

DIGBY WELLS
ENVIRONMENTAL

Proposed Open Pit Magnetite Mine and Concentrator Plant, Mokopane, Limpopo Province

Fauna and Flora Report

Project Number:

VMC3049

Prepared for:

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EXECUTIVE SUMMARY

Digby Wells Environmental was commissioned by Pamish Investment Company, on behalf of the Mokopane Tin Company to complete environmental studies for the proposed Magnetite Open Pit Project near Mokopane, Limpopo Province. This Flora and Fauna Report will describe the current state of terrestrial biodiversity on the project site based on desktop research and field surveys. This study complies with the requirements stipulated by the International Finance Corporation (IFC) and World Bank, specifically the Performance Standard six is intended to:

- protect and conserve biodiversity;
- maintain the benefits from ecosystem services; and,
- promote the sustainable management of living natural resources through the adoption of practices that integrates conservation needs and development priorities.

The Proposed Magnetite Open Pit Mine is situated in the Savanna Biome, within the Makhado Sweet Bushveld and Central Sandy Bushveld regional vegetation types. Habitat classified within the site included three vegetation units, namely: *Acacia borleae – Eragrostis rigidior* Black Turf Savanna; *Acacia tortilis – Eragrostis rigidior* Savanna and *Commiphora marlothii – Heteropogon contortus* Rocky Woodland.

A total of 75 plant species were recorded on site, three of which hold a conservation status in South Africa, namely: *Combretum imberbe* (Leadwood) – nationally protected, *Scadoxus puniceus* (Royal Paint Brush) – provincially protected according to Schedule 12 of the Limpopo Environmental Management Act, 2003 (Act No. 7 of 2003)(LEMA); and *Sclerocarya birrea* (Marula) –nationally protected (according to the Protected Trees List as part of the National Forests Act, 1998 (Act No. 84 of 1998).). None of the protected trees coincide with the proposed open pit mine or infrastructure, however, *Scadoxus puniceus* may be found throughout the study site.

17 mammal, 102 bird, 8 reptile and 11 herpetofaunal species were recorded on site. A Baboon Spider (*Harpactirinae sp*) was found in low-lying areas associated with the *Acacia borleae – Eragrostis rigidior* Black Turf Savanna. This species has not yet been positively identified but its nesting site has been recorded, although more may occur. All Baboon Spider's have been assigned protected status by the National Environmental Management Biodiversity Act, 2004 (Act No.10 of 2004) (NEMBA). It is stringly recommended that a serperate survey is undertaken for Baboon Spiders specifically to determine the possible locations of other nests on site.

With regard to sensitivity, the study area is not situated within any protected area earmarked for future protection, threatened ecosystems or Important Bird Areas, according to the national and provincial laws that provide protected status. The National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004) provides for list of threatened or

protected ecosystems, in one of four categories: Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or protected. The proposed Open Pit Magnetite Project does not fall within any formally protected areas, or Threatened Ecosystems.

The site-specific sensitivity assessment showed that the *Commiphora marlothii* – *Heteropogon contortus* Rocky Woodland was assigned high sensitivity. This habitat was intact and supported species that are restricted to rocky outcrops. This habitat was found to the west and north-east to eastern areas of the site.

The impacts of the proposed development were rated from minor negative to moderate negative and included loss of habitat, loss of Species of Special Concern and impaired ecosystem services (habitat fragmentation and establishment of alien plant species). In addition to protected species, six medicinal plant species were recorded. It is likely that additional species are employed for medicinal use by the local community. Relocation strategies were recommended, to minimise the impacts on flora and fauna, for plant Species of Special Concern, the medicinal plant species and the Baboon Spiders. There is no mitigation for loss of habitat but should the development go ahead, the infrastructure should occupy as little area as possible and should be kept linear.

Where nationally and provincially protected trees cannot be avoided, permits should be obtained from the Limpopo Department of Economic Development, Environment and Tourism (LEDET) for their removal. Should it not be possible to avoid Baboon Spider nests, they should be relocated by suitably qualified faunal ecologists. Monitoring of habitat is recommended after the construction phase. Inclusive is alien invasive plant monitoring which should take place up to 7 years after development.

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LIST OF ACRONYMS

Acronym	Description
ADU	Animal Demography Unit
CITES	Convention on International Trade of Endangered Species
CR	Critically Rare
DST	Department of Science and Technology
EIA	Environmental Impact Assessment
EN	Endangered
IFC	International Finance Corporation
IUCN	International Union for the Conservation of Nature
LC	Least Concern
LEMA	Limpopo Environmental Management Act, 2003 (Act No. 7 of 2003)
NBI	National Botanical Institute
NEMBA	National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004)
NFA	National Forests Act, 1998 (Act No. 84 of 1998)
NT	Near Threatened
PRECIS	Pretoria Computerised Information System
POSA	Plants of Southern Africa
QDS	Quarter Degree Square
SABAP (2)	South African Bird Atlas Project (2)
SABIF	South African Biodiversity Information Facility
SANBI	South African National Biodiversity Institute
SARCA	Southern African Reptile Conservation Assessment
TSP	Threatened Species Programme
TSF	Tailings Storage Facility
VU	Vulnerable

1 Introduction

Biodiversity is defined, according to the National Environmental Management Biodiversity Act of 2004 (Act No.10 of 2004) (NEMBA), as “the variability among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part and also includes diversity within species, between species, and of ecosystems”. The NEMBA legislation upholds the country’s commitment to the protection of South Africa’s biological resources and it is imperative that development takes place in a sustainable way so that this can be achieved.

The Open Pit Magnetite Project is found in the Savanna Biome, one of nine South African Plant Biomes. The Savanna Biome is the largest Biome in southern Africa, occupying 46% of its area, and over one-third the area of South Africa (Mucina and Rutherford, 2006). It is well developed over the lowveld and Kalahari region of South Africa and is also the dominant vegetation in Botswana, Namibia and Zimbabwe. Environmental factors that delimit the boundaries of this biome are altitude, rainfall patterns, the occurrence of frost, as well as geologic and edaphic conditions. Edaphic characteristics further influence the vegetation patterns of the Savanna Biome (Colgan *et al.* 2012), which is evident in the study area, which is characterised by vertic clays and rocky outcrops.

The study area is situated in the Waterberg District, an area of exceptional plant and animal diversity, including many Red Data species, over a large contiguous area of natural habitat (Contour and Associates 2011). The landscape of the study area is characterised by savanna plains of black vertic clays, intermittent by red haemic soils, with granite *koppies* forming unique rocky habitat for flora and fauna. Rocky outcrops are regarded as “hotspots” for biodiversity, particularly for reptiles (Michael *et al.* 2008), and may support endemic species. Unique reptile speciation is represented in the Waterberg, with some species restricted to this area.

There are many examples of poor mining practices within the Central Coalfields, due to historic mining practices, which has resulted in deterioration of habitats. The Central Coalfields (Witbank, Highveld and Ermelo Coalfields) is an example of poor mining practices, where deterioration to habitat is severe and in many cases irreversible. It is imperative that mining in the Waterberg region is done in a sustainable way, keeping the environmental impact as minimal as possible, whilst meeting the growing needs of the South African economy.

2 Terms of Reference

Digby Wells Environmental (hereafter Digby Wells) was commissioned by Pamish Investment Company to complete environmental studies for the proposed Magnetite Open Pit Project near Mokopane, Limpopo Province.

The purpose of this Flora and Fauna EIA Report is to describe the baseline conditions for terrestrial biodiversity associated with the study site; as well as to assess the impacts of the proposed development and provide mitigation measures. The flora and fauna surveys were completed in adherence to national and provincial legislation, as well as in accordance with the guidelines set out by the International Finance Corporation (IFC) and Equator Principles. The following was completed as part of the EIA phase of this project:

- Vegetation classification regarding plant communities within the area and sub communities and variations of these;
- Species list for each plant community, including diagnostic and dominant species;
- Invasive species (if present) for each plant community;
- Exotic species (if present) for each plant community;
- Species of Special Concern for each plant community (including location and threat status);
- Culturally significant (ethnobotanical) plant species within each community;
- List of expected species for mammals, avifauna and herpetofauna;
- List of mammals, avifauna and herpetofauna recorded on site;
- Faunal Species of Special Concern; and
- Impacts Assessment and relevant mitigation and management measures.

The methodology followed for this flora and fauna assessment is outlined in section 5. The following national and provincial legislation and best-practice documents are relevant to this study:

- National Environmental Management Biodiversity Act ,2004 (Act No.10 of 2004);
- National Forests Act, 1998 (Act No. 84 of 1998);
- Limpopo Environmental Management Act, 2003 (Act No. 7of 2003) (LEMA);
- Limpopo State of the Environment Report Overview, 2003;
- Waterberg Environmental Management Plan;
- IFC Performance Standard 6, which establishes objectives and requirements to avoid, minimise, and where residual impacts remain, to compensate/offset for risks and impacts to the environment. The objectives of the IFC Performance Standards 6 are:

- to protect and conserve biodiversity;
- to maintain the benefits from ecosystem services; and
- to promote the sustainable management of living natural resources through the adoption of practices that integrates conservation needs and development priorities.

3 Expertise of the Specialists

James Coetzee, a fauna specialist, achieved a Diploma in Nature Conservation from Technikon S.A (now Unisa). He was formerly Chief Nature Conservator at the Mpumalanga Parks Board, Park Warden at the Kissama National Parks in Angola, Area Manager of the Invasive Plant Control Unit for SAN Parks in the Western Cape and Environmental Manager for Labonte 5 in Lephalale. James has 18 years of practical field experience in conservation management.

Phil Patton (Pr. Sci. Nat.), fauna specialist, achieved a Bachelor of Science (UPE), and a Bachelor of Science (Honours) at the University of Cape Town in Environmental and Geographical Science. Experience includes 17 years of environmental consulting and biodiversity assessments throughout Europe, the Middle East and sub Saharan Africa.

Crystal Rowe (Pr.Sci.Nat.), flora specialist, achieved a Bachelor of Science and Honours in Botany at Nelson Mandela Metropolitan University (NMMU) and is an environmental consultant specialising in vegetation and wetland assessments. Experience includes ecological impact assessments, baseline vegetation assessments, estuarine ecological state assessments and wetland health assessments. Project experience includes various countries such as the Democratic Republic of Congo (DRC), Ethiopia, the Ivory Coast, Mali, Mozambique, Sierra Leone and extensively within South Africa. A declaration of independence is presented in Appendix A.

4 Study Area

4.1 Locality

The study area is situated approximately 45km north-west of the town of Mokopane, Limpopo Province (Figure 4-1). The site is bound to the west by the Mogalakwena River, a major watercourse of the Limpopo Province and a tributary of the Limpopo River. The study area falls within the farms: Vogelstruisfontein 765 LR, Vriesland 781 LR, Vleigekraal 783 LR, Schoonoord 786 LR and portions Re/1, Re/2, 3, 4, 5 and 6 of the farm Bellevue 808 LR. The N11 national route is situated 5 km east and the R518 regional road is situated 2.5 km south of the proposed project area respectively. Numerous secondary roads run through the project area. The primary land-use is crop and livestock agriculture, which has contributed to some alteration to the natural landscape. In addition, quarrying in the rocky outcrops for granite had resulted in significant disturbance.

