere Reserve.</p> <p>According to the 2021 South African Conservation Areas Database (SACAD), the project area lies 3 km north of the 360 000 ha Magaliesberg Biosphere Reserve, which incorporates the Cradle of Humankind</p>

Desktop Information Considered	Relevant	Motivation and finding
		World Heritage Site, the Magaliesberg Protected Environment, and the Magaliesberg Important Bird and Biodiversity Area (IBA).
National Protected Areas Expansion Strategy, 2016	Yes	The study area overlaps with an NPAES priority focus area .The project area also overlaps with a priority focus area for protected area expansion as per the 2016 National Protected Areas Expansion Strategy (NPAES).
Important Bird and Biodiversity Areas, 2015	Yes	The study area is just over 3 km from the Magaliesberg Important Birding Area.
South African Inventory of Inland Aquatic Ecosystems, 2018	Yes	A Critically Endangered wetland seep intersects the study area Critically Endangered (CR) wetland along its westernmost portions, the wetland is classified as a Not Protected (NP) wetland seep. Additionally, the Critically Endangered (CR) Sterkstroom River runs 1 km east of the project area. The river is considered a Not Protected (NP) permanent or seasonal river.
National Freshwater Priority Areas, 2011	Yes	Numerous small artificial wetlands surround the study area
Strategic Water Source Areas, 2021	No	There are no Strategic Water Source Areas within the region

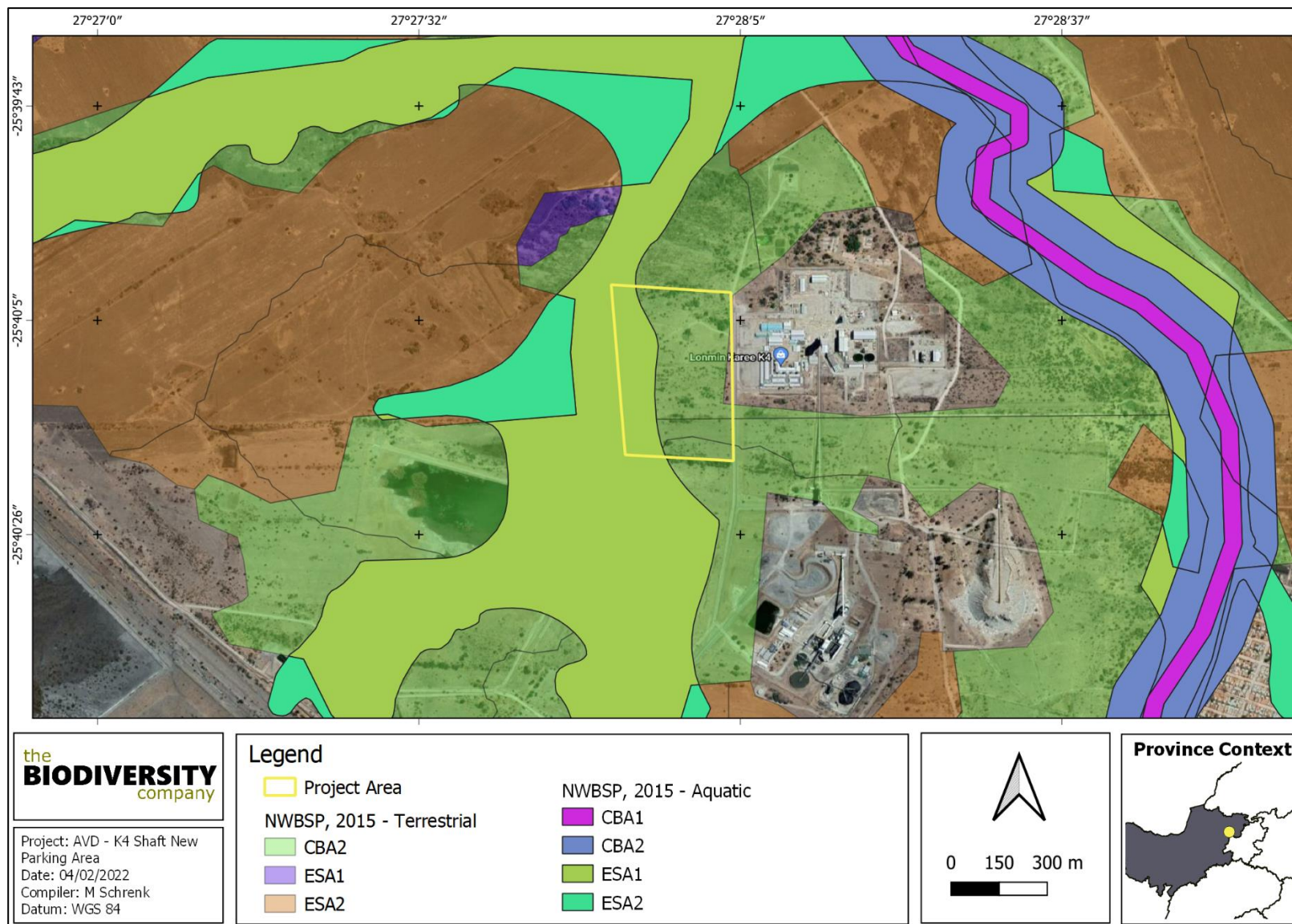


Figure 7:5 Study area superimposed on the 2015 NWBSP (TBC32, 2022)

7.5.2 Flora

The project area is situated within the savanna biome. The savanna vegetation of South Africa represents the southernmost extension of the most widespread biome in Africa (Mucina & Rutherford, 2006). Major macroclimatic traits that characterise the Savanna biome include:

- Seasonal precipitation; and
- A (Sub) tropical thermal regime with no or usually a low incidence of frost (Mucina & Rutherford, 2006).

The savanna biome is the largest biome in South Africa, extending throughout the eastern and north-eastern areas of the country. Savannas are characterised by dominant grass layers, over-topped by a discontinuous, but distinct woody plant layer. At a structural level, Africa's savannas can be broadly categorised as either fine-leaved (microphyllous) savannas or broad-leaved savannas. Fine-leaved savannas typically occur on nutrient rich soils and are dominated by microphyllous woody plants of the Mimosaceae family (Common genera include *Vachellia* and *Albizia*) and a generally dense herbaceous layer.

The savanna biome is comprised of 6 parent bioregions and a total of 87 different vegetation types. The project area is situated within the Marikana Thornveld of the Central Bushveld Bioregion (Figure 7:6 **Error! Reference source not found.**).

7.5.2.1 Marikana Thornveld

This vegetation type is characterised by open *Vachellia karroo* (sweet thorn) woodland, occurring in valleys and slightly undulating plains, and some lowland hills. Shrubs are denser along drainage lines and rocky outcrops or in other habitat protected from fire (Mucina & Rutherford, 2006).

The conservation status of this vegetation community was listed by both Mucina and Rutherford (2006) and SANBI (2018) as Endangered (EN). The national conservation target is 19%, but only a small portion of this habitat is protected within public and private Nature Reserves. The ecosystem is considered substantially impacted, with 48% transformed mainly as a result of cultivated land and urban or built-up areas

Based on the Plants of Southern Africa (BODATSA-POSA, 2019) database, over 600 plant species have the potential to occur within the study area and its surroundings. Of these species, one is listed as being a Species of Conservation Concern (SCC) and six are listed as protected flora. Table 7:3 below outlines both the SCC and protected species identified through the desktop assessment.

Table 7:3 Plant Species of Conservation Concern potentially occurring in the project area (TBC3, 2022)

Family	Taxon	Common name	National Red-List (SANBI, 2016)	Protection Status	Ecology
Sapindaceae	<i>Erythrophysa transvaalensis</i>	Transvaal red balloon	Least Concern	Protected Tree (DEFF-2, 2021)	Indigenous
Euphorbiaceae	<i>Euphorbia cooperi</i> var. <i>cooperi</i>	Bushveld candelabra euphorbia	Least Concern	Protected Plant (NWBMA, 2016)	Indigenous
Euphorbiaceae	<i>Euphorbia davyi</i>	-	Least Concern	Protected Plant (NWBMA, 2016)	Indigenous
Pittosporaceae	<i>Pittosporum viridiflorum</i>	White Cape Beech	Least Concern LC	Protected Tree (DEFF-2, 2021)	Indigenous
Anacardiaceae	<i>Sclerocarya birrea</i> subsp. <i>caffra</i>	Marula	Least Concern	Protected Tree (DEFF-2, 2021)	Indigenous
Apocynaceae	<i>Stenostelma umbelluliferum</i>	-	Near Threatened	Protected Plant (NWBMA, 2016)	Indigenous; Endemic

Protected plants are legally protected by the North West Biodiversity Management Act, No. 4 of 2016 (NWBMA, 2016), Protected trees are legally protected by the National Forests Act, 1998 (Act No. 84 of 1998), and Red-

Listed plants (SCC) are those that are threatened to some degree with extinction and must be protected to ensure their survival in the wild.

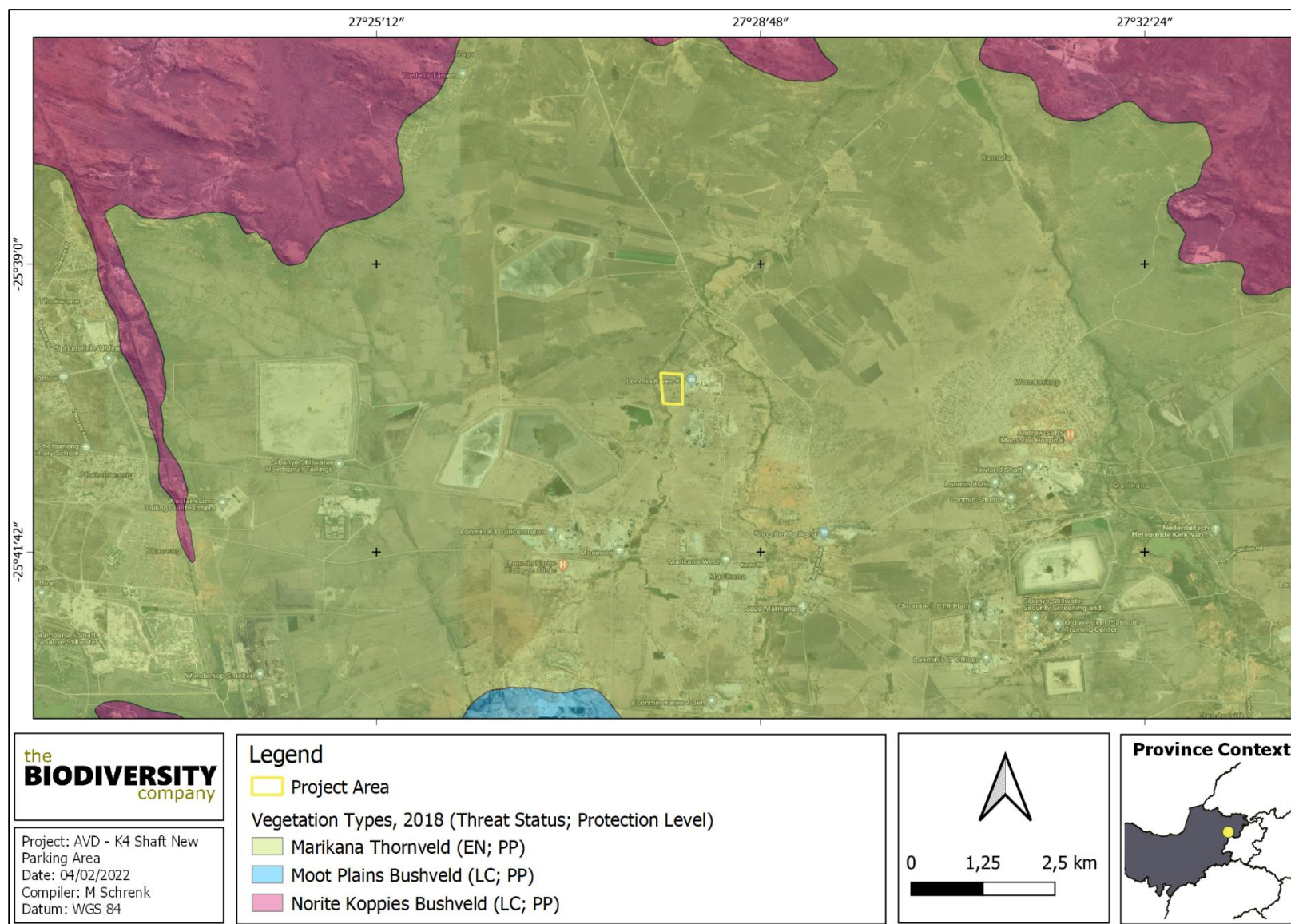


Figure 7:6 Regional vegetation types (TBC3, 2022)

7.5.2.2 Vegetation field survey

The majority of the study area was dominated by a monoculture of mature *Vachellia karroo* (Sweet thorn) trees, broken up by vast expanses of low, green, patchy grasses. The state of the open grassland areas is such that they have been subjected to frequent disturbance – likely in the form of regular burning and possibly mechanised cutting. This is supported by the fact that scattered species of *Gomphocarpus fruticosus* (Milkweed) and *Hibiscus trionum* (Bladderweed) can be found throughout certain portions, a shrub and an annual herb (respectively) synonymous with disturbed areas.

