Integrated Environmental Authorisation Applications for Modikwa Platinum Mine
South 3 Opencast Project

Draft Biodiversity Impact Assessment for Modikwa Platinum Mine South 3 Project

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Document Control

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Glossary of term

Term	Definition
Alien Invasive Species	An exotic species that can spread rapidly and displace native species causing damage to the environment.
Biodiversity	Term used to describe the variety of life on Earth and is defined as "the variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems" (Secretariat of the Convention on Biological Diversity, 2005).
Cities	The Convention on International Trade in Endangered Species of Wild Fauna and Flora.
Endangered Species	Means a species is endangered when it is facing a very high risk of extinction in the wild in the near future and includes— (a) Any living or dead specimen of such a species; or (b) Any egg, skin, bone, feather, seed, flower or any other part or derivative of such a species.
Environment	Means the surroundings within which humans exist and that are made up of— (a) The land, water and atmosphere of the earth; (b) Microorganisms, plant and animal life; (c) Any part or combination of (a) and (b) and the interrelationships amongst and between them; and (d) The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.
Indigenous Plant	(a) Means any living or dead plant which is indigenous to the Republic, whether artificially propagated or in its wild state; and (b) Includes the flower, pollen, seed, cone, fruit, bulb, tuber, stem or root or any other part or derivative of such plant but does not include a plant declared a weed in terms of any legislation.
Protected Area	A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values. (IUCN Definition 2008).
Protected Environment	Means an area declared a Protected Environment or Private Nature Reserve in terms of section 21 (1) (a).
Rare Species	Means a species of fauna and flora referred to in section 68 (a) (ii), and includes— (a) any living or dead specimen of such a species; or (e) any egg, skin, bone, feather, seed, flower or any other part or derivative of such a species.

List of acronyms

Acronym	Term
ALARP	As Low as Reasonably Practicable
BES	Biodiversity and Ecosystem Services
CARA	Conservation of Agricultural Resources Act
CBA	Critical Biodiversity Area
CBD	Convention on Biological Diversity
CR	Critically Endangered
ESA	Ecological Support Areas
EN	Endangered
GIS	Geographical Information System
I&APS	Interested & Affected Parties
IPPC	International Plant Protection Convention
IUCN	International Union for Conservation of Nature
LC	Least Concern
NBF	National Biodiversity Framework
NEMA	National Environmental Management Act (Act 107 of 1998)
NEMBA	National Environmental Management Biodiversity Act
NFEPA	National Freshwater Ecosystem Priority Areas
NT	Near Threatened
PA	Protected Areas
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
VU	Vulnerable

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1 Introduction

Segope Water and Environmental Services was appointed by Modikwa Platinum Mine to undertake a Biodiversity Impact Assessment on the proposed opencast mine on Winterveld farm 293 KT in the Fetakgomo Tubatse Local municipality in the Limpopo Province.

1.1 Project Background

Anglo American Platinum Rustenburg Platinum Mines Limited (RPM) and African Rainbow Minerals Mining Consortium Limited (ARM MC), as part of a Joint Venture, are applying to amend their existing approved Modikwa Platinum Mine (MPM) South 2 Shaft Environmental Management Programme (EMP) which was approved in 2014 (DMR Reference: LP 30/5/1/2/3/2(129) to include the proposed additional South 3 Opencast Project and mining related infrastructures and activities associated with their South 3 Opencast Operation.

The South 3 Opencast Project is situated on the Winterveldt 293 KT Farm, which is owned by the Samancor Chrome Mine, MPM is in the process of finalizing a lease agreement. Access to South 3 Project area is through a gravel road which joins a tarred road leading to R555 in Steelpoort town which then joins the regional road (R37) from Burgersfort.

1.2 Project Description

In terms of the Protocol for the Specialist Assessment and Minimum Reporting Content Requirements for Environmental Impacts on Terrestrial Biodiversity (GN R. 320 of 2020), prior to the commencement of a specialist assessment, the current use of the land and the potential environmental sensitivity of the site under consideration as identified by the screening tool, must be confirmed by undertaking a site sensitivity verification. The results of the screening tool, together with the site sensitivity verification, ultimately determine the minimum report content requirements.

The results of the Screening Report generated for the proposed South 3 Opencast Mine project ,show that the relative terrestrial biodiversity theme sensitivity is classified as VERY HIGH due to proposed site falling within a Critical Biodiversity Area (CBA)1 , CBA 2,Ecological Support Area (ESA) 1 ,and ESA2. (Figure 3.7). According to Section 3 (1) of GN R. 320, 'an applicant intending to undertake an activity identified in the scope of this protocol, on a site identified on the screening tool as being of "very high sensitivity" for terrestrial biodiversity, must submit a Terrestrial Biodiversity Specialist Assessment'.