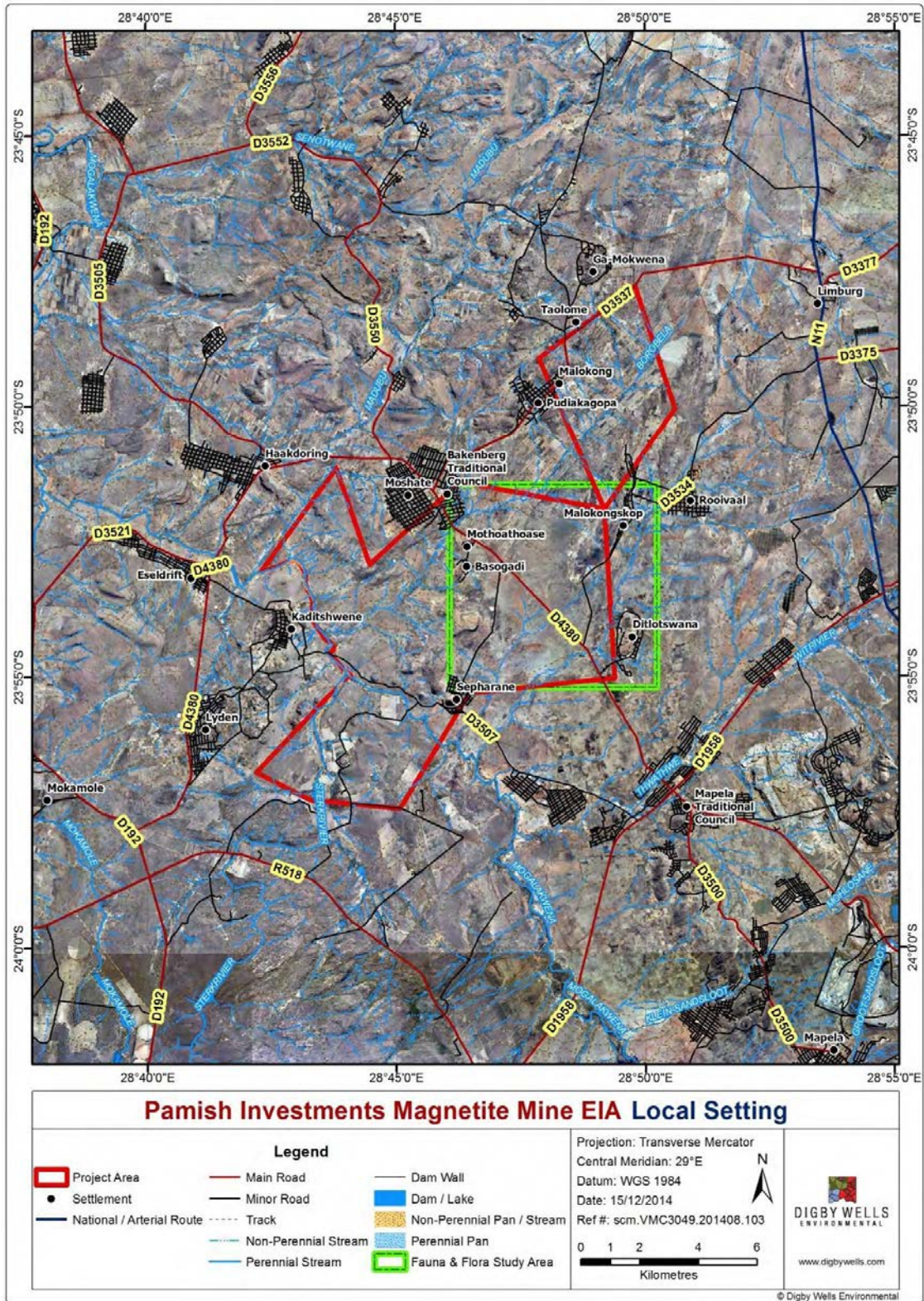


Figure 4-1: Study Site Locality

4.2 Regional Vegetation

The study area is found in the Savanna Biome, one of the nine plant biomes in South Africa. A total of 119 plant species were recorded for the Quarter Degree Squares (QDS') in which the study area occurs, 2328DC and 2328DD (POSA, 2014). The majority of the study area falls within the Makhado Sweet Bushveld, whilst a small proportion of the site coincides with the Central Sandy Bushveld vegetation types, according to Mucina and Rutherford (2006). The distribution of regional vegetation types is represented in Figure 4-2.

4.2.1 Makhado Sweet Bushveld

The vegetation type occurs on slightly to moderately undulating plains sloping generally down to the north with some hills in the south-west. It is a short and shrubby bushveld with a poorly developed grass layer. Part of the area has densely populated rural communities and erosion is classified as low to high. This vegetation unit has been allocated a conservation status of Vulnerable. Common and characteristic plant species for this vegetation type are listed in Table 4-1.

Table 4-1: Common and Characteristic Plant Species of the Makhado Sweet Bushveld

Plant Form	Species
Trees:	<i>Acacia erubescens</i> (d), <i>A. gerrardii</i> (d), <i>A. mellifera</i> subsp. <i>detinens</i> (d), <i>A. rehmanniana</i> (d), <i>Boscia albitrunca</i> (d), <i>Combretum apiculatum</i> (d), <i>Acacia tortillis</i> subsp. <i>heteracantha</i> , <i>Terminalia sericea</i> .
Tall Shrubs:	<i>Commiphora pyracanthioides</i> , <i>Dichrostachys cinerea</i> , <i>Grewia flava</i> , <i>Hibiscus calyphyllus</i> , <i>Lycium shawii</i> , <i>Rhigozum obovatum</i> .
Low Shrubs:	<i>Baleria lancifolia</i> , <i>Hirpicium bechuanense</i> , <i>Indigofera polioties</i> , <i>Melhania rehmannii</i> , <i>Pechuel-Loeschea leubnitziae</i> .
Graminoids (grasses):	<i>Anthepera pubescens</i> (d), <i>Aristida stipitata</i> subsp. <i>graciliflora</i> (d), <i>Cenchrus ciliaris</i> (d), <i>Enneapogon scoparius</i> (d), <i>Brachiaria nigropedata</i> , <i>Eragrostis trichophora</i> , <i>Panicum coloratum</i> , <i>P. maximum</i> , <i>Schmidtia pappophoroides</i> , <i>Urochloa mosambicensis</i> .
Herbs:	<i>Chamaecrista absus</i> , <i>Corbichonia decumbens</i> , <i>Geigeria acaulis</i> , <i>Harpagophytum procumbens</i> subsp. <i>transcaalense</i> , <i>Heliotropium steudneri</i> , <i>Hemizygia elliotii</i> , <i>Hermbstaedtia odorata</i> , <i>Leucas sexdentata</i> , <i>Osteospermum muricatum</i> , <i>Tephrosia purpurea</i> subsp. <i>leptostachya</i> .

Key: Species in **bold** denote species found on site; (d) denotes dominant species

4.2.2 Central Sandy Bushveld

This vegetation occurs in low undulating areas, sometimes between mountains and sandy plains and catena supporting tall, deciduous woodlands comprised of *Terminalia sericea* and *Burkea africana* woodland on deep sandy soils and low broad-leaf *Combretum* woodland on shallow rocky or gravelly soils. Species of *Acacia*, *Ziziphus* and *Euclea* are found on the flats

and lower slopes on eutrophic sands and some less sandy soils. *A. tortilis* may dominate some areas on the valley.

The grass-dominated herbaceous layer shows relatively low basal cover on dystrophic sands. Much of the unit in the broad arc south of the Springbokvlakte is heavily populated by rural communities. Several alien plants are widely scattered but often at low densities; these include: *Cereus jamacaru*, *Eucalyptus* species, *Lantana camara*, *Melia azedarach*, *Opuntia ficus-indica* and *Sesbania punicea*. This vegetation unit has been allocated a conservation status of Vulnerable. Common and characteristic plant species for this vegetation type are listed in Table 4-2.

Table 4-2: Common and Characteristic Plant Species of the Central Sandy Bushveld

Plant Form	Species
Trees:	<i>Acacia Burkei</i> (d), <i>A. robusta</i> , <i>Sclerocarya birrea</i> subsp. <i>caffra</i> , <i>Burkea africana</i> (d) <i>Combretum apiculatum</i> (d), <i>C zeyheri</i> , <i>Terminalia sericea</i> (d), <i>Ochna pulchra</i> , <i>Peltophorum africanum</i> , <i>Searsia leptodictya</i> .
Tall Shrubs:	<i>Combretum hereoense</i> , <i>Grewia bicolor</i> , <i>G. Monticola</i> , <i>Strychnos pungens</i> .
Low Shrubs:	<i>Agathisanthemum bojeri</i> (d), <i>Indigofera filipes</i> (d)
Graminoids (grasses):	<i>E. rigidior</i> (d), <i>Hyperthelia dissoluta</i> (d), <i>Panicum maximum</i> (d), <i>Perotis patens</i> (d), <i>Anthehora pubescens</i> , <i>Aristida acabrivals</i> subsp. <i>abrivalvis</i> , <i>Brachiaria serrata</i> , <i>Elionurus muticus</i> , <i>Eragrostis nindensis</i> , <i>Loudetia simplex</i> , <i>Schmidtia papophoroides</i> , <i>Themeda triandra</i> , <i>Trachypogon spicatus</i> .
Herbs:	<i>Aloe greatheadii</i> var. <i>davyana</i> , <i>Dicerocaryum seneiodes</i> (d), <i>Baleria macrostegia</i> , <i>Blepharis integrifolia</i> , <i>Crabbea angustifolia</i> , <i>Evolvulus alsinoides</i> , <i>Geigeria burkei</i> , <i>Hermannia lancifolia</i> , <i>Hypoxis hemerocallidea</i> , <i>Indigofera daleoides</i> , <i>Justicia anagalloides</i> , <i>Kyphocarpa angustifolia</i> , <i>Lophiocarpus tenuissimus</i> , <i>Mosdenia leptostachys</i> , <i>Oxygonum dregeanum</i> subsp. <i>canescens</i> var. <i>dissectum</i> , <i>Waltheria indica</i> , <i>Xerophyta humilis</i> .

Key: Species in **bold** denote species found on site; (d) denotes dominant species

***Acacia* Name Change**

The International Code of Botanical Nomenclature, the official botanical names authority, made a decision in July 2005 to reserve the name *Acacia* for Australian species only. Both Africa and Australia had been sharing the genus name for two distinctly different groups of species and a final call had become a necessity. The *Acacia* name change has been a matter of dispute for over a decade but it is important to note that the change is now official. The reasons for voting *Acacia* as an Australian type were numerous, primarily owing to the fact that over 1000 *Acacia*'s (many that are endemic) are to be found in Australia, making up the largest genus in the country. In addition, the *Acacia* has significant cultural and traditional value as a symbol in the Australian coat of arms. A taxonomic revision of African *Acacia*'s is underway and all species will be renamed into either *Vachellia* or *Senegalia*. The *Acacia* name is maintained for the purpose of this report.



Pictures from: <http://www.kyffhauser.co.za/>

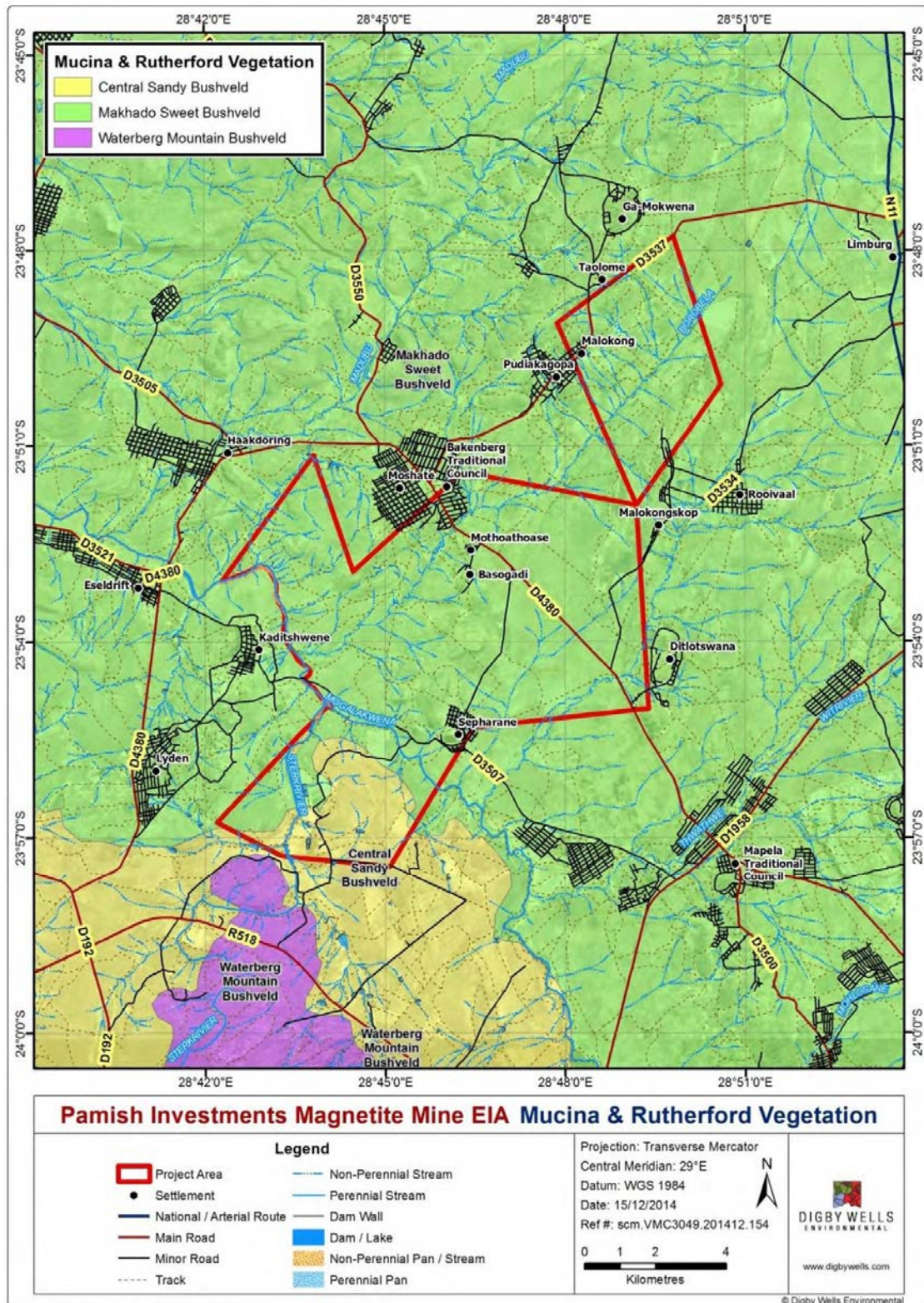


Figure 4-2: Regional Vegetation

5 Methodology

5.1 Flora

5.1.1 Desktop Assessment

For vegetation, broad habitats were defined using aerial imagery for the desktop component. In addition, the following literature and databases were used in order to generate expected species lists and to ascertain the likelihood of the presence of Species of Special Concern on site:

- PRECIS (Pretoria Computerised Information System). This database provides taxonomic information for plant species occurring in southern Africa and follows the format of Germishuizen and Meyer, 2003. It is updated every two months and is supplied by SANBI. It is accessed on the Plants of Southern Africa (POSA) website;
- SIBIS: SABIF - South African Biodiversity Information Facility established by the Department of Science and Technology (DST); and
- Threatened Species Programme (TSP) listing in collaboration with the National Botanical Institute (NBI).

