TERRESTRIAL BIODIVERSITY AND WETLAND DELINEATION STUDY:

PROSPECTING RIGHT (PR) AND MINING PERMIT (MP) APPLICATIONS FOR CHROME, NICKEL, PGMS AND GENERAL AGGREGATE OVER THE FARM . FARMS LINTIE 86 MS, BRINDISI 10 MR, SUEZ 12, MUNTOK 206 AND DRADANELLEN 382 MR SITUATED IN THE MUSINA LOCAL MUNICIPALITY, VHEMBE MAGISTERIAL DISTRICT OF THE LIMPOPO PROVINCE.

PRODUCED BY:	PRODUCED FOR:	PRODUCED FOR:
	Ergy Investment	MODISON Mining (Pty) Ltd

Physical Address: **5 13th Avenue, Fairlands, Randburg 2170**

Mobile Number: **071 2082 364**Email: info@ntumbuluko@gmail.com

JULY 2023

CONDITIONS RELATING TO THIS REPORT

DECLARATION OF INTEREST

Ntumbuluko Consulting Pty (Ltd) has no vested interest in the property studied nor is it affiliated with any other person/body involved with the property and/or proposed development. Ntumbuluko Consulting Pty (Ltd) is not a subsidiary, legally or financially of the proponent. The study was undertaken by Mr Tshuxekani Maluleke, he is a registered Natural Scientists with the following details:

QUALIFICATIONS

SPECIALIST	QUALIFICATION
Mr Tshuxekani Maluleke (SACNASP Reg. No. 120501)	MSc Environmental Sciences (Wits University) BSc Hons Zoology (University of Limpopo) BSc Hons Animal, Plant and Environmental Sciences (Wits University)

APPROVAL

PREPARED BY:

Mr Tshuxekani Maluleke

Wetland and Biodiversity Specialist

Msc. Environmental Sciences

17 JULY 2023

.

INDEMNITY

Although Ntumbuluko Consulting Pty (Ltd) exercises due care and diligence in rendering services and preparing documents, the client takes full responsibility for this report and its implementation in terms of the National Environmental Management Act of 1998, and exempt Ntumbuluko Consulting Pty (Ltd) and its associates and their sub-contractors from any legal responsibility based on the timing of the assessment, the result and the duration thereof, which has an influence on the credibility and accuracy of this report. Ntumbuluko Consulting Pty (Ltd) accepts no liability, and the client indemnifies Ntumbuluko Consulting Pty (Ltd) and its directors, managers, agents, and employees against all actions, claims, demands, losses, liabilities, costs, damages, and expenses arising from or in connection with services rendered, directly or indirectly, by Ntumbuluko Consulting Pty (Ltd) and by the use of this document.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

.

.

DEFINITIONS

Alien animal	**(a) Any live vertebrate, including a bird and a reptile, but excluding a fish, belonging to a species or subspecies that is not a recognised domestic species and the natural habitat of which is not in the Republic; or** **(b) The egg of such vertebrate.**
Biodiversity	Means the diversity of animals, plants or other organisms, including the diversity of animals, plants or other organisms found within and between— (a) Ecosystems; (b) Habitats; (c) The ecological complexes of which these systems and habitats are part; and (d) Species.
CITES	Means 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	Means— (*a*) A provincial nature reserves; (*b*) A site of ecological importance; (*c*) A protected environment; (*d*) A private nature reserves; or (*e*) A resource use area.
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.

1. INTRODUCTION AND PROJECT DESCRIPTION

1.1 INTRODUCTION

Ntumbuluko Consulting (Pty) Ltd, was appointed by Ergy Investment (Pty)Ltd and Modison Mining (Pty)Ltd to conduct a terrestrial Biodiversity Impact Assessment and a Wetland Delineation for the Proposed Prospecting Right (PR) application and Mining Right of Chrome, over the farms Lintie 86 Ms, Brindisi 10 Mr, Suez 12, Muntok 206 and Dradanellen 382 Mr situated in the Musina Local Municipality, Vhembe Magisterial District of the Limpopo Province. **The purpose of this study is to describe and characterise the terrestrial environment, habitats, species present on site and to delineate all the existing watercourses or wetlands onsite.**

1.2 PROJECT DESCRIPTION

1.2.1 PROSPECTING RIGHT APPLICATION ON FARM LINTIE 86 MS, BRINDISI 10, SUEZ 12, MUNTOK 206 AND DRADANELLEN 382 MR. (DMRE REF NO: LP30/5/1/1/2/14884 PR)

The proposed prospecting project will comprise of activities including site establishment (erecting of temporary mobile ablution facilities, offices, and site laydown area), geological mapping, soil and rock chip sampling, trenching and drilling of boreholes. Collected samples and drilled core logs will be temporarily stored on site laydown area and will be taken to the laboratory for further analysis. All these activities will be conducted in phases.

1.2.2 MINING PERMIT APPLICATION ON FARM SUEZ 12MR (DMRE APPLICATION REF NO: IS LP30/5/1/3/2/11962MP)

The proposed activities will allow the applicant to mine Chrome, Nickel and PGM. The commodities will be mined through an open cast mining method. This method consists of blasting of the mineral followed by excavation of the loosened mineral by excavators, loading of it onto tipper trucks which then transport the mineral out of the mining area to the mobile crusher plant into desirable sizes. Mining operations will be conducted in boxcuts which will be small scale contract mining.

.

1.3 STUDY AREA

The proposed development is located within the farms Lintie 86 Ms, Brindisi 10 Mr, Suez 12, Muntok 206 and Dradanellen 382 Mr situated in the Musina Local Municipality, Vhembe Magisterial District of the Limpopo Province. The proposed area is located approximately 25 km North West of Alldays town (**Figure 1**). The landuse map is depicted on **Figure 2**, the study site is dominated by the Limpopo Ridge Bushveld and Musina Mopane Bushveld vegetation types, with patches of cultivated land.

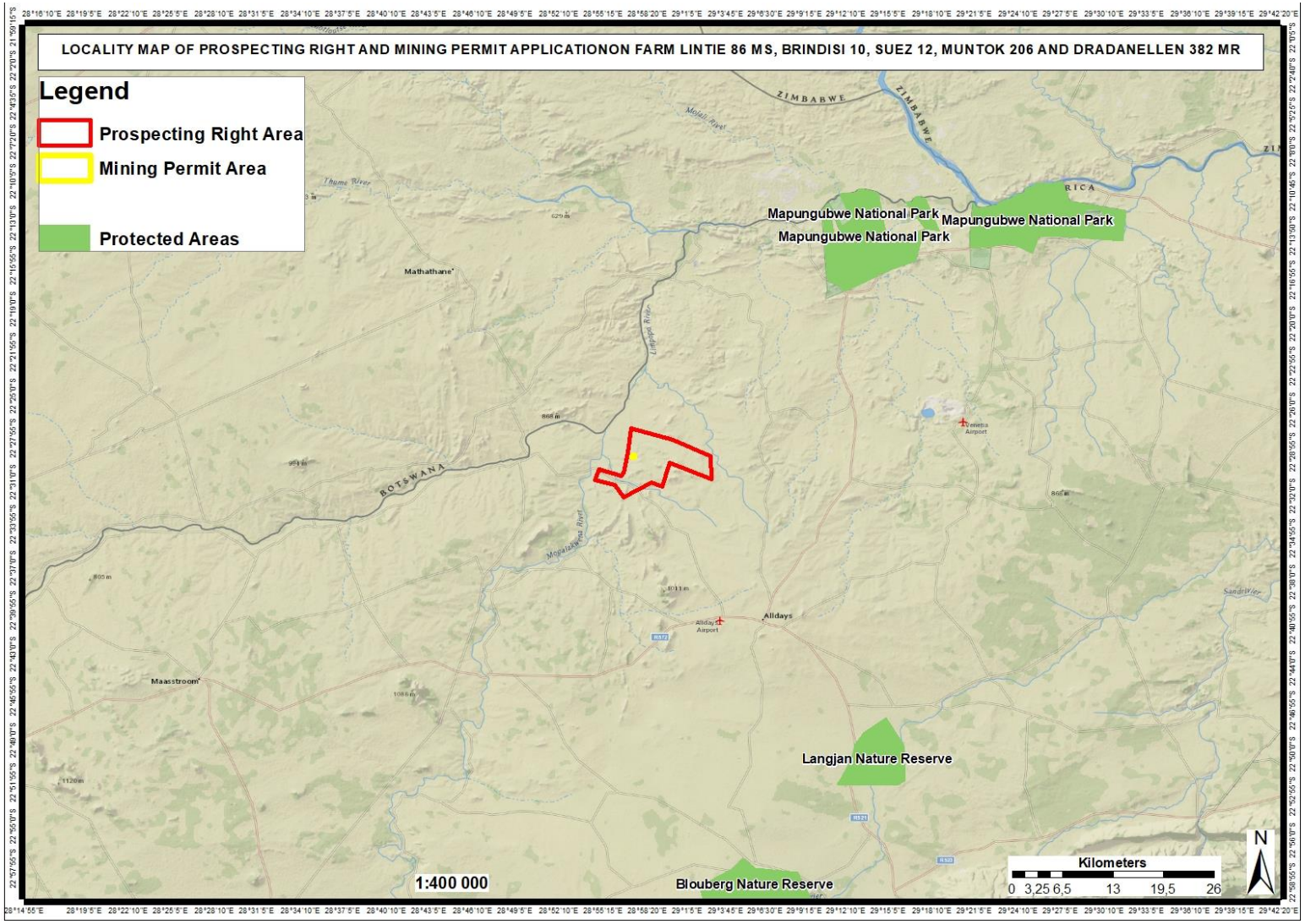


Figure 1:Locality Map

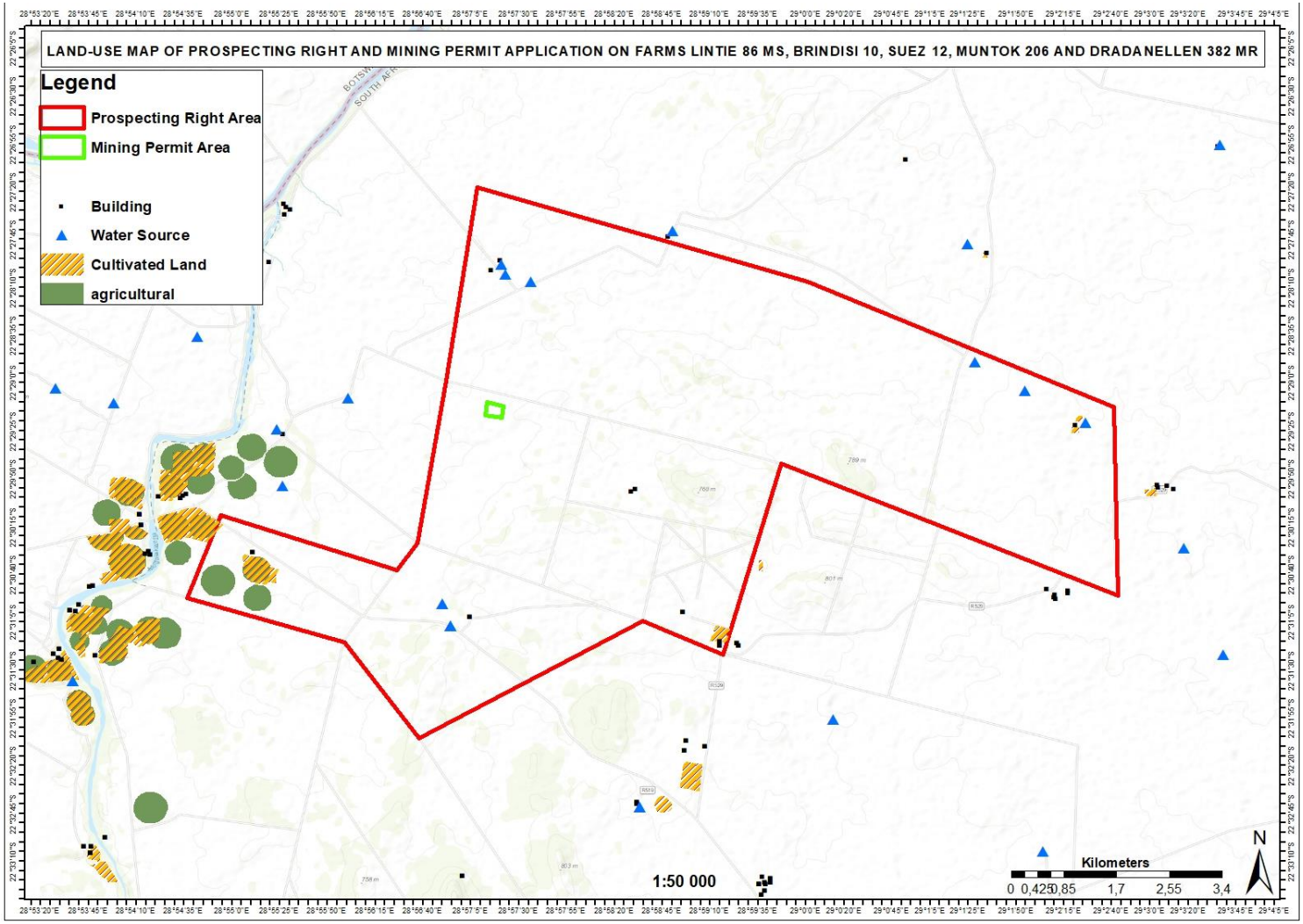


Figure 2: Landuse Use Map

1.4 SITE SENSITIVITY VERIFICATION AND MINIMUM REPORT CONTENT REQUIREMENTS

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) and Terrestrial Animal and Plant Species (GN R. 1150), 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 determines the minimum report content requirements.

1.5 TERMS OF REFERENCE AND OBJECTIVES

Ntumbuluko Consulting (Pty) Ltd has been appointed to undertake the following specialist functions:

- Describe and map the vegetation types in the study area.
- Describe the biodiversity and ecological state of each vegetation unit.
- Identify plant and animal species of conservation concern (Red Data List, PNCO and TOPS lists). In the case of the fauna, this was done at a desktop level.
- Identify alien plant species, assess the invasive potential and recommend management procedures.
- Assess the potential impacts of the proposed project on both the fauna and flora.
- Provide mitigation measures, rehabilitation process and/or vegetation removal procedures that would reduce the potential impacts of the developments on biodiversity.

1.6 SCOPE OF STUDY

1.6.1 FLORAL STUDY:

- Identify sensitive vegetation types and critical biodiversity areas on site.
- Identify Critical Biodiversity and Ecological Support Areas onsite.

- Describe the potential direct, indirect and cumulative negative and positive impacts of the proposed activity on the vegetation species during construction, operation and decommissioning phases of the project.
- Provide monitoring requirements, mitigation measures and recommendations.

1.6.2 FAUNAL STUDY:

- Describe the existing micro-habitats, and the species associated with those habitats.
- Provide a description of species composition and conservation status in terms of protected, endangered or vulnerable faunal species.
    - This description will include species which are likely to occur within, traverse across or forage within the proposed project area, as well as species which may not necessarily occur on site, but which are likely to be impacted upon as a result of the proposed development.