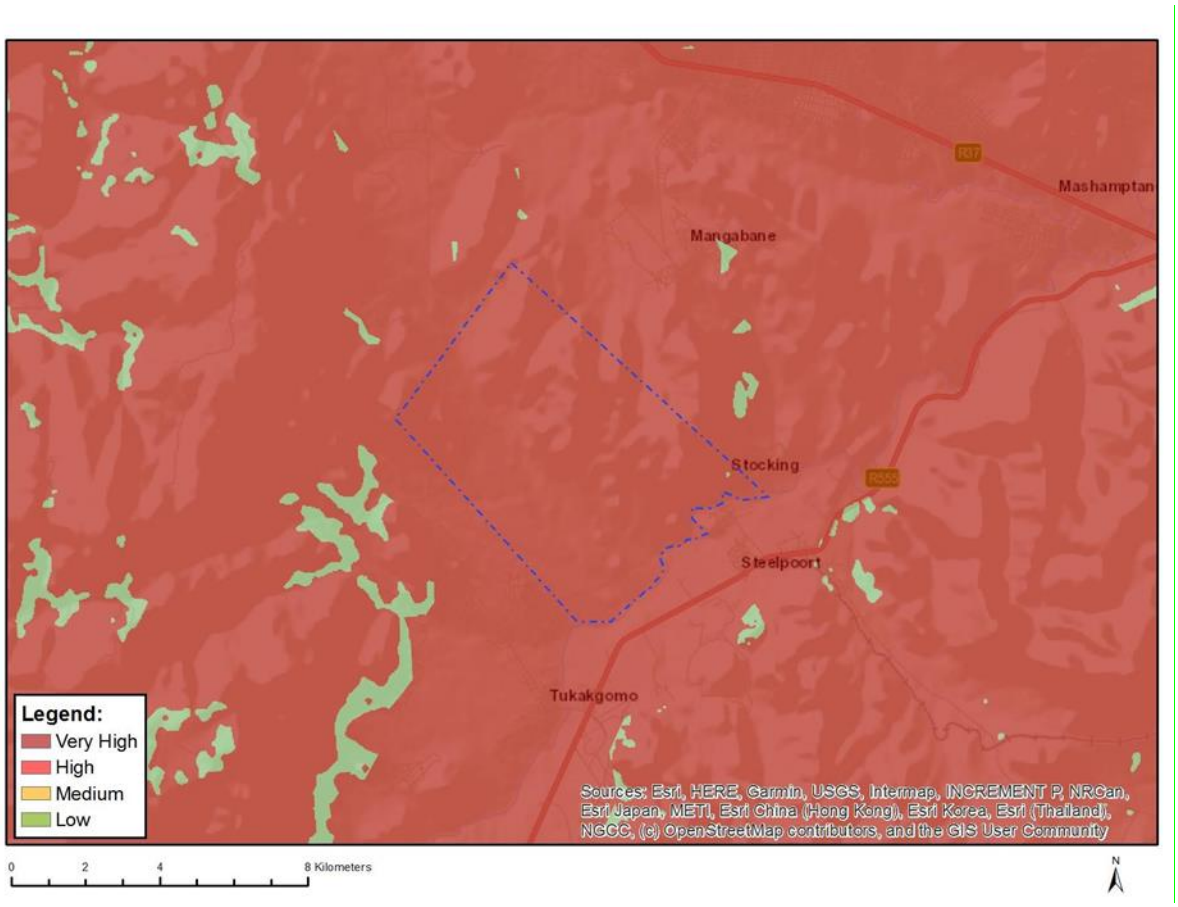

Figure 1: Map of relative terrestrial biodiversity theme

1.3 Study Area

MPM is located approximately 20 km west of Burgersfort and 18 km north of Steelpoort on the Eastern Limb of the Bushveld Complex, within Fetakgomo Tubatse Local Municipality (FTLM) in the Sekhukhune District Municipality of the Limpopo Province. MPM's mining area includes portions of the farms: Maandagshoek 254 KT, Driekop 253 KT, Hendrikplaats 281 KT, Onverwacht 292 KT and Winterveld 293 KT. Specific reference given to Winterveld 293 KT.

1.4 Terms of reference

The terms of reference for this report were to:

- Assess the potential impacts the proposed opencast mine would have on both the fauna and flora of the proposed site.
- Provide mitigation measures, a rehabilitation plan and if required vegetation removal procedures to reduce the potential impacts of the development on the biodiversity.

2 Scope of Assessment

2.1 Floral Study

The scope of work with regards to the floral study was to:

- Identify the current state of the vegetation on the proposed site.
- Determine the species found on the proposed site.
- Identify the sensitivity of the vegetation types, critical biodiversity areas and ecological support areas.
- Determine the presences of any alien plant species and recommend management plan.
- Provide monitoring requirements, mitigation measures and recommendations.

2.2 Faunal Study

The scope of work for the faunal study was to:

- Describe the microhabitats that exist within the proposed site and the species that are associated with the habitat.
- Provide a species composition and conservation status in terms of protected, endangered, or vulnerable.

3 Legal Framework

This specialist assessment was conducted in alignment with the regulatory and legislative requirements for environmental management in South Africa. The environmental legislation relevant to the proposed development is summarised below.

Table 1: Legislative Framework

Legislation	Description	Relevance
The Constitution, 1996 (Act No. 108 of 1996).	The Constitution of the Republic of South Africa is the supreme law of the land. As a result, all laws, including those pertaining to this Management Plan, must conform to the Constitution. The Bill of Rights - Chapter 2 of the Constitution, includes an environmental right (Section 24) according to which, everyone has the right: a) To an environment that is not harmful to their health or well-being; and b) To have the environment protected for the benefit of present and future generations, through reasonable legislative and other measures that: i. Prevent pollution and ecological degradation; ii. Promote conservation; and iii. Secure ecologically sustainable development and use of natural resources	The proponent has an obligation to ensure that the proposed activity will not result in pollution and ecological degradation, as well as an obligation to ensure that the proposed development is ecologically sustainable, while demonstrating economic and social development

Legislation	Description	Relevance
	while promoting justifiable economic and social development.	
National Environmental Management Act (NEMA), 1998 (Act No. 108 of 1998)	The objective of NEMA is: "To provide for cooperative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote cooperative governance and procedures for coordinating environmental functions exercised by organs of state; and to provide for matters connected therewith." This report has been guided by the NEMA Principles detailed in Section 2 of the Act. NEMA introduces the "duty of care" concept, which is based on the policy of strict liability. This duty of care extends to the prevention, control and rehabilitation of significant pollution and environmental degradation. It also dictates a duty of care to address emergency incidents of pollution. A failure to perform this duty of care may lead to criminal prosecution, and may lead to the prosecution of responsible persons, including companies, for the conduct of the legal persons.	The undertaking of a specialist study, in this case, the terrestrial biodiversity study, in order to identify potential impacts on the terrestrial environment and to recommend mitigation measures to minimize these impacts, complies with Section 28 of NEMA. The developer must apply the NEMA principles, the fair decision-making and conflict management procedures that are provided for in NEMA.
NEMA EIA Regulations (2014, as amended)	The NEMA EIA Regulations (2014, as amended) aim to avoid detrimental environmental impacts through the regulation of specific activities that cannot commence without prior environmental authorization. Authorisation either requires a Basic Assessment or a Full Scoping and Environmental Impact Assessment, depending on the type of activity. These assessments specify mitigation and management guidelines to minimize negative environmental impacts and optimize positive impacts. Should any portion of an area be proposed for development (after proclamation) these Regulations should be consulted	An application for Environmental Authorisation (as triggered by the EIA 2014 Regulations, as amended) is required to be submitted to the Competent Authority.
NEMA Public Participation	Public consultation is a legal requirement throughout the EIA process. Developers are required to conduct public consultation throughout the Basic Assessment process.	The Public Participation Process (PPP) to be followed will be described in detail in the Basic Assessment Report. The draft