5.1.2 Field Survey

The field survey involved stratified random sampling where sample plots were to be used to determine vegetation distribution in the field, the survey was conducted from the 20th to 23rd of January 2015. The Braun-Blanquet floristic-sociological approach recognises units by the floristic composition and abundance. This methodology is easier and quicker to use than the alternative point-survey or wheel-point methodology and results in a reliable estimate of cover abundance. The Braun-Blanquet method incorporates seven cover-abundance categories as listed in Table 5-1. A general species list was compiled from random traversing through the site.

Table 5-1: Braun-Blanquet Analysis Cover Abundance

Cover Abundance	Category
One or few individuals	r
Occasional and less than 5% of total plot area.	+
Abundant and with very low cover, or less abundant but higher cover; in any case less than 5% cover of total plot area.	1
Very abundant and less than 5%, or 5-25% cover, of a total plot area: <ul style="list-style-type: none"> ▪ 2m – Very abundant ▪ 2a – 5-12.5 % cover, irrespective of number of individuals ▪ 2b – 12.5-25% cover, irrespective of number of individuals 	2

Cover Abundance	Category
25-50% cover of total plot area, irrespective of number of individuals.	3
50-75% cover of total plot area, irrespective of number of individuals	4
75-100% cover of total plot area, irrespective of number of individuals	5

Baseline National Herbarium Pretoria (PRE) Computerised Information System (PRECIS) data from South African National Biodiversity Institute (SANBI) for the grid square, was compared to the Limpopo Environmental Management Act, 2003 (Act No. 7 of 2003) protected species and to compile a list of Red Data plant species that may potentially occur within the study area. Furthermore, species that are provincially protected have been listed under Schedule 12 of LEMA (2003) were used as well as species that are nationally protected have been listed under the Protected Trees List as part of the National Forests Act, 1998 (Act No. 84 of 1998; Government Gazette 35648, Government Notice 716 of 7 September 2012).

Floristic sensitivity analysis was determined by subjectively assessing the ecological function and conservation importance of the vegetation, as defined in Figure 5-2:

Table 5-2: The Floristic Sensitivity Analysis Determination through Assessment of the Ecological Function and Conservation Importance

Sensitivity	Ecological function	Conservation importance
High	Sensitive ecosystems with either low inherent resistance or resilience towards disturbance factors or highly dynamic systems considered to be stable and important for the maintenance of ecosystems integrity (e.g. pristine grasslands, pristine wetlands and pristine ridges).	Ecosystems with high species richness and usually provide suitable habitat for a number of threatened species. Usually termed 'no-go' areas and unsuitable for development, and should be protected.
Medium	Relatively important ecosystems at gradients of intermediate disturbances. An area may be considered of medium ecological function if it is directly adjacent to sensitive/pristine ecosystem.	Ecosystems with intermediate levels of species diversity without any threatened species. Low-density development may be allowed, provided the current species diversity is conserved.
Low	Degraded and highly disturbed systems with little or no ecological function.	Areas with little or no conservation potential and usually species poor (most species are usually exotic).

5.2 Fauna

5.2.1 Desktop Assessment

A desktop study was undertaken to generate a list of fauna species that are found within the study site. The list of possible fauna species was generated using various sources listed below, and from this a list of possible Species of Special Concern was also created. The following information sources were consulted:

- The SIBIS online interactive species distribution map was used to obtain data for the distribution of mammals, reptiles, amphibians and terrestrial invertebrates within the greater study area. Data was acquired for the QDS in which the study is located;
- The Convention on International Trade of Endangered Species (CITES) species database;
- The IUCN (2010) Red Data List for South African fauna;
- National Environmental Management Biodiversity Act, 2004 (Act No 10 of 2004)(NEMBA), Government Notice 700, listed species; and
- Fauna and Flora Assessment Report for the Proposed Platreef Underground Mine. (Digby Wells, 2013); and A screening assessment was conducted in December 2014, whereby habitats were identified and species were recorded.

5.2.2 Field Survey

The field surveys for fauna took place over 15-19 December 2014 and 20-23 January 2015.

5.2.2.1 Animal Survey

Pertinent notes were made during the survey and desktop studies were also conducted for mammals, birds, reptile and frogs. All fauna species encountered on site were identified and recorded. The following methods were used during the survey:

5.2.2.1.1 *Mammals*

Visual sightings and ecological indications were used to identify the mammal inhabitants of the study area; this includes scats, tracks and habitat such as burrows and dens. Scats found were collected (if required), photographed on scale along with any tracks found and identified. For identification purposes a field guide Mammals of Southern Africa (Smithers, 2000), Mammals of Southern African Sub-Region (Skinner & Smithers, 1990) and the species distribution maps in Friedman and Daly (2004) was used.

The following was recorded:

- All mammals encountered, noted or captured during the survey;
- Animals listed by landowners;
- A list of the most prominent mammal species; and
- A list of rare and endangered species encountered during the survey.

Small mammal trapping was also applied by using Sherman traps (Figure 5-1). Sherman traps are collapsible traps (23 cm x 9 cm x 7.5 cm) which were baited and laid along transects. Ten traps were used per survey. Areas where clear small mammal activity could be seen such as the presence of burrows were also used as sites for trapping. The traps were checked every morning due to the fact that the small mammals are predominantly active at night. Trapping was undertaken for two consecutive nights for the dry and wet season survey independently. Captured animals were photographed and identified. Motion-sensitive cameras were baited and positioned along watercourses or habitat that had the propensity to harbour animal species. Species of conservation concern and listed by the IUCN or by the Limpopo Environmental Management Act as protected and endemic within the study area, took priority and the Red Data status identified and recorded.

5.2.2.1.2 Birds

The principal ornithological field survey technique used was transect surveys. Transect surveys were planned based on sites representative of different avifauna habitat, such as bushveld, open areas and mountainous regions. A transect line was selected at each site to reflect its general habitat conditions. Footpaths, trails and other access ways within each site were used as the transect line. The sampling period stretched over the survey period of six days for the dry and wet season collectively and identification was focused on early in the morning and in the evenings when bird activity was at its highest. Transect procedures involve slow attentive walks along transects during which any bird seen or heard is identified and recorded. Species observed during the vegetation transect surveys were also recorded.

The following was recorded:

- All birds encountered or noted during the survey including night surveys;
- A list of the birds encountered; and
- A list of rare and endangered species encountered.

Where possible, visual identification was used to confirm calls. Bird species were confirmed using Sinclair *et al* (1997).

Assessment of the conservation status of species recorded focused on the various categories of Globally Threatened Species (IUCN 2004) and birds listed by the Limpopo Environmental Management Act (2003). Robert's' Multimedia of Birds of Southern Africa (2006) and BirdLife South Africa, 2014 Checklist of Birds- List of Threatened Species was

used to compile a list of possible species that might occur in the project area which falls within the quarter degree square. Lists of birds found in the QDS for the study area were determined using online data from the South African Bird Atlas Project (SABAP 2) for 2011.

5.2.2.1.3 Reptiles and Frogs

Herpetofauna include reptile and amphibian species. Direct /opportunistic observation was done along trails or paths within the project area. Any herpetofauna species seen or heard along such paths or trails within the project area was identified and recorded. Another method used was refuge examinations using visual scanning of terrains to record smaller herpetofaunal species which often conceal themselves under rocks and in fallen logs, rotten tree stumps, under rocks, in leaf litter, rodent burrows, ponds, old termite mounds, etc. Branch (1996) and Carruthers (2001) was used to confirm identification where necessary.

5.2.2.1.4 Arthropods

A sweep net (750 mm diameter) was used to sample the grassland vegetation. This was however limited due to the fact that project area predominantly consisted of bushveld. Day flying butterflies (Lepidoptera) and other flying insects were caught using a 750 mm butterfly net. Identification was done by using Picker *et al* (2002).

5.2.2.1.5 Red Data Faunal Assessment

The following parameters were used to assess the Probability of Occurrence of each Red Data species:

- Habitat requirements (HR) – Most Red Data animals have very specific habitat requirements and the presence of these habitat characteristics in the study area was evaluated;
- Habitat status (HS) – The status or ecological condition of available habitat in the area is assessed. Often a high level of habitat degradation prevalent in a specific habitat will negate the potential presence of Red Data species (this is especially evident in wetland habitats); and
- Habitat linkage (HL) – Movement between areas for breeding and feeding forms an essential part of the existence of many species. Connectivity of the study area to surrounding habitat and the adequacy of these linkages are evaluated for the ecological functioning of Red Data species habitat within the study area.

Probability of occurrence is presented in four categories, namely:

- Low (will not occur);
- Medium (could possibly occur);
- High (most likely could occur); or
- Recorded (does occur on site).

The IUCN Red Data categories are defined as in Table 5-3 and it is used for the status identification of mammals, birds, reptiles and amphibians globally.

Table 5-3: Red Data Categories and Description from IUCN (IUCN, 2010)

Category	Description
Least Concern (LC)	A least concern (LC) species is one which has been categorised by the International Union for Conservation of Nature as evaluated but not qualified for any other category.
Critically Endangered (CR)	A taxon is Critically Endangered when it is considered to be facing an extremely high risk of extinction in the wild
Endangered (EN)	A taxon is Endangered when it is considered to be facing a very high risk of extinction in the wild
Vulnerable (VU)	A taxon is Vulnerable when the best available evidence indicates it to be facing a high risk of extinction in the wild
Near threatened (NT)	A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future
Data Deficient (DD)	A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status
Not Evaluated (NE)	A taxon is Not Evaluated when it is has not yet been evaluated against the criteria

5.3 Assessment of Sensitive Landscapes and Conservation Significance

Subsequently all flora and fauna data were collectively assessed to determine areas that are of conservation importance. This was then collaborated with a desktop study and mapping which aimed at describing the sensitive landscapes and conservation importance/significance of the proposed mining area. Sensitive areas will include areas with a unique or sensitive ecological system such as wetlands, ridges and Red Data species habitat.



Figure 5-1: Examples of Line Array (top) and Sherman Traps (bottom) used to Capture Small Animals on Site

5.4 Impacts Assessment

This report will comply with the standards set out by the IFC that defines the Environmental and Social Impact Assessment as “...a way to identify, predict and assess the type and scale of potential impacts associated with any business activities or projects”.

The EIA process involves a series of steps; the first of which is to identify the activities that could potentially interact with the natural or social environment (aspects). These interactions could have an impact, which needs to be assessed and mitigated. The following are terms and definitions which are applicable to the EIA concept (ISO 14001), with mining specific examples:

- **Project Activity:** Activities associated with the project that result in an environmental interaction during the different phases (construction, operation and

decommissioning), e.g., new processing plant, new stockpiles, development of open pit, dewatering, water treatment plant;

- **Interaction:** An “environmental interaction” is an element or characteristic of an activity, product, or service that interacts or can interact with the environment. Environmental interactions can cause environmental impacts (but may not necessarily do so). They can have either beneficial impacts or adverse impacts and can have a direct and decisive impact on the environment or contribute only partially or indirectly to a larger environmental change.
- **Environmental Aspect:** The term “environmental aspect” refers to the various natural and human environments that an activity may interact with. These environments extend from within the activity itself to the global system, and include air, water, land, flora, fauna (including people) and natural resources of all kinds.
- **Environmental impact:** An “environmental impact” is a change to the environment that is caused either partly or entirely by one or more environmental interactions. An environmental interaction can have either a direct and decisive impact on the environment or contribute only partially or indirectly to a larger environmental change. In addition, it can have either a beneficial environmental impact or an adverse environmental impact.