The large, open, central portions of the study area were broken up by several small-medium rocky features. These features represent portions of more in-tact natural habitat and supported a diversity of locally indigenous trees and shrubs such as *Ziziphus mucronate* (Buffalo thorn), *Celtis africana* (White stinkwood), *Searsia* spp., and *Diospyros lycioides* subsp. *lycioides* (Bluebush). The northernmost section was dominated by larger expanses of rocky outcrops with a sensitive ridge occurring in the north-western corner. A healthy variety of trees, shrubs, and succulents were abundant in these areas, including those mentioned above in addition to *Vitex zeyheri*, *Kalanchoe paniculata*, *Barleria pretoriensis*, *Aloe maculata*, *Leonotis ocymifolia* var. *schinzii*, and *Pellaea calomelanos* var. *calomelanos* **Error! Reference source not found.** occurring over the ridge. The lower foothills of the ridge were found to be dominated by mature *Senegalia caffra* and scattered *Vachellia karroo* trees.

The southernmost portion of the project area contained an east-west drainage feature which supported a range of large mature trees and smaller shrubs. *Searsia lancea*, *S. leptodictya*, *Diospyros lycioides* subsp. *lycioides*, and *Asparagus cooperi* dominated this linear section. The drainage feature terminated in a large wetland portion at the southwestern corner of the project area. The most prolific indigenous wetland species recorded include several *Cyperus* spp. And *Brachiaria* spp. As well as *Persicaria decipiens* and *Asparagus cooperi*. It is noted that portions of the wetland were overrun with *Berkheya* weeds.

No protected or SCC flora species were observed, however it is suspected that these species may occur in certain sections of the sensitive ridge area.

Other than the wetland section, which was found to be seriously impacted by the invasive *Populus alba* (Silver poplar), no other portions of the project area were found to be significantly invaded. Additional invasive species recorded in patches throughout the project area included *Melia azedarach*, *Lantana camara*, *Verbena bonariensis*, and *Opuntia ficus-indica* – all listed as Category 1b invasive species as per the latest NEM:BA legislation.

7.5.3 Fauna

Largely based on the South African Bird Atlas Project Version 2 (SABAP2, 2017), IUCN Digital Distribution Maps (IUCN, 2016), and the Animal Demography Unit (ADU, 2020) databases, Table 7:4 summarises the total number of animal species that have the potential to occur in or around the project area, and the corresponding number of SCC.

Table 7:4 Total number of potential fauna species present, and corresponding SCC (TBC3, 2022)

Fauna Type	Total Potential No.	Total SCC
Avifauna	283	11
Mammals	108	13
Herpetofauna (Reptiles and Amphibians)	64	0

These numbers exclude any animals that only occur within nature reserves and private reserves. Of the eleven avifaunal SCC, four have a low-moderate likelihood of project area occurrence; *Ciconia abdimii* (Abdim's Stork), *Alcedo semitorquata* (Half-collared Kingfisher), *Ciconia nigra* (Black Stork), and *Sagittarius serpentarius* (Secretarybird). The other seven SCC are unlikely to occur within the project area due to a lack of suitable habitat and the associated disturbed nature of the project area and surrounds.

Of the thirteen total mammal SCC listed, none of the species are likely to occur within the project area due to the disturbed nature of the local habitats.

7.5.3.1 Fauna field survey

Due to the various indigenous tree species present, as well as the close proximity to watercourses, numerous avifaunal species were observed passing over the project area and foraging within the western sections. Over 20 bird species were recorded, mostly consisting of locally common wetland species such as the White-winged Widowbird, Southern Masked Weaver, Cattle Egret, and Southern Red Bishop. Notable species recorded include the Yellow-Crowned Bishop, Green-backed Heron, European Bee-eater, and the Black-chested Snake-eagle. No avifaunal SCC were observed; however, it is noted that most wild bird species are regarded as protected according to provincial legislation, and certain local SCC may forage within the wetland area from time to time.

Mammal activity was low as only one locally common gerbil species was observed moving through the ridge area. Two reptile species were observed within the northernmost sections, *Trachylepis punctatissima* (Speckled Rock Skink) and *Agama atra* (Southern Rock Agama). Due to the limited in-tact and suitable habitat found within the project area it is unlikely that any mammal or herpetofaunal SCC will occur nearby. It is however important to note that all reptile species and most mammal species are protected by provincial legislation.

7.5.4 Habitat sensitivity and site ecological importance

The main habitat types identified across the project area were initially identified and pre-delineated largely based on aerial imagery from late 2021. These habitat types were then refined based on the field coverage and data collected during the survey. Five habitat units are delineated for the project area: degraded savannah, rock outcrops, drainage line, wetland, and ridge.

The degraded savannah habitat represents the largest portion of habitat across the project area. impacts recorded across this habitat include a large artificially raised portion of earth in the northern half of the area, likely as a result of historical earth dumping from the nearby mines, paths and roads showing regular human ingress and scattered occurrence of litter and dumping.

Rock outcrops are dispersed throughout the area, including four portions approximately 50 m in diameter each – all occurring within the southern half of the area, and a larger portion occurring within the north-eastern corner of the project area. These features represent healthy nodes of mixed indigenous vegetation and useful microhabitat for reptile and mammal species. There were only minimal signs of disturbance and the local trees and shrubs had mostly reached a healthy maturity.

The ridge habitat was found to be the most sensitive and in-tact portion of the project area, supporting a wide variety of habitat specific flora and extensive segments of micro-habitat that is useful for local, indigenous mammal and reptile species. There were however signs of regular human ingress and an area had recently been used for a small, controlled fire.

The five delineated habitat types have each been allocated a sensitivity category, or Sensitivity Ecological Importance (SEI), and this breakdown is presented in Table 7:5 below. In order to identify and spatially present sensitive features in terms of the relevant specialist discipline, the sensitivities of each of the habitat types delineated within the project area are mapped in Figure 7:7.

Table 7:5 SEI assessment summary (TBC3, 2022)

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Degraded Savannah	Low	Medium	Low	High	Very Low
Rock Outcrops	Medium	Low	Low	Medium	Low
Drainage Line	Medium	Low	Low	Medium	Low
Wetland	Medium	High	Medium	Medium	Medium

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Ridge	High	High	High	Medium	High

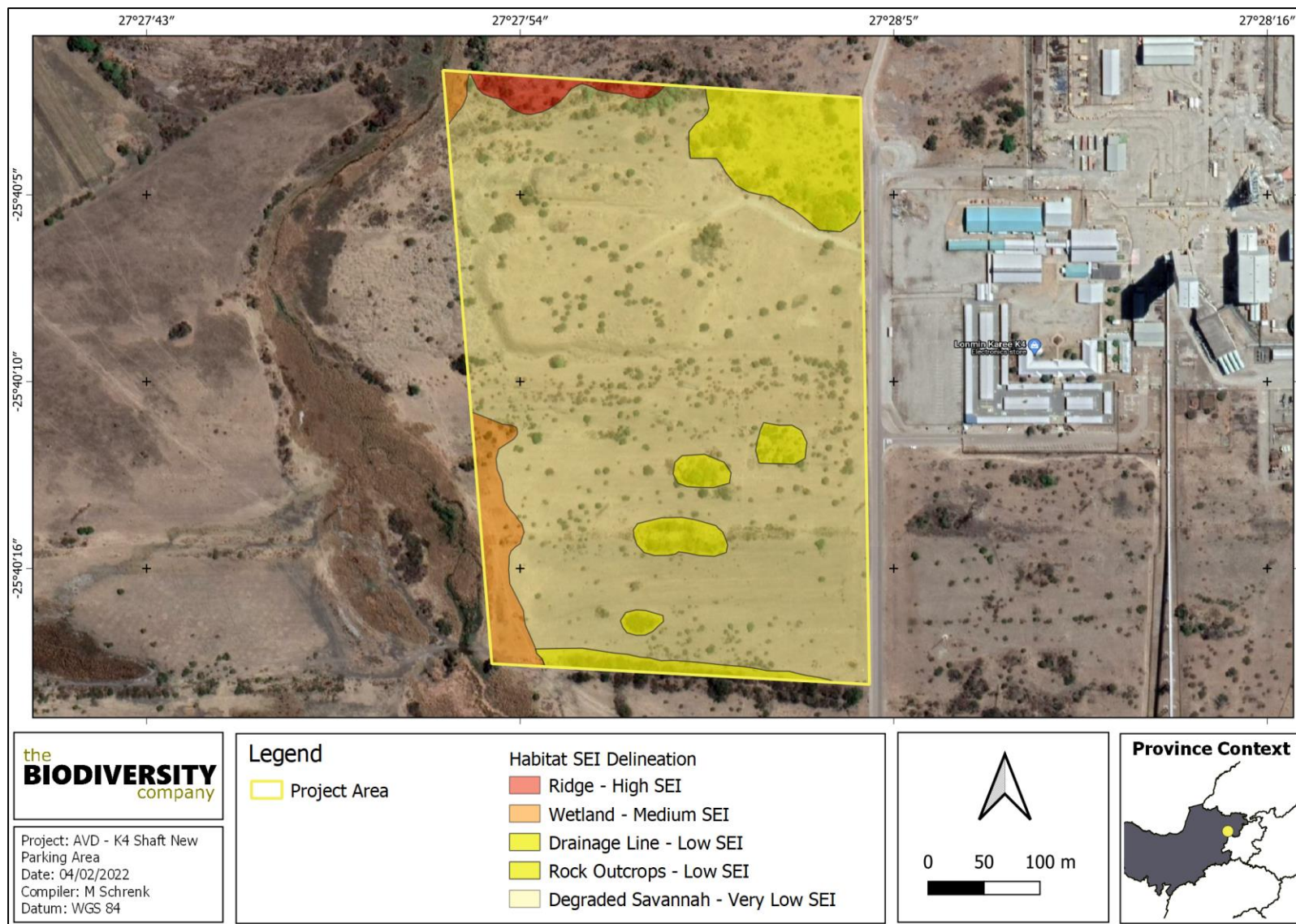


Figure 7:7 Biodiversity Site Ecological Importance (TBC3, 2022)

7.6 Wetland

Information for wetland was obtained from The Biodiversity Company's wetland report (TBC4, 2022), (Appendix E3).

7.6.1 Wetland unit identification

The wetland areas were delineated in accordance with the DWAF (2005) guidelines. Two hydrogeomorphic (HGM) units were identified within the 500 m regulated area, which have been classified as being a floodplain and a seep wetland (Figure 7:9). Additionally, various artificial wetlands and drainage features were identified within the 500 m regulated area. The artificial wetland to the south of the proposed parking lot is subject to extensive artificial stormwater inputs with those to the north characterised by overspills and leaks from a local dam structure (suspected pollution control dam or attenuation pond).

From the two HGM units identified within the 500 m regulated area, only HGM 1 can be affected due to the locality of HGM 2 on the opposite side of the main floodplain from the proposed development footprint. Any impacts caused by the proposed development will be absorbed by HGM 1 only (Figure 7:8). Therefore, the only watercourse assessed is that of HGM 1.



Figure 7:8 HGM 1 Wetland - Floodplain

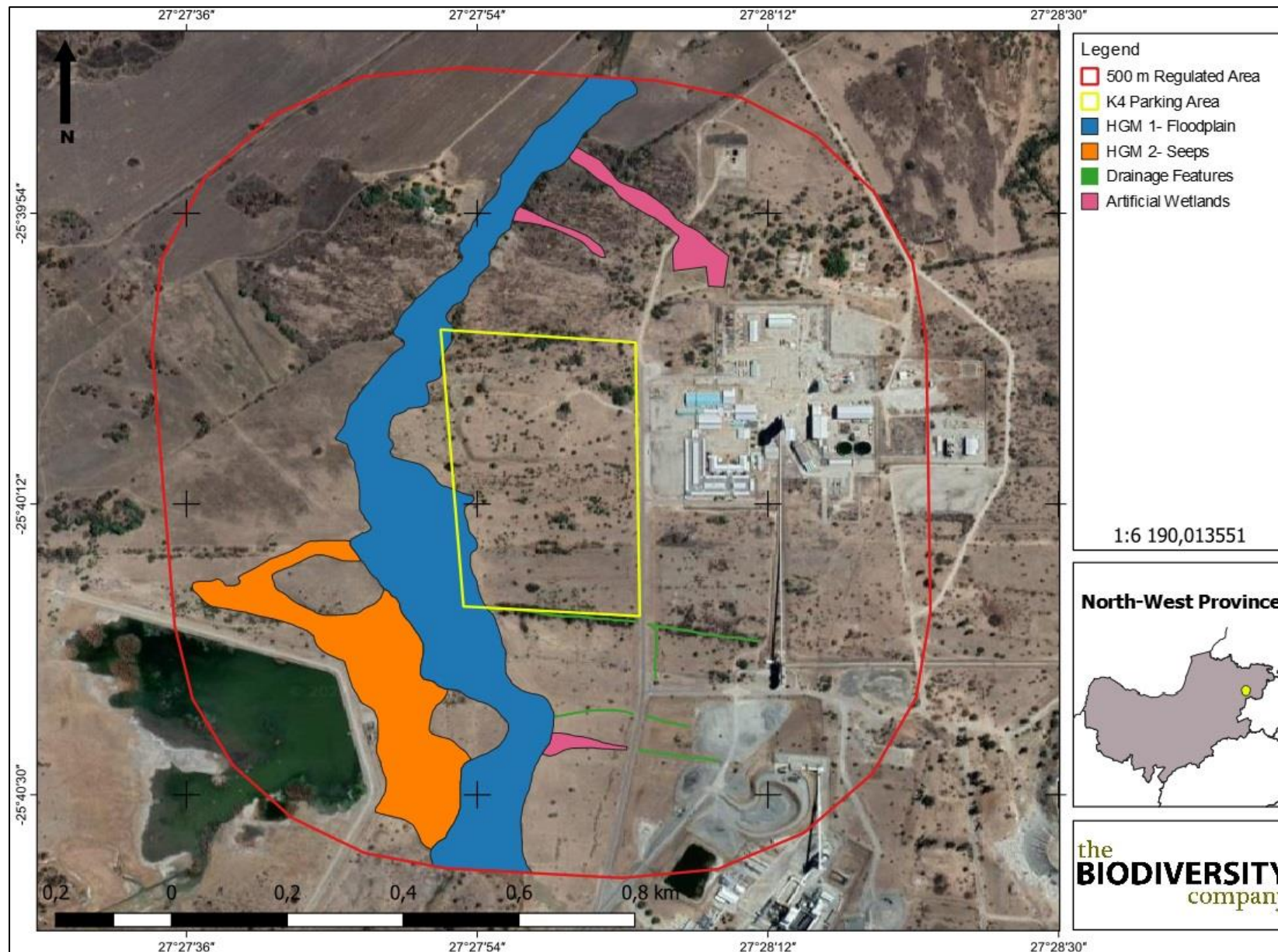


Figure 7:9 Delineated wetlands in the study area (TBC4, 2022)

The wetland classification as per SANBI guidelines (Ollis *et al.*, 2013) is presented in Table 7:6. Only one wetland unit will be assessed throughout the baseline results, namely that of the floodplain system (HGM 1).