Legislation	Description	Relevance
Guidelines (General Notice 807 of 2012	Formal EIA documents are required to be made available for public review, which include the project brief, Draft and Final BARs, and the decision of the Competent Authority. According to Regulation 41(2) of the NEMA EIA Regulations 2014 (as amended 2017) "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"	ecological report (this report), will be attached to the Draft BAR and will undergo a formal 30-day public commenting and review period. All proof and correspondence will be available in the Draft and Final BARs. No comments have been received to date that relates to the terrestrial ecological environment
National Environmental Management: Biodiversity Act (NEMBA), 2004 (Act No. 10 of 2004)	The National Environmental Management: Biodiversity Act (NEMBA), No. 10 of 2004, aims to assist with the management and conservation of South Africa's biological diversity through the use of legislated planning tools. These planning tools include the declaration of bioregions and the associated bioregional plans as well as other mechanisms for managing and conserving biodiversity. The objectives of the Act include inter alia: • The management and conservation of biological diversity within the Republic and of the components of such biological diversity; • The use of indigenous biological resources in a suitable manner; • The fair and equitable sharing of benefits arising from bio-prospecting of genetic material derived from indigenous biological resources; and • To give effect to ratified international agreements relating to biodiversity which are binding on the Republic. • To provide for co-operative governance in biodiversity management and conservation; and • To provide for a South African National Biodiversity Institute to assist in achieving the objectives of the Act. • In addition to this, Sections 50-62 of the Act provide details relating to the protection of threatened or protected ecosystems and species, while Sections 63-77 of the Act provide details relating to alien and invasive species with the purpose of preventing their introduction and spread, managing,	Activities may not be carried out in threatened or protected ecosystems without first gaining authorization for such activities. No protected species may be removed or damaged without a permit.

Legislation	Description	Relevance
	controlling and eradicating of alien and invasive species	
NEMBA National List of Threatened Ecosystems (GNR 1002 of 2011)	The National List of Ecosystems is in place for the ecosystems that are threatened and in need of protection. The NEMBA provides for listing of threatened or protected ecosystems in one of the following categories: • Critically endangered (CR) ecosystems, being ecosystems that have undergone severe degradation of ecological structure, function or composition as a result of human intervention and are subject to an extremely high risk of irreversible transformation; • Endangered (EN) ecosystems, being ecosystems that have undergone degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems; • Vulnerable (VU) ecosystems, being ecosystems that have a high risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems or endangered ecosystems; • Protected ecosystems, being ecosystems that are of high conservation value or of high national or provincial importance, although they are not listed as critically endangered, endangered or vulnerable.	An invasive species management, control and eradication plan for land/activities under their control should be developed, as part of their environmental plans in accordance with Section 11 of NEMA.
NEMBA: Alien Invasive Species Regulations (2014)	The Alien and Invasive Species Regulations (2014) categories the different types of alien and invasive plant and animal species and how they should be managed: • Category 1a Listed Invasive Species – species which must be combatted or eradicated.	An invasive species management, control and eradication plan for land/activities under their control should be developed, as part of their environmental plans in accordance with Section 11 of NEMA.

Legislation	Description	Relevance
	• Category 1b Listed Invasive Species – species which must be controlled. • Category 2 Listed Invasive Species – species which require a permit and must not be allowed to spread outside of the designated area. • Category 3 Listed Invasive Species – species which are subject to exemptions in terms of section requiring a permit, but where such a species occurs in riparian areas, must, for the purposes of these regulations, be considered to be a Category 1b Listed Invasive Species and must be managed according to regulation 3	
Terrestrial Biodiversity Protocol (2020)	This protocol provides the criteria for the specialist assessment and minimum report content requirements for impacts on aquatic biodiversity for activities requiring EA. This protocol replaces the requirements of Appendix 6 of the EIA Regulations 2014, GN R. 982 (as amended), published under NEMA.	The screening tool identified the site footprint as falling within an area of "Very High Sensitivity" for Terrestrial Biodiversity, due to the presence of a Terrestrial Ecological Support Area (ESA) 1 within the site. This triggered the need for a full Terrestrial Biodiversity Assessment. This assessment and report comply with Terrestrial Biodiversity Protocol
Plant and Animal Species Protocols (GN R. 1150 2020), and the associated Species Environmental Assessment Guideline (SANBI, 2020)	These protocols provide the criteria for the specialist assessment and minimum report content requirements for impacts on plant and animal species diversity for activities requiring EA. This protocol replaces the requirements of Appendix 6 of the EIA Regulations 2014, GN R. 982 (as amended), published under NEMA.	The screening tool indicates that the site falls within low and medium sensitivity areas in terms of terrestrial plant and animal species sensitivity, respectively. This assessment and report comply the Plant and Animal Species Protocols, as well as the Species Environmental Assessment Guideline.
Conservation of Agricultural Resources Act (Act 43 of 1983)	This act regulates the utilization and protection of wetlands, soil conservation and all matters relating thereto; control and prevention of veld fires, control of weeds and invader plants, the prevention of water pollution resulting from farming practices and losses in biodiversity.	
National Forest Act (Act 84 of 1998)	The main objective of the National Forests Act, 1998 is to promote the sustainable management and development of forests and to provide protection for certain forests	

Legislation	Description	Relevance
	and trees. This said protection is provided through the protection of all natural forests (Section 7 (1), the protection of all trees declared to be protected in terms of section 12(1) of the Act, and the regulation of certain activities in a proclaimed State forest (Section 23(1)(a) – (k)). It should be noted that there is other environmental legislation administered by other State Departments that also regulate natural resources. The Act is responsible for: • Promotes the sustainable management and development of forests for the benefit of all; • Creates the conditions necessary to restructure forestry in South Africa; • Provide special measures for the protection of certain forests and protected trees; • Promotes the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes; • Promotes community forestry; and • Promotes greater participation in all aspects of forestry and the forest products industry by persons disadvantaged by unfair discrimination.	

4 Site Characteristics

4.1 Geology and soils

The Sekhukhune Plains Bushveld is known for its complex geology consisting of the Rustenburg Layered Suite on the eastern lobe of the Bushveld Igneous Complex. The zones are dominated by belts of norite, gabbro, anorthosite and pyroxenite with localised protrusions of magnetite, chromatite, serpentinised, harzburgite, olvine diorite, shale, dolomite and quartzite. The deep, loamy Valsriver soils are found on the plains, while the shallow Glenrosa soils are characteristic of the low-lying, rocky hills (Mucina and Rutherford, 2006).

The Sekhukhune Mountain Bushveld is dominated by rocks associated with the eastern Rustenburg Layered Suite of the Bushveld Igneous Complex with three sub suites or zones, the Croydon, Dwars River and Dsjate present. These are made up of norite, pyroxenite, anorthosite, and gabbro. A wide

variety of soils are present associated with the complex geological composition (Mucina and Rutherford, 2006).

4.2 Climate

The Sekhukhune Plains Bushveld is known for its dry winter and summer rainfall with the average between 400-600 mm per annum. Very little frost occurs and the mean daily temperatures range between 37.3°C and -0.9°C. The Sekhukhune Mountain Bushveld has a MAP of 500-700mm with infrequent frost (Mucina and Rutherford, 2006).

4.3 Regional vegetation

The proposed site falls into the Sekhukhune Plains Bushveld vegetation type, it is also surrounded by the Sekhukhune Mountain Bushveld (Mucina and Rutherford 2006).