Figure 5-2 provides a simplified flow diagram of the EIA process.

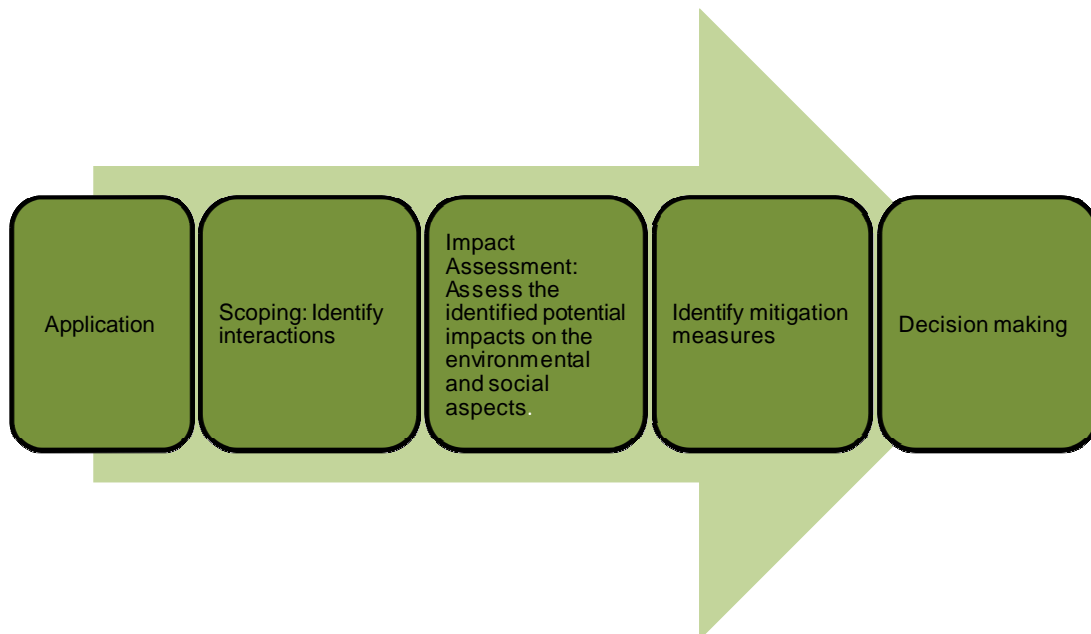


Figure 5-2: Simplified Flow Diagram of the EIA Process

The impacts of the development and operation of the proposed development on the receiving natural areas within the project area will be assessed using a clearly defined rating scale, as detailed below (Table 5-4, Table 5-5 and Table 5-6). Aspects of severity, spatial extent and duration (which determines the consequence), in terms of the frequency of the activity and the frequency of the related impact (which determines the likelihood of occurrence) will be considered.

The significance rating process follows the established impact/risk assessment formula:

$$\text{Significance} = \text{CONSEQUENCE} \times \text{PROBABILITY} \times \text{NATURE}$$

Where

$$\text{Consequence} = \text{intensity} + \text{extent} + \text{duration}$$

and

$$\text{Probability} = \text{likelihood of an impact occurring}$$

and

$$\text{Nature} = \text{positive (+1) or negative (-1) impact}$$

The matrix calculates the rating out of 147, whereby intensity, extent, duration and probability are each rated out of seven as indicated in Table 5-4. The weight assigned to the various parameters is then multiplied by +1 for positive and -1 for negative impacts.

Impacts are rated prior to mitigation and again after consideration of the mitigation has been applied; post-mitigation is referred to as the residual impact. The significance of an impact is determined and categorised into one of seven categories (The descriptions of the significance ratings are presented in Table 5-4).

It is important to note that the pre-mitigation rating takes into consideration the activity as proposed, (i.e., there may already be some mitigation included in the engineering design). If the specialist determines the potential impact is still too high, additional mitigation measures are proposed.

Table 5-4: Impact Assessment Parameter Ratings

RATING	Intensity/Replace ability		EXTENT	DURATION/REVERSIBILITY	PROBABILITY
	Negative impacts (Nature = -1)	Positive impacts (Nature = +1)			
7	Irreplaceable loss or damage to biological or physical resources or highly sensitive environments. Irreplaceable damage to highly sensitive cultural/social resources.	Noticeable, on-going natural and / or social benefits which have improved the overall conditions of the baseline.	International The effect will occur across international borders.	Permanent: The impact is irreversible, even with management, and will remain after the life of the project.	Definite: There are sound scientific reasons to expect that the impact will definitely occur. >80% probability.
6	Irreplaceable loss or damage to biological or physical resources or moderate to highly sensitive environments. Irreplaceable damage to cultural/social resources of moderate to highly sensitivity.	Great improvement to the overall conditions of a large percentage of the baseline.	National Will affect the entire country.	Beyond project life: The impact will remain for some time after the life of the project and is potentially irreversible even with management.	Almost certain / Highly probable: It is most likely that the impact will occur. <80% probability.

RATING	Intensity/Replaceability		EXTENT	DURATION/REVERSIBILITY	PROBABILITY
	Negative impacts (Nature = -1)	Positive impacts (Nature = +1)			
5	Serious loss and/or damage to physical or biological resources or highly sensitive environments, limiting ecosystem function. Very serious widespread social impacts. Irreparable damage to highly valued items.	On-going and widespread benefits to local communities and natural features of the landscape.	<u>Province/ Region</u> Will affect the entire province or region.	Project Life (>15 years): The impact will cease after the operational life span of the project and can be reversed with sufficient management.	Likely: The impact may occur. <65% probability.
4	Serious loss and/or damage to physical or biological resources or moderately sensitive environments, limiting ecosystem function. On-going serious social issues. Significant damage to structures / items of cultural significance.	Average to intense natural and / or social benefits to some elements of the baseline.	<u>Municipal Area</u> Will affect the whole municipal area.	Long term: 6-15 years and impact can be reversed with management.	Probable: Has occurred here or elsewhere and could therefore occur. <50% probability.

RATING	Intensity/Replaceability		EXTENT	DURATION/REVERSIBILITY	PROBABILITY
	Negative impacts (Nature = -1)	Positive impacts (Nature = +1)			
3	Moderate loss and/or damage to biological or physical resources of low to moderately sensitive environments and, limiting ecosystem function. On-going social issues. Damage to items of cultural significance.	Average, on-going positive benefits, not widespread but felt by some elements of the baseline.	<u>Local</u> Local extending only as far as the development site area.	Medium term: 1-5 years and impact can be reversed with minimal management.	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. <25% probability.
2	Minor loss and/or effects to biological or physical resources or low sensitive environments, not affecting ecosystem functioning. Minor medium-term social impacts on local population. Mostly repairable. Cultural functions and processes not affected.	Low positive impacts experience by a small percentage of the baseline.	<u>Limited</u> Limited to the site and its immediate surroundings.	Short term: Less than 1 year and is reversible.	Rare / improbable: Conceivable, but only in extreme circumstances. The possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures. <10% probability.

RATING	Intensity/Repl ace ability		EXTENT	DURATION/REVERSIBILITY	PROBABILITY
	Negative impacts (Nature = -1)	Positive impacts (Nature = +1)			
1	<p>Minimal to no loss and/or effect to biological or physical resources, not affecting ecosystem functioning. Minimal social impacts, low-level repairable damage to commonplace structures.</p>	<p>Some low-level natural and / or social benefits felt by a very small percentage of the baseline.</p>	<p>Very limited/Isolated Limited to specific isolated parts of the site.</p>	<p>Immediate: Less than 1 month and is completely reversible without management.</p>	<p>Highly unlikely / None: Expected never to happen. <1% probability.</p>

Table 5-5: 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
		Consequence																																					

Table 5-6: Significance Rating Description¹

Score	Description	Rating
109 to 147	A very beneficial impact that may be sufficient by itself to justify implementation of the project. The impact may result in permanent positive change	Major (positive) (+)
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	Moderate (positive) (+)
36 to 72	An positive impact. These impacts will usually result in positive medium to long-term effect on the natural and / or social environment	Minor (positive) (+)
3 to 35	A small positive impact. The impact will result in medium to short term effects on the natural and / or social environment	Negligible (positive) (+)
-3 to -35	An acceptable negative impact for which mitigation is desirable. 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 natural and / or social environment	Negligible (negative) (-)
-36 to -72	A minor negative impact 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 natural and / or social environment	Minor (negative) (-)
-73 to -108	A moderate negative impact may prevent the implementation of the project. These impacts would be considered as constituting a major and usually a long-term change to the (natural and / or social) environment and result in severe changes.	Moderate (negative) (-)
-109 to -147	A major negative impact 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. The impacts are likely to be irreversible and/or irreplaceable.	Major (negative) (-)

5.5 Study Limitations

The following limitations were experienced during this study:

- The project was assessed according to the project activities listed herein (that were made available to Digby Wells by the client). Any changes to these after the assessments were done would not be captured in this report;
- Only the area that coincides directly with infrastructure and development were assessed. The entire Mining Right Application area was not assessed for this report;
- Whilst every effort to document all plant species was made, it is possible that the emerging period (including flowering or seed-bearing phases of plant life-cycles) of some plants may not have coincided with the time of sampling. In this case, the absence of these plants from the species list does not imply that they do not occur on site at all;
- Only ethnobotanical species that have been documented in literature were recorded for this survey. Whilst members of the local community were interviewed as part of the heritage assessment (Digby Wells Heritage Impact Assessment Report, 2015a), individuals were hesitant to disclose the names and locations of medicinal plant species associated with the study area;
- The faunal sampling assessment was intended to document any faunal activity or evidence thereof on site. It is likely that some cryptic, nocturnal or migrant species may not have been recorded during the faunal survey; and
- During the wet-season survey, heavy rains were experienced during the majority of the site visit. As a result, the Mogalakwena River and low-lying areas dominated by balck turf were inaccessible in parts.

6 Findings

The findings from a desktop assessment of flora and fauna associated with the study site, as well as the results of a brief screening site visit are represented in this section of the report.

6.1 Flora

6.1.1 Vegetation Communities

The distribution of vegetation in the study area was found to be strongly linked to edaphic features. Plant communities were determined based on statistical analysis of the sampling plot data from the field studies (TWINSPAN). Three primary vegetation units were identified, associated with black vertic clays, red iron-rich soils and rocky outcrops. Ephemeral watercourses were identified in the low-lying areas but did not hold water during the sampling seasons. These watercourses are described in the Digby Wells Wetlands Assessment Report (Digby Wells, 2015b). Vegetation types identified on site are listed in Table 6-1 (as well as residential areas present within the site) and their distribution is

represented in Figure 6-5. A total of 75 plant species were recorded on site, although more may occur.

Table 6-1: Vegetation Types Identified on Site

Vegetation Unit	Area (ha)	Proportion of site (%)
<i>Acacia borleae</i> – <i>Eragrostis rigidior</i> Black Turf Savanna	2005.84	57
<i>Acacia tortilis</i> – <i>Eragrostis rigidior</i> Savanna	165.383	5
<i>Commiphora marlothii</i> – <i>Heteropogon contortus</i> Rocky Woodland	495.94	14
Agricultural Land	730.41	21
Residential Area	120.637	3
Total	3518.22	100

6.1.1.1 *Acacia borleae* – *Eragrostis rigidior* Black Turf Savanna

This vegetation unit covered the majority of the study area and was comprised of open to closed *Acacia* thornveld that was largely infested by the native invader species: *Dichrostachys cinerea* (Sickle Bush). Certain areas where *D. cinerea* was dominant were impenetrable. The vegetation unit showed little variation throughout the site and was found on black vertic clay referred to as “Black Turf” (see Digby Wells Soils Assessment Report (Digby Wells 2015c). An example of the landscape of the vegetation is represented in Figure 6-1. Common and characteristic plant species included trees: *Acacia borleae* (Sticky Acacia), *Acacia luederitzii* (Kalahari-sand Acacia), *Acacia tortilis* (Umbrella Thorn); shrubs: *Grewia flava* (Velvet Raisin), *Ehretia rigida* (Puzzle Bush) and *Rhoicissus tridentata* (Wild Grape) and grasses: *Aristida diffusa*, *Dichanthium annulatum* (Bluestem), *Digitaria eriantha* (Finger Grass) and *Lintonia nutans*. *Aspilia mossambicensis*, *Commicarpus pentandra* and *Lablab purpurea* were dominant forbs.



Figure 6-1: Landscape of the *Acacia borleae-Eragrostis rigidior* Black Turf Savanna

6.1.1.2 *Acacia tortilis – Eragrostis rigidior* Savanna

This vegetation unit was found on iron-rich Oakleaf soils and was relatively limited in extent. Plant diversity was higher than in the plant communities associated with the Black Turfs. Although *Dichrostachys cinerea* (Sickle Bush) was present, it was not found to be invasive. The tree assemblage was made up of *Acacia tortilis* (Umbrella Thorn) and *Acacia karroo* (Sweet Thorn) with the occasional occurrence of *Boscia foetida* (Smelly Shepherd's Tree). Forbs not found in other vegetation types on site, such as *Albuca* sp., *Crinum* sp., *Hermbsaedtia odorata* (Guinea Flower) and *Heliotropium nelsonii*. An example of the landscape of the vegetation is represented in Figure 6-2.