1.6.3 WETLAND DELINEATION:

- Desktop assessment of the site;
- A site visit to confirm the presence or absence of wetland/s along the proposed borrow pit areas;
- Assessment of the catchment;
- Assessment of the Present Ecological Status of wetlands on site (Level 1, Wet-Health);
- Assessment of Ecological Importance and Sensitivity of wetlands on site (Level 2, Eco- Services); and
- Impact assessment of the proposed activities on the wetlands

1.7 LIMITATIONS AND ASSUMPTIONS

This report is based on current available information and, as a result, the following limitations and assumptions are implicit:

- The report is based on a project description received from the client.

.

- The study was done during the dry season and thus a follow-up needs to be done during the rainy season to make sure none of the plant species are missed.
- Species of Conservation Concern (SCC) are difficult to find and difficult to identify, thus species described in this report do not comprise an exhaustive list. It is almost certain that additional SCCs will be found during construction and operation of the development.
- Some areas of the study site were not accessible during the day of the site inspection.
- It is assumed that wetland plant species flowering only during specific times of the year could be confused with a very similar species of the same genus.
- Some wetland plant species that emerge and bloom during another time of the year or under very specific circumstances may have been missed entirely.
- In order to obtain a comprehensive understanding of the dynamics of the wetland habitats of the study area, surveys should ideally have been replicated over several seasons and over a number of years. However, due to project time constraints such long-term studies are not feasible and this survey was conducted in one season during a once-off site visit of five days.
- Data collection in this study relied heavily on data from representative, homogenous wetland sections, as well as general observations, analysis of satellite imagery from the past until the present, generic data and a desktop analysis.
- No formal water quality or aquatic faunal assessments (e.g. SASS 5) were conducted as part of this study. All comments on these subjects were made from estimations of the current, visible situation in the field.
- The specialist responsible for this study reserves the right to amend this report, recommendations and/or conclusions at any stage should any additional or otherwise significant information come to light.

2. LEGAL FRAMEWORK

The following national and provincial legislative guidelines and requirements were followed as part of this study:

2.1 THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT NO 107 OF 1998) (NEMA) AS AMENDED

This Act embraces all three (3) fields of environmental concern namely: resource conservation and exploitation; pollution control and waste management; and land-use planning and development. The environmental management principles include the duty of care for wetlands and special attention is given to management and planning procedures. NEMA provides for co-operative, environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state; and to provide for matters connected therewith.

2.2 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT (ACT NO 10 OF 2004) (NEM: BA)

NEMBA was signed into law in mid-2004 and entered into effect on 1 September 2004. NEM: BA provides for the consolidation of biodiversity legislation through establishing national norms and standards for the management of biodiversity across all sectors and by different management authorities. Certain activities, known as Restricted Activities, are regulated on listed species using permits by a special set of regulations published under the Act. Restricted activities regulated under the act are keeping, moving, having in possession, importing and exporting, and selling.

2.3 THE NATIONAL BIODIVERSITY FRAMEWORK (2017-2022)

The National Biodiversity Framework (NBF) is a requirement under Section 38 of the National Environmental Management: Biodiversity Act (Act 10 of 2004, hereafter referred to as the 'Biodiversity Act'). The NBF is a short to medium-term coordination tool that shows the alignment between the strategic objectives and outcomes

identified in the National Biodiversity Strategy and Action Plan (NBSAP v.2, 2015) and other key national strategies, frameworks and systems that currently guide the work of the biodiversity sector and identifies mechanisms through which this work is coordinated. It also identifies a set of interventions or "acceleration measures" that can unlock or fast-track implementation of the NBSAP and indicates the relative roles of the many agencies involved in implementing these activities. The purpose of the NBF is not to provide a comprehensive review of all work currently being undertaken in the biodiversity sector, nor to list all of the actions required to conserve and manage South Africa's biodiversity in support of sustainable development.

2.4 CONSERVATION OF AGRICULTURAL RESOURCES ACT (ACT NO 43 OF 1983) (CARA):

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.

2.5 THE NATIONAL FOREST ACT (ACT NO 84 OF 1998) (NFA)

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 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 are 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.

2.6 CONVENTION ON BIOLOGICAL DIVERSITY

The objectives of the CBD are the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising from commercial and other utilization of genetic resources. The agreement covers all ecosystems, species, and genetic resources.

2.7 CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA (CITES)

The CITES aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival. Through its three appendices, the Convention accords varying degrees of protection to more than 30,000 plant and animal species.

2.8 CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS

The CMS, or the Bonn Convention aims to conserve terrestrial, marine and avian migratory species throughout their range. Parties to the CMS work together to conserve migratory species and their habitats by providing strict protection for the most endangered migratory species, by concluding regional multilateral agreements for the conservation and management of specific species or categories of species, and by undertaking co-operative research and conservation activities.

2.9 THE INTERNATIONAL TREATY ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

The objectives of the Treaty are the conservation and sustainable use of plant genetic resources for food and agriculture and the fair and equitable sharing of the benefits

arising out of their use, in harmony with the Convention on Biological Diversity, for sustainable agriculture and food security. The Treaty covers all plant genetic resources for food and agriculture, while it's Multilateral System of Access and Benefit-sharing covers a specific list of 64 crops and forages. The Treaty also includes provisions on Farmers' Rights.

2.10 2.CONVENTION ON WETLANDS (POPULARLY KNOWN AS THE RAMSAR CONVENTION)

The Ramsar Convention provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The convention covers all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities.

2.11 WORLD HERITAGE CONVENTION (WHC)

The primary mission of the WHC is to identify and conserve the world's cultural and natural heritage, by drawing up a list of sites whose outstanding values should be preserved for all humanity and to ensure their protection through a closer co-operation among nations.

2.12 RAMSAR CONVENTION

The Convention on Wetlands of International Importance, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The Ramsar Convention is the only global environmental treaty that deals with a particular ecosystem. The treaty was adopted in the Iranian city of Ramsar in 1971 and the Convention's member countries cover all geographic regions of the planet.

2.13 INTERNATIONAL PLANT PROTECTION CONVENTION (IPPC)

The IPPC aims to protect world plant resources, including cultivated and wild plants by preventing the introduction and spread of plant pests and promoting the

appropriate measures for their control. The convention provides the mechanisms to develop the International Standards for Phytosanitary Measures (ISPMs), and to help countries to implement the ISPMs and the other obligations under the IPPC, by facilitating the national capacity development, national reporting and dispute settlement. The Secretariat of the IPPC is hosted by the Food and Agriculture Organization of the United Nations (FAO).

2.14 LIMPOPO ENVIRONMENTAL MANAGEMENT ACT (ACT NO. 7 OF 2003)

This Act makes provision with respect to the protection and conservation of the environment in the Limpopo Province. It makes provision for a wide variety of matters regarding the environment including protected areas, hunting of wild and exotic animals, the establishment of Wildlife Councils, inland fishing and the protection and aquatic systems. The Act prioritizes the protection of indigenous plants, the application of CITES, restrictions on development and environmental impact reports. The Act makes provision for the declaration and protection:

- Site of Ecological Importance;
- Protected Environments and Private Nature Reserves; and
- Mountain catchment area

2.15 NATIONAL WATER ACT, 1998 (ACT NO. 36 OF 1998)

The National Water Act, 1998 (Act No. 36 of 1998) (NWA) aims to provide management of the national water resources to achieve sustainable use of water for the benefit of all water users. This requires that the quality of water resources is protected as well as integrated management of water resources with the delegation of powers to institutions at the regional or catchment level. The purpose of the Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in responsible ways. Of specific importance to this application is Section 19 of the NWA, which states that an owner of land, a person in control of land or a person who occupies or uses the land which thereby causes, has caused or is likely to cause pollution of a water resource must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring and

must therefore comply with any prescribed waste standard or management practices.

Regulations GN 704 dated June 1999 under the NWA, 1998 (Act 36 of 1998) stipulates that no development activities may take place within the 1:100 year floodline of a watercourse, or within 100 m of the watercourse, whichever is the furthest.

Regulations GN 509 dated August 2016 under the Section 21 c and i water uses of the NWA, 1998 (Act No 36 of 1998) stipulates the:

"Extent of a watercourse" as:

(a) The outer edge of the 1 in 100-year flood line and/or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam.

"Regulated area of a watercourse" for section 21(c) or (i) of the Act water uses in terms of this Notice means:

(a) The outer edge of the 1 in 100-year flood line and /or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam;
(b) In the absence of a determined 1 in 100-year flood line or riparian area the area within 100 m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench (subject to compliance to section 144 of the Act); or
(c) A 500 m radius from the delineated boundary (extent) of any wetland or pan.

2.16 NATIONAL FRESHWATER ECOSYSTEM PRIORITY AREA (NFEPA) STATUS

In an attempt to better conserve aquatic ecosystems, South Africa has recently categorised its river systems according to set ecological criteria (i.e. ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify Freshwater Ecosystem Priority Areas (FEPAs) (Driver et al. 2011) The FEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act (NEM:BA) biodiversity goals (Nel et al. 2011).

3. TERRESTRIAL BIOSIVERSITY METHODOLOGY

3.1 THE ASSESSMENT

A site inspection was undertaken on the **14th of June 2023** to assess the site-specific ecological state, current land-use, identify potential sensitive ecosystems and identify fauna and flora species associated with the proposed project activities. The site inspection also served to identify potential impacts of the proposed development, and its impacts on the surrounding ecological environment.

In addition to the site visit, key resources that were consulted include the following:

- South African Vegetation Map (SA VEGMAP) (Mucina et al., 2018);
- The National Freshwater Ecosystem Priority Areas (NFEPA, 2011/14);
- The National Environmental Management: Biodiversity Act (NEM:BA), 2004: List of Threatened Ecosystems (2011);
- National Biodiversity Management: Biodiversity Act (NEMBA) List of Threatened or Protected Species (2005);
- 2015 Northwest Biodiversity Sector Plan; and
- International Union for Conservation of Nature (IUCN).

3.2 SPECIES OF CONSERVATION CONCERN

Data on the known distribution and conservation status for each potential Species of Conservation Concern (SCC) has to be obtained to develop a list of 'Species of Concern'. These species are those that may be impacted significantly by the proposed activity. In general, these will be species that are already known to be threatened or at risk, or those that have restricted distributions (endemics) with a portion of their known range falling within the study area i.e. strict endemic and near endemic species. Species that are afforded special protection, notably those that are protected by NEM:BA (Act No. 10 of 2004).

3.3 SAMPLING PROTOCOL

The study site was visually surveyed to evaluate vegetation composition, and faunal assemblages and to provide detailed information on the plant communities present.

The aim of the site inspection was to characterise and describe each fauna and flora community within the study site as well as identify areas of high sensitivity and SCC. Prior to the site visit, sampling locations representative of each vegetation type were identified. At these sampling locations, vegetation types within the study area were assessed and surveyed using plant identification guides and other published literature. Vegetation communities were then described according to the dominant set of species recorded from each type. These were mapped and assigned a sensitivity score using the methodology outlined in Species Environmental Assessment Guideline Document.

3.4 VEGETATION MAPPING

The revised SA VEGMAP (2018) was established in order to "provide floristically based vegetation units of South Africa, Lesotho and Swaziland at a greater level of detail than had been available before." The map was developed using a wealth of data provided by a network of ecologists, biologists and conservation planners that make periodic contributions to the project. These contributions have allowed for the best national vegetation map to date, the last being that of Acocks developed over 50 years ago. The SANBI Vegetation map informs finer scale bioregional plans and includes an additional 47 new vegetation units since its refinement in 2012.

The SA VEGMAP project has two main aims:

1. To determine the variation in and units of Southern African vegetation based on the analysis and synthesis of data from vegetation studies throughout the region, and
2. To compile a vegetation map. The aim of the map was to accurately reflect the distribution and variation on the vegetation and indicate the relationship of the vegetation with the environment. For this reason, the collective expertise of vegetation scientists from various universities and state departments were harnessed to make this project as comprehensive as possible

The map and accompanying book describes each vegetation type in detail, along with the most important species, including endemic species and those that are biogeographically important.

The SA VEGMAP is compared to actual conditions of vegetation observed onsite during the site assessment through mapping from aerial photographs, satellite images, literature descriptions (e.g. SANBI and ECBCP) and related data gathered on the ground.

3.5 SENSITIVITY ASSESSMENT

The Species Environmental Assessment guideline (SANBI, 2020) was applied to assess the Site Ecological Importance (SEI) of the project area. The habitats and the species of conservation concern in the project area were assessed based on their conservation importance, functional integrity and receptor resilience (**Table 1**). The combination of these resulted in a rating of SEI and interpretation of mitigation requirements based on the ratings.

The sensitivity map was developed using available spatial planning tools as well as by applying the SEI sensitivity based on the field survey.

Table 1: Criteria for establishing Site Ecological importance and description of criteria.

CRITERIA	DESCRIPTION
Conservation Importance (CI)	The importance of a site for supporting biodiversity features of conservation concern present e.g. populations of IUCN Threatened and Near-Threatened species (CR, EN, VU & NT), Rare, range- restricted species, globally significant populations of congregatory species, and areas of threatened ecosystem types, through predominantly natural processes.
Functional Integrity (FI)	A measure of the ecological condition of the impact receptor as determined by its remaining intact and functional area, its connectivityto other natural areas and the degree of current persistent ecological impacts.
Biodiversity Importance (BI) is a function of Conservation Importance (CI) and theFunctional Integrity (FI) of a receptor.	

Receptor Resilience (RR)	The intrinsic capacity of the receptor to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention.
Site Ecological Importance (SEI) is a function of Biodiversity Importance (BI) and ReceptorResilience (RR)	

3.6 TERRESTRIAL BIODIVERSITY IMPACT ASSESSMENT

3.6.1 IMPACT RATING METHODOLOGY

To ensure a balanced and objective approach to assessing the significance of potential impacts, a standardized rating scale was adopted which allows for the direct comparison of specialist studies. This rating scale has been developed in accordance with the requirements of the NEMA EIA Regulations (2014 and subsequent 2017 amendments).

The potential impacts of the proposed establishment of a Borrow pit, existing land uses and the available alternatives sites were rated using a clearly defined rating scale. The significance rating formula is as follows:

Significance = Consequence x Probability

Where

Consequence = Type of Impact x (Intensity + Spatial Scale + Duration)

And

Probability = Likelihood of an Impact Occurring

In addition, the formula for calculating consequence:

Type of Impact = +1 (Positive Impact) or -1 (Negative Impact)

The weight assigned to the various parameters for positive and impacts to biodiversity is provided for in the formula and is presented in **Table 2.** The probability consequence matrix is displayed in **Table 3**, with the impact significance rating described in **Table 4.**

.

Table 2: Biodiversity Impact Assessment Parameter Ratings

RATING	INTENSITY		SPATIAL SCALE	DURATION	PROBABILITY
	Negative Impacts (Type of Impact = -1)	**Positive Impacts (Type of Impact = +1)**			
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 breakdown of social order.	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.
6	Significant impact on highly valued species, habitat or ecosystem.	Great improvement to livelihoods and living standards of a large percentage of	National Will affect the entire country.	Beyond Project Life The impact will remain for some time	Almost certain/Highly probable It is most likely that the impact will occur.

.