Table 7:6 Wetland classification as per SANBI guideline (TBC4, 2022)

Wetland System	Level 1	Level 2		Level 3	Level 4		
	System	DWS Ecoregion/s	NFEPA Wet Veg Group/s	Landscape Unit	4A (HGM)	4B	4C
HGM 1	Inland	Bushveld Basin	Central Bushveld Group 2	Valley Bottom	Floodplain Flat	N/A	N/A

Floodplain wetlands are located on valley floors and are characterised by a well-defined stream channel with typical floodplain features, including levees, scroll bars and oxbows. The water inputs of this wetland is mainly from overflows from the stream channel's banks during flooding events. Figure 7:10 presents a diagram of the delineated floodplain, showing the dominant movement of water into, through and out of the system.

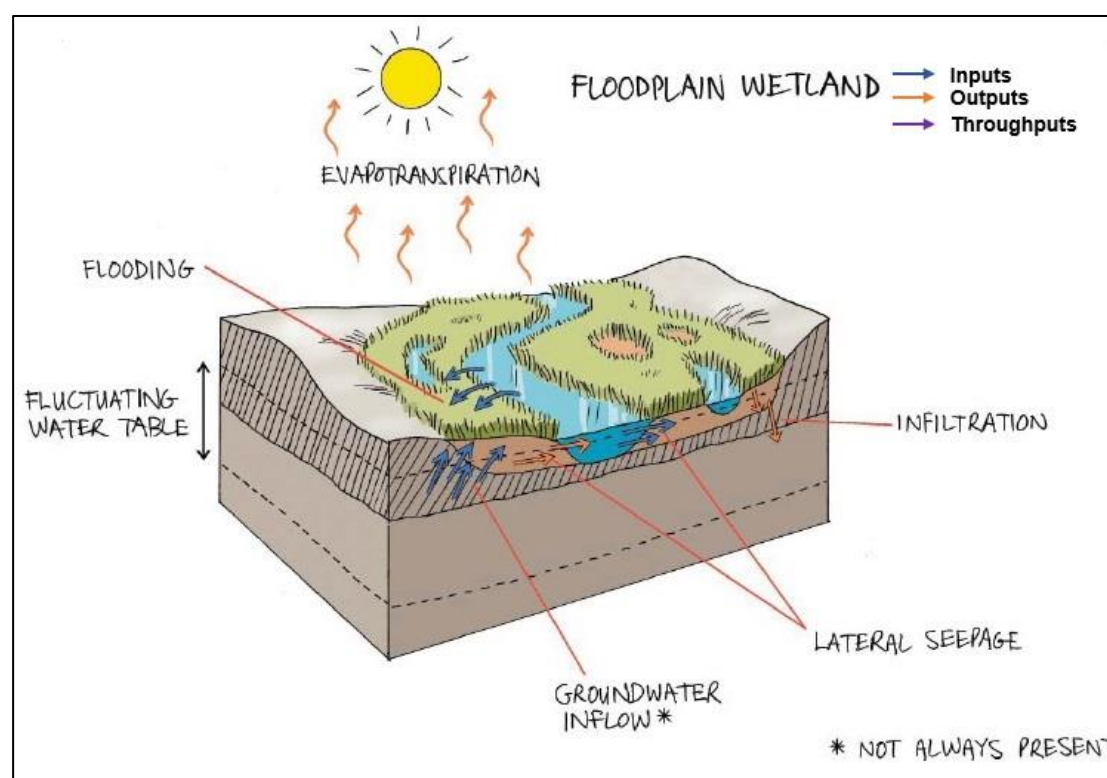


Figure 7:10 Amalgamated diagram of a typical floodplain system, highlighting the dominant water inputs, throughputs and outputs, SANBI guidelines

Floodplains generally are formed during high flow events which subsequently cause water to overflow its banks. Due to the topographic setting of floodplains, flood attenuation for these systems are very high, especially during seasons where the soil within the wetland is not yet saturated and before the oxbows are filled. Seeing that floodplains usually are characterised by clayey soils which retain water for long periods and are susceptible to vast amounts of evapotranspiration, very little streamflow regulation is expected for floodplains. In hindsight, floodplains with coarse soil types are ideal in regulating streamflow. Floodplains are excellent in assimilating phosphates due to the decrease in velocity during the overflow of banks. During this process, lateral deposition of sediment is prone to happen. Phosphorus tends to bound strongly to mineral particles which ensures that the phosphorus is retained on the floodplain after the deposition of these particles. Denitrification does occur to a lesser extent due to little exposure of large amounts of water seeing that these water masses are dependent on

floods. Additionally, sub-surface flows are rare for floodplains which decrease the possibility of denitrification even more so.

It is however important to note that the descriptions of the above-mentioned functions are merely typical expectations. All wetland systems are unique and therefore, the ecosystem services rated high for these systems on site might differ slightly to those expectations.

7.6.2 Present Ecological State

The Present Ecological State (PES) for the assessed HGM unit is presented in Table 7:7. The overall PES for HGM 1 has been scored “Largely Modified” with the largest contributor being the modifications associated with the hydrology of the system. The hydrology of HGM 1 has been affected by predominantly by wetland crossings and small earthen dams in the extent of the floodplain. The natural sediment deposition processes and streamflow regulation at the crossing and immediately below has been disrupted with a complete loss of vegetation in the road’s servitude. In addition, the invasion of *Populus alba* and artificial stormwater inputs (**Error! Reference source not found.**) have contributed to the hydrological modification score. Stormwater components typically increase flows into relevant watercourses with *Populus alba* decreasing flows due to abnormal water use as compared to expected indigenous species.

The vegetation component for HGM 1 has been deemed to be “Moderately Modified” due to the impacts from alien invasive species as well as informal wetland crossings that has resulted in a loss of hydrophytic vegetation.

Table 7:7 Summary of the scores for the wetland PES (TBC4, 2022)

Wetland	Hydrology		Geomorphology		Vegetation	
	Rating	Score	Rating	Score	Rating	Score
HGM 1	E: Seriously Modified	6.0	C: Moderately Modified	2.6	C: Moderately Modified	3.7
Overall PES Score	4.4		Overall PES Class		D: Largely Modified	

7.6.3 Importance and sensitivity

The results of the ecological importance and sensitivity (IS) assessment are shown in Table 7:8. Various components pertaining to the protection status of a wetland is considered for the IS, including Strategic Water Source Areas (SWSA), the NFEPA wet veg protection status and the protection status of the wetland itself considering the NBA wetland data set. The IS for HGM 1 has been calculated to be “Very High”, which combines all parameters listed in Table 7:8.

It is worth noting that the DEA screening tool (2022) was used to further refine the sensitivity of wetland features by means of the aquatic biodiversity theme. The wetlands in question are both associated with “Inland Water Aquatics CBA” areas as well as “Inland Waters Wetland and Estuaries”, which have both been allocated “Very High” sensitivities. Additionally, a “Very High” sensitivity strategic water source area covers the 500 m regulated area (see **Error! Reference source not found.**).

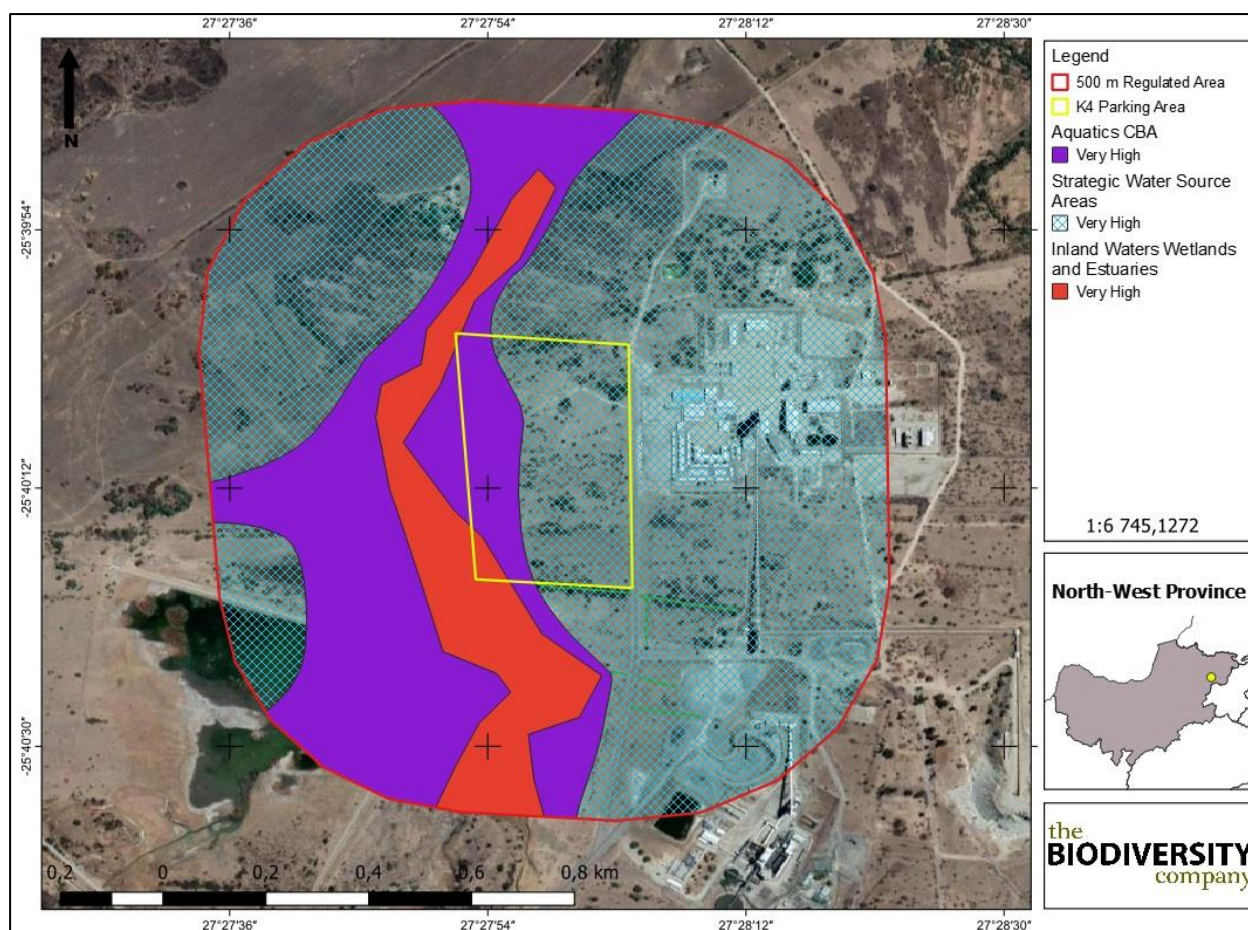


Figure 7:11 Results from the DEA screening tool (2022)

Table 7:8 The IS results for the delineated HGM unit

HGM Type	Wet Veg			NBA Wetlands		SWSA (Y/N)	Calculated IS
	Type	Ecosystem Threat Status	Ecosystem Protection Level	Wetland Condition	Ecosystem Threat Status 2018		
HGM 1	Central Bushveld Group 2	Least Threatened	Not Protected	D/E/F Seriously Modified	Critically Endangered	Y	Very High

7.6.4 Buffer requirements

The “Preliminary Guideline for the Determination of Buffer Zones for Rivers, Wetlands and Estuaries” (Macfarlane *et al.*, 2014) was used to determine the appropriate buffer zone for the proposed activity. A pre-mitigation buffer zone of 30 m is recommended for the identified wetland, which can likely be decreased to 22 m if suitable avoidance and mitigation measures are implemented (see Table 7:7). Even though the drainage features located to the south of the proposed parking area are not assigned buffer zones, this feature must still be conserved and stayed clear of.

Table 7:9 Pre-and post-mitigation buffer sizes

Buffer	Buffer Widths
Pre-mitigation buffer	30 m

Buffer	Buffer Widths
Post-mitigation buffer	22 m

7.7 Heritage

Information for heritage resources was obtained from the Beyond Heritage's Heritage Impact Assessment (HIA) report (Beyond Heritage, 2022) (Appendix E4).