Figure 6-2: Landscape of the *Acacia tortilis – Eragrostis rigidior* Savanna

6.1.1.3 Commiphora marlothii – Heteropogon contortus Rocky Woodland

Granite outcrops provided a unique habitat for plant species and were colonised by species not found in the open savanna areas of the site. Such species include *Acacia nigrescens* (Knobthorn), *Steganotaenia araliacea* (Carrot Tree) on north-west facing slopes and *Commiphora marlothii* (Paperbark Corkwood), a species restricted to rocky outcrops (often granite). The Nationally Protected trees *Sclerocarya birrea* (Marula) and *Combretum imberbe* (Leadwood) were found in this habitat. Figure 6-3 represents examples of the landscape of the *Commiphora marlothii* – *Heteropogon contortus* Rocky Woodland. Common and characteristic plant species found in this intact habitat are found in Figure 6-4.



Figure 6-3: Landscape of the *Commiphora marlothii* – *Heteropogon contortus* Rocky Woodland

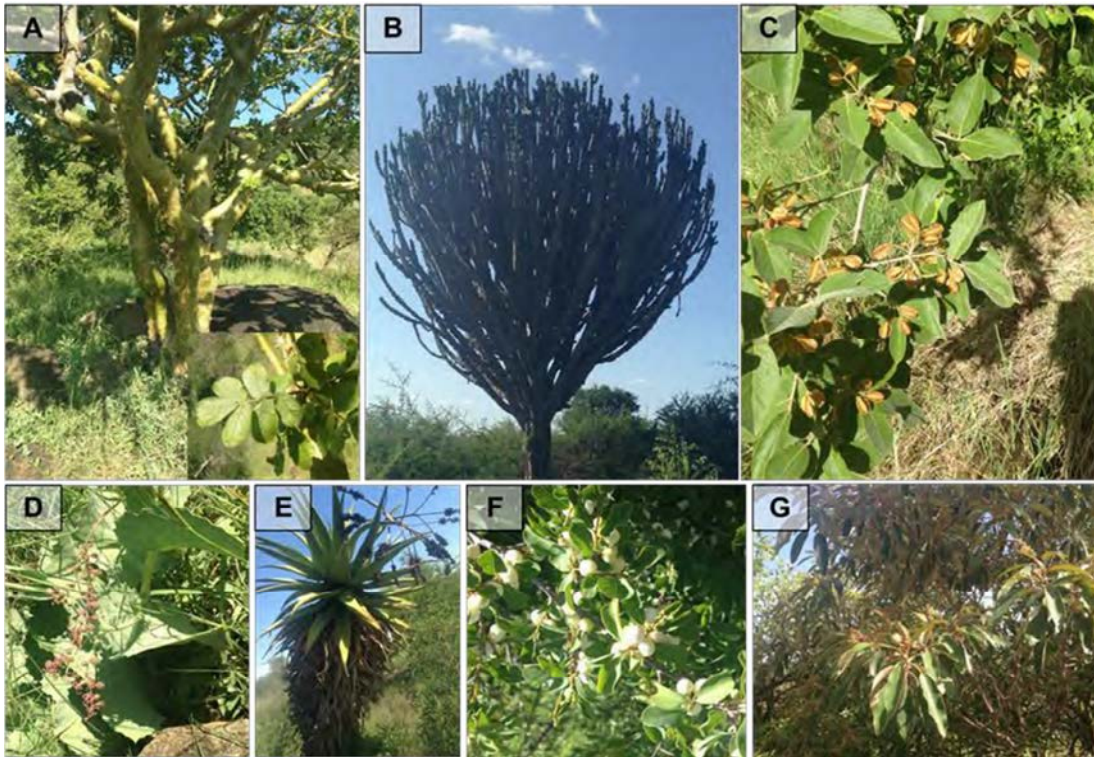


Figure 6-4: Common and characteristic plant species of the *Commiphora marlothii* – *Heteropogon contortus* Rocky Woodland (A: *Commiphora marlothii*, B: *Euphorbia ingens*, C: *Combretum nelsonii*, D: *Cyphostemma* sp., E: *Aloe marlothii*, F: *Flueggea virosa* and G: *Croton gratissimus*)

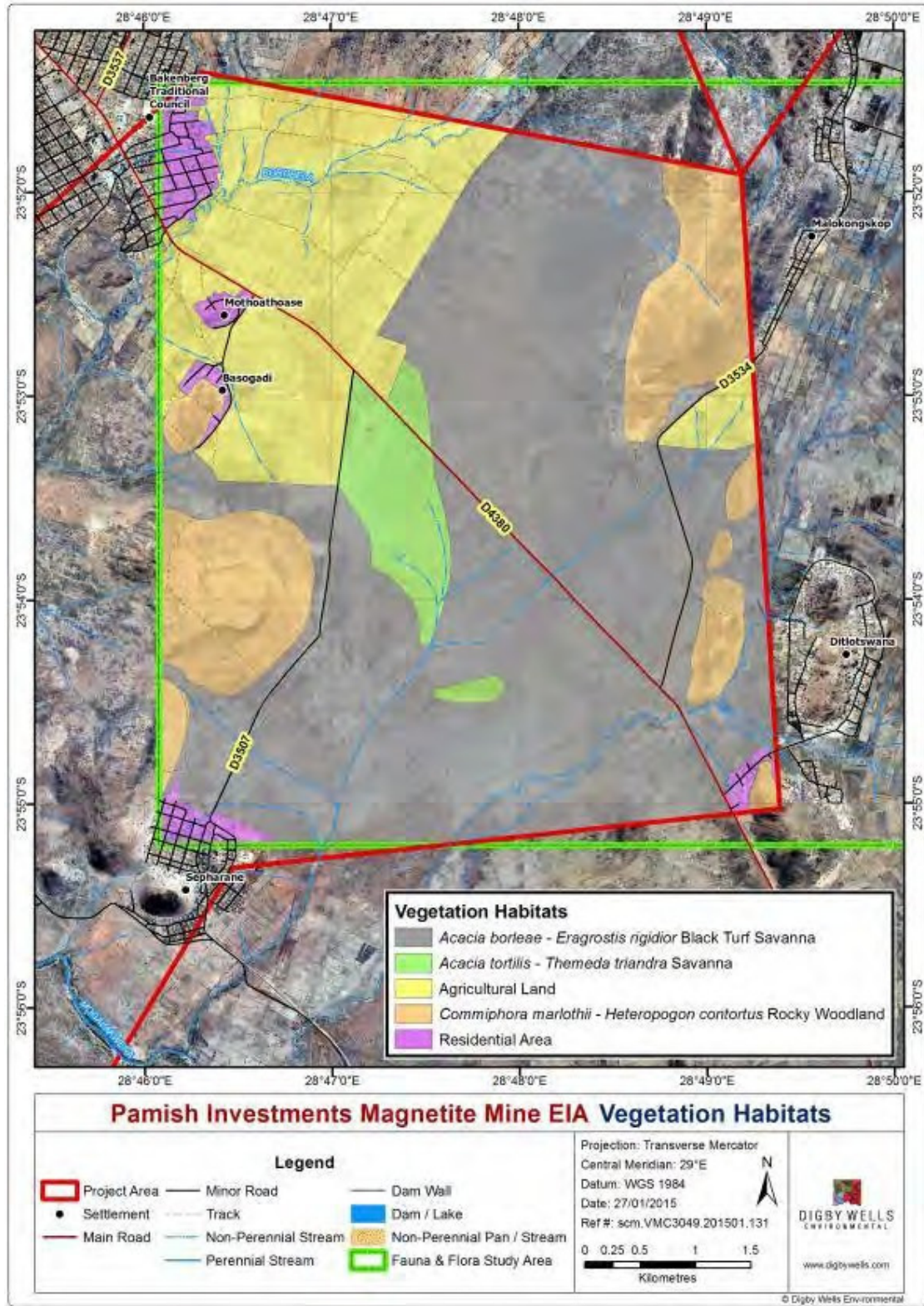


Figure 6-5: Vegetation Habitats

6.1.2 Species of Special Concern

The PRECIS database lists one Red Data species, namely the rare plant: *Brachystelma inconspicuum*. This species is, however, unlikely to occur on site as it is usually found on sandy to loam soils derived from Waterberg quartzite and conglomerate rocks (Peckover and Victor 2006).

Species that are provincially protected have been listed under Schedule 12 of LEMA (2003). Species that are nationally protected have been listed under the Protected Trees List as part of the National Forests Act (NFA), 1998 (Act No. 84 of 1998). Three plant Species of Special Concern were recorded on site, as listed in Table 6-2: Plant Species of Special Concern recorded on site and represented in Figure 6-6. The locality of protected trees recorded is represented in Figure 6-7, although additional species may occur. None of the protected trees coincide with the proposed open pit mine or infrastructure, however, *Scadoxus puniceus* may be found throughout the study site.

Table 6-2: Plant Species of Special Concern Recorded on Site

Species	Common Name	Threat Status	Habitat
<i>Combretum imberbe</i>	Leadwood	Nationally Protected	Black Turf
<i>Scadoxus puniceus</i>	Royal Paint Brush	Provincially Protected	Red soils and clay
<i>Sclerocarya birrea</i>	Marula	Nationally Protected	Black Turf

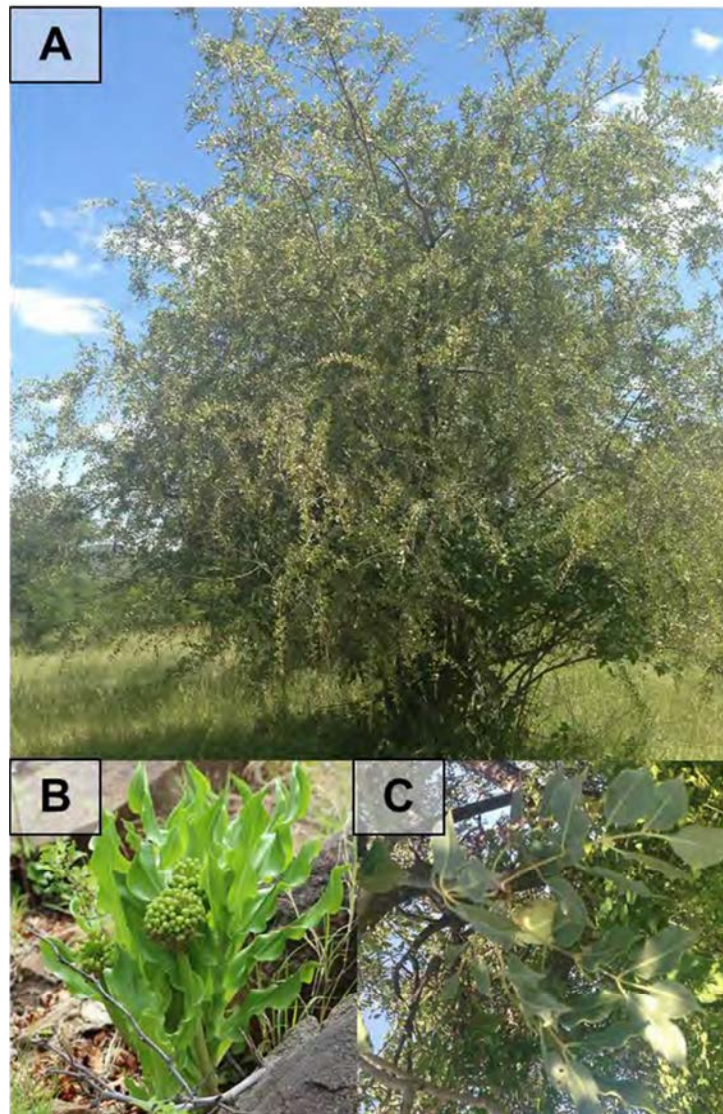


Figure 6-6: Plant Species of Special Concern recorded on site (A: *Combretum imberbe* (Leadwood); B: *Scadoxus puniceus* (Royal Paint Brush) and C: *Sclerocarya birrea* (Marula))