	Irreparable damage to highly valued items of cultural significance or breakdown of social order.	population, as well as significant increase in the quality of the receiving environment.		after the life of a Project.	
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.
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 /	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.

.

	items of cultural significance.				
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.
2	Minor effects on biological or physical environment. Environmental damage can be rehabilitated internally with/ without help of external consultants. Minor medium-term social impacts on local	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 during lifetime of the Project but has happened elsewhere. The possibility of the

.

	population. Mostly repairable. Cultural functions and processes not affected.				impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures.
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.

.

Table 3: Probability Consequence Matrix

	Significance																																						
Probability	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	12	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
		-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

Table 4: Significance Threshold Limits

Score	Description	Rating
109 to 147	A very beneficial impact which may be sufficient by itself to justify implementation of the project. The impact may result in permanent positive change.	

.

Score	Description	Rating
73 to 108	A beneficial impact which may help to justify the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the (natural and/or social) environment.	
36 to 72	An important positive impact. The impact is insufficient by itself to justify the implementation of the project. These impacts will usually result in positive medium to long-term effect on the social and/or natural environment.	
3 to 35	A small positive impact. The impact will result in medium to short term effects on the social and/or natural environment.	
-3 to -35	An acceptable negative impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative medium to short term effects on the social and/or natural environment.	
-36 to -72	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the Project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the social and/or natural environment.	
-73 to -108	A serious negative impact which may prevent the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term change to the (natural and/or social) environment and result in severe effects.	

.

Score	Description	Rating
-109 to -147	A very serious negative impact which may be sufficient by itself to prevent implementation of the project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects.	

4. WETLAND DELINEATION METHOLODOLOY

4.1 WETLAND DELINEATION

As indicated above, a visual reconnaissance of the area was undertaken before surveying the study site on the **14 June 2023**. Maps and Google Earth™ images were studied in order to determine the position of possible wetlands and/or riparian zones in the study area. All possible wetlands and water courses were subsequently surveyed in order to determine the delineation thereof. The method described by (DWAF, 2005 and 2008). The DWAF guidelines contain a number of stipulations relating to the protection of wetlands and the undertaking of wetland assessments.

The guidelines state that a wetland delineation procedure must identify the outer edge of the temporary zone of the wetland, which marks the boundary between the wetland and adjacent terrestrial areas and is that part of the wetland that remains flooded or saturated close to the soil surface for only a few weeks in the year, but long enough to develop anaerobic conditions and determine the nature of the plants growing in the soil.

The guidelines also state that locating the outer edge of the temporary zone must make use of four specific indicators including the terrain unit indicator, the soil form indicator, the soil wetness indicator and the vegetative indicator. In addition the wetland and a protective buffer zone, beginning from the outer edge of the wetland temporary zone, must be designated as sensitive in a sensitivity map.

The guidelines stipulate buffers to be delineated around the boundary of a wetland; the wetland and a protective buffer zone, beginning from the outer edge of the wetland temporary zone, must be designated as sensitive and a

30m buffer delineated around the edge of the wetland in which no development must be allowed to occur.

For the purposes of this investigation a wetland was defined according to the definition in the National Water Act (1998) as:

"*land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which in normal circumstances supports or would support vegetation typically adapted to life in saturated soil*."

Wetland delineation took place according to the method presented in the final draft of "A practical field procedure for identification and delineation of wetlands and riparian areas" published by the department of Water Affairs and Forestry (DWAF, 2005). The method for identification and delineation uses four indicators to indicate/flag the presence of riparian areas and wetlands. These four indicators are:

- Terrain Unit (Location in the landscape)
- Soil form (typical wetland soil forms)
- Vegetation (indicator species or hydrophytes) and
- Soil wetness (evidence of hydric conditions)

For delineation purposes only the wetland boundary is defined as the edge where the hydric indicators are encountered within the top 50cm or 500 mm of the surface, but from a wetland management perspective consideration should extend beyond the boundaries to include the wetland catchment as a whole.

(a) <u>Terrain Unit Indicator:</u>

Identifies those parts of the landscape where wetlands are likely to occur: Pans are usually concentrated in areas with an average slope of less than one

degree and are characterised by a lack of integrated drainage. Inundation is usually seasonal or ephemeral. This indicator cannot be used for mapping, but is useful for screening (e.g., desktop screening assessment of where development is proposed in or alongside a valley bottom wetland or river). 1:50 000 topographic maps were used to generate digital base maps onto which the boundaries of the wetland can be delineated using Arcview 9.2. The terrain unit indicator is used for indicating the likely presence of wetlands, but not for delineation purposes.

(b) Soil Form Indicator:

Particular forms of soil are associated with wetlands and display hydromorphic characteristics, and their presence at a site indicates that permanent or periodic (temporary or seasonal) saturation of the soil near the surface occurs. Soils forms are also only indicators of possible wetland presence: i.e. on its own it is not sufficient information to rely on for wetland verification. The exceptions are the Katspruit, Champagne, Willowbrook and Rensburg soil forms which are mostly associated with permanent wetlands. No comprehensive soil survey has been undertaken for the site.

(c) Vegetation Indicator

The presence of indicator plant species or hydrophytes can be used to denote the presence of wetlands. This indicator is very useful as verification of the boundaries in undisturbed sites. Soil condition is the primary criterion that signifies waterlogged conditions. These conditions manifest itself through plant communities that can tolerate hydromorphic soils. These plants are hydrophytes that are adapted to stresses imposed on plants through temporary or permanent waterlogged conditions.

(d) Soil wetness Indicator

This indicator refers to the colour of soil component is often the most diagnostic indicator of hydromorphic soils. Iron is what gives soil its red-brown colour; the

reddish colour originates from iron-oxide (rust) – iron and oxygen. Wetland soils can be permanently, seasonally or temporarily saturated. This normally results in anoxic (low oxygen) conditions in the saturated zone. Soil colour is markedly influenced by the oxidation statues of manganese and iron. Yellow, red and reddish-brown soil form under well-oxidised conditions and greyish colours when aeration is poorer. Under anoxic conditions, iron becomes soluble and can be leached out of the soil.

Where the soil is permanently wet; the iron can all be dissolved out of the soil; resulting in a greyish or blueish colour. This is termed gleying. Prolonged periods of water saturation producing gleysation, where grey and blue mottles are form and are a condition in which hydrophilic plants flourish. Soil that are gleyed or organic soils indicate permanently saturated zones. Where the soil is only saturated on a seasonal basis (at least 3 months per year); the gleying may not be extensive. Instead, due to alternating periods of iron being dissolved and then oxidised, a mottled appearance develops in the soil. Consequently, it is possible to identify wetland areas on the basis of soil colour, while mottle hue and chroma initially increase and then decrease the more saturated the soils become (**Table 5 & Figure 3**).

Table 5: Relationship between degree of wetness (wetland zone) and vegetation (adapted from Kotze et al., 1994)

Degree wetness			
	Temporary	**Seasonal**	**Permanent/ Semi-permanent**
Soil Depth (0cm-50cm)	Few/no mottles Non-sulphuric	Many mottles Seldom sulphuric	Few / no mottles Often sulphuric
Vegetation	Predominantly sedges and grasses	Predominantly sedges and grasses	Predominantly reeds and sedges

By observing the evidence of these features, in the form of indicators, wetlands can be delineated and identified. If the use of these indicators and the interpretation of the findings are applied correctly, then the resulting delineation can be considered accurate (DWAF 2005).

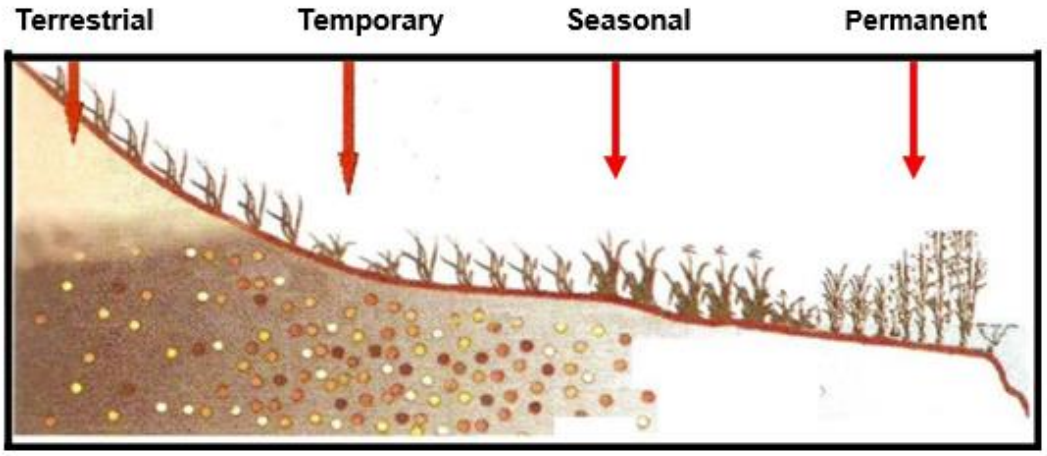


Figure 3: Cross section through a valley bottom wetland indicating how soil wetness and vegetation indicators change as one moves along a gradient of decreasing wetness, from the permanent wet hydrological zone to the temporarily wet hydrological zone and eventually into the non-wetland or terrestrial zone (Department of Water Affairs and Forestry, 2003 as adapted by Kotze, 1996)

4.2 PRESENT ECOLOGICAL STATUS

4.2.1 PES METHODOLOGY

The Present Ecological State (PES) refers to the current state or condition of a watercourse in terms of all its characteristics and reflects the change to the watercourse from its reference condition. The results from such an assessment are compared to the standard DWAF A-F ecological categories (**Table 6**) from where the PES/Habitat integrity of the wetland can be determined. The values give an indication of the alterations that have occurred in the wetland system.

Table 6: Present Ecological status categories of wetlands (adapted from kleynhans, 1996 & 1999)

ECOLOGICAL CATEGORY	SCORE	DESCRIPTION
A	90-100%	Unmodified, natural.
B	80-90%	Largely natural with few modifications. A small change in natural habitats and biota may have taken place but the ecosystem functions are essentially unchanged
C	60-80%	Moderately modified. Loss and change of natural habitat and biota have occurred, but the basic ecosystem functions are still predominantly unchanged.
D	40-60%	Largely modified. A large loss of natural habitat, biota and basic ecosystem functions has occurred
E	20-40%	Seriously modified. The loss of natural habitat, biota and basic ecosystem functions is extensive
F	20-40%	Critically / Extremely modified. Modifications have reached a critical level and the system has been modified completely with an almost complete loss of natural habitat and biota. In the worst instances the basic ecosystem functions have been destroyed and the changes are irreversible.

4.3 ECOLOGICAL IMPORTANCE AND SENSITIVITY

4.3.1 EIS METHODOLOGY

The Ecological Importance and Sensitivity (EIS) of a watercourse is an expression of its importance to the maintenance of ecological diversity and functioning on local and wider scales, and both abiotic and biotic components of the system are taken into consideration. Sensitivity refers to the system's ability to resist disturbance and its capability to recover from disturbance once it has occurred. The ecological importance and sensitivity categories are indicated in **Table 7**.

Table 7: Ecological Importance & Sensitivity Categories of Wetlands

EIS Categories	Description
Low/marginal	Not ecologically important and sensitive at any scale. Biodiversity ubiquitous and not sensitive to flow and habitat modifications (Wetlands: play an insignificant role in moderating water quality & quantity)
Moderate	Ecologically important & sensitive on provincial/local scale. Biodiversity not usually sensitive to flow & habitat modifications. (Wetlands: play a small role in moderating water quantity & quality)
High	Ecologically important & sensitive and important. Biodiversity may be sensitive to flow & habitat modifications. (Wetlands: Play a role in moderating water quantity & quality)
Very high	Ecologically important & sensitive on a national (or even international) level. Biodiversity usually very sensitive to flow & habitat modifications. (Wetlands: play a major role in moderating water quantity & quality)

4.4 EIS OF WETLANDS IN THE STUDY AREA

The wetlands in the study area have EIS categories and EMC values as indicated in **Table 8**.

Table 8: Summary of EIS onsite.

Wetland	EIS category	EMC
Mogalakwena River	Moderate sensitivity	D
Dry Tributaries and drainage lines	Dry	Undetermined

4.5 WETLAND ECO SERVICES (ES)

4.5.1 ES METHODOLOGY

WET-EcoServices (Kotze et al. 2004) was used to assess the goods and services that the floodplain provides. This tool provides guidelines for scoring the importance of different ecosystem services delivered by a wetland. The different services are then assessed based on existing knowledge and/or field assessment data. Each of fifteen different categories are assessed based on various characteristics (e.g., size of the wetland, pattern of flow through the wetland, social value and uses, etc.) that are relevant to the particular benefit (**Table 9**).

Table 9: Levels of ecosystem service ratings.

Services Rating Score	Services Rating Category
0	Low
1	Moderately Low
2	Intermediate
3	Moderately High
4	High

4.5.2 ES OF WETLANDS IN THE STUDY AREA

The wetlands in the study area have ES values as indicated in **Table 10**.

Table 10: ES values of wetlands in the study area.

Wetland	ES value
Mogalakwena River	3
Dry Tributaries and drainage lines	3

5. SITE CHARACTERISTICS

5.1 GEOLOGY & SOILS

The area is underlain by the gneisses and migmatites of the Hout River Gneiss (Randian Erathem) and the potassium-deficient gneisses of the Goudplaats Gneiss (Swazian Erathem). Sandstones and mudstones of the Matlabas Subgroup (Mokolian Waterberg Group) are also found. Soils include deep, greyish sands, eutrophic plinthic catenas, red-yellow apedal freely drained soils with high base status, clayey in bottomlands. Land types mainly Bd, Bc, Ae and Ia.

In addition, the site consistently Mostly rocks of the Beit Bridge Complex (Swazian Erathem) as well as sediments (including sandstones of the Clarens Formation) and basalt (particularly in the east) of the Karoo Supergroup. Shallow gravel and sand (Glenrosa and Mispah soil forms) to calcareous clayey soil. Land types mainly Fc, Fb and Ib.

5.2 CLIMATE

The study site experiences summer rainfall with very dry winters. The Mean Annual Precipitation is about 350–550 mm. Frost fairly infrequent. The Mean monthly maximum and minimum temperatures for Mara-Agr 36.5°C and –0.8°C for November and June, respectively.

5.3 VEGETATION & LANDSCAPE

5.3.1 SVmp 1 Musina Mopane Bushveld

The site consists of the SVmp 1 Musina Mopane Bushveld vegetation unit (**Figure 4**), this vegetation unit is characterized by Undulating to very irregular plains, with some hills. In the western section, open woodland to moderately closed shrubveld

dominated by *Colophospermum mopane* on clayey bottomlands and *Combretum apiculatum* on hills. In the eastern section on basalt, moderately closed to open shrubveld is dominated by *Colophospermum mopane* and *Terminalia prunioides*. On areas with deep sandy soils, moderately open savanna dominated by *Colophospermum mopane*, *T. sericea*, *Grewia flava* and *Combretum apiculatum*. Field layer well developed (especially on the basalt), open during the dry season; the herbaceous layer is poorly developed in areas with dense cover of *Colophospermum mopane* shrubs, for example, north of Alldays bordering the Limpopo floodplain.