4.3.1 Sekhukhune Plains Bushveld

This vegetation type had previously been classified as Mixed Bushveld (Acocks, 1953, Low and Rebelo, 1996). It occurs widely throughout the Limpopo Province, occurring mostly in lower river basins and plains at an altitude of between 700 - 1 100 m.

The area is mainly semi-arid plains with open valleys associated with the small hills and mountains running parallel to the larger escarpment mountains. Predominantly found is closed thornveld with a variety of Aloes and other succulents (Muncina and Rutherford, 2006). Erosion dongas are prominent in the clay rich soils of the area (Mucina and Rutherford, 2006).

4.3.2 Sekhukhune Mountain Bushveld

The Sekhukhune Mountain Bushveld (SVcb 28) was previously known as the Sourish Mixed Bushveld (Acocks, 1953) or the Mixed Bushveld (Low and Rebelo, 1996). Siebert et al. 2002) called it the Kirkia wilmsii-Terminalia prunioides Closed Mountain Bushveld, Combretum hereroense-Grewia vernicosa Open Mountain Bushveld, Hippobromus pauciflorus-Rhoicissus tridentate Rock Outcrop Vegetation.

This vegetation type is found within the Limpopo and Mpumalanga provinces and is comprised of mountains and undulating landscapes. It is known to be dry with open to closed micro-phyllus and broad-leaved savanna. On the mountain slopes, the bushveld vegetation is taller in the valleys with a well-developed herb layer. In the dryer habitats, a number of xerophytic adapted species are present (Mucina and Rutherford, 2006).

4.4 Regional Sensitivity

4.4.1 Sekhukhune Plains Bushveld

Sekhukhune Plains Bushveld occurs mainly on semi-arid plains and open valleys between chains of hills and small mountains that run parallel to the escarpment. It is dominated by short, open to close thornveld with an abundance of Aloe species and other succulents. It is heavily degraded in some places and overexploited by man for cultivation, mining and urbanisation. Both man-made and natural erosion dongas occur in areas containing clays rich in heavy metals. Encroachment by indigenous microphyllous trees and invasion by alien species is common throughout the area. There is a high level of degradation of much of the remaining vegetation by unsustainable harvesting and utilisation. (Manjwe 2021). The vegetation type's conservation status is regarded as **Endangered.**

4.4.2 Sekhukhune Mountain Bushveld

Sekhukhune Mountain Bushveld occurs on dry, open to closed microphyllous and broad-leaved savanna on hills and mountain slopes that form concentric belts parallel to the northeastern escarpment. This open bushveld is often associated with having ultramafic soils on southern parts. The bushveld on ultramafic soils contain a high diversity of edaphic specialists. The Bushveld of mountain slopes are generally taller than those in the valleys, and a well-developed herb layer. The bushveld found in the valleys and dry northern aspects are usually dense, like thicket, with an herbaceous layer that comprises of many short-lived perennials. Dry habitats contain a number of species with xerophytic adaptations, such as succulence and underground storage organs. Both man-made and natural erosion dongas occur on footslopes of clays rich in heavy metals. An increasing area along the Dwars River Subsuite is under pressure from mining activities and its associated urbanisation. (Manjwe 2021). This vegetation type's conservation status is regarded as **Least Concern**.

4.5 Limpopo Conservation Plan

Conservation plan (C-plan) is a strategic plan used to enables us to identify the most important natural resources and preserve an interconnected network of healthy ecosystems. The ecosystems are then divided into different categories which include: critical biodiversity areas (CBA), ecological support areas (ESA), protected area (PA) and other natural areas (ONA).

The proposed site for the South 3 opencast project falls within CBA1- these areas are maintained to a natural or near natural state to ensure that the existing ecological services and functioning of the ecosystem are able to continue. As well as ESA 2- these areas are required to provide support to the functioning of the CBA.

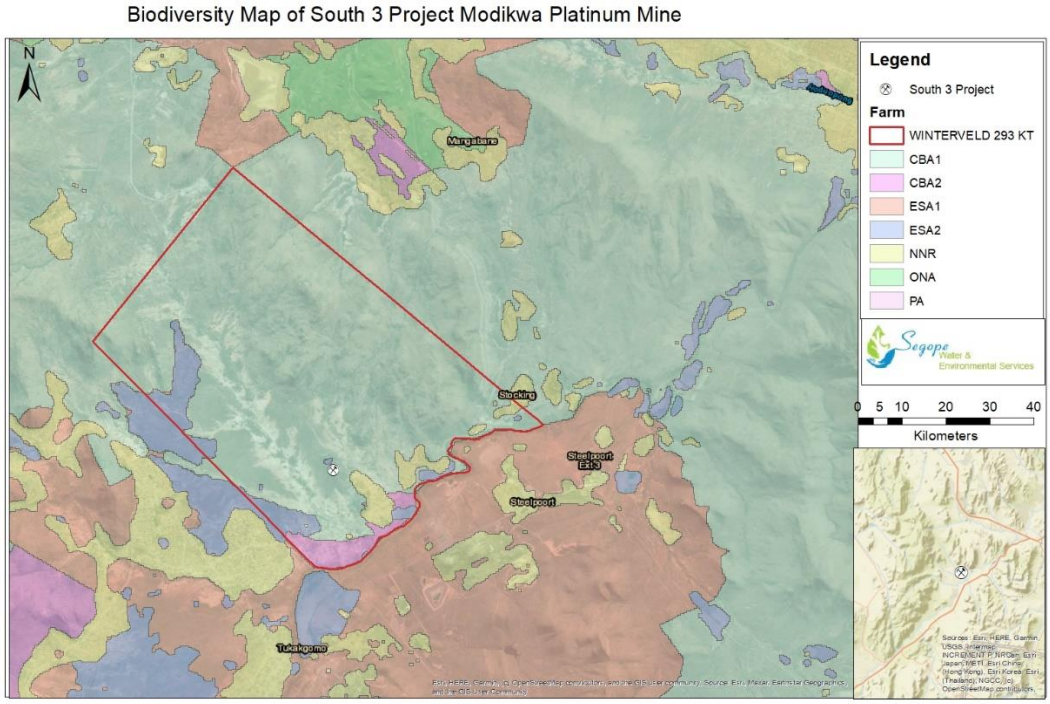

Figure 2: Biodiversity Map of the proposed study site.

4.6 Quaternary

The proposed site for the project falls within the B41J catchment, which is in the Olifants Water Management Area. The operation will fall in between the Mofafa River catchment as well as the Tubatsane river catchment. Both of which are tributaries of the Steelpoort River, which is a major tributary of the Olifants River.