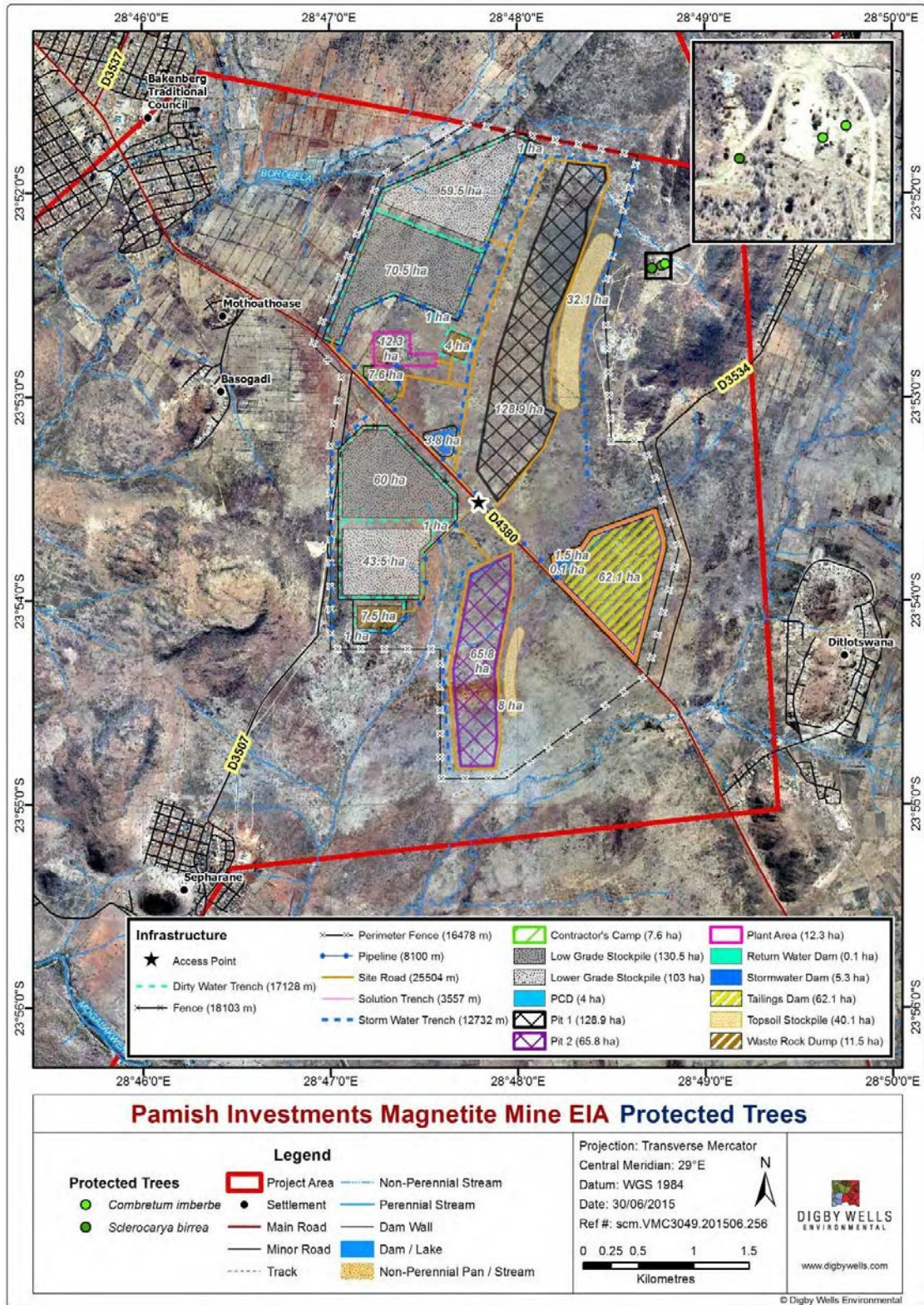


Figure 6-7: Protected Tree Location

6.1.3 Ethnobotanical Plant Species

Ethnobotany is a branch of botany that focuses on the use of plants for medicines and other practical purposes. The use of native plants for ethnobotanical uses can be detrimental to populations that are overexploited.

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. Table 6-3 lists medicinal plant species recorded within the study site. There may be additional medicinal plant species on site that are utilised by the local community but have not been incorporated into literature. Interviews with members of the community showed that individuals were not forthcoming with disclosing information regarding plant species that are put to medicinal use. This places a limitation on the accuracy of this component of the study.

Table 6-3: Medicinal Plant Species Recorded on Site (van Wyk *et al.* 2009)

<i>Asparagus sp.</i>
Species of this genus are traditionally used in southern Africa for treatment of tuberculosis, kidney ailments and rheumatism. Certain species are part of a North Sotho remedy for epilepsy.
<i>Dichrostachys cinerea</i>
Root diffusions and decoctions have been used to treat body pain, backache, elephantiasis, syphilis and leprosy. Also used as a styptic, diuretic, purgative and aphrodisiac. In the Limpopo Province specifically, root decoctions (often mixed with other plants) are used to treat pharyngitis and infertility. Ash from incinerated pods, together with roots of <i>Brackenridgea zanguebarica</i> (often confused with <i>Ochna pulchra</i> which was identified on stie), and fruits <i>Solanum aculeatum</i> are mixed with Vaseline to apply to wounds as an ointment.
<i>Malva parviflora</i>
Leaf infusions are taken orally as a nerve tonic (Watt & Breyer-Brandwijk, 1962). The Sotho give root decoctions to persons who have lost near relatives (Watt & Breyer-Brandwijk, 1962). This may be the species Ashton (1945) reports as Mosala-suping, that is used by the Sotho as a sedative (Sobiecki 2002).
<i>Rhoicissus tridentata</i>
Roots and tubers are used to treat stomach ailments, kidney and bladder complaints, infertility and dysmenorrhoea.
<i>Sclerocarya birrea</i>
The bark is used to treat dysentery, diarrhoea and unspecified stomach problems. The bark is also believed to be of value in treating malaria. Chewing the fresh leaves and swallowing the astringent juice is believed to help with indigestion.

Ziziphus mucronata

Warm bark infusions (sometimes with roots or leaves added) are used as expectorants (also as emetics) for chest problems. Decoctions of roots and leaves (or chewed leaves) are applied externally to boils, sores and glandular swellings, not only to promote healing but also to relieve pain.

6.1.4 Alien Plant Invasion

Alien plants are considered to be exotic plants that invade formerly pristine environments (Bromilow 2010). Invasions by alien plants cause a change in the composition and functioning of ecosystems and delivery of ecosystem services (Wilgen and de Lange 2011). If alien invasions are not controlled, they exhibit the ability to transform heterogeneous landscapes to homogenous, often dominated by single species or scattered mono-specific clumps, thereby replacing natural vegetation. Further to this, alien bushclumps can alter hydraulic properties, such as infestations of alien trees rendering a water deficit for native plants (Foxcroft 2002). In 2002, the estimated area of alien plant cover in South Africa was 10 million ha, which resulted in an annual water use of 3.3 billion m³ in excess of natural vegetation (Wilgen and de Lange 2011). Although this is a preliminary estimate, based on desktop studies, it is a good indication of the water losses that incur due to alien plant invasion.

Alien plant species in South Africa have been classified according to NEMBA (No. 10 of 2004), as published in August 2014 (GN R599 in GG 37886 of 1 August 2014) into the following categories:

- Category 1a: Species requiring compulsory control;
- Category 1b: Invasive species controlled by an invasive species management programme;
- Category 2: Invasive species controlled by area, and;
- Category 3: Invasive species controlled by activity.

Alien plants recorded on site are listed in Table 6-4 and examples are represented in Figure 6-8. Seven species were recorded, the majority of which were found in low-lying areas of the site where grazing or other disturbance had resulted in the colonisation of alien plant species.

Table 6-4: Alien Plants Recorded on Site

Species	Common Name	Alien Category
<i>Agave americana</i>	Spreading Century Plant	No category (3 in the Western Cape)
<i>Argemone ochroleuca</i>	Mexican Poppy	1b
<i>Cereus jamacaru</i>	Queen of the Night	1b
<i>Lantana camara</i>	Lantana	1b

Species	Common Name	Alien Category
<i>Melia azederach</i>	Syringa	1b
<i>Opuntia ficus-indica</i>	Prickly Pear	1b
<i>Pennesetum setaceum</i>	Fountain Grass	1b
<i>Solanum panduriforme</i>	Apple of Sodom	No category
<i>Zinnia peruviana</i>	Wildstar Zinna	No category



Figure 6-8: Examples of alien plant species recorded on site (A: *Argemone ochroleuca*, B: *Agave americana*, C: *Cereus jamacaru*, D: *Opuntia-ficus indica*, E: *Melia azedarach* and F: *Lantana camara*)

6.2 Fauna

The majority of the study area is comprised of intact habitat, suitable for a range of faunal species. The *Commiphora marlothii* – *Heteropogon contortus* Rocky Woodland habitat was regarded as the most sensitive faunal habitat. Rocky ridges are defined as landscape features with a slope of 5° or more such as hills and gorges. Ridges are important for the conservation of biodiversity as they have a high propensity for the occurrence of plant and animal Species of Special Concern and they serve as wildlife corridors in highly developed areas. The guidelines for development of ridges by the Gauteng Department of Agriculture and Rural Development (GDARD) were adapted for the ridges in the Limpopo Province as best practice as there is no relevant policy available for the Limpopo Province. The guidelines stipulate that a 200m buffer should be applied around ridges and rocky outcrops. Rocky outcrops have been delineated and are represented in Figure 6-9. The current mine plan falls outside of this buffer zone.

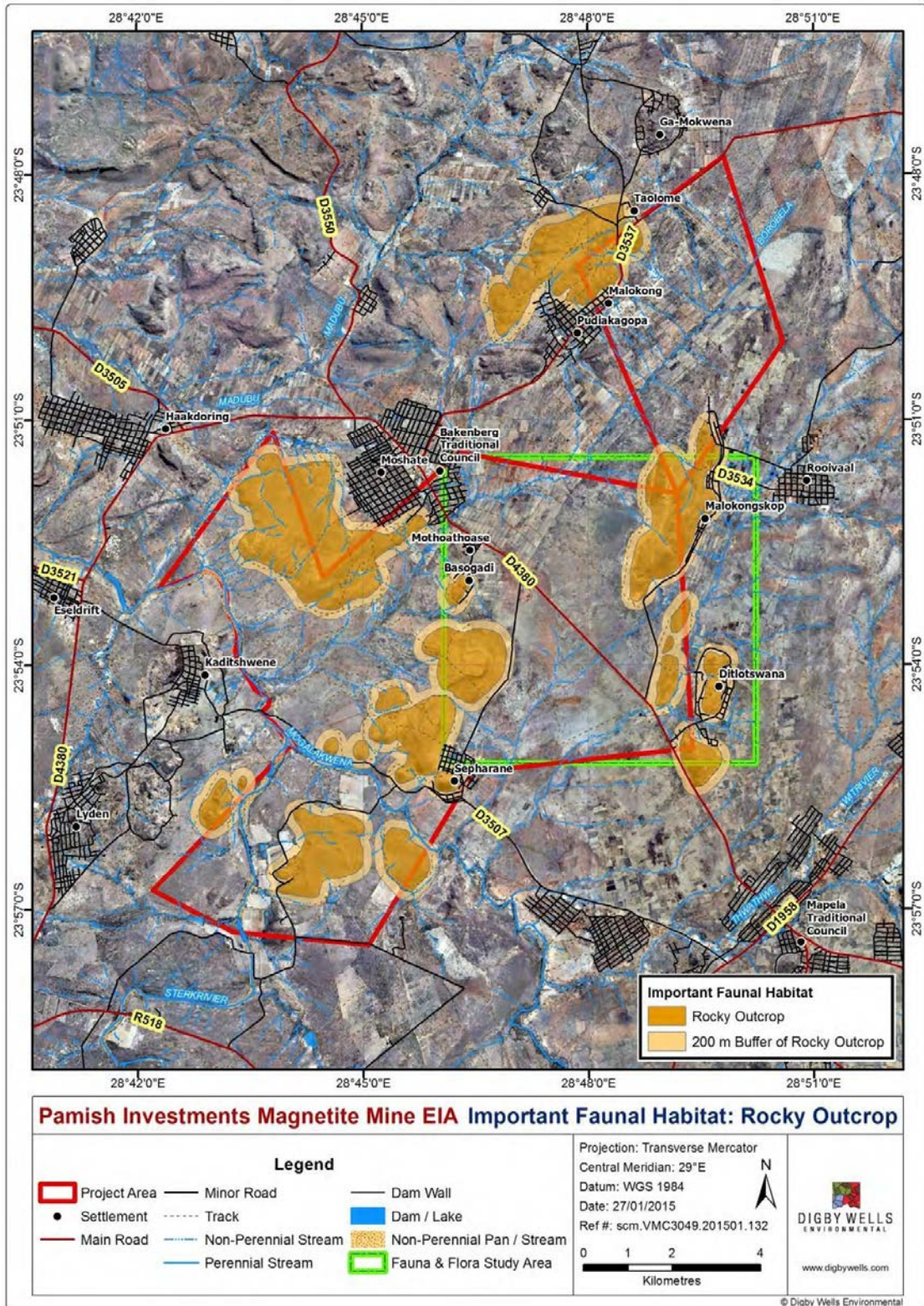


Figure 6-9: Rocky Outcrops

6.2.1 Mammals

Of the 171 species reported to occur in the region, 17 species (Appendix C) were recorded during the field surveys. It must be noted that some species listed in the expected mammals list are sensitive to habitat and in some instances the likelihood for them to occur is minimal. Relatively unspoilt habitat exists within the vicinity of the study area and although the presence of many of these species is not confirmed, there is a possibility that they may still occur on site. Thirty one mammal Species of Special Concern have a medium likelihood of occurrence. Table 6-5 lists mammals recorded on site.