5.3.2 SVmp 2 Limpopo Ridge Bushveld

In addition to Mopani Bushveld, the study site consists of the Limpopo Ridge Bushveld. This vegetation is characterized by Extremely irregular plains with ridges and hills. Moderately open savanna with poorly developed ground layer. Umbrella-shape canopied *Kirkia acuminata* is prominent on some ridge skylines with the often enormous *Adansonia digitata* on shallow calcareous gravel. The shrub *Catophractes alexandri* is dominant on calc-silicate soils. These are particularly striking landscapes with rock walls and passages within areas of sandstone of the Clarens Formation (e.g. within the Mapungubwe National Park).

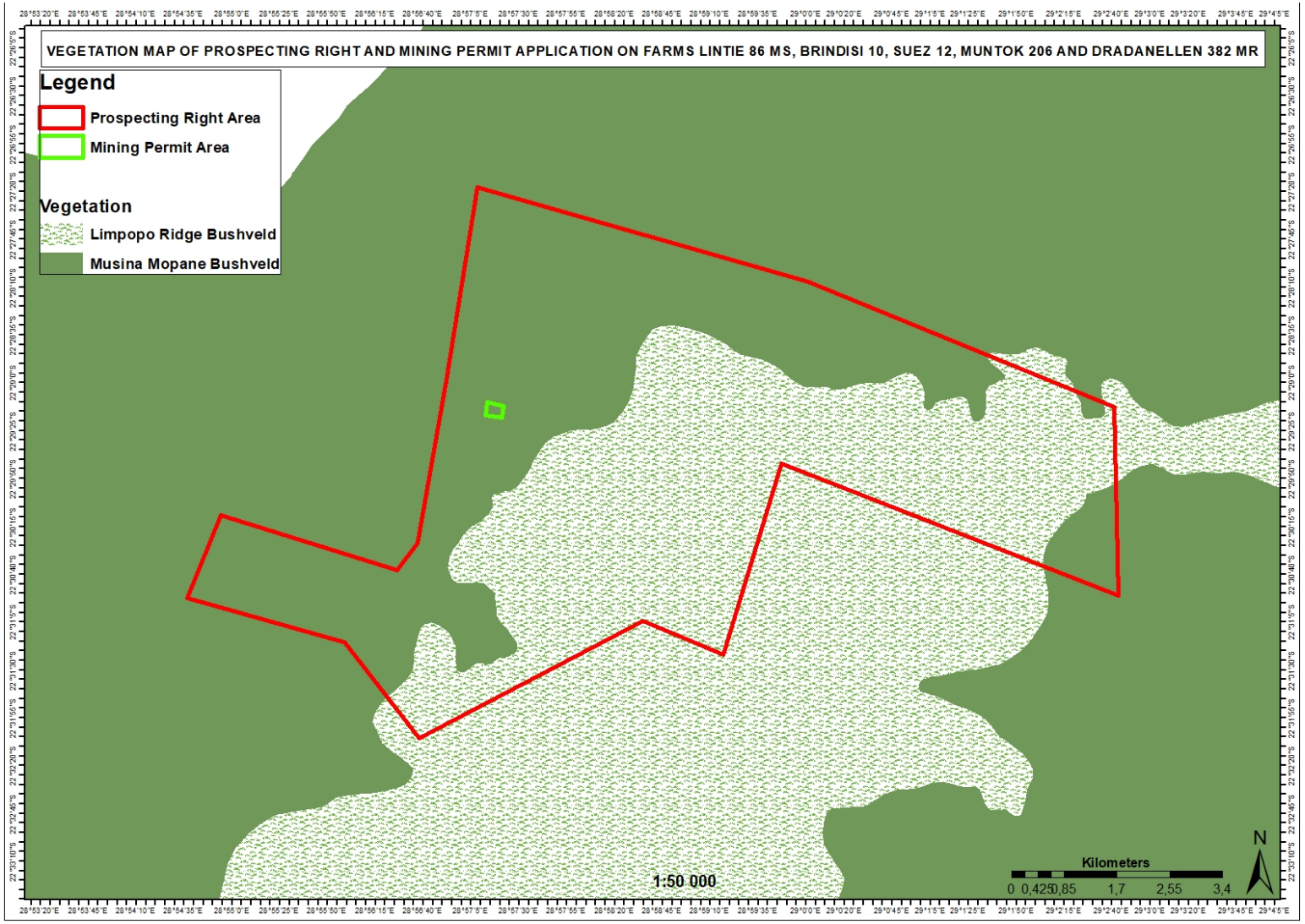


Figure 4:Vegetation Map

5.4 DISTRIBUTION OF THE VEGETATION UNITS FOUND ONSITE

5.4.1 Distribution of the SVmp 1 Musina Mopane Bushveld

The Musina Mopane Bushveld is distributed in the Limpopo Province. It can observed in undulating plains from around Baines Drift and Alldays in the west, remaining north of the Soutpansberg and south of the Limpopo River (but also occurring to the north in Zimbabwe), through Musina and Tshipise to Malongavlakte, Masisi and Banyini Pan in the east. Altitude about 300 m (in the eastern Limpopo Valley) to 800 m..

5.4.2 Distribution of t SVmp 2 Limpopo Ridge Bushveld Vegetation Unit

The Limpopo Ridge Bushvled is found in the Limpopo Province. It is found on hills and ridges, such as Madiapala in the lower Mogalakwena River basin in the west through a cluster of hills in the Pontdrif area including Poortjieberg and Tsolwe, eastwards including Mapungubwe Mountain in the Mapungubwe National Park through to the hills and ridges in the vicinity of the Limpopo River further downstream (for example Ha-Tshansi at Musina, Ha-Dowe and Maremani). Also including hills and ridges well away from the river north of the Soutpansberg and generally east of the Sand River (e.g. Tshitangai, Bloukop and Ha-Manenzhe) through to some rugged areas in the far northern Kruger National Park. Altitude from about 300 m in the east to 700 m, with the top of a few hills in the west at around 1 000 m.

5.5 CONSERVATION STATUS OF THE VEGETATION UNITS ONSITE

5.5.1 Conservation status of the SVmp 1 Musina Mopane Bushveld

The SVmp 1 Musina Mopane Bushveld is classified as **Least threatened**. A conservation target of 19% has been set, with about Only 2% statutorily conserved mainly in the Mapungubwe National Park as well as in Nwanedi and Honnet Nature Reserves. Additionally, about 1% conserved in the Baobab Tree Reserve. Roughly 3% transformed, mainly by cultivation. Erosion is high to moderate .

5.5.2 Conservation status of the SVmp 2 Limpopo Ridge Bushveld

According to SANBI, the Limpopo Ridge Bushveld has been classified as **Least threatened**. A conservation target of 19% has been set, with some 18% statutorily conserved, mainly in the Kruger and Mapungubwe National Parks. An additional 2% conserved in the Baobab Tree Reserve (thus together attaining the target). Only about 1% is transformed, mainly for cultivation and mining.

5.5.3 Plant Species of Conservation Concern

South Africa has become the first country to fully assess the status of its entire flora (Domitilla and Raimondo, 2011). Major threats to the South African flora are identified in terms of the number of plant taxa Red-Listed as threatened with extinction as a result of threats like, habitat loss (e.g. infrastructure development, urban expansion, crop cultivation and mines), invasive alien plant infestation (e.g. outcompeting indigenous plant species), habitat degradation (e.g. overgrazing, inappropriate fire management etc.), unsustainable harvesting, demographic factors, pollution, loss of pollinators or dispersers, climate change and natural disasters (e.g. such as droughts and floods)[1]. South Africa uses the internationally endorsed IUCN Red List Categories and Criteria in the Red List of South African plants. However, due to its strong focus on determining risk of extinction, the IUCN system does not highlight species that are at low risk of extinction but may nonetheless be of high conservation importance. As a result, SANBI uses an amended system of categories in order to highlight species that may be of low risk of extinction but are still of conservation concern (SANBI, 2015).

A list of plant species of conservation concern was compiled based on the POSA database (POSA, 2017). Three (3) plant species of conservation concern are expected to occur within the study site (**Table 11**). The endemic plant species that are expected to occur within the study site, include*Dicliptera minor* subsp. *pratis-manna, Pavonia dentata* and *Cleome oxyphylla var. robusta.* The likelihood of occurrence of these species was assessed based on their known habitat preferences.

[1] RAIMONDO, Domitilla. The Red List of South African plants: a global first. S. Afr. j. sci., Pretoria , v. 107, n. 3-4, p. 01-02, Apr. 2011 . on 17 Aug. 2021. http://dx.doi.org/10.4102/sajs.v107i3/4.653.

Table 11: Plant species of conservation concern expected to occur in grid square 2427CC as well as the conservation status of each (POSA, 2017; SANBI, 2017)

NO.	SPECIES NAME	Common Name	Threat Status	RECORDED ONSITE (YES/NO)
1	*Combretum imberbe*	Leadwood	Provincially Protected	**Yes**
2	*Euphorbia waterbergensis*	Spurge	Provincially Protected	**No**
3	*Adansonia digitata*	Boabab	Provincially Protected	**Yes**
4	*Afzelia quanzensis*		Declining	
5	*Acacia erioloba* -	Camel thorn	Provincially Protected	**Yes**
6	*Boscia albitrunca -)*	Sheperd's tree	Provincially Protected	**Yes**
7	*Sclerocarya birrea subsp. caffra* - Ma	Marula Tree	Provincially Protected	**Yes**

5.6 IMPORTANT TAXA

Table 12: Important Taxa within the within the study site (Mucina and Rutherford 2006)

PLANT FORM	SPECIES
SVmp 2 Limpopo Ridge Bushveld	
TALL TREES	*Adansonia digitata (d), Acacia nigrescens, Sclerocarya birrea subsp. caffra.*
SMALL TREES:	*Colophospermum mopane (d), Commiphora glandulosa (d), C. tenuipetiolata (d), Terminalia prunioides (d), Acacia sene¬gal var.*

	leiorhachis, A. tortilis subsp. heteracantha, Boscia albitrunca, Combretum apiculatum, C. imberbe, Commiphora mollis, Ficus abutilifolia, F. tettensis, Kirkia acuminata, Sterculia rogersii, Ximenia americana.
TALL SHRUBS	*Catophractes alexandri, Commiphora pyracanthoides, Gardenia resiniflua, Grewia bicolor, G. villosa, Hibiscus calyphyllus, H. micranthus.*
LOW SHRUBS	*Barleria affinis, Blepharis diversispina, Neuracanthus africanus, Plinthus rehmannii, Ptycholobium contortum.*
WOODY CLIMBER	*Cissus cornifolia.*
GRAMINOIDS	*Aristida adscensionis, A. stipitata subsp. graciliflora, Digitaria eriantha subsp. eriantha, Enneapogon cenchroides, Panicum maximum, Schmidtia pappophoroides, Stipagrostis uniplumis.*
SVmp 1 Musina Mopane Bushveld	
TALL TREES	*Acacia nigrescens, Adansonia digitata, Sclerocarya birrea subsp. caffra*
SMALL TREES	*Colophospermum mopane (d), Combretum apiculatum (d), Acacia senegal var. leiorhachis, A. tortilis subsp. heteracantha, Boscia albitrunca, B. foetida subsp. rehmanniana, Commiphora glandulosa, C. tenuipetiolata, C. viminea, Sterculia rogersii, Terminalia pruni¬oides, T. sericea, Ximenia americana.*
TALL SHRUBS	*Grewia flava (d), Sesamothamnus lugardii (d), Commiphora pyracanthoides, Gardenia volkensii, Grewia bicolor, Maerua parvifolia, Rhigozum zambesiacum, Tephrosia polystachya.*
LOW SHRUBS	*Acalypha indica, Aptosimum lineare, Barleria senensis, Dicoma tomentosa, Felicia clavipilosa subsp. transvaalensis, Gossypium herbaceum subsp. africanum, Hermannia glanduligera, Neuracanthus africanus, Pechuel-Loeschea leubnitziae, Ptycholobium contortum, Seddera suffruticosa.*
SUCCULENT SHRUB	*Hoodia currorii subsp. lugardii. Herbaceous Climber: Momordica balsamina.*
GRAMINOIDS	*Schmidtia pappophoroides (d), Aristida adscensionis, A. congesta, Bothriochloa insculpta, Brachiaria deflexa, Cenchrus ciliaris, Digitaria eriantha subsp. eriantha, Enneapogon cenchroides, Eragrostis lehmanniana, E. pallens, Fingerhuthia africana, Heteropogon contortus, Sporobolus nitens, Stipagrostis hirtigluma subsp. patula, S. uniplumis, Tetrapogon tenellus, Urochloa mosambicensis.*

SUCCULENT HERBS	*Stapelia gettliffei, S. kwebensis.*
HERBS	*Acrotome inflata, Becium filamentosum, Harpagophytum procumbens subsp. transvaalense, Heliotropium steudneri, Hermbstaedtia odorata, Oxygonum delagoense.*

5.6.1 VEGETATION TYPES RECORDED ON SITE

While National level vegetation maps have described broad vegetation types, local conditions, and micro-habitats (rainfall, soil structure, rocky outcrops, etc.) can result in variations in plant composition. As such, site surveys are critical for the verification of desktop findings and establishing the baseline ecological conditions of a site. The site visit conducted on the **14th of June 2023** confirmed that the vegetation of the project area is Musina Mopane Bushveld and Limpopo Ridge Bushveld (**Figures 8, 9 and 10**) . The site has evidence agricultural activities, and it was previously used a nature reserve. The study site is dominated by the open woodland to moderately closed shrubveld dominated by *Colophospermum mopane* on clayey bottomlands

.

Figure 5: Aerial Overview of the study site, open woodland to moderately closed shrubveld dominated by *Colophospermum mopane*.

.

Figure 6: *Colophospermum mopane* trees, and Limpopo Ridge Bushveld along the bank of the dry river.

.

Figure 7:Disturbance observed onsite.

Figure 8: *Colophospermum mopane* tress observed onsite.

5.7 ETHNOBOTANICAL PLANT SPECIES

Ethnobotany/ Ethnoecology is a branch of botany that focuses on the use of plants for medicines, cultural and recreational purposes. The overexploitation of indigenous plants for ethnobotanical purposes can be detrimental to populations of those particular plant species, and the other species that depend on its existence for their survival. South Africa has a rich diversity of medicinal plants that not only have a global significance, but also have a cultural and historical role (van Wyk *et al.* 2009). There is a rapidly growing concern for conservation of medicinal plants that are dwindling in number due to illegal harvesting (Institute of Natural Resources 2003). This is particularly apparent in rural areas where medicinal plants are overexploited by traditional doctors (Mazid *et al.,* 2012).

The study site has Marula trees (Figure 9). The powdered bark is used to treat pregnant women to determine the gender of an unborn baby. If a pregnant woman wishes to

have a girl, she will take a preparation from the female plant and for a boy she will use the male plant. Traditional healers use the hard nut in their divining dice[2].

Figure 9: Example of the *Marula species found onsite*.