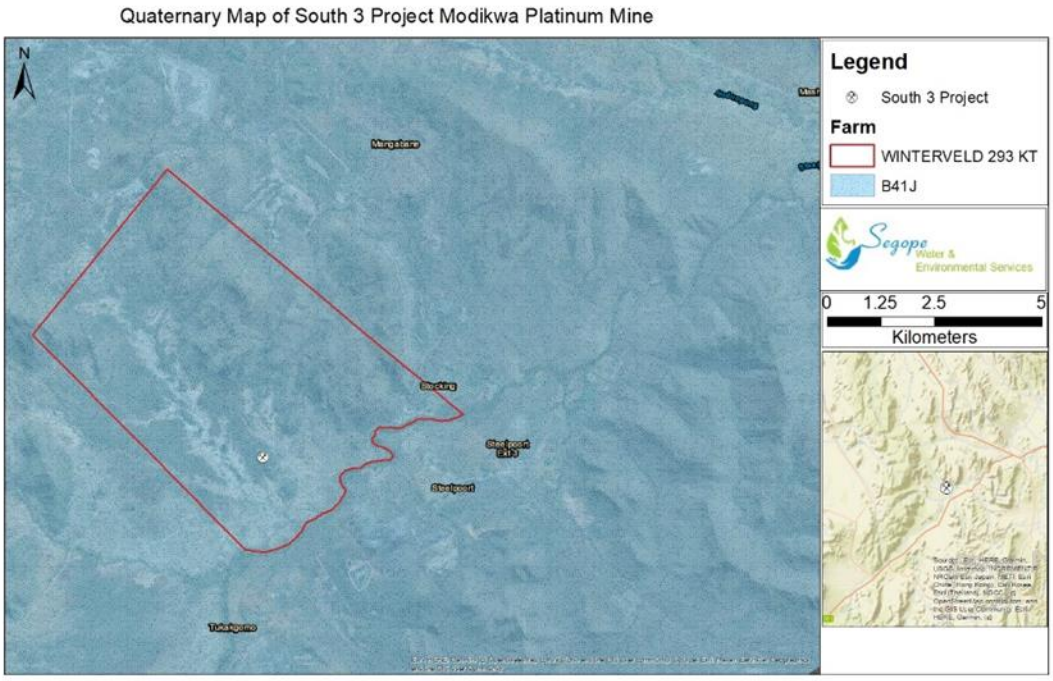

Figure 3: Quaternary Map of the proposed site.

4.7 Methodology

Before conducting a site visit. A desktop study was completed to: firstly, identify the biodiversity sensitivity of the proposed site using the screening tool. The Limpopo C-plan data was used to create a map that would indicate which category the proposed site would fall under. Further research was done to on the site to find out which SSC species would be found on site and the conservation status of the vegetation types on site. Ground-truthing was done through a site visit which was conducted on the 13/03/2024 and 14/03/2024 a walkthrough was done at the proposed site and pictures of any observations of fauna and flora were taken.

4.7.1 Species of Special Concern

The International Union of Conservation Network is the international authority that is responsible for red data species. The authority that is responsible for this in South Africa is the Threatened Species Programme in collaboration with South African National Biodiversity Institute (SANBI).

These species include any national red species that are protected nationally, provincially or are endemic or have been recorded or observed on site.

These species whether fauna or flora are classified into one or more of the following categories:

Extinct (EX)- No known individuals remaining.

Extinct the Wild (EW)- known only to survive in captivity, or as a naturalised population outside its habitat range.

Critically Endangered (CR)- Extremely high risk of extinction in the wild.

Endangered (EN)- High risk of extinction in the wild

Vulnerable (VU)- High risk of extinction in the wild

Near Threatened (NT) – Likely to become endangered in the near future.

Least Concern (LC)- Lowest risk, does not qualify for more at risk category. Widespread and abundant taxa are included in this category.

Data Deficient (DD)- Not enough data to make an assessment of its risk of extinction.

Not Evaluated (NE)- has not yet been evaluated against the criteria.

4.7.2 Impact Assessment

The impact assessment is aimed at avoiding damage, loss of the ecosystem services, and in cases where these impacts cannot be avoided, the aim is to reduce, mitigate or manage the impacts as far as possible.

It is important that all efforts are made to ensure that the natural environment is preserved as far as possible. Offsets are an option that can be considered however these are used as a last resort as part of the mitigation hierarchy that must be followed always. The mitigation hierarchy is described in the table below.

Table 2: Mitigation hierarchy

Mitigation	Description
Avoid or Prevent	Refers to considering options in project location, sitting, scale, layout, technology and phasing to avoid impacts on biodiversity, associated ecosystem services and people. This is the best option but is not always possible. Where environmental and social factors give rise to unacceptable negative impacts, mining should not take place. In such cases, it is unlikely to be possible or appropriate to rely on the other steps in the mitigation
Minimise	Refers to considering alternatives in the project location, sitting, scale, layout, technology and phasing that would minimise impacts on biodiversity, associated ecosystem services. In cases where there are environmental constraints, every effort should be made to minimise impacts.
Rehabilitate	Refers to rehabilitation of areas where impacts are unavoidable, and measures are provided to return impacted areas to near natural state or an agreed land use after mine closure. Rehabilitation can, however, fall short of replicating the diversity and complexity of natural systems.

Mitigation	Description
Offset	Refers to measures over and above rehabilitation to compensate for the residual negative impacts on biodiversity after every effort has been made to minimise and then rehabilitate the impacts. Biodiversity offsets can provide a mechanism to compensate for significant residual impacts on biodiversity.

4.7.3 Impact Assessment

The significance rating formula used for the assessment of the impacts of the proposed South 3 project is as follows:

Significance=consequence x probability

Where

Consequence=type of impact x intensity+ spatial scale+ duration

And

Probability=likelihood of an impact occurring

Table 3: Biodiversity Impact Assessment ratings

Rating	Intensity		Spatial Scale	Duration	Probability
	Negative Impacts (Type of impact= -1)	Positive Impacts (Type of impact= +1)			
1	Limited damage to minimal area of low significance that will have no impact on the environment. Minimal social impacts, low-level repairable damage to commonplace structures.	Some low-level social and environmental benefits felt by very few of the population.	Very limited Limited to specific isolated parts of the site.	Immediate Less than 1 month.	Highly unlikely/None Expected never to happen.
2	Minor effects on biological or physical environment. Environmental damage can be	Low positive impacts experience by very few of population.	Limited Limited to the site and its immediate surroundings.	Short term Less than 1 year.	Rare/ improbable Conceivable, but only in extreme circumstances and/ or has not happened