Table 6-5: Mammal Species Recorded on Site

Common Name	Scientific Name	Status
Black-backed Jackal	<i>Canis mesomelas</i>	LC
Brown Hyena*	<i>Hyaena brunnea</i>	NT
Chacma Baboon	<i>Papio ursinus</i>	LC
Civet	<i>Civettictis civetta</i>	LC
Common Duiker	<i>Sylvicapra grimmia</i>	LC
Pygmy Mouse	<i>Mus minutoides</i>	LC
Impala	<i>Aepyceros melampus</i>	LC
Multimammate Mouse	<i>Mastomys coucha</i>	LC
Namaqua Rock Mouse	<i>Michaelomys namaquensis</i>	LC
Porcupine	<i>Hystrix africaeaustralis</i>	LC
Red Veld Rat	<i>Aethomys chrysophilus</i>	LC
Rock Dassie	<i>Procavia capensis</i>	LC
Rock Elephant-shrew	<i>Elephantulus myurus</i>	LC
Single striped Mouse	<i>Lemniscomys rosalia</i>	LC
Small spotted Genet	<i>Genetta genetta</i>	LC
Steenbok	<i>Raphicerus campestris</i>	LC
Vervet Monkey	<i>Cercopithecus aethiops</i>	LC

Key: * Whilst spoor identified on site is characteristic of that of the Brown Hyena (*Hyaena brunnea*), this species has not been confirmed to occur on site.

The Sherman traps (1 and 2) yielded 31 captures, 17 of which were the Multimammate Mouse (*Mastomys coucha*). In addition, six captures were the Single Stripped Mouse (*Lemniscomys rosalia*), four were the Pygmy Mouse (*Mus minutoides*), three were the Namaqua Rock Mouse (*Michaelomys namaquensis*) and one was the Red Veld Rat (*Aethomys chrysophilus*). Examples of small mammals recorded on site are represented in Figure 6-10.

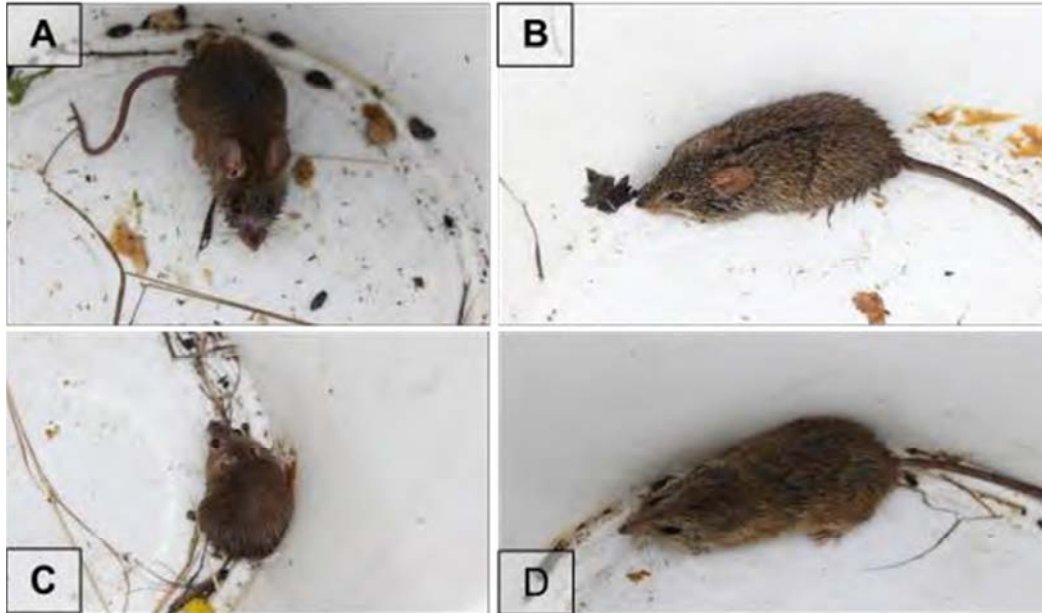


Figure 6-10: Examples of small mammals (A: Multimammate Mouse (*Mastomys coucha*), B: Single-striped Mouse (*Lemniscomys rosalia*), Pygmy Mouse (*Mus minutoides*) and Namaqua Rock Mouse (*Michaelomys namaquensis*)

The Brown Hyena (*Hyaena brunnea*) has the Red Data status of Near Threatened and spoor found on site is characteristic of this species, however, this has not been confirmed due to the prevalence of other domesticated canine species used for hunting and cattle herding. The possibility exists that more Red Data species may occur in the area especially with regards to bats and moles and this will require further surveys over 4 seasons to establish this conclusively. Figure 6-11 shows examples of large mammals recorded on site.

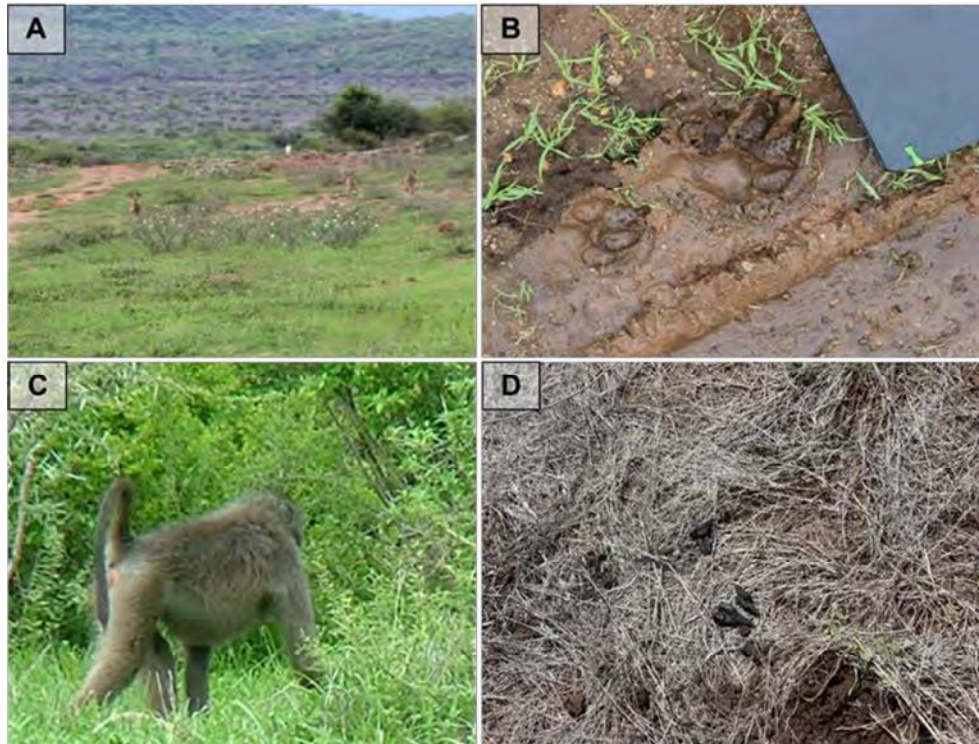


Figure 6-11: Examples of evidence of large mammal activity recorded on site (A: Impala (*Aepyceros melampus*); B: potential spoor of Brown hyena (*Hyaena brunnea*), C: Chacma Baboon (*Papio ursinus*) D: scat of African Porcupine (*Hystrix africaeaustralis*))

6.2.2 Avifauna (Birds)

Birds, like some species of rodents and amphibians, can be viewed as good ecological indicators, since their presence or absence tends to represent conditions pertaining to the proper functioning of the ecosystem. Bird communities and ecological condition are linked to land cover, as the land cover changes so do the types of birds in the area. The project area has the propensity to harbour Red Data Bird Species however none were observed during the field surveys. The surrounding habitat holds several restricted-range and biome-restricted species including Common Whitethroat (*Sylvia communis*) and Olive-tree Warbler (*Hippolais olivetorum*).

The desktop study revealed that 247 bird species (Appendix C) occur in and in the vicinity of the grid squares 2328DC, 2328DD which encompass the site (SABA, 2014). Table 6-6 lists the bird species recorded on site and some examples are represented in Figure 6-12 (a total of 102 birds were recorded).

Table 6-6: Avifauna Species Recorded on Site

Common Name	Species	Threat Status
Acacia Pied Barbet	<i>Tricholaema leucomelas</i>	LC
African Dusky Flycatcher	<i>Muscicapa adusta</i>	LC
African Hawk-Eagle	<i>Aquila spilogaster</i>	LC
African Hoopoe	<i>Upupa africana</i>	LC
African Paradise Flycatcher	<i>Terpsiphone viridis</i>	LC
African Pipit	<i>Anthus cinnamomeus</i>	LC
Amethyst Sunbird	<i>Chalcomitra amethystina</i>	LC
Arrow-marked Babbler	<i>Turdoides jardineii</i>	LC
Barn Swallow	<i>Hirundo rustica</i>	LC
Barred Wren-Warbler	<i>Calamonastes fasciolatus</i>	LC
Bar-throated Apalis	<i>Apalis thoracica</i>	LC
Black Heron	<i>Egretta ardesiaca</i>	LC
Black-collared Barbet	<i>Lybius torquatus</i>	LC
Black-crowned Tchagra	<i>Tchagra senegalus</i>	LC
Black-shouldered Kite	<i>Elanus caeruleus</i>	LC
Black-throated Canary	<i>Crithagra atrogularis</i>	LC
Blue Waxbill	<i>Uraeginthus angolensis</i>	LC
Brown-crowned Tchagra	<i>Tchagra australis</i>	LC
Brown-hooded Kingfisher	<i>Halcyon albiventris</i>	LC
Brubru	<i>Nilaus afer</i>	LC
Burchell's Coucal	<i>Centropus burchelli</i>	LC
Cape Glossy Starling	<i>Lamprotornis nitens</i>	LC
Cape Turtle Dove	<i>Streptopelia capicola</i>	LC
Cape White-eye	<i>Zosterops capensis</i>	LC
Cardinal Woodpecker	<i>Dendropicos fuscescens</i>	LC
Chestnut-vented Tit-babbler	<i>Sylvia subcaerulea</i>	LC
Chinspot Batis	<i>Batis molitor</i>	LC
Cinnamon-breasted Bunting	<i>Emberiza tahapisi</i>	LC
Common Myna	<i>Acridotheres tristis</i>	LC
Common Waxbill	<i>Estrilda astrild</i>	LC

Common Name	Species	Threat Status
Common Whitethroat	<i>Sylvia communis</i>	LC
Crested Barbet	<i>Trachyphonus vaillantii</i>	LC
Crimson-breasted Shrike	<i>Laniarius atrococcineus</i>	LC
Crowned Lapwing	<i>Vanellus coronatus</i>	LC
Dark-capped Bulbul	<i>Pycnonotus tricolor</i>	LC
Diederik Cuckoo	<i>Chrysococcyx caprius</i>	LC
Emerald-spotted Wood Dove	<i>Turtur chalcospilos</i>	LC
European Bee-eater	<i>Merops apiaster</i>	LC
Familiar Chat	<i>Oenanthe familiaris</i>	LC
Flappet Lark	<i>Mirafra rufocinnamomea</i>	LC
Fork-tailed Drongo	<i>Dicrurus adsimilis</i>	LC
Golden-breasted Bunting	<i>Emberiza flaviventris</i>	LC
Great Spotted Cuckoo	<i>Clamator glandarius</i>	LC
Green Wood-hoopoe	<i>Phoeniculus purpureus</i>	LC
Grey Go-away-bird	<i>Corythaixoides concolor</i>	LC
Grey Penduline Tit	<i>Anthoscopus caroli</i>	LC
Hadedda Ibis	<i>Bostrychia hagedash</i>	LC
Helmeted Guineafowl	<i>Numida meleagris</i>	LC
House Sparrow	<i>Passer domesticus</i>	LC
Jacobin Cuckoo	<i>Clamator jacobinus</i>	LC
Jameson's Firefinch	<i>Lagonosticta rhodopareia</i>	LC
Kirk's Francolin	<i>Dendroperdix rovuma</i>	LC
Klaas's Cuckoo	<i>Chrysococcyx klaas</i>	LC
Knob-billed Duck	<i>Sarkidiornis melanotos</i>	LC
Laughing Dove	<i>Spilopelia senegalensis</i>	LC
Lesser Grey Shrike	<i>Lanius minor</i>	LC
Lesser Striped Swallow	<i>Cecropis abyssinica</i>	LC
Lilac-breasted Roller	<i>Coracias caudatus</i>	LC
Little Swift	<i>Apus affinis</i>	LC
Long-billed Crombec	<i>Sylvietta rufescens</i>	LC
Long-tailed Paradise Whydah	<i>Vidua paradisaea</i>	LC