In addition to Sclerocarya birrea , the study site has *Adansonia digitata* (Baobab) (**Figure 10).** The leaves are said to be rich in vitamin C, sugars, potassium tartrate, and calcium. They are cooked fresh as a vegetable or dried and crushed for later use by local people. The sprout of a young tree can be eaten like asparagus. The root of very young trees is also reputed to be edible. The seeds are also edible and can also be roasted for use as a coffee substitute. Caterpillars, which feed on the leaves, are collected and eaten by African people as an important source of protein. Wild animals eat the fallen leaves and fresh leaves are said to be good fodder for domestic animals. The fallen flowers are relished by wild animals and cattle alike. When the wood is chewed, it provides vital moisture to relieve thirst. Humans as well as certain animals eat it in times of drought[3].

[2]https://pza.sanbi.org/sclerocarya-birrea
[3] https://pza.sanbi.org/adansonia-digitata

.

Figure 10:One of the Baobab Trees (Adansonia digitata) observed onsite.

The open woodland to moderately closed shrubveld dominated by *Colophospermum mopane* trees (**Figure 8** above). These beautiful trees with their distinctive butterfly-shaped leaves and strange seeds are, for many, the essence of South Africa's lowveld areas, along with interesting bird and insect life and game animals. They are also an extremely important food source for animals and people. In summer the leaves of C. mopane are fed on by swarms of fat, dark greyish mopane worms, which can reach almost 10 cm long. These are rich in protein and are eaten by people, either roasted or dried. The sale of dried mopane worms is an important income source for many people, creating a local economy. Other traditional uses of the mopane tree include the making of houses and kraal fences, the chewing of twigs as tooth brushes, the use of bark to make twine and for tanning, and the use of leaves for healing wounds. The hard, reddish heartwood timber was used to make railway sleepers and as props for mining activities. This is one South Africa's heaviest timbers and is apparently difficult to work because of its hardness, but this also makes it termite-resistant, therefore a popular choice for fence posts and flooring. The

Gonometa moth caterpillar spins silken cocoons which are harvested as wild silk to make cloth[4].

5.8 ALIEN INVASIVE SPECIES PRESENT ON SITE

An "invasive species" is any species whose establishment and spread outside of its natural distribution range (i) threatens ecosystems, habitats or other species or has a demonstrable potential to threaten ecosystems, habitats or other species; and (ii) may result in economic or environmental harm or harm to human health. Invasive alien plant species are globally considered as one of the greatest threats to the environment, biodiversity, ecosystem integrity and the economy.

According to the Conservation of Agricultural Resources Act (No. 43 of 1983 - Regulation 15, 30 March 2001) (CARA), for agricultural land, and the National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEMBA), for natural areas, invasive alien plant species should be controlled and eradicated with an emphasis on urgent action in biodiversity priority areas. NEMBA published a list of Alien and Invasive Species (No 599) in 2014 which regulates the management of alien and invasive plants in natural environments**. The study site has no evidence of Alien invasive species.**

5.9 2018 LIMPOPO PROVINCE MAP OF CRITICAL BIODIVERSITY AREAS AND ECOLOGICAL SUPPORT AREAS

The key purpose of this BSP is to assist and guide land use planners and managers within various district and local municipalities, to account for biodiversity conservation priorities in all land use planning and management decisions, thereby promoting sustainable development and the protection of biodiversity, and in turn the protection of ecological infrastructure and associated ecosystem services The objectives of the Biodiversity Sector Plan are to:

[4] https://pza.sanbi.org/colophospermum-mopane

.

- Ensure aquatic and terrestrial biodiversity targets are met at the District level.
- Conserve representative samples of biodiversity pattern.
- Conserve the ecological and evolutionary processes that allow biodiversity to persist over time; and
- **Serve as a first step towards the development of a Bioregional Plan.**

According to the 2018 Limpopo Province Map of Critical Biodiversity Areas (CBA 1 and 2) and Ecological Support Areas (ESA 1 and 2), the study site is located within An Ecological Support Area (Figure 13). Critical Biodiversity Area 2 (CBA 2) Maintain in a functional, natural or near-natural state, with no further loss of natural habitat. These areas should be rehabilitated. Ecological Support Area 2 (ESA 2), Restore and/or manage to minimise impact on ecological infrastructure functioning; especially soil and water-related services[5].

[5] https://www.capenature.co.za/uploads/files/protected-area-management-plans/A-Summary-Overview-of-the-Biodiversity-Spatial-Plan.pdf

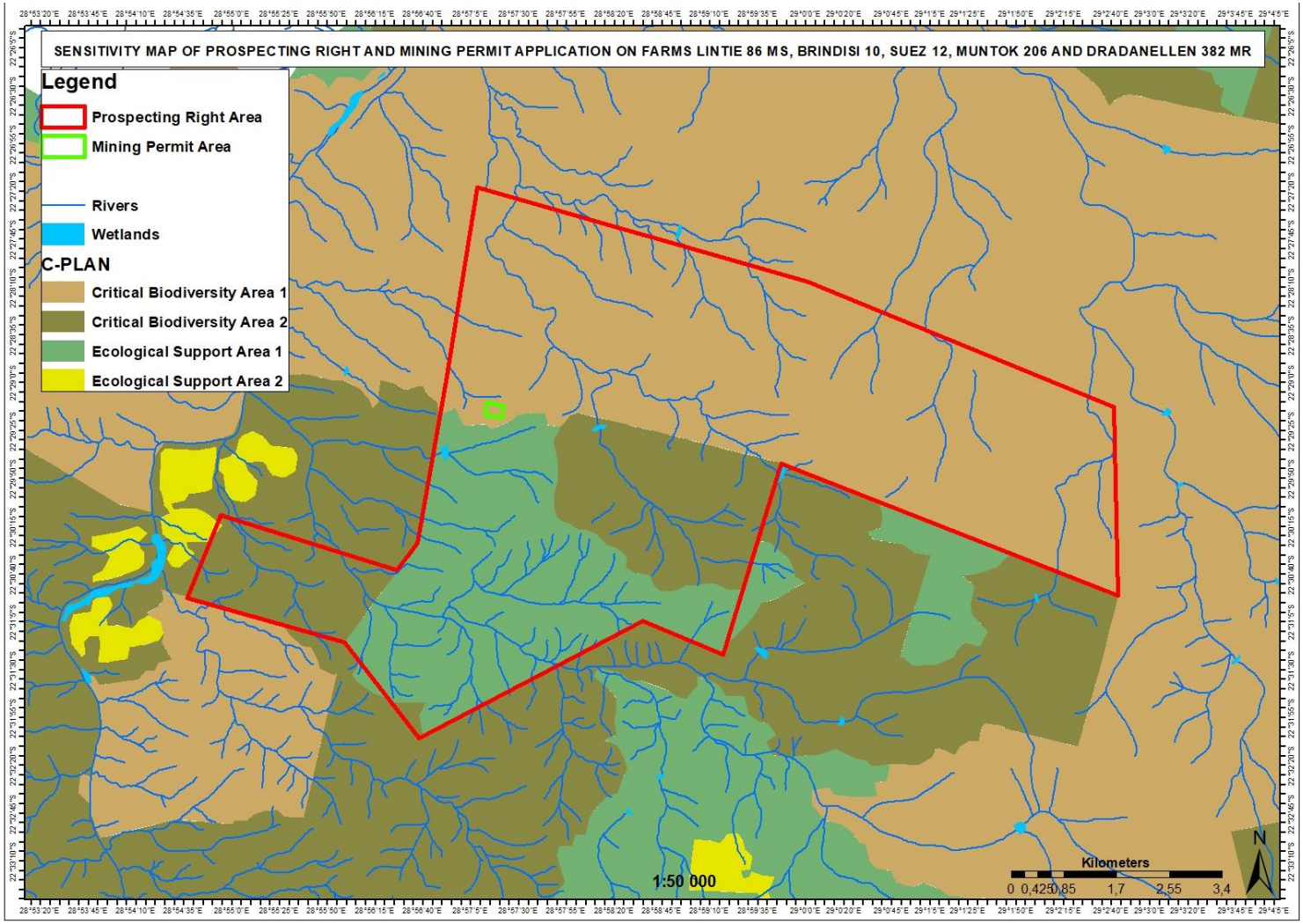


Figure 11: Sensitivity Map

5.10 HYDROLOGY

The study site is located within the Limpopo Water Management Area (WMA ID=1), Mogalakwena Subwater Management Area (WMA-ID=49).The National Freshwater Ecosystems Priority Areas (NFEPA) identifies important wetlands in South Africa. The prospecting area is located within 500m of a number of watercourses. Most of the watercourses were observed to be dry except for the Mogalakwena River. The watercourses are recognised as NFEPA Rivers (**Figure 12**). The mining permit area is located outside of the 500m boundary of a wetland or watercources.

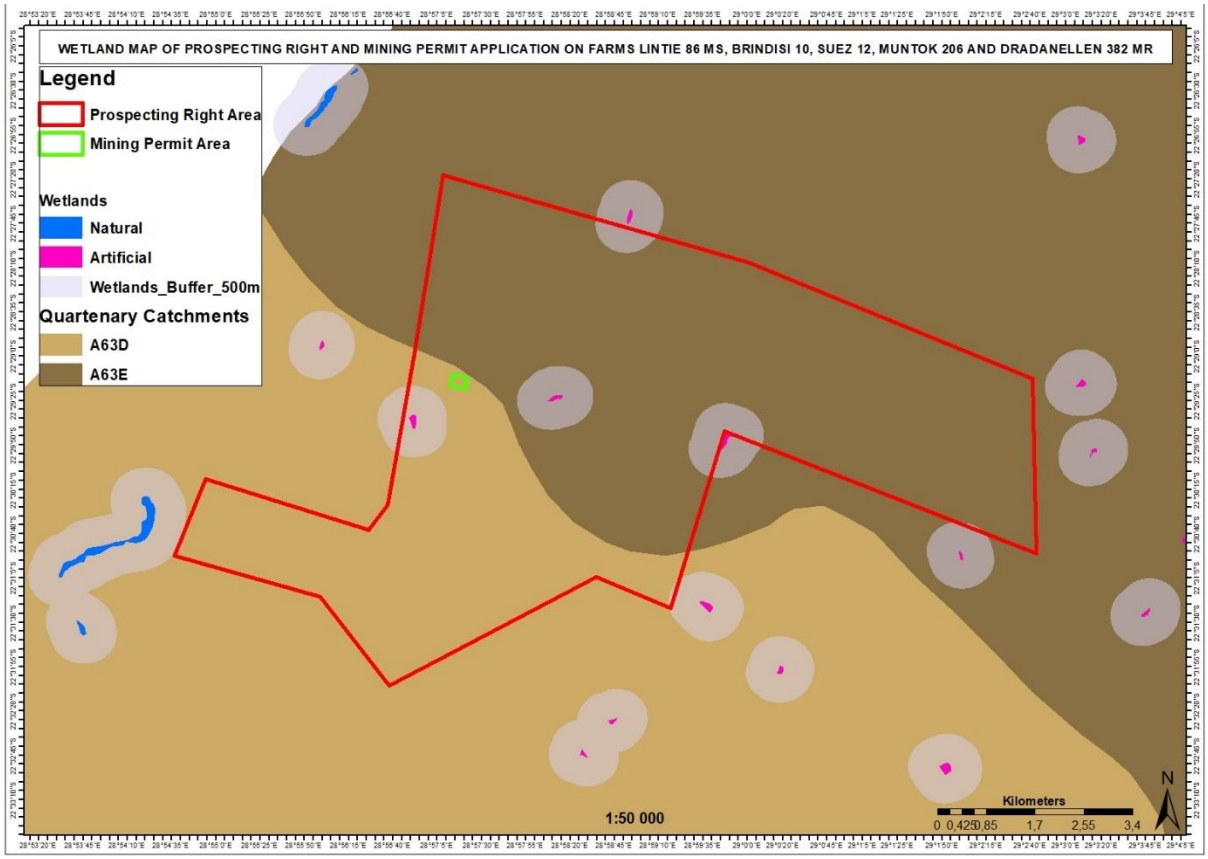


Figure 12: Surface Water Map

5.11 WETLAND FIELD SURVEY

The study site has suffered minor degrees of disturbance as a result of the livestock faming activities and cultivation, the damage is reversible. The result has been high vegetation surface areas a moderate biodiversity sensitivity cover or topsoil in many areas. As a result, the identification of typical wetland indicators in the form of hydrophytes and hydromorphic soils were restricted on the site. The prospecting area is located within 500m of a number of watercourses. Most of the watercourses were observed to be dry except for the Mogalakwena River,(**Figures 13 and 14**). The dry watercourses are dominated predominantly by terrestrial plant species as opposed to the usual hydrophytes.

Figure 13: Mogalakwena River observed onsite.

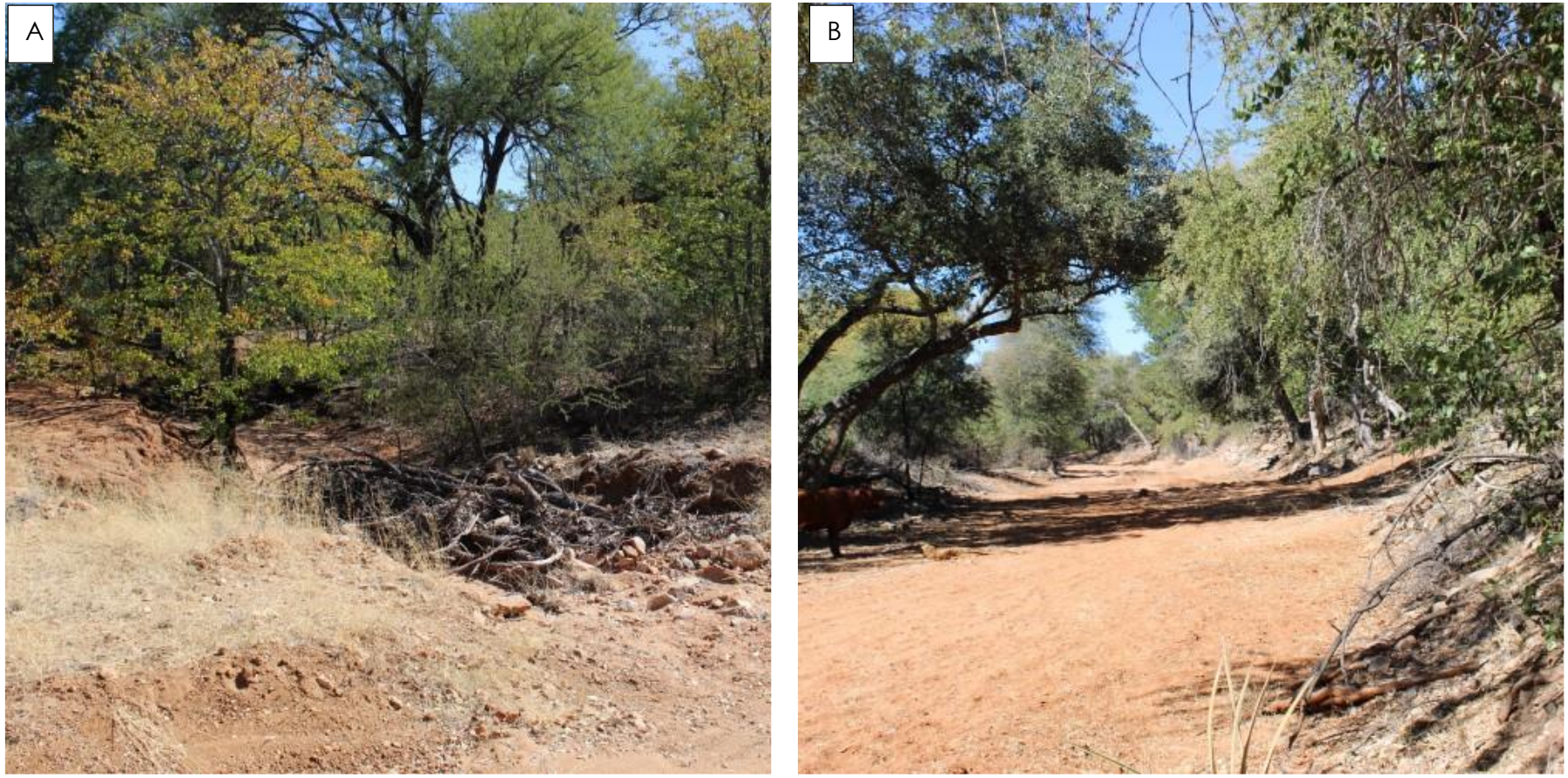


Figure 14:Dry watercourses onsite (A-Drainage Line and B-Non-Perennial River).