Rating	Intensity		Spatial Scale	Duration	Probability
	Negative Impacts (Type of impact= -1)	**Positive Impacts (Type of impact= +1)**			
	rehabilitated internally with/ without help of external consultants. Minor medium-term social impacts on local population. Mostly repairable. Cultural functions and processes not affected.				during lifetime of the Project but has happened elsewhere. The possibility of the impact materializing is very low as a result of design, historic experience or implementation of adequate mitigation measures.
3	Moderate, short-term effects but not affecting ecosystem function. Rehabilitation requires intervention of external specialists and can be done in less than a month. On-going social issues. Damage to items of cultural significance.	Average, on-going positive benefits, not widespread but felt by some.	Local Extending across the site and to nearby settlements.	Medium term 1-5 years.	Unlikely Has not happened yet but could happen once in the lifetime of the Project, therefore there is a possibility that the impact will occur.
4	Serious medium-term environmental effects. Environmental damage can be reversed in less than a year. On-going serious social issues. Significant damage to structures / items of cultural significance.	Average to intense social benefits to some people. Average to intense environmental enhancements.	Municipal Area Will affect the whole municipal area.	Long term 6-15 years.	Probable Has occurred here or elsewhere and could therefore occur.

Rating	Intensity		Spatial Scale	Duration	Probability
	Negative Impacts (Type of impact= -1)	**Positive Impacts (Type of impact= +1)**			
5	Very serious, long-term environmental impairment of ecosystem function that may take several years to rehabilitate. Very serious widespread social impacts. Irreparable damage to highly valued items.	On-going and widespread positive benefits to local communities which improves livelihoods, as well as a positive improvement to the receiving environment.	Province/ Region Will affect the entire province or region	Project Life The impact will cease after the operational life span of the project	Likely The impact may occur.
6	Significant impact on highly valued species, habitat or ecosystem. Irreparable damage to highly valued items of cultural significance or breakdown of social order.	Great improvement to livelihoods and living standards of a large percentage of population, as well as significant increase in the quality of the receiving environment	National Will affect the entire country	Beyond Project Life The impact will remain for some time after the life of a Project	Almost certain/Highly probable It is most likely that the impact will occur.
7	Very significant impact on the environment. Irreparable damage to highly valued species, habitat or ecosystem. Persistent severe damage. Irreparable damage to highly valued items of great cultural significance or complete	Noticeable, on-going social and environmental benefits which have improved the livelihoods and living standards of the local community in general and the environmental features.	International The effect will occur across international borders.	Permanent: No Mitigation The impact will remain long after the life of the Project.	Certain/ Definite. There are sound scientific reasons to expect that the impact will definitely occur.

Rating	Intensity		Spatial Scale	Duration	Probability
	Negative Impacts (Type of impact= -1)	Positive Impacts (Type of impact= +1)			
	breakdown of social order.				

Table 4: Probability Matrix

Significance																																						
7	-147	-140	-133	-126	-119	-112	-105	-98	-91	-84	-77	-70	-63	-56	-49	-42	-35	-28	-21	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140	147
6	-126	-120	-114	-108	-102	-96	-90	-84	-78	-72	-66	-60	-54	-48	-42	-36	-30	-24	-18	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126
5	-105	-100	-95	-90	-85	-80	-75	-70	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105
4	-84	-80	-76	-72	-68	-64	-60	-56	-52	-48	-44	-40	-36	-32	-28	-24	-20	-16	-12	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84
3	-63	-60	-57	-54	-51	-48	-45	-42	-39	-36	-33	-30	-27	-24	-21	-18	-15	-12	-9	9		15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63
2	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16	-14	-12	-10	-8	-6	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
1	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Probability	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Consequence																																						

4.7.4 Study Limitations

- The proposed site falls within the Sekhukhune Plains Bushveld and is surrounded by the Sekhukhune Mountains Bushveld both of these have limited literature that describes them.
- The proposed site had been previously transformed and used for agricultural purposes and the site has been encroached on by some non-indigenous species and the vegetation on site may not be a true representation of the vegetation types.
- The site visit occurred two consecutive days and no follow-up site visit was conducted.

5 Results of Flora Assessment

The proposed site is currently overgrown with plant species and there is evidence of illegal mining in the area.

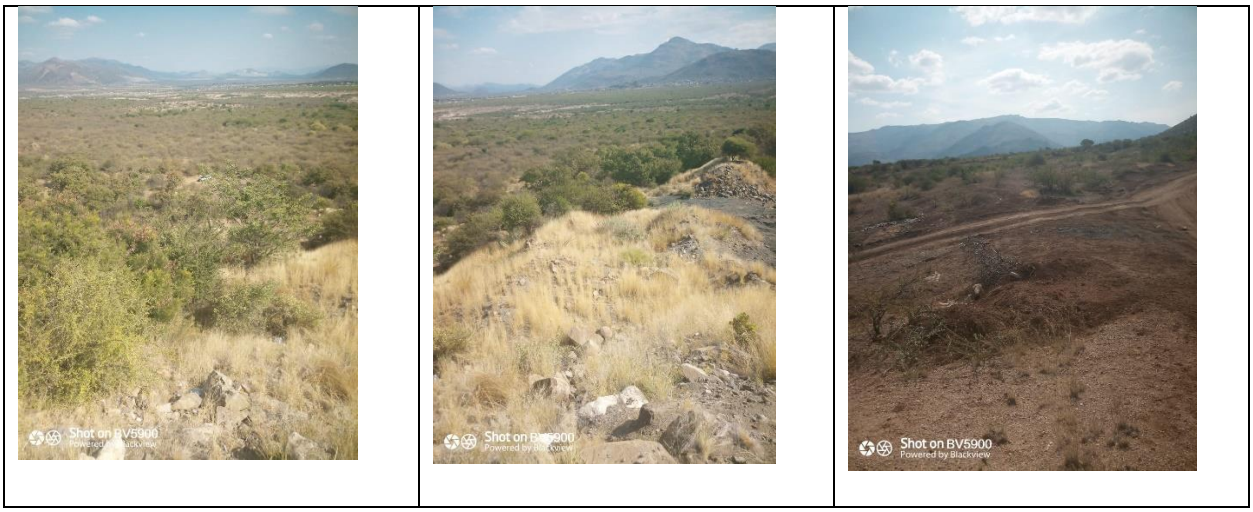

Figure 4: Proposed site

5.1 Flora Species of Special Concern (SSC)

The SSC that are known to the proposed site are provided in the table below of all the SSC species one was found on site.