The study area is located in a landscape dominated by mining activities that used to be a rural landscape marked by cultivation. No developments older than 60 years are indicated in the immediate area and the location of the cemetery has been avoided by cultivation.

The study area is fallow and transformed through historical cultivation and more recently by mining related activities and no heritage resources of significance was found in the proposed new parking area. More than 50 meters to the north of the proposed parking area a cemetery was noted that will not be directly impacted on by the proposed parking area.

The cemetery is overgrown and located near a rocky outcrop. The graves are marked by stone packed grave dressings with no inscriptions or headstones visible. Cemeteries are of high social significance and has a field rating of Generally Protected A – High significance. The feature is indicated in relation to the impact area in Figure 7:13. General site conditions at the cemetery are indicated in Figure 7:12.



Figure 7:12 General site conditions of cemetery

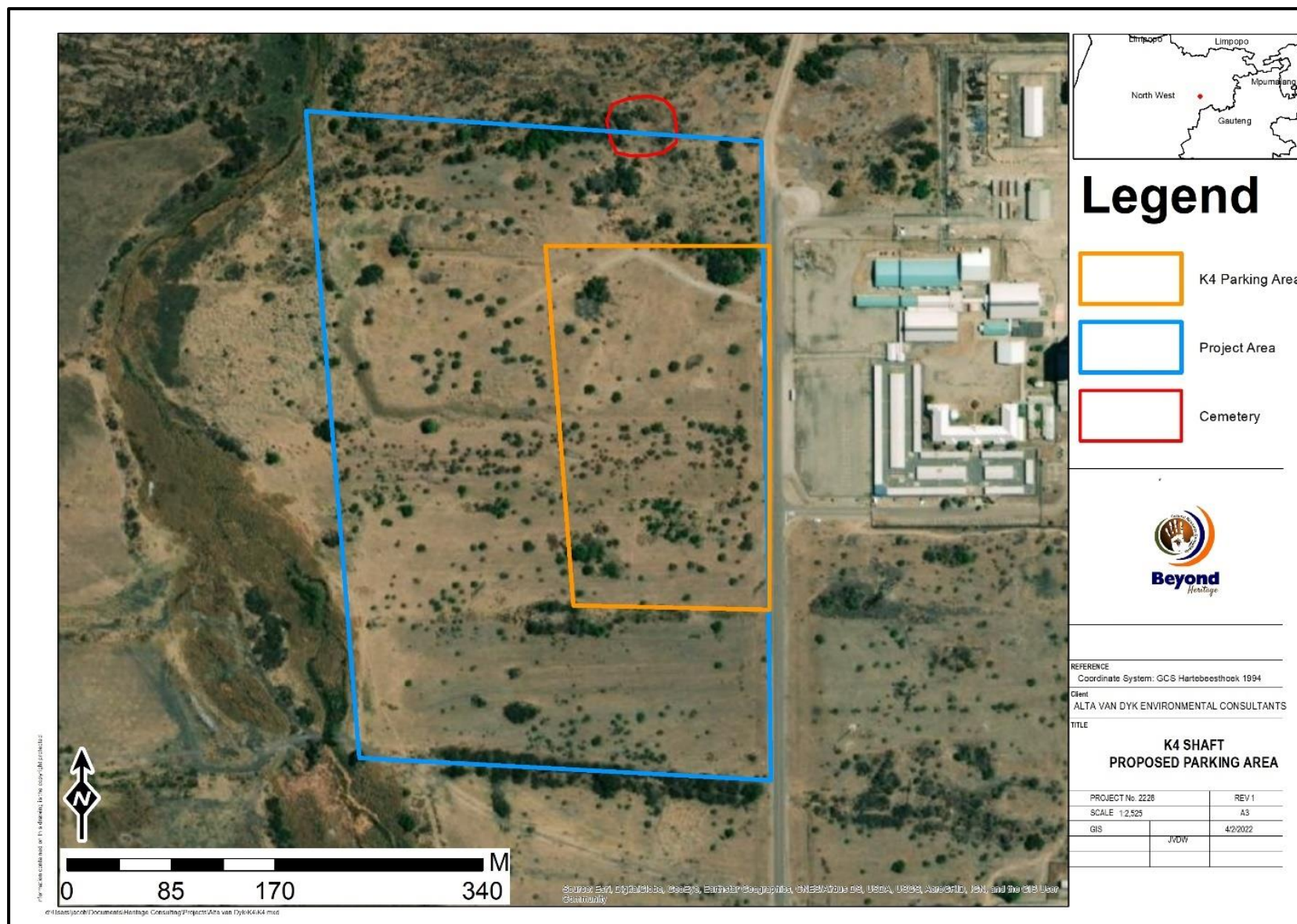


Figure 7:13 Location of cemetery

7.8 Palaeontology

According to the SAHRA Paleontological map the study area is of insignificant paleontological sensitivity and no further studies are required for this aspect (Beyond Heritage, 2022). The yellow polygon on Figure 7:14 indicates the study area. Table 7:10 indicates the paleontological sensitivity rating.

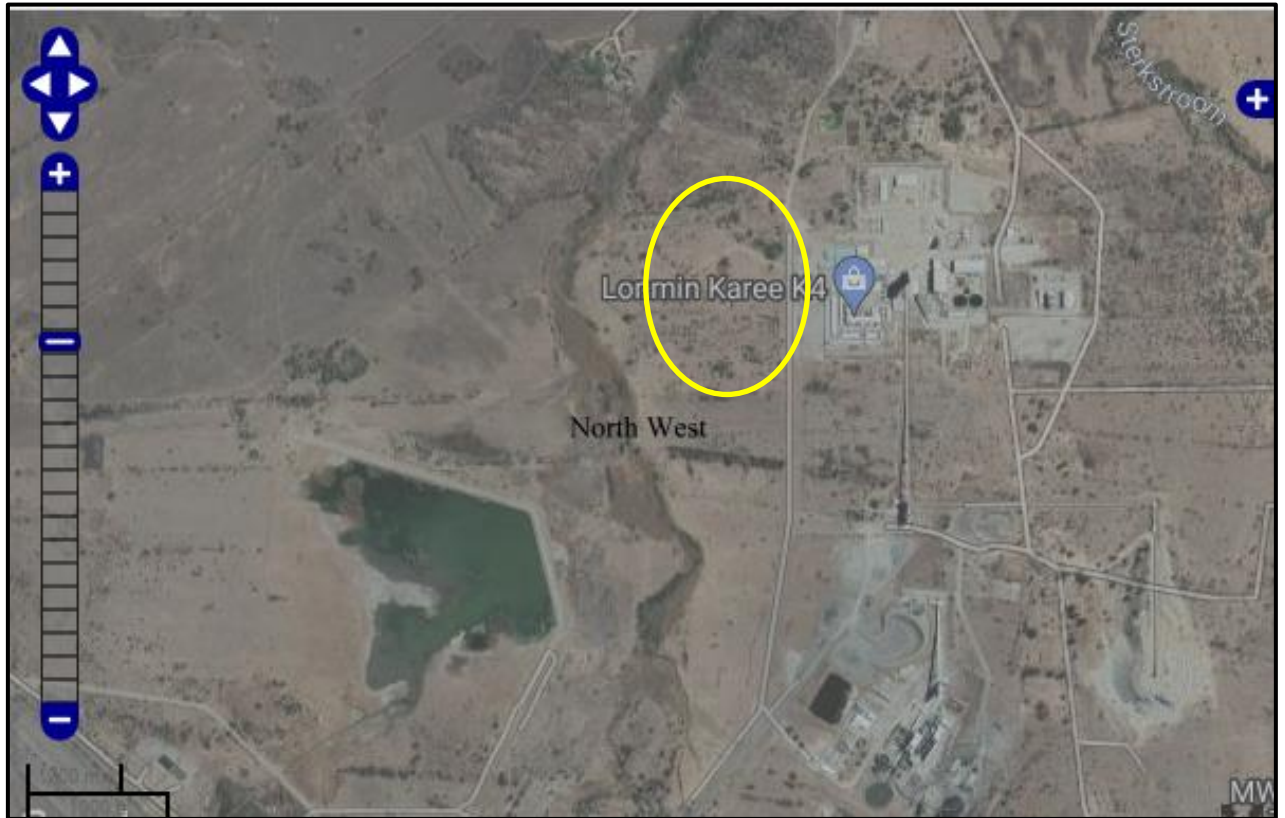


Figure 7:14 Paleontological sensitivity of the approximate study area

Table 7:10 Paleontological sensitivity rating

Colour	Sensitivity	Required Action
Red	Very High	Field assessment and protocol for finds is required
Orange/yellow	High	Desktop study is required and based on the outcome of the desktop study, a field assessment is likely
Green	Moderate	Desktop study is required
Blue	Low	No palaeontological studies are required however a protocol for finds is required
Grey	Insignificant/zero	No palaeontological studies are required
White/clear	Unknown	These areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map

7.9 Air Quality

Information on the air quality was obtained from the Western Platinum Mine Final EIA and EMP (SEF, 2012).

Ambient air quality is determined by the cumulative impact of a variety sources and the meteorological conditions prevalent. Meteorological conditions govern the dispersion, transformation and eventual removal of pollutant from the atmosphere. Ambient concentration levels therefore fluctuate in response to changes

in atmospheric stability, variations in the mixing depth, and shifts in the wind field. Spatial variations and diurnal and seasonal changes in the wind field and stability regime are functions of atmospheric processes operating at various temporal and spatial scales. Sources of air pollution for the North West Province and the Rustenburg Local Municipality (RLM) influencing the Lonmin ambient environment are depicted in Table 7:11.

Table 7:11 Sources of pollutants in the North West Province and Rustenburg (SEF, 2012)

Pollutant	Associated sources
Particulate Matter (PM)	Domestic fuel burning, biomass burning, industrial operations, mining and associated activities, agricultural activities, vehicle entrainment from unpaved roads, informal waste combustion, wind-blown dust from open areas, vehicle tailpipe emissions.
Sulfur dioxide (SO ₂)	Industrial operations, commercial fuel burning appliances, incineration, domestic coal and wood burning, biomass burning, vehicle tailpipe emissions.
Nitrogen dioxide (NO ₂)	Fossil fuel combustion, vehicle tailpipe emissions, industrial processes, biomass burning.
Carbon monoxide	Vehicle tailpipe emissions, industrial operations, commercial fuel burning appliances, domestic fuel burning, biomass burning.
Ozone (O ₃)	Vehicle tailpipe emissions, domestic fuel burning, biomass burning.
Fallout dust (TSP)	Unpaved roads, agricultural activities (seasonal), mining related activities.
Lead (Pb)	Vehicle tailpipe emissions
Benzene (C ₆ H ₆)	Vehicle tailpipe emissions, domestic fuel burning, filling stations,
Methane (CH ₄)	Domestic fuel burning, landfills, biomass burning, wastewater treatment.

Western Platinum activities influence the ambient environment in terms of particulate matter (TSP, PM₁₀ and PM_{2.5}) and sulfur dioxide (SO₂) (as the significant pollutants). Sources include mining and associated activities, vehicle entrainment from paved and unpaved roads, materials handling (i.e. loading and unloading), wind erosion from tailings storage facilities, and emission from the processing activities.

7.10 Noise

Information on noise sources was obtained from the Western Platinum Mine Final EIA and EMP (SEF, 2012).

Noise levels within the Western Platinum mining right area expected to range from 40dBA (decibels) to 50dBA in the surrounding agricultural and residential area. In areas where mining-related activities are predominant, the noise level ranges between 60dBA to 70dBA (Egrosaf, 1997). The main sources of noise at Western Platinum include:

- Open pit mining activities;
- Ventilation fans (shafts);
- Main compressor house;
- Air compressors (shafts);
- Ore transfer points (shafts);

- Pumps (water distribution pumps, tailings pumps etc);
- Vehicular traffic;
- Opencast blasting;
- Crushing and screening; and
- Concentrator plants.

The affected communities are informal settlements, formal residential areas, construction village and mine hostels. With the general trend of decreasing sound power levels by 6 dBA with every doubling of distance from the noise source, it is expected that there will be a significant decrease in noise with an increase of 50m from the noise source.

7.11 Socio-economic

Information on socio-economic aspects was obtained from the Rustenburg Local Municipality's (RLM) Integrated Development Plan (IDP) review report for the financial year 2021/2022.

7.11.1 Demographics

With 645 000 people, the Rustenburg Local Municipality housed 1.1% of South Africa's total population in 2017. Between 2007 and 2017 the population growth averaged 3.05% per annum which is about double than the growth rate of South Africa as a whole (1.56%). Compared to Bojanala Platinum's average annual growth rate (2.34%), the growth rate in Rustenburg's population at 3.05% was slightly higher than that of the district municipality.

Rustenburg Local Municipality's male/female split in population was 118.4 males per 100 females in 2017. The Rustenburg Local Municipality has significantly more males (54.21%) relative to South Africa (48.95%), and what is typically seen in a stable population. This is usually because of physical labour intensive industries such as mining. In total there were 295 000 (45.79%) females and 350 000 (54.21%) males.

In 2017, the Rustenburg Local Municipality's population consisted of 89.89% African (580 000), 8.33% White (53 700), 0.91% Coloured (5 850) and 0.88% Asian (5 660) people.

The largest share of population is within the young working age (25-44 years) age category with a total number of 265 000 or 41.1% of the total population. The age category with the second largest number of people is the babies and kids (0-14 years) age category with a total share of 24.3%, followed by the older working age (45-64 years) age category with 104 000 people. The age category with the least number of people is the retired / old age (65 years and older) age category with only 22 700 people.