5.11.1 WETLAND FEATURES

The site has active natural river and a few dry watercourses (**Figures 13 and 14 above**). The hydrology of the site is connected to the catchment through the river. In addition, the site is located within a floodline. A 100m buffer is highly recommended during the prospecting and mining process. The active wetland and watercourses support a host of hydrophytes, and also serve as the watering hole for the game animals onsite (**Figure 15**).

Figure 15: Hydrophytes observed along the edge of the Mogalakwena River.

5.12 DESCRIPTION OF FAUNA

According to the desktop study conducted, forty-eight species of mammal are known to occur or likely to occur within the region (Friedmann & Daly 2004, Skinner & Chimimba 2005, Monadjem et al. 2010), and the majority of these can be expected to occur within the study area, given the habitats available and the relatively untransformed nature of much of the study area. The species listed in **Table 13** were identified as being possible to occur within the study area or the immediate vicinity of the study site. It must be noted that some of these species are very sensitive to habitat and in some instances; the likeliness for them to occur is minimal.

Table 13 : List of mammal species of conservation concern that may occur in the project area as well as their global and regional conservation statuses (IUCN, 2018; SANBI, 2016).

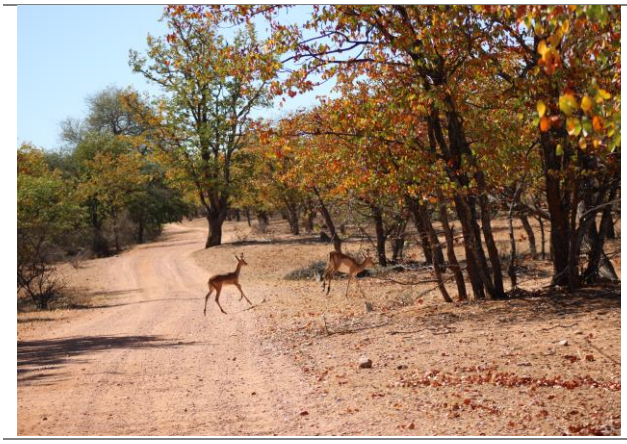
Common name	Recorded on site
Rapbicerus campestris	Yes
Sylvicarpa grimmia	Yes
Cercopithecus aethiops	Yes
Aepyceros melampus	Yes
Kobus ellipsiprymnus	Yes
Tragelaphus strepsiceros	Yes
Phacochoerus africanus	None
Hystrix africaeaustralis	None
Lepus saxatilis	None
Paraxerus cepapi	Yes
Mungos mungo	None
Papio Anubis	Yes

5.12.1 FIELD INVESTIGATION FINDINGS

During the site visit, none of mammals described on **Table 13** above were observed, this can be attributed to the disturbance onsite. The site is generally used for grazing

cattle (**Figure 16**). The farm has some game animals, the animals are depicted on **Figure 17**.

Figure 16: Cattle observed onsite.



***Rapbicerus campestris* (Steebok)**

***Tragelaphus strepsiceros* (Greater Kudu)**

***Paraxerus cepapi* (Smith's bush squirrel)**

***Chlorocebus pygerythrus* (Vervet monkey**

***Papio Anubis* (Olive Baboon)**

Additional Evidence of presence of large mammals onsite.

Figure 17: Mammals observed onsite during the site inspection.

5.13 REPTILES AND AMPHIBIANS

Based on the IUCN Red List Spatial Data (IUCN, 2017) and the Reptile Map database provided by the Animal Demography Unit (ADU, 2017) 13 reptile species are expected to occur in the project area. No species of conservation concern should be present according to the above-mentioned sources within the project area but in situ observations may prove otherwise.

Based on the IUCN Red List Spatial Data (IUCN, 2017) and the Amphibian Map database provided by the Animal Demography Unit (ADU, 2017) 25 amphibian species are expected to occur in the project area.

5.13.1 FIELD INVESTIGATION FINDINGS

None of the expected reptiles were observed on site during the site visit.

5.14 AVIFUANA

Birds are generally regarded as good ecological indicators, because their presence or absence tends to represent conditions pertaining to the proper functioning of an ecosystem. Bird communities and ecological conditions are directly linked to land cover. As the land cover of an area changes, so do the types of birds in that area (The Bird Community Index, 2007). Land cover is directly linked to habitats within the study area. The diversity of these habitats should give rise to many different species.

According to the South African Bird Atlas Project (SABAP2), almost 300 species of birds have been identified in the area. All birds that could be present within the vicinity of the study area are listed in **Table 14**.

Table 14: List of bird species of regional or global conservation importance that are expected to occur onsite.

Scientific Name	Common Name	IUCN Status
Geronticus calvus	Southern Bald Ibis	VU
Sagittarius serpentarius	Secretary bird	NT
Gyps coprotheres	Cape Vulture	VU
Stephanoaetus coronatus	African Crowned Eagle	NT
Circus ranivorus	African Marsh-Harrier	VU
Circus maurus	Black Harrier	NT
Falco biarmicus	Lanner Falcon	LC
Alcedo semitorquata	Half Collared Kingfisher	CR
Bugeranus carunculatus	Wattled Crane	VU
Anthropoides paradiseus	Blue Crane	VU
Balearica regulorum	Grey Crowned Crane	VU

Scientific Name	Common Name	IUCN Status
Eupodotis senegalensis	White-bellied Korhaan	VU

5.14.1 FIELD INVESTIGATION FINDINGS

The study is located outside of an Important Bird Area, and the sensitivity is considered Low. Furthermore, no Species of Conservation Concern were observed during the survey. A few avifaunal species were spotted onsite during the site inspection, All of the avifaunal species observed within the study site are considered to be of Least Concern by the IUCN and are common and widespread species (**Figures 18 and 19**).The study site has nests belong to the feathered locust (Quelea Spp.) (**Figure 20**).

Figure 18: Spur-winged Goose observed along the watercourse.

.

Figure 19: Mevea's starling (*Lamprotornis mevesii*) observed onsite.

Figure 20:Bird nests observed onsite.

5.15 INVERTEBRATES

Butterflies are a good indication of the habitats available in a specific region (Woodhall 2005). Although many species are eurytropes (able to use a wide range of habitats) and are widespread and common, South Africa has many stenotrope or endemic species (specific habitat requirements with populations concentrated in a small area) which may be very specialized (Woodhall 2005). Butterflies are useful indicators as they are relatively easy to locate and catch, and therefore identify.

5.15.1 FIELD INVESTIGATION FINDINGS

No butterflies of conservation concern were seen on site. Some species seen can be found below from **Figure 21**, In addition to the butterfly the wetland had red dragon flies (**Figure 22**).

Figure 21: *Biblia ilithya* observed onsite.

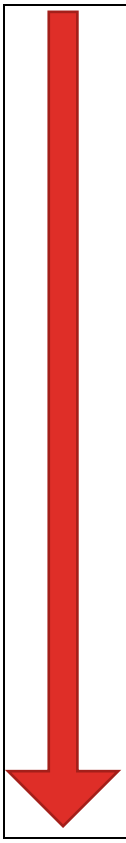
.

Figure 22: Red Dragon fly observed along the banks of the Mogalakwena River.

6. TERRESTRIAL BIODIVERSITY IMPACT ASSESSMENT

The impact assessment is aimed predicting potential impacts of the proposed projects. Impact assessment strives to avoid damage, loss of ecosystems services, and where they cannot be avoided, to reduce and mitigate these impacts (DEA, 2013). Offsets to compensate for loss of habitat are regarded as a last resort, after all efforts have been made to avoid, reduce and mitigate. The mitigation hierarchy is represented in **Table 15**.

Table 15: Mitigation hierarchy of impacts

	**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, the activity 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.
	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.

A significant portion of the property with the remaining natural habitat is anticipated to be lost due to the proposed mining and associated activities, however the proposed prosecting will have minimal impacts. The impact of the proposed activity will involve a loss of habitat for both flora and fauna (**Table 16**).

6.1 GENERAL IMPACT ASSESSMENT

Table 16: Assessment of impacts associated with the proposed Prospecting and mining.

CONSTRUCTION PHASE

IMPACT 1: IMPACTS ON THE TERRESTRIAL HABITAT OF WATERCOURSES
Cause and Comment ***Direct Impact on the available Site Alternatives*** During the construction phase, the clearance of vegetation in preparation for the prospecting and mining activities will directly impact the terrestrial habitat and the watercourse Areas resulting in increased run-off and possible erosion and loss of topsoil. This in turn could impact on the water quality entering the nearby streams during the rainy season. However, if mitigation measures are implemented this impact will be of low significance. ***Cumulative Impact*** The existing watercourses play a role in the provision of ecological services onsite. However, the footprint of the proposed mine is expected to place additional pressure on the habitat. ***No-Go Alternative*** *The prospecting site is located within 500m of watercourses, and thus a minimum 100m buffer is recommended to mitigation the potential impacts. *The Mining right area is located outside of the 500m boundary.
Mitigation Measures: - An Erosion Management Plan / Method Statement should be compiled and implemented during the Construction Phase. - Activities within 500m of a wetland must obtain the necessary Water Use Authorisation prior to the commencement of such activities.

- Vegetation clearance must be kept to a minimum and retained where possible to avoid soil erosion.
- Disturbed areas must be rehabilitated as soon as possible after the prospecting and mining.
- The site should be monitored regularly for signs of erosion. Remedial action must be taken at the first signs of erosion.

Significance Assessment:

Impact	Nature	Duration	Extent	Severity	Likelihood	Significance Before Mitigation	Reversibility	Irreplaceable Loss	Mitigation Potential	Significance After Mitigation
Available Site	Direct	Long-Term	Study-Area	Moderate	May Occur	**High (-)**	Reversible	Resource will be partly	Achievable	**Low (-)**
Cumulative	Cumulative	Long-Term	Study-Area	Slight	Possible	**Low (-)**	It is difficult to implement mitigation measures specific to the cumulative impacts as the applicant only has jurisdiction over their development and not over other developments or farming activities in the area. However, it is imperative that the applicant implement the mitigation measures listed abovefor the direct impacts.			**N/A**
No-Go	Direct	Short-Term	Localised	Moderate	Probable	**Low (-)**	**N/A**			

IMPACT 2: LOSS OF VEGETATION

.

Cause and Comment

Direct Impact

The clearing of land for the mining of the site to create a will result in the loss of vegetation loss. However, vegetation clearance will only be restricted to the property boundaries. Therefore, the clearance of vegetation required for the required soil material is likely to impact on the extent and long-term conservation of this vegetation type, which is listed as **Least Threatened**.

The overall significance of the project activities at this site, provided the recommended mitigation measures are implemented, would be moderate negative.

Cumulative Impact

The bulk of the vegetation is still intact, with evidence of cultivation and grazing. The proposed development will have a negative impact on the vegetation onsite. The additional loss of vegetation as a consequence of the proposed development will therefore have a High cumulative impact.

No-Go Alternative

If the project does not go ahead, the current impacts associated with grazing will continue. However, these are relatively minor within the proposed site and as such, the No-go Alternative is classified as **low negative**.

Mitigation Measures:

- Construction vehicles and machinery must not encroach into identified 'no-go' areas or areas outside the project footprint.
- Topsoil (20 cm, where possible) must be collected and stored in an area of low sensitivity and used to rehabilitate impacted areas that are no longer requiredduring the operational phase (e.g. laydown areas).
- Only indigenous species must be used for rehabilitation.
- Lay down areas must not be located within any watercourses or drainage lines.
- Employees must be prohibited from making open fires during the prospecting and mining phases.

- The Alien Invasive Management Plan should be complied and implemented.

Significance Assessment:

Impact	Nature	Duration	Extent	Severity	Likelihood	Significance Before Mitigation	Reversibility	Irreplaceable Loss	Mitigation Potential	Significance After Mitigation
Available Site	Direct	Permanent	Study-Area	Moderate	Definite	**MODERATE (-)**	Reversible	Resource will be partly lost	Achievable	**MODERATE (-)**
Cumulative	Cumulative	Long-Term	Study - Area	Slight	Possible	**Low (-)**	It is difficult to implement mitigation measures specific to the cumulative impacts as the applicant only has jurisdiction over their development and not over other developments or farming activities in the area. However, it is imperative that the applicant implement the mitigation measures listed above for the direct impacts.			**N/A**
No-Go	Direct	Short-Term	Localised	Moderate	Probable	**Low (-)**	**N/A**			

IMPACT 4: LOSS OF PLANT SPECIES OF CONSERVATION CONCERN

Cause and Comment

Direct Impact

The permanent loss of plant species of conservation, may occur. Some of these are restricted range species with small Areas of Extent. The severity of the impact will be of high significance if a population of one or more of these species is affected. However, if populations of these species are avoided by the careful placement of infrastructure, the impact can be reduced to moderate significance.

Cumulative Impact

SCC have likely already been lost as a result of the existing developments in the area i.e farming. As such, the loss of SCC associated with the proposed prospecting and mining activities will likely contribute to the cumulative loss of SCC within the region. However, if the mitigation measures as described in this report are implemented and adhered to, thisimpact can be reduced to moderate negative.

No-Go Alternative

The No-go alternative will not require the clearance of vegetation and will therefore not result in the loss of plant SCC. The no-go alternative is therefore **negligible**.

Mitigation Measures:

- If populations of Vulnerable SCC are found, a permit must be obtained for their relocation to a similar habitat type within the site where they will not be disturbed.

Significance Assessment:

Impact	Nature	Duration	Extent	Severity	Likelihood	Significance Before Mitigation	Reversibility	Irreplaceable Loss	Mitigation Potential	Significance After Mitigation
Both Layout Alternatives	Direct	Permanent	Study - Area	Severe	Definite	**HIGH (-)**	Reversible	Resource willbe partly lost	Achievable	**MODERATE (-)**

.