Table 5: Species of Special Concern

Scientific Name	Common Name	Conservation Status	Found on site (Y/N)
Asparagus fourei		VU	Y
Plectranthus-venteri	Sekukuni Spurflower	VU	N
Polygala sekhukhuniensis		VU	N
Searsia sekhukhuniensis	Sekhukhune Karee	RARE	N
Searsia batophylla	Bramble Currant	VU	N
Combretum petrophilum	Olifants River Bushwillow	RARE	N

Adansonia digitate L.	Baobab Tree	LC (protected)	Y

A list of all the species found on site during the site visit can be found in the table below:

Table 6: Species found on site

Species Name	**Common name**	**Conservation Status**	**Ecology**
Maerua parvifolia Pax.	Dwarf bush-cherry	Least Concern (LC)	Indigenous
Gymnosporia senegalensis (Lam.) Loes	Confetti tree	Least Concern (LC)	Indigenous
Aloe ferox Mill	Bitter aloe	Least Concern (LC)	Indigenous
Draceane hydcinthoides (L) Mabb.	Snake plant	N/A	Indigenous
Gymnosporia buxifolia (L) Szysyl	Common spike thorn	Least Concern (LC)	Indigenous
Ximenia Americana L.	Tallowwood	Least Concern (LC)	Indigenous
Cynanchum viminale (L) L.		Least Concern (LC)	Indigenous
Euphorbia tirucalli L.		Least Concern (LC)	Indigenous
Grewia bicolor Juss.	White raisin	Least Concern (LC)	Indigenous
Grewia flava DC.	Brandy bush	Least Concern (LC)	Indigenous
Euphorbia serpens Kunth	Matted sandmat	Not Evaluated	
Adansonia digitate L.	Baobab Tree	Least Concern (LC) (protected)	Indigenous
Dodonaea viscosa Jacq	Florida hopbush	Least Concern (LC)	Indigenous
Spirostachys Africana Sond.	Tamboti	Least Concern (LC)	Indigenous
Berchemia zeyheri (Sond.) Grubov	Red ivory wood	Least Concern (LC)	Indigenous
Evolvulus alsinoides (L.) L	Dwarf-morning glory	Least Concern (LC)	Indigenous
Searsia lancea (L.f) F.A Barkley	Karee	Least Concern (LC)	Indigenous
Heteropogon contortus (L.) P.Beauv.ex Roem	Black spear grass	Least Concern (LC)	Indigenous
Terminalia prunioides M.A. Lawson	Purple fruited cluster leaf	Least Concern (LC)	Indigenous
Vachellia karoo (Hayne) Banfi & Galasso	Sweet-thorn	Least Concern (LC)	Indigenous
Dittrichia graveolens (L) Greater	Camphor inula	Not Evaluated	Alien
Acacia longifolia (Andrews) Wild	Golden Wattle	Not Evaluated	Alien
Cordia monoica Rox	Snot Berry	Least Concern (LC)	Indigenous
Kirkia wilmsii Engl.	Mountain Seringa	Least Concern (LC)	Indigenous
Asparagus racemorus Wild.	Asparagus-fern	Least Concern (LC)	Indigenous
Dichrostachys cinera (L) Wight & Arn	Marabou-thorn	Least Concern (LC)	Indigenous
Vachellia tortillis (Forssk)Galasso & Banifi	Umbrella-thorn	Least Concern (LC)	Indigenous
Flacourtia indica (Burm.f.) Merr	Governor's plum	Least Concern (LC)	Indigenous

Species Name	Common name	Conservation Status	Ecology
Commelina Africana L	Wandering Jew	Least Concern (LC)	Indigenous
Euphorbia aeruginasa Schweick	Crimson needle	Least Concern (LC)	Indigenous
Justicia heterocarpa T Anderson		Least Concern (LC)	Indigenous
Eucalyptus camaldulensis Dehnh.	Murray red gum	Not Evaluated	Alien

5.1.1 Ethnobotanical plant species.

In this section, the discussion will focus on ethnobotanical plant species. This is a study of the relationship between humans and plants. The focus is specifically on the use of plants based on the traditional and indigenous knowledge of the locals within a specific area. These plants can either be used as food, medicine, and/or shelter.

The focus will be placed on the plants that are used for medicinal purposes in the practice of herbalism. These plants are used by getting extracts or compounds from either the leaf, stem, flowers or fruit.

One of the species *Aloe ferox Mill* species found on the proposed site is known to be used as a medicinal plant, it is used for the treatment of arthritis, eczema, stomach complaints, hypertension, stress, skin irritation and bruises.

The purpose of this section is to highlight the importance of these plants and the need to conserve them to prevent over harvesting of the plants leading to extinction in the future. Although one plant was identified on site it is important to have a qualified botanist to conduct a walkthrough on site to locate and identify more plants of these species.

Figure 5: Aloe ferox Mill.

6 Results of Fauna assessment

6.1 Mammals

No mammals were observed during the site visit; the list below is an indication of the reptiles that could be found on the propose site.

Table 7: Possible mammals found on site

Scientific Name	Common Name	Conservation Status	Source
Chlorocebus pygerythrus	Vervet Monkey	Least Concern (LC)	iNaturalist
Hippotragus niger	Sable Antelope	Least Concern (LC)	iNaturalist
Tragelaphus strepsiceros	Greater Kudu	Least Concern (LC)	iNaturalist
Procavia capensis	Rock Hyrax	Least Concern (LC)	iNaturalist
Cryptomys hottentotus	Common Molerat	Least Concern (LC)	iNaturalist
Tragelaphus oryx	Common Eland	Least Concern (LC)	iNaturalist
Lupulella mesomelus	Black-backed Jackal	Least Concern (LC)	iNaturalist
Aepyceros melampus	Impala	Least Concern (LC)	ICUN online
Hippotragus equinus	Roan antelope	Least Concern (LC)	ICUN online
Sylvicapra grimmia	Common Duiker	Least Concern (LC)	ICUN online
Robus ellipsiprymnus	Water buck	Least Concern (LC)	ICUN online
Oreotragus oreotragus	Klipsringer	Least Concern (LC)	ICUN online
Ourebia ourebi	Oribi	Least Concern (LC)	ICUN online
Pelea capreolus	Grey Rhebox	Near Threatened (NT)	ICUN online
Redunca fulvorufula	Mountain Reed	Endangered (EN)	ICUN online
Syncerus caffer	African Buffalo	Near Threatened (NT)	ICUN online
Helogale parvula	Common Dwarf Mongoose	Least Concern (LC)	ICUN online
Equus quagga	Plains Zebra	Near Threatened (NT)	ICUN online
Crocuta crocuta	Spotted Hyaena	Least Concern (LC)	ICUN online
Mungos mungo	Banded Mongoose	Least Concern (LC)	ICUN online

6.2 Reptiles

No reptiles were observed during the site visit; the list below is an indication of the reptiles that could be found on the propose site.