8 ENVIRONMENTAL IMPACT ASSESSMENT

8.1 Methodology to be used

The significance of the identified impacts will be determined using an accepted methodology from the Department of Environmental Affairs and Tourism Guideline document on EIA Regulations, April 1998. As with all impact methodologies, the impact is defined in a semi-quantitative way and will be assessed according to methodology prescribed in the following section.

Table 8:1 Scale utilised for the evaluation of the Environmental Risk Ratings

Evaluation Component	Rating Scale and Description/criteria
MAGNITUDE of negative impact (at the indicated spatial scale)	<p>10 - Very high: Bio-physical and/or social functions and/or processes might be <i>severely</i> altered.</p> <p>8 - High: Bio-physical and/or social functions and/or processes might be <i>considerably</i> altered.</p> <p>6 - Medium: Bio-physical and/or social functions and/or processes might be <i>notably</i> altered.</p> <p>4 - Low : Bio-physical and/or social functions and/or processes might be <i>slightly</i> altered.</p> <p>2 - Very Low: Bio-physical and/or social functions and/or processes might be <i>negligibly</i> altered.</p> <p>0 - Zero: Bio-physical and/or social functions and/or processes will remain <i>unaltered</i>.</p>
MAGNITUDE of POSITIVE IMPACT (at the indicated spatial scale)	<p>10 - Very high (positive): Bio-physical and/or social functions and/or processes might be <i>substantially</i> enhanced.</p> <p>8 - High (positive): Bio-physical and/or social functions and/or processes might be <i>considerably</i> enhanced.</p> <p>6 - Medium (positive): Bio-physical and/or social functions and/or processes might be <i>notably</i> enhanced.</p> <p>4 - Low (positive): Bio-physical and/or social functions and/or processes might be <i>slightly</i> enhanced.</p> <p>2 - Very Low (positive): Bio-physical and/or social functions and/or processes might be <i>negligibly</i> enhanced.</p> <p>0 - Zero (positive): Bio-physical and/or social functions and/or processes will remain <i>unaltered</i>.</p>
DURATION	<p>5 - Permanent</p> <p>4 - Long term: Impact ceases after operational phase/life of the activity > 60 years.</p> <p>3 - Medium term: Impact might occur during the operational phase/life of the activity – 60 years.</p> <p>2 - Short term: Impact might occur during the construction phase - < 3 years.</p> <p>1 - Immediate</p>
EXTENT (or spatial scale/influence of impact)	<p>5 - International: Beyond National boundaries.</p> <p>4 - National: Beyond Provincial boundaries and within National boundaries.</p> <p>3 - Regional: Beyond 5 km of the proposed development and within Provincial boundaries.</p> <p>2 - Local: Within 5 km of the proposed development.</p> <p>1 - Site-specific: On site or within 100 m of the site boundary.</p> <p>0 - None</p>

Evaluation Component	Rating Scale and Description/criteria
IRREPLACEABLE loss of resources	5 – Definite loss of irreplaceable resources. 4 – High potential for loss of irreplaceable resources. 3 – Moderate potential for loss of irreplaceable resources. 2 – Low potential for loss of irreplaceable resources. 1 – Very low potential for loss of irreplaceable resources. 0 – None
REVERSIBILITY of impact	5 – Impact cannot be reversed. 4 – Low potential that impact might be reversed. 3 – Moderate potential that impact might be reversed. 2 – High potential that impact might be reversed. 1 – Impact will be reversible. 0 – No impact.
PROBABILITY (of occurrence)	5 - Definite: >95% chance of the potential impact occurring. 4 - High probability: 75% - 95% chance of the potential impact occurring. 3 - Medium probability: 25% - 75% chance of the potential impact occurring 2 - Low probability: 5% - 25% chance of the potential impact occurring. 1 - Improbable: <5% chance of the potential impact occurring.
Evaluation Component	Rating Scale and Description/criteria
CUMULATIVE impacts	High: The activity is one of several similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the natural, cultural, and/or socio-economic resources of local, regional or national concern. Medium: The activity is one of a few similar past, present or future activities in the same geographical area, and might have a combined impact of moderate significance on the natural, cultural, and/or socio-economic resources of local, regional or national concern. Low: The activity is localised and might have a negligible cumulative impact. None: No cumulative impact on the environment.

Once the Environmental Risk Ratings have been evaluated for each potential environmental impact, the Significance Score of each potential environmental impact is calculated by using the following formula:

- **SS (Significance Score) = (magnitude + duration + extent + irreplaceable + reversibility) x probability.**

The maximum Significance Score value is 150.

The Significance Score is then used to rate the Environmental Significance of each potential environmental impact as per Table 8:2 below. The Environmental Significance rating process is completed for all identified potential environmental impacts both before and after implementation of the recommended mitigation measures.

Table 8:2 Scale used for the evaluation of the Environmental Significance Ratings

Significance Score	Environmental Significance	Description/criteria
125 – 150	Very high (VH)	An impact of very high significance will mean that the project cannot proceed, and that impacts are irreversible, regardless of available mitigation options.
100 – 124	High (H)	An impact of high significance which could influence a decision about whether or not to proceed with the proposed project, regardless of available mitigation options.

Significance Score	Environmental Significance	Description/criteria
75 – 99	Medium-high (MH)	If left unmanaged, an impact of medium-high significance could influence a decision about whether or not to proceed with a proposed project. Mitigation options should be relooked
40 – 74	Medium (M)	If left unmanaged, an impact of moderate significance could influence a decision about whether or not to proceed with a proposed project.
<40	Low (L)	An impact of low is likely to contribute to positive decisions about whether or not to proceed with the project. It will have little real effect and is unlikely to have an influence on project design or alternative motivation.
+	Positive impact (+)	A positive impact is likely to result in a positive consequence/effect, and is likely to contribute to positive decisions about whether or not to proceed with the project

8.2 Identified impacts

Most of the potential impacts identified for this project will take place during the construction phase of the project. The construction phase is expected to last approximately 12 months and therefore most of the impacts associated with this project is temporary in nature.

Several potential impacts are associated with the construction activities for this project. These impacts can be categorised as general construction related impacts as well as construction impacts specifically related to this site. General best practice rules to construction should be followed at all times. In addition to this, specific mitigation measures and recommendations are included to avoid or minimise the potential impacts identified. Potential impacts identified during the construction phase of the project is assessed in Table 8:3.

During the operational phase, potential impacts identified are associated with the operation of the parking area, and impacts are generally low even before the implementation of mitigation measures. Impacts identified relate increase in noise in the parking are. Potential impacts identified during the operational phase of the project is assessed in Table 8:4.

During closure of the K4 Shaft, the parking area and entrance road will be demolished, cleared and rehabilitated. Impacts relating to the closure activities will be similar to those activities identified during the construction phase. Potential impacts identified during the closure phase are assessed in Table 8:5.

Table 8:3 Identified impacts during the construction phase of the K4 Shaft parking area and associated infrastructure project

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								Cumulative	Status	RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		Magnitude	Duration	Extent	Irreplaceability	Reversibility	Probability	TOTAL	Significance				Magnitude	Duration	Extent	Irreplaceability	Reversibility	Probability	TOTAL	Significance
Soils																				
Loss of soils due to compaction and erosion.	Construction of parking area and associated infrastructure	4	4	1	4	4	4	68	M	Low	Negative	Strip topsoil in development footprint area and stockpile. No vehicles may drive on topsoil stockpiles. Erosion protection measures must be put in place around topsoil stockpiles. Only proposed access roads to be used to reduce any unnecessary compaction. Compacted areas are to be ripped to loosen the soil structure where necessary during rehabilitation. A rehabilitation strategy focussed on re-vegetation must be initiated after the construction phase. Where possible, construction activities should take place during the dry months in order to minimise erosion from rainwater run-off.	2	4	1	2	2	2	22	L
Contamination of soils due to spillage of hydrocarbons or other hazardous material	Construction of parking area and associated infrastructure	4	4	1	4	4	4	68	M	Low	Negative	Prevent any spills from occurring. Machines must be parked within hard park areas or dedicated parking areas and must be checked daily for fluid leaks. Contractors must have spill kits available to address any unlikely spillages. Hydrocarbons (such as diesel) and other hazardous material must be stored within a bunded area. Contaminated soils must be disposed of at a licensed waste disposal facility.	2	4	1	2	2	2	22	L
Wetlands and surface water																				
The proposed parking area is located in excess of 100 m from the nearest edge of the delineated wetlands and watercourse. Considering this distance, very little impacts are foreseen, with those expected only limited to indirect impacts. There will be no loss or direct disturbance to the wetlands. The parking area will change the current land-use from vegetated to impermeable material, which will ultimately increase overland flows. This could result in the contamination of wetland areas from contaminants accumulating within the parking area (i.e. oil leaks).																				
Increased bare surfaces, surface water runoff and potential for erosion and resulting in increased sedimentation loads to the wetlands	Vegetation clearance, construction of parking area and associated infrastructure	4	4	2	3	3	3	48	M	Low	Negative	Parking area footprint must be demarcated and vegetation clearing limited to the demarcated area. It is critical to spread flows across the system, avoiding incisions in the landscape caused by concentrated flows. Temporary stormwater channels should be filled with aggregate and/or logs (branches included) to dissipate flows. It is recommended that the material surrounding and holding the culverts in place include a coarse rock layer that has been specifically incorporated to increase the porosity and permeability to accommodate flooding and very low flows. The culverts used in the design should be as large as possible, partially sunken and energy dissipating material must be placed at the discharge area of each culvert to prevent erosion of these areas. The use of larger culverts will prevent the build-up of debris by allowing the free movement of debris through the large culverts. Surface run-off from the roads/parking area flowing down the embankments often scours the watercourse on the sides of the culvert causing sedimentation of the channel. This should be catered for with adequate concreted stormwater drainage depressions and channels with energy dissipaters that channel these flows into the river in a controlled manner. Signs of erosion must be addressed immediately to prevent further erosion. Implementation of a Stormwater Management Plan around the parking area.	2	2	1	2	3	2	20	L

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								Cumulative	Status	RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		Magnitude	Duration	Extent	Irreplaceability	Reversibility	Probability	TOTAL	Significance				Magnitude	Duration	Extent	Irreplaceability	Reversibility	Probability	TOTAL	Significance
Contamination of wetlands and surface water with hydrocarbons or other contaminants due to machinery leaks or other spillages.	Construction of parking area and associated infrastructure	4	4	2	3	3	3	48	M	Low	Negative	<p>Storage of potential contaminants in bunded areas.</p> <p>All contractors must have spill kits available and be trained in the correct use thereof.</p> <p>All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping".</p> <p>No cleaning or servicing of vehicles, machines and equipment in delineated wetlands and buffer zones.</p> <p>Adequate sanitary facilities and ablutions must be provided for all personnel throughout the project area. Chemical toilets may not be placed within 100m of any delineated wetlands.</p> <p>All waste generated on-site must be adequately managed and separated and recycled of different waste materials should be supported.</p> <p>All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site.</p>	2	2	1	2	3	2	20	L
Biodiversity - Flora																				
The majority of the project area no longer represents CBA2 area as assigned by the North West Biodiversity Sector Plan. The project area does however contain unique habitat features such as the drainage line and rock outcrops, in addition to the more sensitive ridge and wetland areas.																				

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								Cumulative	Status	RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		Magnitude	Duration	Extent	Irreplaceability	Reversibility	Probability	TOTAL	Significance				Magnitude	Duration	Extent	Irreplaceability	Reversibility	Probability	TOTAL	Significance
Destruction of habitats, ecosystems and loss of CBA2.	Construction of parking area and associated infrastructure	6	4	2	3	3	4	72	M	Low	Negative	<p>All planned activities should be realigned to prioritise development within the 'Very Low' to 'Low' sensitivity areas. It is recommended that areas to be developed/disturbed be specifically demarcated so that during the construction/activity phase, only the demarcated areas be impacted upon. The sensitive ridge area in the north-western corner of the project area is to be demarcated as a strict 'no-go' area. All construction related activities must avoid this area and a 50 m buffer is to be temporarily fenced off and maintained during the entire clearing and construction process. No staff are to be allowed access into this area.</p> <p>Any indigenous woody material that is removed during construction can be shredded and used in conjunction with the topsoil to augment soil moisture and prevent erosion. Large wooded stumps or branches may be used to enhance the local habitat features and encourage herpetofauna.</p> <p>Areas of dense and healthy indigenous vegetation, even secondary communities outside of the direct project footprint, should not be fragmented or disturbed further. This is particularly relevant to the Rock Outcrops and Drainage Line. All vehicles and personnel must make use of the existing roads and walking paths, especially construction/operational vehicles.</p> <p>All laydown, chemical toilets etc. should be restricted to 'Very Low' sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction/closure phase has been concluded.</p> <p>Areas that are denuded during construction that are not within the proposed footprint area need to be re-vegetated with indigenous vegetation to prevent erosion during flood events and strong winds and to support the adjacent habitat. This will also reduce the likelihood of encroachment by alien invasive plant species.</p> <p>It should be made an offence for any staff to take/bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants.</p> <p>Rocks removed during the construction phase may be used in areas where erosion control needs to be performed. Alternatively, they may be piled adjacent to rick areas beyond the park area to create useful habitat features for herpetofauna. Leaking equipment and vehicles must be repaired immediately or be removed from project area to facilitate repair.</p> <p>A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas.</p> <p>A fire management plan needs to be compiled and implemented to restrict the impact that fire might have on remaining natural and newly rehabilitated areas. Natural areas remaining adjacent to the development footprint should be left to naturally regenerate, fire and cutting control methods are not to be used to clear areas containing natural indigenous vegetation. A firebreak surrounding the parking area is recommended.</p>	2	4	1	2	2	2	22	L
Spread and/or establishment of alien and/or invasive species	Construction of parking area and associated infrastructure	4	4	3	3	3	3	51	M	Low	Negative	<p>The implementation of the Alien Invasive Plant management plan is very important, especially because of the invasive species identified on site which, if left unchecked, will continue to grow and spread prolifically leading to further and more significant deterioration to the health of the natural environment within the project area. The plan must especially pertain to any recently cleared and changed areas, this will include the edge effects created by the new parking area. The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Road footprints must be kept to prescribed widths.</p>	4	3	1	2	2	2	24	L
Biodiversity - Fauna																				