Cumulative	Cumulative	Long-Term	Study - Area	Severe	May Occur	**HIGH (-)**	Reversible	Resource willbe partly lost	Achievable	**MODERATE (-)**
No-Go	N/A					**NEGLIGIBLE**	**N/A**			

OPERATIONAL PHASE

No direct loss of habitat is expected during this phase of the project. Alien plant invasion is, however expected to occur. In addition, vehicular transport through the site may increase the risk of roadkill of fauna species that occur (**Table 17**).

Table 17: Loss of habitat during operation phase

Loss of habitat					
Phase	**Operational**				
Criteria	**Details / Discussion**				
Description of impact	• Establishment of alien plant species in disturbed areas				
Mitigation required	• Manage alien invasive species establishment continually through chemical or mechanical removal. • Reinstate vegetation cover through concurrent rehabilitation • Erect signage to control the speed limit for trucks and other vehicles moving through the site				
Parameters	***Intensity***	***Spatial scale***	***Duration***	***Probability***	***Significance***
Pre-Mitigation	Serious (4)	Limited (2)	Short-term (3-5 years) (3)	Likely (6)	Major (negative) (54)
Post Mitigation	Limited (1)	Minor (2)	Short-term (3-5 years) (3)	Likely (4)	Minor (negative) (24)

DECOMMISSIONING PHASE

No direct loss of habitat is expected during this phase of the project. Alien plant invasion is, however expected to occur as vehicles and machinery move throughout the site and disturb the soil (**Table 18**).

Table 18: Loss of habitat during decommissioning

Loss of habitat					
Phase	**Decommissioning**				
Criteria	**Details / Discussion**				
Description of impact	• Removal infrastructure and equipment • Disturbance of the soil • Vehicle operation				
Mitigation required	• Minimise the impacted area and revegetate with indigenous where disturbed • Avoid erosion, manage alien invasive species establishment, ensure the re-establishment of natural vegetation • Employ stormwater management measures				
Parameters	***Intensity***	***Spatial scale***	***Duration***	***Probability***	***Significance***
Pre-Mitigation	Very Significant (7)	National (6)	Permanent (6)	Likely (6)	Major (negative) (115)
Post Mitigation	Significant (6)	National (6)	Short-term (3-5 years) (3)	Likely (6)	Minor (negative) (90)

POST CLOSURE PHASE

No direct loss of habitat is expected during this phase of the project. Alien plant invasion should be monitored for up to three years after closure (**Table 19**).

Table 19: Loss of habitat during post-closure phase

Loss of habitat	
Phase	**Post-closure**
Criteria	**Details / Discussion**
Description of impact	• On-going establishment of alien plant species in disturbed areas
Mitigation required	• Manage alien invasive species establishment continually through chemical or mechanical removal.

.

	• Revegetation of the site where previously disturbed.				
Parameters	***Intensity***	***Spatial scale***	***Duration***	***Probability***	***Significance***
Pre-Mitigation	Serious (4)	Limited (2)	Short-term (3-5 years) (3)	Likely (6)	Major (negative) (54)
Post Mitigation	Limited (1)	Minor (2)	Short-term (3-5 years) (3)	Likely (4)	Minor (negative) (24)

7. WETLAND IMPACT ASSESSMENT

7.1 IMPACT RATING AND MITIGATION

The following impact assessment is supplied. The assessment was conducted for the study with the focus on wetland habitats (Existing Watercourses). From the assessments it is clear that impacts can be are expected from the currently proposed activities (**Table 20 & 21**).

Table 20: Impact 1: Degradation and / or destruction of wetland habitats.

Impact Name	**1. Degradation and/or destruction of wetland habitats.**				
Alternative	**Proposal**				
Phase	**All phases**				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	1	1
Extent of Impact	1	1	Reversibility ofImpact	2	1
Duration of Impact	2	1	Probability	3	2
Environmental Risk (Pre-mitigation)					-4.50
Mitigation Measures					

In terms of section 19 of the NWA (1998), owners / managers / people occupying land on which any activity orprocess undertaken which causes, or is likely to cause pollution or degradation of a water resource must take all reasonable measures to prevent any such disturbance from occurring, continuing or recurring. These measures may include measures to (inter alia):

- Cease, modify, or control any act or process causing the pollution/degradation.
- Comply with any prescribed waste standard or management practice.
- Contain or prevent the movement of pollutants or the source of degradation.
- Remedy the effects of the pollution/degradation.
- Remedy the effects of any disturbance to the bed and banks of a watercourse/wetland.

According to the NWA (1998) part of the definition of pollution of water resources states that any physical alterations to a water resource, for example the excavation of a wetland / stream or changes to the morphology of such a water resource may be considered to be pollution. Activities which cause

an alteration to the biological properties of a wetland i.e. the fauna and flora contained within and supported by that water resource are therefore also considered to be a form of pollution. Any construction activities in or within a delineated buffer zone of a water resource may only take place afterthe necessary water use license has been obtained. Where wetlands may be encroached upon by proposed activities, the edge of the wetland must be clearly demarcated in the field with pegs or poles that will last for the duration of the construction phase, color-codedas follows: • RED – Indicating the edge of the wetland (Note: This includes the permanent, seasonal and temporal zonesof wetlands, or parts thereof; and no vehicles or building materials are allowed in this zone). These should beput along the entire length of the site. • ORANGE – Indicating the edge of the buffer zone Construction machinery and associated vehicles may not be allowed to enter wetlands. Strictly no re-fueling ofvehicles or machinery should be allowed to take place in any area close to a wetland. During and after construction areas of exposed soil can easily erode and subsequently end up in the wetlands. A well-designed storm water system must be put in place to avoid erosion into wetlands. Naturalrunoff from the natural terrestrial habitat surrounding the wetlands should however not be restricted unnecessarily
The use of potential pollutants (paint, chemicals, etc.) during construction and operational phases must bestrictly controlled and a high quality of management and supervision concerning such materials must be enforced, especially close to wetland buffer zone areas. Sanitary facilities must be made available to construction workers to prevent urine and human waste enteringthe wetlands. If at any point construction activities encroach on wetlands, it is strongly advised that a wetland/aquatic specialist is appointed during all phases to monitor impacts and related mitigation measures regardingwetland habitats.

Environmental Risk (Post-mitigation)	-2.00
Degree of confidence in impact prediction:	High
Impact Prioritisation	
Public Response	1
Low: Issue not raised in public responses	
Cumulative Impacts	2
Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it isprobable that the impact will result in spatial and temporal cumulative change.	
Degree of potential irreplaceable loss of resources	1
The impact is unlikely to result in irreplaceable loss of resources.	

.

Prioritisation Factor	1.17
Final Significance	-2.33

Table 21: Impact 2: Loss of indigenous fauna and flora diversity associated with the watercourse.

Impact Name	**2. Loss of indigenous fauna and flora diversity associated with wetlands.**				
Alternative	**Proposal**				
Phase	**All phases**				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	2	1
Extent of Impact	2	1	Reversibility ofImpact	4	2
Duration of Impact	2	2	Probability	2	1
Environmental Risk (Pre-mitigation)					-5.00
Mitigation Measures					
Destruction of natural wetland vegetation must be avoided at all cost. Special attention should be paid to alien and invasive control within the whole study area. Alien and invasivevegetation control should take place throughout all development phases to prevent loss of habitat of indigenous fauna and flora. Movement of vehicles and construction workers in wetlands and buffer zones should be strictly prohibited. Noharvesting of plants or animals should be allowed. Any specimens of protected plant species known to occur in the wetlands and the delineated buffer zone and maypotentially be impacted by the construction activities, are to be fenced off for the duration of the activity. Conservation of these specie and their natural habitat must be a high priority. If at any point construction activities encroach on wetlands, it is strongly advised that a wetland/aquatic specialist is appointed during all phases to monitor impacts and related mitigation measures regarding wetland habitats. Red Data listed and protected species as well as sensitive habitats					

related to wetlands	
should be strictly monitored. Any conservation recommendations and measures that aim to mitigate the impacts of this development must also be monitored by such a specialist during the construction, operational and decommissioning phases.	
Environmental Risk (Post-mitigation)	-1.50
Degree of confidence in impact prediction:	High
Impact Prioritisation	
Public Response	1
Low: Issue not raised in public responses	
Cumulative Impacts	2
Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.	
Degree of potential irreplaceable loss of resources	2
The impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value(services and/or functions) of these resources is limited.	
Prioritisation Factor	1.33
Final Significance	-2.00

7.2 ASSESSMENT OF THE NO-GO ALTERNATIVE

Currently there is no proposal from a wetland point of view of a no-go alternative. The site will not have major impacts on the wetlands in the study area, provided a minimum 100m-500m buffer is allocated from the existing watercourses.

7.3 MONITORING REQUIREMENTS

There are no monitoring requirements for the proposed development, In the event that the proposed prospecting and mining activities will encroach on the wetlands, the following is strongly advised from a wetland point of view:

- It is strongly advised that a wetland/aquatic specialist is appointed during the construction, operational and decommissioning phases to monitor impacts and related mitigation measures regarding wetlands and the faunal and floral assemblages occurring in this habitat.
- If the no-go alternative is enforced no monitoring is advised at this stage.

8. IMPACT STATEMENT, CONCLUSIONS AND RECOMMENDATIONS

The site inspection was conducted during the dry season, and thus there are plant species that may have been missed or misidentified. Some plant species that emerge and bloom during another time of the year or under very specific circumstances may have been missed entirely. It is important to schedule a follow-up site inspection to update the report where necessary, including the development of additional fine scale maps that will capture the sensitivity of the site.

The study site was surveyed on the 14 June 2023 to ascertain the overall state of biodiversity and confirm the presence or absence of wetlands. According to the South African National Biodiversity Institute (SANBI) the proposed site is classified as a Critical Biodiversity Area (CBA 1 and 2)and Ecological Support Area (ESA 1), this implies that the proposed sites play a role in meeting biodiversity targets for ecosystems, species and ecological processes as identified in a systematic biodiversity plan. A summary of the Biodiversity assessment is outlined Below:

8.1 Ecological Characteristics of the study sites:

The proposed site consists of both the Limpopo Ridge Bushveld and the Musina Mopane Bushvled, both of which are classified as Least Threatened. The bulk of the study site was observed to consist of open woodland to moderately closed shrubveld dominated by *Colophospermum mopane* on clayey bottomlands. The bulk of the site consist of indigenous vegetation, with small patches of agricultural activities. The Farm has evidence of the Protected *Combretum Imberbe* commonly known as Leadwood, Sclerocarya birrea (Marula) and Adansonia digitata (Baobab tree). The farms were previously used for game farming, and thus the site a number of game animals. In addition, the site is located within 500m of a watercourse (Mogalakwena River) and a few dry streams/tributaries were observed during the site inspection.

9. STATEMENT AND OPINION OF THE SPECIALIST

The proposed development is deemed environmentally acceptable, provided the mitigation measures and recommendations specified in this report are implemented and adhered to. Based size of the site, the site will require a significant amount of

vegetation clearing. The site has a Faunal Species diversity, and SCC's (I.e *Adansonia digitata*), A botanical micro-siting investigation of the development footprint is not necessary.

If populations of Critically Endangered, or Endangered SCC are found consider relocating them, and where this is not feasible, permits for their removal must be obtained from the relevant competent authority. Species that are known to survive translocation should be translocated to the nearest similar habitat type within the site where they will not be disturbed.

The site is located within 500m of a watercourse, which is currently functional from an ecological support point of view. The main watercourses is currently active, In order to protect this watercourses, a minimum 100m buffer is recommended. Furthermore, the development footprint of the proposed prospecting and subsequent mining must be demarcated to prevent any encroachment of construction or operational activities into surrounding natural areas.

10. KEY MITIGATION MEASURES TO PROTECT THE WATERCOURSES

The proposed prospecting area is located within close proximity to a number of the watercourses, and thus the following mitigation measures are applicable;

- ✓ Establish a visible buffer zone to help protect the stream from sedimentation and erosion.
- ✓ The prospecting should be done in the dry season.
- ✓ An Erosion Management Plan / Method Statement should be compiled and implemented during the Construction Phase.
- ✓ Activities within 500m of a wetland must obtain the necessary Water Use Authorisation prior to the commencement of such activities.
- ✓ Vegetation clearance must be kept to a minimum and retained where possible to avoid soil erosion.
- ✓ Disturbed areas must be rehabilitated as soon as possible after construction.
- ✓ The site should be monitored regularly for signs of erosion. Remedial action must be taken at the first signs of erosion.

.

- ✓ Construction vehicles and machinery must not encroach into identified 'no-go' areas or areas outside the project footprint.
- ✓ Topsoil (20 cm, where possible) must be collected and stored in an area of low sensitivity and used to rehabilitate impacted areas that are no longer required during the operational phase (e.g. laydown areas).
- ✓ Only indigenous species must be used for rehabilitation.
- ✓ Lay down areas must not be located within any watercourses or drainage lines.
- ✓ Employees must be prohibited from making open fires during the construction phase.
- ✓ Were necessary, consider relocating the animals onsite to a safer place.

11. REFERENCES

Acocks, J.P.H. 1953. Veld types of South Africa. Mem. Bot. Surv. S. Afr. 28: 1-192.

Branch, B. 1998. Field Guide to Snakes and Other Reptiles of Southern Africa. Struik Publishers, Cape Town.

Department of environmental affairs, department of mineral resources, chamber of mines, South African mining and biodiversity forum and South African National Biodiversity Institute 2013. Mining and biodiversity guidelines: mainstream biodiversity into the mining sector. Pretoria: 100pp.

Du Preez V. and Carruthers L. 2009. A Complete guide to the frogs of Southern Africa.

Germihuizen, G. and Meyer, N.L. (eds) 2003. Plants of southern Africa: an annotated checklist. Strelitzia 14.

Institute of Natural Resources 2003. Indigenous medicinal plant trade: Sector analysis. Investigation report: no. 248.

LepiMAP 2014. Accessed at: http://lepimap.adu.org.za/ on 2014-09-12.

Maria Luisa Bárcenas-Argüello, Ma. del Carmen Gutiérrez- Castorena and Teresa Terrazas. 2013. The Role of Soil Properties in Plant Endemism – A Revision of Conservation Strategies. Soil trends and current trends in quality assessment.

Mazid, M., Khan, T.A. and Mohammad, F., 2012. Medicinal plants of rural India: a review of use by Indian folks. *Indo Global journal of pharmaceutical sciences*, *2*(3), pp.286-304.

Mucina L. and Rutherford M.C. (eds) 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

RAIMONDO, Domitilla. The Red List of South African plants: a global first. S. Afr. j. sci., Pretoria , v. 107, n. 3-4, p. 01-02, Apr. 2011 . Available from<http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S0038-23532011000200003&lng=en&nrm=iso>. access on 17 Aug. 2021. http://dx.doi.org/10.4102/sajs.v107i3/4.653.

SARCA 2014. Southern African Reptile Conservation Assessment. Accessed at: 9:05am on 2014-04-29. Accessed at: http://vmus.adu.org.za/vm_sp_list.php.

Van Wyk B., van Oudtshoorn B. and Gericke N. 2009. Medicinal Plants of South Africa. Briza Publications: 330 pp.

Young, S., 2010. Monitoring threatened species in South Africa: A review of the South African National Biodiversity Institutes' Threatened Species Programme: 2004-2009.