Table 8: Possible reptiles found on site

Scientific Name	Common Name	Conservation Status	Source
Lizards			
Platysaurus orientails	Sekukhune flat lizard	Least Concern (LC)	iNaturalist
Nucras ornata	Ornate scrub lizard	Least Concern (LC)	iNaturalist
Smaug vandami	Van Dam's girlded lizard	Least Concern (LC)	iNaturalist
Cordylus vittifer	Common girlded lizard	Least Concern (LC)	iNaturalist
Snakes			

Scientific Name	Common Name	Conservation Status	Source
Telescopus semiannulatus	Common tiger snake	Least Concern (LC)	iNaturalist
Psammophis brevirostris	Short-snout whip snake	Least Concern (LC)	iNaturalist
Python natalensis	Southern African python	Vulnerable (VU)	iNaturalist
Crotaphopeltis hotamboeia	Red-lipped snake	Least Concern (LC)	iNaturalist
Lamprophis guttatus	Spotted house snake	Least Concern (LC)	iNaturalist
Bitis arietans	Puff Adder	Least Concern (LC)	ICUN online
Indotyphlops braminus	Brahming Blind snake	Least Concern (LC)	ICUN online
Geckos			
Pachydactylus van soni	Van son's thick bed gecko	Least Concern (LC)	iNaturalist
Hemidactylus mabouia	Tropical house gecko	Least Concern (LC)	iNaturalist
Afroedura leoloensis	Leolo rock gecko	Least Concern (LC)	iNaturalist
Lygodactylus nigropunctatus	Black-spotted dwarf gecko	Least Concern (LC)	iNaturalist
Homopholis wahlbergii	Wahlberg's velvet gecko	Least Concern (LC)	iNaturalist
Pachdactylus affinis	Transvaal gecko	Least Concern (LC)	iNaturalist
Skink			
Trachylepis magaritifera	Rainbow skink	Least Concern (LC)	iNaturalist
Trachlepis varia sensu stricto	Common variable skink	Data Deficient	iNaturalist
Chameleon			
Chamaeleo dilepis	Common African flap necked chameleon	Least Concern (LC)	ICUN online

6.3 Birds

While no birds were observed during the site visit the list below shows the type of birds what would potentially be found on the proposed site.

Table 9: Possible birds on site.

Scientific Name	Common Name	Conservation status	Source
Chrrysococcyx caprius	Diederik cuckoo	Least Concern (LC)	iNaturalist
Tockus leucomelas	Southern yellow-billed hornbill	Least Concern (LC)	iNaturalist
Batis molitor	Chinspot batis	Least Concern (LC)	iNaturalist
Motacilla aguimp	African Pied wagtail	Least Concern (LC)	iNaturalist
Cinnyris talatala	White-breasted sunbird	Least Concern (LC)	iNaturalist
Lanius collaris	Southern fiscal	Least Concern (LC)	iNaturalist
Microcarbo africanus	Long-tailed cormorant	Least Concern (LC)	iNaturalist
Calidris ferruginea	Curlew Sandpiper	Near Threatened (NT)	ICUN online
Anninga rufa	African Darter	Least Concern (LC)	ICUN online

Scientific Name	Common Name	Conservation status	Source
Rostratula benghulensis	Greater painted snipe	Least Concern (LC)	ICUN online
Sarkicliornis melantos	Knob-billed duck	Least Concern (LC)	ICUN online
Muscivapa striata	Spotted flycatcher	Least Concern (LC)	ICUN online
Butovides striata	Green-backed Heron	Least Concern (LC)	ICUN online
Curruca communis	Common Whitethroat	Least Concern (LC)	ICUN online

7 Impact Assessment

7.1 Loss of Habitat

7.1.1 Construction phase

Table 10: Loss of habitat during construction phase

Parameters	Intensity	Spatial Scale	Duration	Probability	Significance
Impact	Direct				
Potential Impact	Loss of Habitat				
Mitigation Measures	Removal of vegetation should only be done in the approved footprint.				
Pre-Mitigation	6	3	6	7	90
Post Mitigation	5	3	6	6	71

7.1.2 Operational phase

Table 11: Habitat loss during operational phase

Parameters	Intensity	Spatial Scale	Duration	Probability	Significance
Impact	Direct				
Potential Impact	Establishment of alien species				
Mitigation Measures	An alien species management plan must be developed and implemented.				
Pre-Mitigation	5	3	3	4	65
Post Mitigation	4	2	3	4	60

7.1.3 Decommissioning phase

Table 12: Habitat loss during the decommissioning phase

Parameters	Intensity	Spatial Scale	Duration	Probability	Significance
Impact	Direct				
Potential Impact	Soil disturbance Further vegetation loss				
Mitigation Measures	Revegetate disturbed areas with indigenous plants Keep all removal activities to the opencast footprint				
Pre-Mitigation	4	3	3	4	60
Post Mitigation	3	3	3	3	45

7.1.4 Post Closure

Table 13: Habitat loss post closure

Parameters	Intensity	Spatial Scale	Duration	Probability	Significance
Impact	Direct				
Potential Impact	Further establishment of alien species				
Mitigation Measures	Implement alien species management plan				
Pre-Mitigation	3	3	3	4	36
Post Mitigation	2	2	2	4	30

7.2 Loss of Species of Special Concern

7.2.1 Construction phase

Table 14: Loss of SCC species during construction

Parameters	Intensity	Spatial Scale	Duration	Probability	Significance
Impact	Direct				
Potential Impact	Vegetation removal				
Mitigation Measures	Impact should be limited to the approved footprint Tag all SSC plants and avoid them.				
Pre-Mitigation	7	6	7	6	115
Post Mitigation	6	6	6	6	100

7.2.2 Operational phase

No impact is expected during the operational phase.

7.2.3 Decommissioning phase

No impact is expected during the operational phase.

7.2.4 Post Closure

No impact is expected during the operational phase.

8 Cumulative Impacts

Although the site is currently vacant there is some illegal mining activities on the outskirts of the boundary. The site does have a diverse number of endemic plant species it is expected that the proposed mining activity will lead to the loss of these plants, the loss of these plants with additionally lead to the further loss of faunal species, that are already in decline.

9 Conclusion and Recommendations

Modikwa Platinum Mine's South 3 project is located in an area that had previously been used for agricultural purposes and therefore it has been transformed. The site falls into a Critical Biodiversity Area as well as an Ecological Support Area, thus showing that it plays an important role in the ecological functioning of the area.

It is important to ensure that this area is managed as effectively as possible, so the following recommendations are suggested:

- Before any clearing can take place all the SSC must be identified, located using GPS coordinates, photographed and then a database created. This information must be used to develop a relocation strategy.
- A monitoring plan must be developed for both the fauna and flora. This plan must be used to manage any changes that may occur.
    - An annual survey is required
    - A qualified specialist must conduct the survey
    - An adaptive management plan must be followed

10 References

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