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								Cumulative	Status	RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		Magnitude	Duration	Extent	Irreplaceability	Reversibility	Probability	TOTAL	Significance				Magnitude	Duration	Extent	Irreplaceability	Reversibility	Probability	TOTAL	Significance
Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, dust, vibration and poaching).	Construction of parking area and associated infrastructure	4	5	2	5	5	2	42	M	Low	Negative	<p>No trapping, killing, or poisoning of any wildlife is to be allowed. Signs must be put up to enforce this. These actions are illegal in terms of provincial environmental legislation.</p> <p>A qualified environmental control officer must be on site when clearing begins. The area must be walked through prior to construction to ensure that no faunal species remain in the habitat and get killed. Should animals not move out of the area on their own relevant specialists must be contacted to advise on how the species can be relocated.</p> <p>Any holes/deep excavations must be dug in a progressive manner in order to allow burrowing animals time to move off and to prevent trapping. Should the holes remain open overnight they must be covered temporarily to ensure no fauna species fall in.</p> <p>The proposed area to be developed must be disturbed by walking the area, prior to clearing of the area. This will allow fauna to move off from the area.</p> <p>The areas to be developed (or activity areas) must be specifically demarcated to prevent the movement of staff or equipment/vehicles into the surrounding environments. Signs must be put up to enforce this.</p> <p>The duration of the construction should be minimized to as short a term as possible, to reduce the period of disturbance on fauna.</p> <p>Outside lighting should be designed and limited to minimize impacts on fauna. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (yellow) lights should be used wherever possible.</p> <p>All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must be enforced to ensure that road killings and erosion is limited. Speed bumps should be built to force slow speeds.</p> <p>Noise must be kept to a minimum during the evenings/ at night to minimize all possible disturbances to amphibian species and nocturnal mammals.</p>	2	5	2	5	5	1	19	L
Introduction of nuisance vectors (pests) such as rodents and baboons	Construction of parking area and associated infrastructure	4	2	1	2	1	3	30	L	Low	Negative	<p>Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site.</p> <ul style="list-style-type: none"> • Refuse bins must be emptied and secured; • Temporary storage of domestic waste shall be in covered waste skips; and • Maximum domestic waste storage period must be 10 days. <p>Any litter, spills, fuels, chemical and human waste in and around the project area must be removed and disposed of timeously and responsibly.</p> <p>It must be made an offence to litter or dump any material outside of specially demarcated and managed zones. Signs and protocols must be established to explain and enforce this.</p> <p>A minimum of one toilet must be provided per 10 persons. Portable toilets must be regularly pumped dry to ensure that the system does not degrade over time and spill into the surrounding area.</p> <p>The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility.</p> <p>Where a registered disposal facility is not available close to the project area, the Contractor/property owner shall provide a method statement with regards to waste management. Under no circumstances may domestic waste be burned on site.</p> <p>Waste may never be stored in an open pit where it is susceptible to the elements such as wind and rain.</p>	2	2	1	1	1	2	14	L
Heritage																				

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								Cumulative	Status	RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		Magnitude	Duration	Extent	Irreplaceability	Reversibility	Probability	TOTAL	Significance				Magnitude	Duration	Extent	Irreplaceability	Reversibility	Probability	TOTAL	Significance
Destruction, damage, alteration or removal of the original position of archaeological and paleontological material or objects	Construction of parking area and associated infrastructure	4	5	2	5	5	2	42	M	Low	Negative	The cemetery must be indicated on development plans, with a 50m buffer zone. The cemetery should be considered a no-go area. No development is allowed to take place within the cemetery or buffer zone. Demarcate the cemetery and 50m buffer zone as a no-go area with danger tape or similar product, prior to the commencement of the development. Should a grave or other archaeological artefact be uncovered during the construction phase, implement the chance find procedure.	2	5	2	5	5	1	19	L
Noise																				
General rise in ambient noise levels	Construction of parking area and associated infrastructure	4	2	2	1	1	4	40	M	Low	Negative	Construction only take place during daylight hours. A complaints register must be available at the construction site office. Complaints must be attended to immediately and a close out report to be filed.	2	2	2	1	1	2	16	L
Air Quality																				
Increased dust fallout	Construction of parking area and associated infrastructure	4	2	1	1	1	4	36	L	Low	Negative	Develop and implement a dust monitoring programme for the construction phase of the project. Dust-reducing mitigation measures must be put in place and must be strictly adhered to, particularly for all dirt roads and any earth dumps. This includes the wetting of exposed soft soil surfaces and not conducting activities on windy days which will increase the likelihood of dust being generated. Only environmentally friendly suppressants may be used to avoid the pollution of water sources. Set speed limits to 40 km/h to minimise the creation of fugitive dust within the project boundary. Speed bumps should also be constructed, if required.	2	2	1	1	1	2	14	L
Social																				
Benefits resulting from employment and income opportunities created by the construction of the parking area	Construction of parking area and associated infrastructure	4	2	2	2	1	3	33	L	Low	Positive	Develop a clear and concise employment policy prioritising local employment. Employ local works if qualified applicants with the appropriate skills are available. Purchase goods and services at a local level if available.	6	2	2	2	1	4	52	M
Influx of people and construction workers leading to increased pressure on social services and infrastructure	Construction of parking area and associated infrastructure	4	2	2	2	1	3	33	L	Low	Negative	Develop a clear and concise employment and recruitment policy that prioritizes local recruitment. Ensure that contractors adhere to this policy. Identify and support community development programmes that address challenges raised by population influx and spontaneous settlement. Support local government capacity for integrated development planning. Prepare a detailed vocational training program in consultation with the local community to be implemented during the construction phase. Through the stakeholder engagement process ensure that expectations are managed around employment opportunities and practice.	6	2	2	2	1	4	52	M

Table 8:4 Identified impacts during the operational phase of the K4 Shaft parking area and associated infrastructure project

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								Cumulative	Status	RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		Magnitude	Duration	Extent	Irreplaceability	Reversibility	Probability	TOTAL	Significance				Magnitude	Duration	Extent	Irreplaceability	Reversibility	Probability	TOTAL	Significance
Surface water and wetlands																				
Contamination of wetlands and surface water with hydrocarbons or other contaminants due to machinery leaks or other spillages.	Operation of parking area	2	4	1	3	2	5	60	M	Low	Negative	Maintenance of vehicles should not be permitted within the parking area.	1	4	1	3	1	5	50	M
Increased surface water run-of into wetlands and watercourses	Operation of parking area	2	3	1	3	5	2	28	L	Low	Negative	Implementation of a Stormwater Management Plan for surface water run-off. Surface run-off from the roads/parking area flowing down the embankments often scours the watercourse on the sides of the culvert causing sedimentation of the channel. This should be catered for with adequate concreted stormwater drainage depressions and channels with energy dissipaters that channel these flows into the river in a controlled manner.	2	5	1	3	5	1	16	L
Soils																				
No additional impacts are expected during the operational phase.																				
Biodiversity - Fauna and Flora																				
No additional impacts are expected during the operational phase.																				
Heritage																				
No additional impacts are expected during the operational phase.																				
Noise																				
No additional impacts are expected during the operational phase.																				
Air Quality																				
No additional impacts are expected during the operational phase.																				
Social																				
No additional impacts are expected during the operational phase.																				

Table 8:5 Identified impacts during the closure phase of the K4 Shaft parking area and associated infrastructure project

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								Cumulative	Status	RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		Magnitude	Duration	Extent	Irreplaceability	Reversibility	Probability	TOTAL	Significance				Magnitude	Duration	Extent	Irreplaceability	Reversibility	Probability	TOTAL	Significance
Soils																				
Loss of soils due to compaction and erosion.	Demolishing of parking area and access road	2	2	1	2	2	4	36	L	Low	Negative	Compacted areas are to be ripped to loosen the soil structure where necessary during rehabilitation. A rehabilitation strategy focussed on re-vegetation must be initiated during the closure phase. Where possible, construction activities should take place during the dry months in order to minimise erosion from rainwater run-off.	2	4	1	2	2	2	22	L
Contamination of soils due to spillage of hydrocarbons or other hazardous material	Demolishing of parking area and access road	2	2	1	2	2	4	36	L	Low	Negative	Prevent any spills from occurring. Machines must be parked within hard park areas or dedicated parking areas and must be checked daily for fluid leaks. Contractors must have spill kits available to address any unlikely spillages. Hydrocarbons (such as diesel) and other hazardous material must be stored within a bunded area. Contaminated soils and other material must be disposed of at a licensed waste disposal facility.	2	4	1	2	2	2	22	L
Wetlands and surface water																				
Increased bare surfaces, surface water runoff and potential for erosion and resulting in increased sedimentation loads to the wetlands	Demolishing of parking area and access road	2	2	1	2	2	4	36	L	Low	Negative	It is critical to spread flows across the system, avoiding incisions in the landscape caused by concentrated flows. Temporary stormwater channels should be filled with aggregate and/or logs (branches included) to dissipate flows. Signs of erosion must be addressed immediately to prevent further erosion. Implementation of a Stormwater Management Plan around the parking area.	2	2	1	2	3	2	20	L
Contamination of wetlands and surface water with hydrocarbons or other contaminants due to machinery leaks or other spillages.	Demolishing of parking area and access road	2	2	1	2	2	4	36	L	Low	Negative	Storage of potential contaminants in bunded areas. Spill kits must be available to clean hydrocarbon spillages immediately. No cleaning or servicing of vehicles, machines and equipment in delineated wetlands and buffer zones. Adequate sanitary facilities and ablutions must be provided for all personnel throughout the project area. Chemical toilets may not be placed within 100m of any delineated wetlands. All waste generated on-site must be adequately managed and separated and recycled of different waste materials should be supported. All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site.	2	2	1	2	3	2	20	L
Biodiversity - Flora																				
Re-vegetation of the area	Demolishing of parking area and access road	2	2	1	2	2	4	36	L	Low	Negative	Before seeding, any topsoil and mulched vegetation should be spread across the bare soil areas to a depth of between 50 mm and 100 mm. Implementation of a rehabilitation plan for the area, focussing on re-vegetation.	2	4	1	2	2	2	22	L
Spread and/or establishment of alien and/or invasive species	Demolishing of parking area and access road	2	2	1	2	2	4	36	L	Low	Negative	The implementation of the Alien Invasive Plant management plan is very important, especially because of the invasive species identified on site which, if left unchecked, will continue to grow and spread prolifically leading to further and more significant deterioration to the health of the natural environment within the project area. The plan must especially pertain to any recently cleared and changed areas, this will include the edge effects created by the new parking area.	4	3	1	2	2	2	24	L
Heritage																				
No additional impacts expected during the closure phase.																				
Noise																				

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								Cumulative	Status	RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		Magnitude	Duration	Extent	Irreplaceability	Reversibility	Probability	TOTAL	Significance				Magnitude	Duration	Extent	Irreplaceability	Reversibility	Probability	TOTAL	Significance
General rise in ambient noise levels	Demolishing of parking area and access road	2	2	1	2	2	4	36	L	Low	Negative	Demolition only take place during daylight hours. A complaints register must be available at the Shaft office. Complaints must be attended to immediately and a close out report to be filed.	2	2	2	1	1	2	16	L
Air Quality																				
Increased dust fallout	Demolishing of parking area and access road	4	2	1	1	1	4	36	L	Low	Negative	Develop and implement a dust monitoring programme for the operational phase of the project. Dust-reducing mitigation measures must be put in place and must be strictly adhered to, particularly for all dirt roads and any earth dumps. This includes the wetting of exposed soft soil surfaces and not conducting activities on windy days which will increase the likelihood of dust being generated. Only environmentally friendly suppressants may be used to avoid the pollution of water sources. Set speed limits to 40 km/h to minimise the creation of fugitive dust within the project boundary. Speed bumps should also be constructed, if required.	2	2	1	1	1	2	14	L
Social																				
No additional impacts expected during the closure phase.																				

9 FINANCIAL PROVISION

Information on Financial Provision was obtained from Western Platinum Mine's Final Environmental Impact Assessment and Environmental Management Programme (SEF, 2012).

9.1 Overall goal for mine closure

The overall goal for reclamation and closure of the Marikana Mine is to re-instate a final land use which would match the surrounding bushveld/thornveld as far as possible, and/or acceptable, predetermined land-use by the community, ensuring that the land is stable and safe in the long-term, taking into account the unavoidable remaining, but reclaimed mining residue.