12. SPECIES ASSOCIATED WITH THE THE FARMS LINTIE 86 MS, BRINDISI 10 MR, SUEZ 12, MUNTOK 206 AND DRADANELLEN 382 MR

.

Spreadsheet for creating species lists for describing vegetation types. It allows formatting in the paragrpaphs as contained in the book Mucina and Rutherford (2

VegType	Name of vegetation type. Full name, e.g. SVcb 21 Soutpansberg Mountain Bushveld
TaxonList	Important Taxa; Endemic Taxa; Biogeogrphically Important Taxa.
SubDivision	Vegetation type subdivision (optional, e.g. 'Mistbelt bush clumps', 'Open savanna sandveld' in SVcb 21 Soutpansberg Mountain Bushveld)
FamilyName	Name of family in which the taxon is classified. This is not essential, but is useful for quality control purposes.
GrowthForm	Refer to Table 2.1 (page 26 of Mucina & Rutherford (2006))
TaxonName	Name of taxon. Normally no subspecies or variety, unless they are diagnostic or endemic. Avoid sp. or spp. Do not abbreviate genus name stage.
Superscript	Superscript. It must include an explanation of what the superscript means.
text for superscript	e.g. ([T]Cape thickets, [W]Wetlands) e.g. T for 'Cape Thickets' in FFs1, page 99 of Mucina & Rutherfo
Dominant	Dominant (biomass) or prominent (e.g. conspicuous). See p. 27 of Mucina & Rutherford (2006). Other unformatted suggested text can be p
Sort	This gives the order in which the author intends the species to be listed. Not essential, but highly desirable to give the author's choice.
Qualifier	Any qualifier as it appears in the book.e.g. variant 'speciosa'; (West Coast endemic); (southernmost distribution limit)
Growth Form Sort	Refer to the tab **Growth forms and order**. The order should normally follow the order already used in the biome.

	VegType	TaxonList	SubDivision	FamilyName	GrowthForm	TaxonName
SVmp 2 Limpopo Ridge Bushveld	Endemic Taxa		CAPPARACEAE	Herb	Cleome oxyphylla var. robusta	
SVmp 2 Limpopo Ridge Bushveld	Endemic Taxa		MALVACEAE	Low Shrub	Pavonia dentata	
SVmp 2 Limpopo Ridge Bushveld	Important Taxa		ACANTHACEAE	Low Shrubs	Barleria affinis	
SVmp 2 Limpopo Ridge Bushveld	Important Taxa		ACANTHACEAE	Low Shrubs	Blepharis diversispina	
SVmp 2 Limpopo Ridge Bushveld	Important Taxa		ACANTHACEAE	Low Shrubs	Neuracanthus africanus	
SVmp 2 Limpopo Ridge Bushveld	Important Taxa		AIZOACEAE	Low Shrubs	Plinthus rehmannii	

.

SVmp 2 Limpopo Ridge Bushveld	Important Taxa	ANACARDIACEAE	Tall Trees	Sclerocarya birrea subsp. caffra
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	APOCYNACEAE	Succulent Herb	Tavaresia barklyi
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	BIGNONIACEAE	Tall Shrubs	Catophractes alexandri
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	BURSERACEAE	Small Trees	Commiphora glandulosa
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	BURSERACEAE	Small Trees	Commiphora mollis
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	BURSERACEAE	Small Trees	Commiphora tenuipetiolata
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	BURSERACEAE	Tall Shrubs	Commiphora pyracanthoides
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	CAPPARACEAE	Small Trees	Boscia albitrunca
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	COMBRETACEAE	Small Trees	Combretum apiculatum
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	COMBRETACEAE	Small Trees	Combretum imberbe
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	COMBRETACEAE	Small Trees	Terminalia prunioides
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	FABACEAE	Low Shrubs	Ptycholobium contortum
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	FABACEAE	Small Trees	Acacia senegal var. leiorhachis
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	FABACEAE	Small Trees	Acacia tortilis subsp. heteracantha
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	FABACEAE	Small Trees	Colophospermum mopane
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	FABACEAE	Tall Trees	Acacia nigrescens
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	KIRKIACEAE	Small Trees	Kirkia acuminata
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	MALVACEAE	Small Trees	Sterculia rogersii
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	MALVACEAE	Tall Shrubs	Grewia bicolor

.

SVmp 2 Limpopo Ridge Bushveld	Important Taxa	MALVACEAE	Tall Shrubs	Grewia villosa
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	MALVACEAE	Tall Shrubs	Hibiscus calyphyllus
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	MALVACEAE	Tall Shrubs	Hibiscus micranthus
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	MALVACEAE	Tall Trees	Adansonia digitata
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	MORACEAE	Small Trees	Ficus abutilifolia
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	MORACEAE	Small Trees	Ficus tettensis
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	OLACACEAE	Small Trees	Ximenia americana
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	POACEAE	Graminoids	Aristida adscensionis
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	POACEAE	Graminoids	Aristida stipitata subsp. graciliflora
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	POACEAE	Graminoids	Digitaria eriantha
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	POACEAE	Graminoids	Enneapogon cenchroides
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	POACEAE	Graminoids	Panicum maximum
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	POACEAE	Graminoids	Schmidtia pappophoroides
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	POACEAE	Graminoids	Stipagrostis uniplumis
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	RUBIACEAE	Tall Shrubs	Gardenia resiniflua
SVmp 2 Limpopo Ridge Bushveld	Important Taxa	VITACEAE	Woody Climber	Cissus cornifolia

.

Spreadsheet for creating species lists for describing vegetation types. It allows formatting in the paragrpaphs as contained in the book Mucina and Rutherford (2

VegType	Name of vegetation type. Full name, e.g. SVcb 21 Soutpansberg Mountain Bushveld
TaxonList	Important Taxa; Endemic Taxa; Biogeogrphically Important Taxa.
SubDivision	Vegetation type subdivision (optional, e.g. 'Mistbelt bush clumps', 'Open savanna sandveld' in SVcb 21 Soutpansberg Mountain Bushveld)
FamilyName	Name of family in which the taxon is classified. This is not essential, but is useful for quality control purposes.
GrowthForm	Refer to Table 2.1 (page 26 of Mucina & Rutherford (2006))
TaxonName	Name of taxon. Normally no subspecies or variety, unless they are diagnostic or endemic. Avoid sp. or spp. Do not abbreviate genus name
Superscript	Superscript. It must include an explanation of what the superscript means.
text for superscript	e.g. ([T]Cape thickets, [W]Wetlands) e.g. T for 'Cape Thickets' in FFs1, page 99 of Mucina & Ruthe
Dominant	Dominant (biomass) or prominent (e.g. conspicuous). See p. 27 of Mucina & Rutherford (2006). Other unformatted suggested text can be
Sort	This gives the order in which the author intends the species to be listed. Not essential, but highly desirable to give the author's choice.
Qualifier	Any qualifier as it appears in the book.e.g. variant 'speciosa'; (West Coast endemic); (southernmost distribution limit)
Growth Form Sort	Refer to the tab **Growth forms and order**. The order should normally follow the order already used in the biome.

	VegType	TaxonList	SubDivision	FamilyName	GrowthForm
SVmp 1 Musina Mopane Bushveld	Important Taxa		ACANTHACEAE	Low Shrubs	Barleria senensis
SVmp 1 Musina Mopane Bushveld	Important Taxa		ACANTHACEAE	Low Shrubs	Neuracanthus africanus
SVmp 1 Musina Mopane Bushveld	Important Taxa		AMARANTHACEAE	Herbs	Hermbstaedtia odorata
SVmp 1 Musina Mopane Bushveld	Important Taxa		ANACARDIACEAE	Tall Trees	Sclerocarya birrea subsp. caffra
SVmp 1 Musina Mopane Bushveld	Important Taxa		APOCYNACEAE	Succulent Herbs	Stapelia gettliffei
SVmp 1 Musina Mopane Bushveld	Important Taxa		APOCYNACEAE	Succulent Herbs	Stapelia kwebensis

.

SVmp 1 Musina Mopane Bushveld	Important Taxa	APOCYNACEAE	Succulent Shrub	Hoodia currorii subsp. lugardii
SVmp 1 Musina Mopane Bushveld	Important Taxa	ASTERACEAE	Low Shrubs	Dicoma tomentosa
SVmp 1 Musina Mopane Bushveld	Important Taxa	ASTERACEAE	Low Shrubs	Felicia clavipilosa subsp. transvaalensis
SVmp 1 Musina Mopane Bushveld	Important Taxa	ASTERACEAE	Low Shrubs	Pechuel-Loeschea leubnitziae
SVmp 1 Musina Mopane Bushveld	Important Taxa	BIGNONIACEAE	Tall Shrubs	Rhigozum zambesiacum
SVmp 1 Musina Mopane Bushveld	Important Taxa	BORAGINACEAE	Herbs	Heliotropium steudneri
SVmp 1 Musina Mopane Bushveld	Important Taxa	BURSERACEAE	Small Trees	Commiphora glandulosa
SVmp 1 Musina Mopane Bushveld	Important Taxa	BURSERACEAE	Small Trees	Commiphora tenuipetiolata
SVmp 1 Musina Mopane Bushveld	Important Taxa	BURSERACEAE	Small Trees	Commiphora viminea
SVmp 1 Musina Mopane Bushveld	Important Taxa	BURSERACEAE	Tall Shrubs	Commiphora pyracanthoides
SVmp 1 Musina Mopane Bushveld	Important Taxa	CAPPARACEAE	Small Trees	Boscia albitrunca
SVmp 1 Musina Mopane Bushveld	Important Taxa	CAPPARACEAE	Small Trees	Boscia foetida subsp. rehmanniana
SVmp 1 Musina Mopane Bushveld	Important Taxa	CAPPARACEAE	Tall Shrubs	Maerua parvifolia
SVmp 1 Musina Mopane Bushveld	Important Taxa	COMBRETACEAE	Small Trees	Combretum apiculatum
SVmp 1 Musina Mopane Bushveld	Important Taxa	COMBRETACEAE	Small Trees	Terminalia prunioides
SVmp 1 Musina Mopane Bushveld	Important Taxa	COMBRETACEAE	Small Trees	Terminalia sericea
SVmp 1 Musina Mopane Bushveld	Important Taxa	CONVOLVULACEAE	Low Shrubs	Seddera suffruticosa
SVmp 1 Musina Mopane Bushveld	Important Taxa	CUCURBITACEAE	Herbaceous Climber	Momordica balsamina
SVmp 1 Musina Mopane Bushveld	Important Taxa	EUPHORBIACEAE	Low Shrubs	Acalypha indica

SVmp 1 Musina Mopane Bushveld	Important Taxa	FABACEAE	Low Shrubs	Ptycholobium contortum
SVmp 1 Musina Mopane Bushveld	Important Taxa	FABACEAE	Small Trees	Acacia senegal var. leiorhachis
SVmp 1 Musina Mopane Bushveld	Important Taxa	FABACEAE	Small Trees	Acacia tortilis subsp. heteracantha
SVmp 1 Musina Mopane Bushveld	Important Taxa	FABACEAE	Small Trees	Colophospermum mopane
SVmp 1 Musina Mopane Bushveld	Important Taxa	FABACEAE	Tall Shrubs	Tephrosia polystachya
SVmp 1 Musina Mopane Bushveld	Important Taxa	FABACEAE	Tall Trees	Acacia nigrescens
SVmp 1 Musina Mopane Bushveld	Important Taxa	LAMIACEAE	Herbs	Acrotome inflata
SVmp 1 Musina Mopane Bushveld	Important Taxa	LAMIACEAE	Herbs	Becium filamentosum
SVmp 1 Musina Mopane Bushveld	Important Taxa	MALVACEAE	Low Shrubs	Gossypium herbaceum subsp. africanum
SVmp 1 Musina Mopane Bushveld	Important Taxa	MALVACEAE	Low Shrubs	Hermannia glanduligera
SVmp 1 Musina Mopane Bushveld	Important Taxa	MALVACEAE	Small Trees	Sterculia rogersii
SVmp 1 Musina Mopane Bushveld	Important Taxa	MALVACEAE	Tall Shrubs	Grewia bicolor
SVmp 1 Musina Mopane Bushveld	Important Taxa	MALVACEAE	Tall Shrubs	Grewia flava
SVmp 1 Musina Mopane Bushveld	Important Taxa	MALVACEAE	Tall Trees	Adansonia digitata
SVmp 1 Musina Mopane Bushveld	Important Taxa	OLACACEAE	Small Trees	Ximenia americana
SVmp 1 Musina Mopane Bushveld	Important Taxa	PEDALIACEAE	Herbs	Harpagophytum procumbens subsp. transvaalense
SVmp 1 Musina Mopane Bushveld	Important Taxa	PEDALIACEAE	Tall Shrubs	Sesamothamnus lugardii
SVmp 1 Musina Mopane Bushveld	Important Taxa	POACEAE	Graminoids	Aristida adscensionis
SVmp 1 Musina Mopane Bushveld	Important Taxa	POACEAE	Graminoids	Aristida congesta

SVmp 1 Musina Mopane Bushveld	Important Taxa	POACEAE	Graminoids	Bothriochloa insculpta
SVmp 1 Musina Mopane Bushveld	Important Taxa	POACEAE	Graminoids	Brachiaria deflexa
SVmp 1 Musina Mopane Bushveld	Important Taxa	POACEAE	Graminoids	Cenchrus ciliaris
SVmp 1 Musina Mopane Bushveld	Important Taxa	POACEAE	Graminoids	Digitaria eriantha
SVmp 1 Musina Mopane Bushveld	Important Taxa	POACEAE	Graminoids	Enneapogon cenchroides
SVmp 1 Musina Mopane Bushveld	Important Taxa	POACEAE	Graminoids	Eragrostis lehmanniana
SVmp 1 Musina Mopane Bushveld	Important Taxa	POACEAE	Graminoids	Eragrostis pallens
SVmp 1 Musina Mopane Bushveld	Important Taxa	POACEAE	Graminoids	Fingerhuthia africana
SVmp 1 Musina Mopane Bushveld	Important Taxa	POACEAE	Graminoids	Heteropogon contortus
SVmp 1 Musina Mopane Bushveld	Important Taxa	POACEAE	Graminoids	Schmidtia pappophoroides
SVmp 1 Musina Mopane Bushveld	Important Taxa	POACEAE	Graminoids	Sporobolus nitens
SVmp 1 Musina Mopane Bushveld	Important Taxa	POACEAE	Graminoids	Stipagrostis hirtigluma subsp. patula
SVmp 1 Musina Mopane Bushveld	Important Taxa	POACEAE	Graminoids	Stipagrostis uniplumis
SVmp 1 Musina Mopane Bushveld	Important Taxa	POACEAE	Graminoids	Tetrapogon tenellus
SVmp 1 Musina Mopane Bushveld	Important Taxa	POACEAE	Graminoids	Urochloa mosambicensis
SVmp 1 Musina Mopane Bushveld	Important Taxa	POLYGONACEAE	Herbs	Oxygonum delagoense
SVmp 1 Musina Mopane Bushveld	Important Taxa	RUBIACEAE	Tall Shrubs	Gardenia volkensii
SVmp 1 Musina Mopane Bushveld	Important Taxa	SCROPHULARIACEAE	Low Shrubs	Aptosimum lineare

.