9.2 Guiding principles for mine closure

The guiding principles that have been adopted to direct/guide closure planning at Marikana are as follows:

- Closure planning would include compilation of a closure plan complying with relevant local legislation, and specifically the criteria stipulated in the MPRDA, as well as with international best practices in order to facilitate the receipt of a closure certificate and eventual site relinquishment;
- Closure planning would be conducted progressively and refined as information becomes available, resulting in an appropriate and up-to-date closure plan at the time of closure;
- Risk-based approaches would be applied, as necessary, with closure planning and the application of these approaches would be at the base of the development of the closure plans leading up to the final/detailed closure plan;
- Closure measures would be guided by current land use planning which aims at re-instating a suitable land capability over as large as possible reclaimed mine site to facilitate the implementation and maintenance of the planned post-closure land-use;
- The closure measures conceptualised and eventually stipulated in the closure plan/s for implementation will limit the potential adverse effects of the closed site on the receiving environment, and thereby ensure that the quality of life of the surrounding/resident communities is not compromised after closure by possible threats to the health and safety of people and their animals;
- The success and performance of the above closure measures would be demonstrated and confirmed by suitable monitoring and measurement for an adequate period of time to be confident in the outcome of the monitoring and measurement;
- Closure measures would be sustainable under foreseeable natural events;
- Consideration would be given to the possible transfer of portions of the site and/or surface infrastructure that could be beneficially re-used after mining to third parties. These transfers may contribute to a sustainable socio-economic benefit to the region in which mining has taken place;
- Involvement of stakeholders would be undertaken in a meaningful manner to inform closure planning by reflecting local requirements, priorities and preferences, as well as the requirements as stipulated in local and provincial planning and Integrated Development Plans (IDPs);
- Concurrent reclamation and eventual closure-related reclamation of land disturbed by mining will be conducted to achieve pre-determined post-mining/end land uses acceptable to resident communities;
- The closed site would be reclaimed in such a manner that the agreed key biodiversity attributes applicable to the local environment within which the facility is located are replicated on the site itself, and/or that the site contributes to the overall biodiversity requirement for the local area;
- Priority would be given to the use of locally available natural materials and/or vegetation as opposed to imported/synthetic material and/or exotic vegetation to improve/add to the 'natural' feel of the reclaimed facility. Moreover, the measures provided would be appropriate for a remote area within an arid area; and

- A “walk away from” outcome with limited residual care and maintenance requirements would be sought. In this regard, proven sustainable passive measures would be favoured over measures that require on-going maintenance and/or active care (treatment).

9.3 Unscheduled closure

The three-year closure scenario forecast for Marikana is premised on the following:

- Platinum and associated metals are valuable resources and whilst reserves are available demand for their exploitation will exist;
- Given the cyclic nature and the volatility in the resource market it is at best difficult, if not impossible, to predict the likely closure situation that will exist in the unlikely event of unscheduled closure, especially considering taking final land use as the basis for such as costing exercise. Hence, the three-year scenario forecast provides a realistic time horizon to predict the most likely situation in the case of such an event;
- The next land use is key to the above scenario forecast and in terms of this approach has to be revised and updated at a three year frequency, gradually progressing towards the final land use on which the scheduled closure costs are based;
- Within the next land use perspective, assets that have value to sustain the next land use and/or can be beneficially reused are not dismantled /removed but maintained for this purpose. Allowance is made in the costs for making good and/or fit for purpose of these assets; and
- The onus is on Sibanye-Stillwater to ensure that the required planning and associated preparation is in place to ensure that the next land use could be implemented as predicated by the scenario forecast in the unlikely event of unscheduled closure. Allowance is made in the costing for this planning.

Within the above context, the only possible impediments to a “seamless” transition of the mining operation to a third party are the condition or functionality of key mining infrastructure to maintain production, and possible latent environmental related risks that could deter others from taking these on. The approach followed for unscheduled closure planning addresses both these possible impediments by making allowance for improvements to infrastructure and environmental clean-up to facilitated transition/handover, whilst the associated closure cost provision are adequate not to leave the DMR financially exposed during the process of arranging transfer of ownership of the mine.

9.4 Scheduled closure

Scheduled closure is premised upon the fact that, at the end of life of mine, the platinum and associated metal resources would have largely been depleted and it would be unlikely that a third party would be willing to take over the mining related infrastructure in its fully operational state at that time. Limited/reduced mining could still continue, using some of the mining infrastructure, and/or some of the infrastructure could be beneficially transferred to the surrounding communities. Nevertheless, most of the mining infrastructure would be redundant and would have to be demolished to facilitate the implementation of the final (end-state) land use. Hence, for scheduled closure it was assumed that most of the mining infrastructure will be decommissioned, dismantled/demolished, disturbed areas rehabilitated and the demolition waste safely disposed. Remaining contamination and environmental threats will also be addressed.

9.5 Closure objectives

9.5.1 Unscheduled closure

The closure objectives for the unscheduled situation that would inter alia facilitate “seamless” transfer of mining infrastructure and activities to a third party are as follows:

- Dismantle /remove superfluous infrastructure as per the latest site-wide inventory and rehabilitate associated disturbed footprint areas;
- Rehabilitate and close mining residues that do not have a beneficial use with the next land use;
- Make good the surface infrastructure and mining residues (including TDFs) that will remain on the mine site for the next land use;
- Make-up the backlog in surface rehabilitation of the open pits and related betterments for the next land use mining to continue mining without impediments;
- Conduct general surface rehabilitation to leave a neat and tidy overall mine site behind at the time of transfer;
- Conduct environmental clean-up that the next land use is not compromised/adversely affected by possible physical effects and chemical contaminants from the remaining mine infrastructure/areas and /or from the previous mining activities;
- Identify and assess possible health and safety threats to continued mining and correct;
- Identify, quantify and execute additional aspects/work to facilitate transition of operational mining complex to third party.

9.5.2 Scheduled closure

Scheduled closure will only occur when the economically recoverable resources on site have been largely mined out, the scheduled closure objectives would entail the following:

- Dismantle /remove infrastructure as per the end state site-wide inventory and rehabilitate associated disturbed footprint areas;
- Transfer surface infrastructure and/or mining components as per the inventory for beneficial reuse by others/third parties;
- Rehabilitate and close mining residues in a manner that will not compromise the final land use;
- Make good the surface infrastructure and mining residues that will remain on the mine site for the final land use;
- Conduct final surface rehabilitation of the open pits and related betterments in a manner that will not compromise the final land use;
- Conduct general surface rehabilitation to leave a neat and tidy overall mine site behind;
- Conduct environmental clean-up that the final land use is not compromised/adversely affected by possible physical effects and chemical contaminants from the remaining mine infrastructure/areas and /or from the historical mining activities;
- Identify and assess possible health and safety aspects posing a threat to the final land use;
- Re-instate a suitable land-use capability over as large as possible an area of the rehabilitated mine site with the aim to facilitate the implementation and maintenance of the planned end state land-use;
- Leaving behind a rehabilitated mine site with indigenous and/or appropriate vegetation on relevant rehabilitated areas such that the biodiversity is largely re-instated over time, as well as protecting the undisturbed areas to maintain/enhance the biodiversity of these areas beyond mine closure.

9.6 Closure cost assessment

A summary of the closure cost assessment for the K4 Shaft Parking area is provided in Table 9:1. The detailed assessment is available in Appendix G. This closure cost assessment will be included in Marikana Mine's annual closure cost assessment and the financial guarantee will be updated.

Table 9:1 Summary of the K4 Shaft parking area closure cost assessment

K4 Parking Area			
Closure components		Unscheduled Closure (2021)	Scheduled Closure (2035)
1	Infrastructural aspects	R 4 763 147	R 4 763 147
2	Mining aspects	R 0	R 0
3	General surface rehabilitation	R 448 969	R 448 969
4	Surface water reinstatement	R 0	R 0
	Sub-Total 1	R 5 212 117	R 5 212 117
5	Post-Closure Aspects		
5.1	Post-Closure Aspects	R 138 949	R 138 949
	Sub-Total 2	R 138 949	R 138 949
6	Additional Allowances		
6.1	Preliminary and general	R 312 727	R 312 727
6.2	Contingencies	R 402 133	R 402 133
	Sub-Total 3	R 714 860	R 714 860
	Grand Total Excl. VAT. (Sub-total 1 + 2 + 3)	R 6 065 925	R 6 065 925

10 CONCLUSIONS AND RECOMMENDATIONS

This chapter summarises the key findings of the Basic Assessment study and presents the EAP's conclusion and recommendations.

10.1 Summary of potential impacts

A summary of the assessment of potential environmental impacts associated with the proposed project is provided in Table 9:1. The mitigated assessment assumes that technical design controls, as included in the project description, together with mitigation measures included would be implemented when the proposed project is constructed and operated. Most impacts identified had a significance rating of Medium without implementing mitigation measures, and could be reduced to a Low significance rating after implementing the proposed mitigation measures.

Table 10:1 Summary of significance of the potential impacts of the proposed project

Potential impact	Without mitigation measures	With mitigation measures	+/-
Impacts during construction phase			
Loss of soils due to compaction and erosion.	Medium	Low	-
Contamination of soils due to spillage of hydrocarbons or other hazardous material	Medium	Low	-
Increased bare surfaces, surface water runoff and potential for erosion and resulting in increased sedimentation loads to the wetlands	Medium	Low	-
Contamination of wetlands and surface water with hydrocarbons or other contaminants due to machinery leaks or other spillages.	Medium	Low	-
Destruction of habitats, ecosystems and loss of CBA2.	Medium	Low	-
Spread and/or establishment of alien and/or invasive species	Medium	Low	-
Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, dust, vibration and poaching).	Medium	Low	-
Introduction of nuisance vectors (pests) such as rodents and baboons	Low	Low	-
Destruction, damage, alteration or removal of the original position of archaeological and paleontological material or objects	Medium	Low	-
General rise in ambient noise levels	Medium	Low	-
Increased dust fallout	Low	Low	-

Potential impact	Without mitigation measures	With mitigation measures	+/-
Benefits resulting from employment and income opportunities created by the construction of the parking area	Low	Low	+
Influx of people and construction workers leading to increased pressure on social services and infrastructure	Low	Low	-
Impacts during operational phase			
Contamination of wetlands and surface water with hydrocarbons or other contaminants due to machinery leaks or other spillages.	Medium	Low	-
Increased surface water run-of into wetlands and watercourses	Low	Low	-
Impacts during the closure phase			
Loss of soils due to compaction and erosion.	Low	Low	-
Contamination of soils due to spillage of hydrocarbons or other hazardous material	Low	Low	-
Increased bare surfaces, surface water runoff and potential for erosion and resulting in increased sedimentation loads to the wetlands	Low	Low	-
Contamination of wetlands and surface water with hydrocarbons or other contaminants due to machinery leaks or other spillages.	Low	Low	-
Re-vegetation of the area	Low	Low	-
Spread and/or establishment of alien and/or invasive species	Low	Low	-

10.2 Summary of specialist findings

10.2.1 Agricultural compliance statement

One dominant soil form was identified within the assessment corridor, namely the Arcadia soil form. The land capability sensitivities (DAFF, 2017) indicate land capabilities with “Moderate” sensitivities, which correlates with the findings from the baseline assessment. The regulated area is not associated with any arable soils, predominantly due to the climate, which in itself limits crop production significantly. It is the specialist’s opinion that the proposed development will have no impacts on the agricultural production ability of the land and that no segregation of high production arable land will take place. Therefore, the proposed development may be favourably considered.

10.2.2 Hydropedology

One hydropedological type has been identified within the slope relevant to the proposed activities, namely responsive (shallow and responsive). The latter mentioned responsive zone is associated with overland flow

during rainfall events. It is predicted that the proposed parking area will have the same dominant flow paths as that of the natural hillslope (overland flow). Therefore, it is the specialist's opinion that very little to no impacts are expected towards the hillslope hydrology.

10.2.3 Wetlands

Two wetland HGM units were identified within the 500 m regulated area, of which only one (HGM 1-floodplain) can be measurably affected by the proposed parking area development. The present ecological state of HGM 1 has been determined to be "Largely Modified" with the average ecosystem service score classified as being "Moderately High". The importance and sensitivity of HGM 1 has been scored "Very High". Additionally, a 22 m buffer has been recommended to ensure the conservation of the relevant wetland during the construction and operational phase of the proposed parking area.

Assuming the adherence to all prescribed mitigation measures, especially respecting the 22 m no-go buffer zone, all post-mitigation significance ratings associated with the relevant aspects have been scored "Low". Considering these low scores, it is recommended that the proposed activities proceed as have been planned. No-go areas include the delineated wetlands as well as their associated buffer zones. Due to the low residual risks for the project, a General Authorisation is permissible for the project.

10.2.4 Biodiversity

The majority of the project area no longer represents CBA2 area as assigned by the North West Biodiversity Sector Plan, and only the delineated wetland habitat may be regarded as aquatic ESA1 area. This is largely due to the fact that most of the area has experienced long-term and continuous disturbance, mostly in the form of burning, cutting and human/vehicle ingress. The project area does however contain unique habitat features such as the drainage line and rock outcrops, in addition to the more sensitive ridge and wetland areas. Thus, it is very important that the management outcomes presented above be adhered to, in order to mitigate the negative expected environmental impacts that will stem from the development activities. These include:

- The loss and fragmentation of vegetation communities;
- The safe movement of faunal species; and
- The direct and indirect loss and disturbance of floral and faunal species and communities.

Completion of the terrestrial biodiversity assessment led to a disputing of the 'Very High' classification for the terrestrial biodiversity theme sensitivity as allocated by the National Environmental Screening Tool. The majority of the project area has instead been assigned a 'Very Low' to 'Low' sensitivity, because of the significant levels of environmental disturbance that have taken place and the fact that no SCC were observed - or are very likely to occur. It is noted that two small areas have been assigned higher sensitivities, with the wetland allocated a 'Medium' sensitivity and the ridge allocated a 'High' sensitivity. These two areas maintain healthy portions and diversities of unique indigenous vegetation and faunal communities, and the wetland may support the occasional foraging of avifaunal SCC.

The portion of land within the project area that is classified as having a sensitivity rating of 'Very Low', namely the Degraded Savannah habitat, is likely to face minimal further impacts from any development activities, and as such the proposed activities may proceed within these areas. The fragmented habitats that have been allocated a 'Low' sensitivity rating (including the rock outcrops and drainage line) have been avoided.

The two areas assigned 'Medium' and 'High' sensitivities (namely the wetland and ridge habitats respectively) must be avoided, and the ridge should be given a 50 m buffer. The proposed development footprint was overlayed with the delineated habitat map, and it was found that it does not intrude on any of these requirements. Should the development maintain this general footprint layout, then there are no fatal flaws

for this project and the proposed activities may commence, following the mitigation measures put forward in the assessment.

The development footprint occurs within the 500 m regulation area for a wetland and as such development must follow the guidelines stipulated in the project wetland assessment.

10.2.5 Heritage

The proposed parking area was previously cultivated and more recently disturbed by mining activities. Examination of historical topographic maps and aerial images showed no structures or stone walled settlements occurred in the impact footprint and the study area is considered to be of low heritage potential. This was confirmed during the site visit and no heritage finds of significance was recorded during the survey. A small cemetery was however noted more than 50 meters north of the proposed new parking area and will not be directly impacted. According to the SAHRA Paleontological sensitivity map the study area is of insignificant paleontological significance, no further studies are required for this aspect.

No adverse impact on heritage resources is expected by the project and it is recommended that the project can commence on the condition that the following recommendations are implemented as part of the EMP and based on approval from SAHRA.

- Implementation of a chance find procedure for the project.
- The recorded cemetery must be indicated on development plans and avoided with a 50-meter buffer.

10.3 Sensitive areas

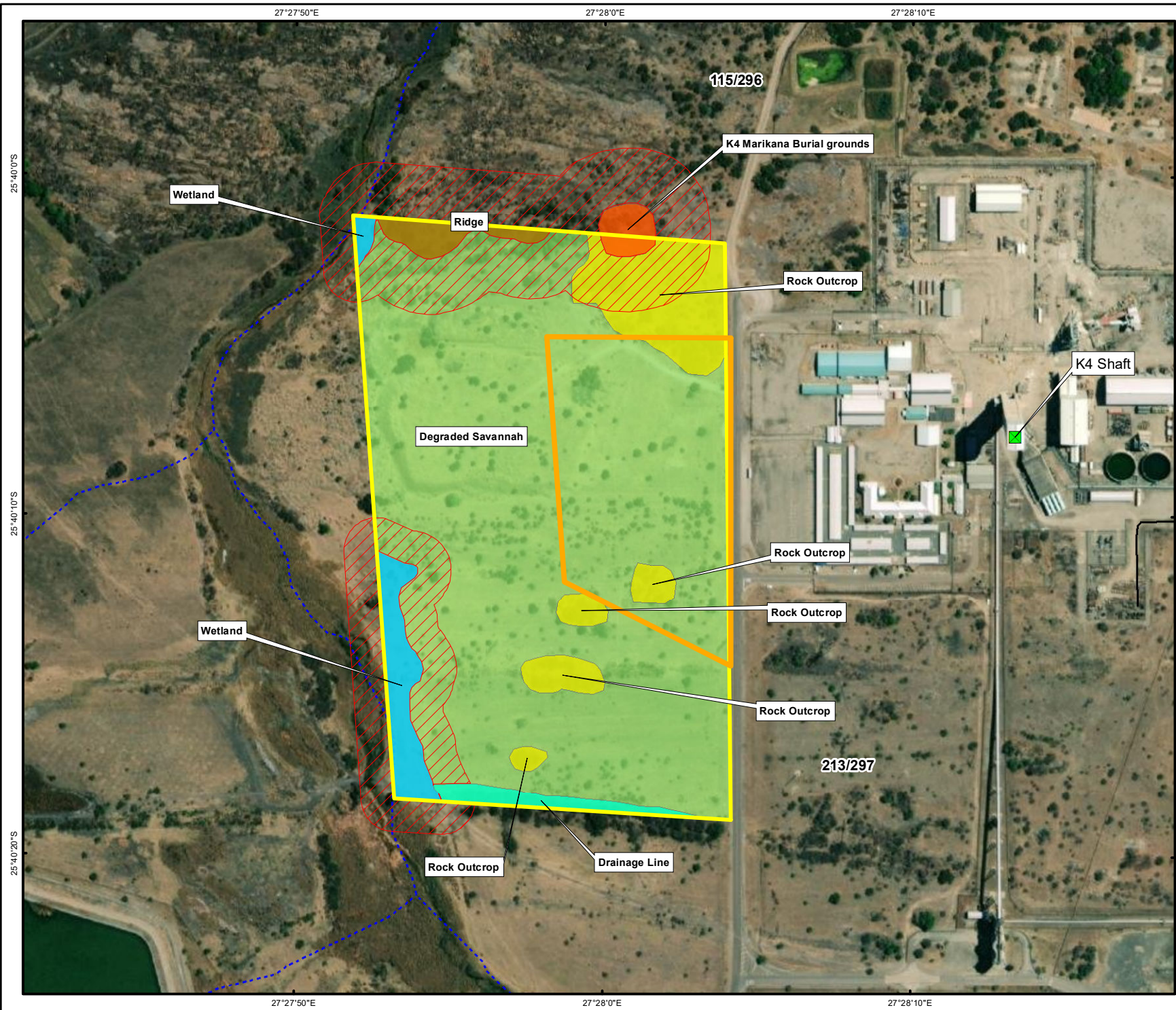
The following sensitive areas in around the proposed K4 Parking Area have been identified:

- Delineated wetlands and watercourses (no-go area);
- Graveyard (no-go area); and
- Ridge area (no-go area).

The following buffer zones have been included around the no-go areas (which is also considered a no-go area):

- Delineated wetlands: 30m
- Graveyard: 35m buffer zone
- Ridge: 50m buffer zone.

Refer to Figure 10:1 which indicates sensitive areas relevant to the proposed K4 Shaft parking area.

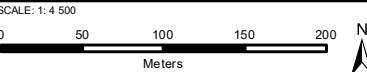
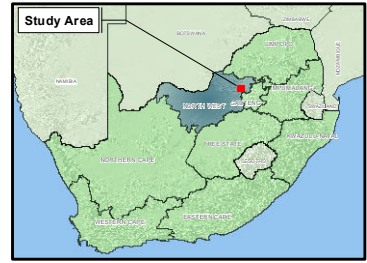


Legend

- Study area
- Proposed Parking Area
- K4 Shaft
- Street/Road
- Railway
- Non-Perennial River

Habitat Type

- Drainage Line
- K4 Marikana Burial grounds
- Ridge
- Rock Outcrop
- Wetland
- Degraded Savannah
- No Go Areas



TITLE:
Figure 9:1 Sensitive areas around the proposed K4 Shaft parking area

CLIENT:
Sibanye-Stillwater

DATE: June 2022	PROJECT: K4_SHAFT_PA
DRAWN: THURLOW MAPPING	APPROVED: KP
MAP SENS_AREAS_K4_SHAFT_PA_REV1.mxd	REV: 0

Alta van Dyk Environmental Consultants cc (2011/059764/23)
VAT No: 4630259952
Tel: 012 940 9457
Fax: 086 634 3967
Cell: 062 782 4005



Projection: Transverse Mercator CM: 27 Datum: WGS 84
Source: Chief Directorate National Geo-Spatial Information,
ESRI World Imagery Layer - 2021
Inset: ESRI Data and Maps

SIZE:
A4

10.4 Period for which the environmental authorisation is required

It is recommended that the period for which the environmental authorisation is required is ten (10) years.

10.5 Environmental impact statement

The proposed parking area and associated infrastructure at the K4 Shaft is not fatally flawed in any way. The construction impacts and operational impacts, if effectively managed as per the mitigation measures recommended in this report and the EMPr, will have a low residual significance rating.

Most of the potential impacts identified for this project will take place during the construction phase of the project. The construction phase is expected to last approximately 12 months and therefore most of the impacts associated with this project are temporary in nature.

The no-go option will entail not constructing the proposed K4 Shaft parking area and associated infrastructure, and to continue as per the current status quo and environmental baseline. In addition, no impact on the bio-physical or social environment would not occur.

Should the proposed K4 Shaft parking area project not go-ahead, there will not be adequate parking space for vehicles of personnel working at K4 Shaft once the mine has ramped up to full production. Personnel would have to make alternative arrangements for transport, or they will park on side of the road close to the mine entrance, as the current parking area at the shaft is not sufficient for the expected increase in personnel.

In addition, buses and taxis will stop at the mine entrance to drop-off personnel working at the mine. This could potentially create congestion on the road and entrance to the mine area, and could create an unsafe environment for other vehicles and pedestrians using the road.

Although the proposed parking area falls within a Critical Biodiversity Area, as per the NWBSP, the terrestrial biodiversity study confirmed that the majority of the study area no longer represents a Critical Biodiversity Area, as most of the area has experienced long term and continuous disturbance.

As indicated in Section 8 of this report, all negative environmental impacts identified during the basic assessment can be reduced to low significance with the implementation of various mitigation measures. The no-go option is therefore not preferred.

It is the recommendation of the EAP that the proposed K4 Shaft parking area and associated infrastructure project is approved and allowed to proceed, on the assumption that the environmental and social mitigation measures as outlined in this report and the EMPr are adhered to, the project description remains as per the description provided in this document.

11 UNDERTAKING BY THE EAP

In accordance with Appendix 1 of the NEMA EIA Regulations, 2014, as amended, this serves as an affirmation by the Environmental Assessment Practitioner (EAP) in relation to:

Section 3(1)(r)

An undertaking under oath or affirmation by the EAP in relation to-

- (i) The correctness of the information provided in the reports;
- (ii) The inclusion of comments and inputs from stakeholders and I&APs;
- (iii) The inclusion of inputs and recommendations from the specialist reports where relevant; and
- (iv) Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.

AVDE and the EAP managing this project hereby affirm that:

- To the best of our knowledge the information provided in the report is correct, and no attempt has been made to manipulate information to achieve a particular outcome. Some information, especially pertaining to the project description, was provided by the applicant and/or their sub-contractors.
- To the best of our knowledge, all comments and inputs from stakeholders and interested and affected parties have been captured in the report and no attempt has been made to manipulate such comment or input to achieve a particular outcome. Written submissions are appended to the report while other comments are recorded within the report. For the sake of brevity, not all comments are recorded verbatim and are mostly captured as issues, and in instances where many stakeholders have similar issues, they are grouped together, with a clear listing of who raised which issue(s).
- Information and responses provided by the EAP to interested and affected parties are clearly presented in the report. Where responses are provided by the applicant (not the EAP), these are clearly indicated.



Signature of Environmental Assessment Practitioner

Alta van Dyk Environmental Consultants cc

Name of Company

30/08/2022

Date

12 REFERENCES

- Alta van Dyk Environmental Consultants (AVDE), 2021. Sibanye-Stillwater Marikana Operations Integrated Water and Waste Management Plan. Project Reference: 005-079, April 2021.
- Beyond Heritage, 2022. Heritage Impact Assessment for Western Platinum – Marikana Operations’ proposed parking area at its K4 Shaft, located near Marikana, North West Province. Reference Number: 2228. April 2022.
- Hydrological Environmental Engineering Solutions (Pty) Ltd (HEES), 2022. Stormwater Management Plan for Parking Extension at K4 Shaft
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- Strategic Environmental Focus (SEF), 2012. Western Platinum Mine Final Environmental Impact Assessment and Environmental Management Programme. Reference Number: 504381. November 2012.
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- The Biodiversity Company (TBC1), 2022. Hydropedological Assessment for the proposed K4 Parking Area. February 2022.
- The Biodiversity Company (TBC3), 2022. Terrestrial Biodiversity Compliance Statement, and Associated Management Plans, for the proposed K4 Shaft New Parking Area Project. February 2022.
- The Biodiversity Company (TBC4), 2022. Wetland Baseline and impact assessment for the proposed K4 Parking Area. February 2022.

13 APPENDICES

APPENDIX A: CURRICULUM VITAE OF THE EAP

APPENDIX B: SCREENING TOOL REPORT

APPENDIX C: PUBLIC PARTICIPATION DOCUMENTATION

APPENDIX C1: COMMENT AND RESPONSE REPORT

APPENDIX C2: MINUTES OF MEETINGS

APPENDIX C3: PROOF OF SITE NOTICES

APPENDIX C4: BACKGROUND INFORMATION LETTER

APPENDIX C5: BIL EMAILS SENT

APPENDIX C6: ADVERTISEMENT

APPENDIX C7: NOTIFICATION LETTER OF DRAFT BAR AVAILABILITY

APPENDIX C8: NOTIFICATION EMAILS SENT

APPENDIX C9: LIST OF STAKEHOLDERS

APPENDIX D: PHOTOGRAPHS OF SITE

APPENDIX E: SPECIALIST STUDIES

APPENDIX E1: AGRICULTURAL COMPLIANCE STATEMENT

APPENDIX E2: TERRESTRIAL BIODIVERSITY REPORT

APPENDIX E3: WETLAND REPORT

APPENDIX E4: HERITAGE IMPACT ASSESSMENT

APPENDIX F: ENVIRONMENTAL MANAGEMENT PROGRAMME

APPENDIX G: CLOSURE COST ASSESSMENT