Common Name	Species	Threat Status
Marico Flycatcher	<i>Bradornis mariquensis</i>	LC
Marico Sunbird	<i>Cinnyris mariquensis</i>	LC
Natal Spurfowl	<i>Pternistis natalensis</i>	LC
Neddicky	<i>Cisticola fulvicapilla</i>	LC
Olive-tree Warbler	<i>Hippolais olivetorum</i>	LC
Orange-breasted Bushshrike	<i>Chlorophoneus sulfureopectus</i>	LC
Ovambo Sparrowhawk	<i>Accipiter ovampensis</i>	LC
Pied Crow	<i>Corvus albus</i>	LC
Rattling Cisticola	<i>Cisticola chiniana</i>	LC
Red-backed Shrike	<i>Lanius collurio</i>	LC
Red-billed Firefinch	<i>Lagonosticta senegala</i>	LC
Red-billed Quelea	<i>Quelea quelea</i>	LC
Red-breasted Swallow	<i>Cecropis semirufa</i>	LC
Red-chested Cuckoo	<i>Cuculus solitarius</i>	LC
Red-eyed Dove	<i>Streptopelia semitorquata</i>	LC
Red-faced Mousebird	<i>Urocolius indicus</i>	LC
Rufous-naped Lark	<i>Mirafra africana</i>	LC
Sabota Lark	<i>Calendulauda sabota</i>	LC
Scaly-feathered Finch	<i>Sporopipes squamifrons</i>	LC
Sedge Warbler	<i>Acrocephalus schoenobaenus</i>	LC
Shaft-tailed Whydah	<i>Vidua regia</i>	LC
Southern Black Tit	<i>Parus niger</i>	LC
Southern Boubou	<i>Laniarius ferrugineus</i>	LC
Southern Grey-headed Sparrow	<i>Passer diffusus</i>	LC
Southern Masked Weaver	<i>Ploceus velatus</i>	LC
Southern Yellow-billed Hornbill	<i>Tockus leucomelas</i>	LC
Speckled Mousebird	<i>Colius striatus</i>	LC
Spotted Thick-knee	<i>Burhinus capensis</i>	LC
Swainson's Spurfowl	<i>Pternistis swainsonii</i>	LC
Tawny-flanked Prinia	<i>Prinia subflava</i>	LC
Violet-backed Starling	<i>Cinnyricinclus leucogaster</i>	LC

Common Name	Species	Threat Status
Violet-eared Waxbill	<i>Uraeginthus granatina</i>	LC
Wailing Cisticola	<i>Cisticola lais</i>	LC
White-bellied Sunbird	<i>Cinnyris talatala</i>	LC
White-browed Robin-Chat	<i>Cossypha heuglini</i>	LC
White-browed Scrub Robin	<i>Erythropygia leucophrys</i>	LC
White-browed Sparrow-Weaver	<i>Plocepasser mahali</i>	LC
White-fronted Bee-eater	<i>Merops bullockoides</i>	LC
Willow Warbler	<i>Phylloscopus trochilus</i>	LC
Yellow-bellied Greenbul	<i>Chlorocichla flaviventris</i>	LC
Yellow-fronted Canary	<i>Crithagra mozambica</i>	LC

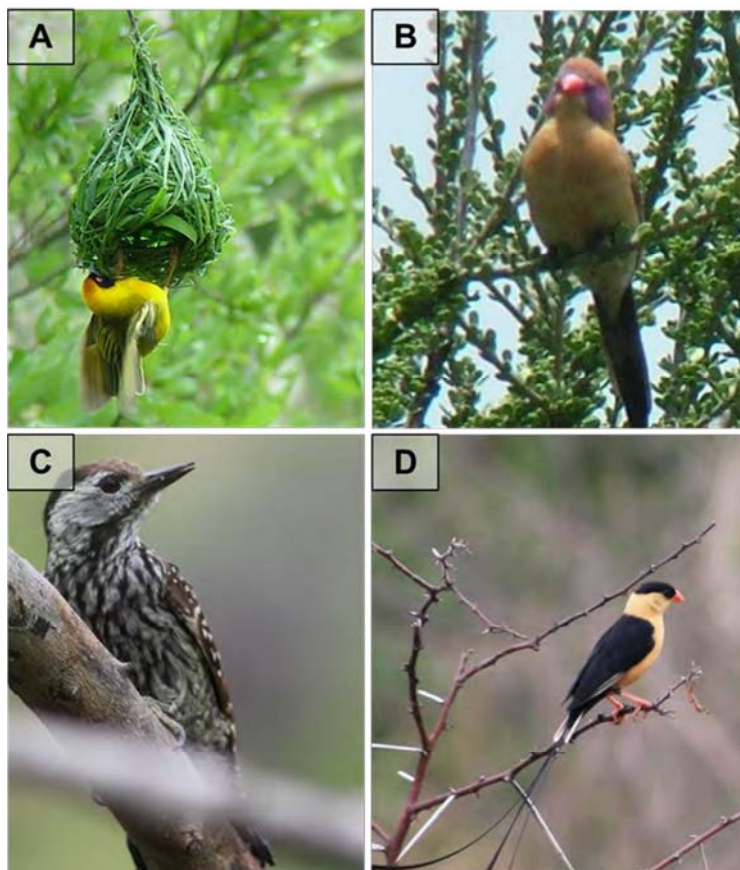


Figure 6-12: Examples of avifauna recorded on site (A: Southern Masked Weaver (*Ploceus velatus*); B: Violet-eared Waxbill (*Uraeginthus granatinus*); C: juvenile Cardinal Woodpecker (*Dendropicos fuscescens*) and D: Shaft-tailed Whydah (*Vidua regia*))

6.2.3 Herpetofauna

The desktop study reveals that 13 reptiles and 15 frog species occur in the grid square in which the study occurs (SARCA, 2014, Appendix E), none of which are listed as having Red Data status, however there are 226 reptile and 57 amphibian species (Appendix E) listed for the Limpopo Province. 11 herpetofauna have a medium to high propensity to occur on site. Table 6-7 lists herpetofauna species recorded on site and examples are represented in Figure 6-13.

Table 6-7: Herpetofauna Found to Occur on Site

English name	Species	Threat Status
African Guttural Toad	<i>Amietophrynus gutturalis</i>	Status unknown
African Red Toad	<i>Schismaderma carens</i>	LC
Grey Foam Nest Frog	<i>Chiromantis xerampelina</i>	LC
Striped Skaapsteker	<i>Psammophylax tritaeniatus</i>	LC
Giant Plated Lizard	<i>Gerrhosaurus validus</i>	LC
Variable Skink	<i>Mabuya varia</i>	LC
Rainbow Skink	<i>Trachylepis margaritifera</i>	LC
Variegated Skink	<i>Trachylepis variegata</i>	LC



Figure 6-13: Examples of reptiles recorded on site (A & B: Variable Skink (*Mabuya varia*); C: Rainbow Skink (*Trachylepis margaritifera*); D: Nest of the Grey Foam Nest Frog (*Chiromantis xerampelina*); and E: African Guttural Toad (*Amietophrynus gutturalis*))

6.2.4 Macro-Invertebrates (Spiders, Scorpions, Beetles and Butterflies)

Butterflies are a good indication of the habitats available in a specific region (Woodhall 2005). Although many species are eurytopes (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 specialised (Woodhall 2005). Butterflies are useful indicators as they are relatively easy to locate and catch, and therefore identify.

In addition, according to the Schedules published in GN 29657/ R151 NEMBA, certain invertebrate species in South Africa are listed as either: Critically Endangered, Endangered, Vulnerable and Protected.

According to the Animal Demography Unit (ADU) (2015), all three genera of scorpions, *Hadogenes*, *Opisthacanthus* and *Opisthophthalmus* occur in the Limpopo Province; however, there are no records for grid squares 2328DC and 2328DD, on which the site occurs. Table 6-8 lists macro-invertebrates recorded on site and Figure 6-14. Baboon Spider nests were found on low-lying areas in the *Acacia borleae* – *Eragrostis rigidior* Black Turf Savanna. This species is protected by the NEMBA legislation and must be protected from development.

Table 6-8: Macro-Invertebrates Expected and Recorded on Site

Common Name	Species
Meadow Blue Butterfly	<i>Cupidopsis issus</i>
Spotted Joker Butterfly	<i>Byblia ilithyia</i>
Dotted Blue Butterfly	<i>Teracus sybaris</i>
Black Pie Butterfly	<i>Tuxentius melaena</i>
Male Diadem	<i>Hypolimnas misippus</i>
Pale Hair tail	<i>Anthene butleri sb spp lividia</i>
Horned Baboon Spider	<i>Ceratogyrus darlingii</i>
Orange Baboon Spider	<i>Pterinochilus murinis</i>

Key: highlighted rows – Whilst Baboon spider nests were recorded on site, the species identity was not confirmed.

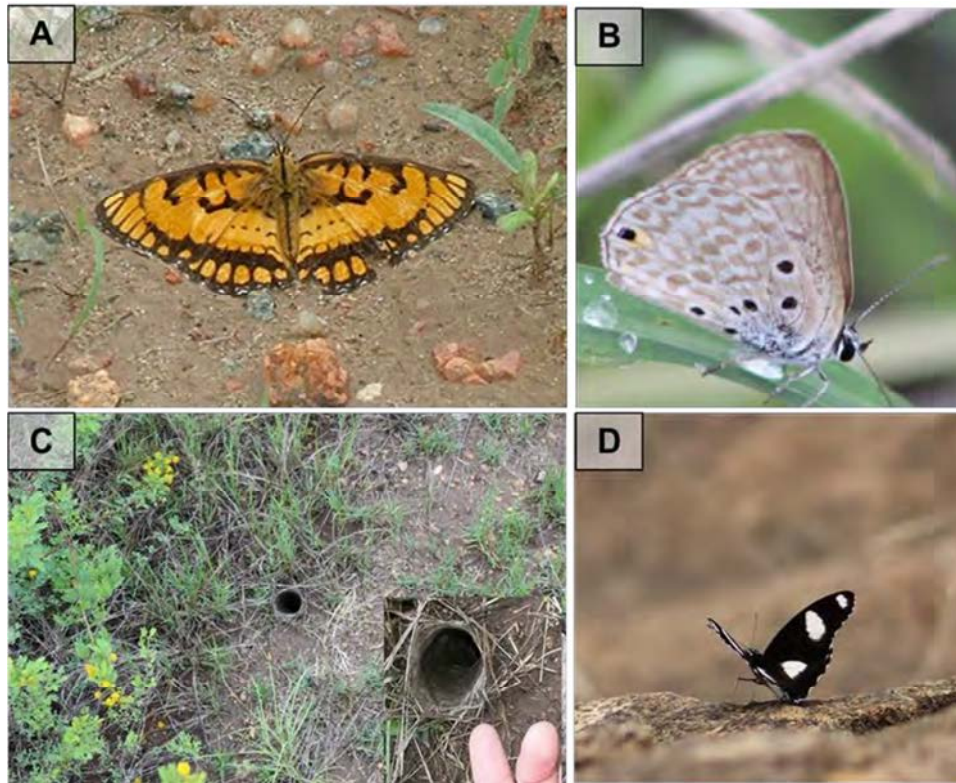


Figure 6-14: Examples of macro-invertebrates recorded on site (A: Spotted Joker Butterfly (*Byblia ilithyia*); B: Meadow Blue Butterfly (*Cupidopsis issus*); C: nest of a Baboon Spider D: Male Diadem (*Hypolimnas misippus*))

7 Sensitivity

The Threatened Ecosystems programme is aimed at meeting explicit biodiversity targets as defined in a systematic biodiversity plan. The National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004) provides for list of threatened or protected ecosystems, in one of four categories: Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or protected. The proposed Open Pit Magnetite Project does not fall within any formally protected areas, or Threatened Ecosystems.

7.1 Important Bird Area (IBA)

The South African Important Bird Area (IBA) Programme is coordinated by BirdLife South Africa. The purpose of the IBA Programme is to identify and protect a network of sites, at a biogeographical scale, critical for the long-term viability of naturally-occurring bird populations. The nearest Important Bird Area (IBA) is the Waterberg System situated 14 km south of the proposed project area (Figure 7-1).

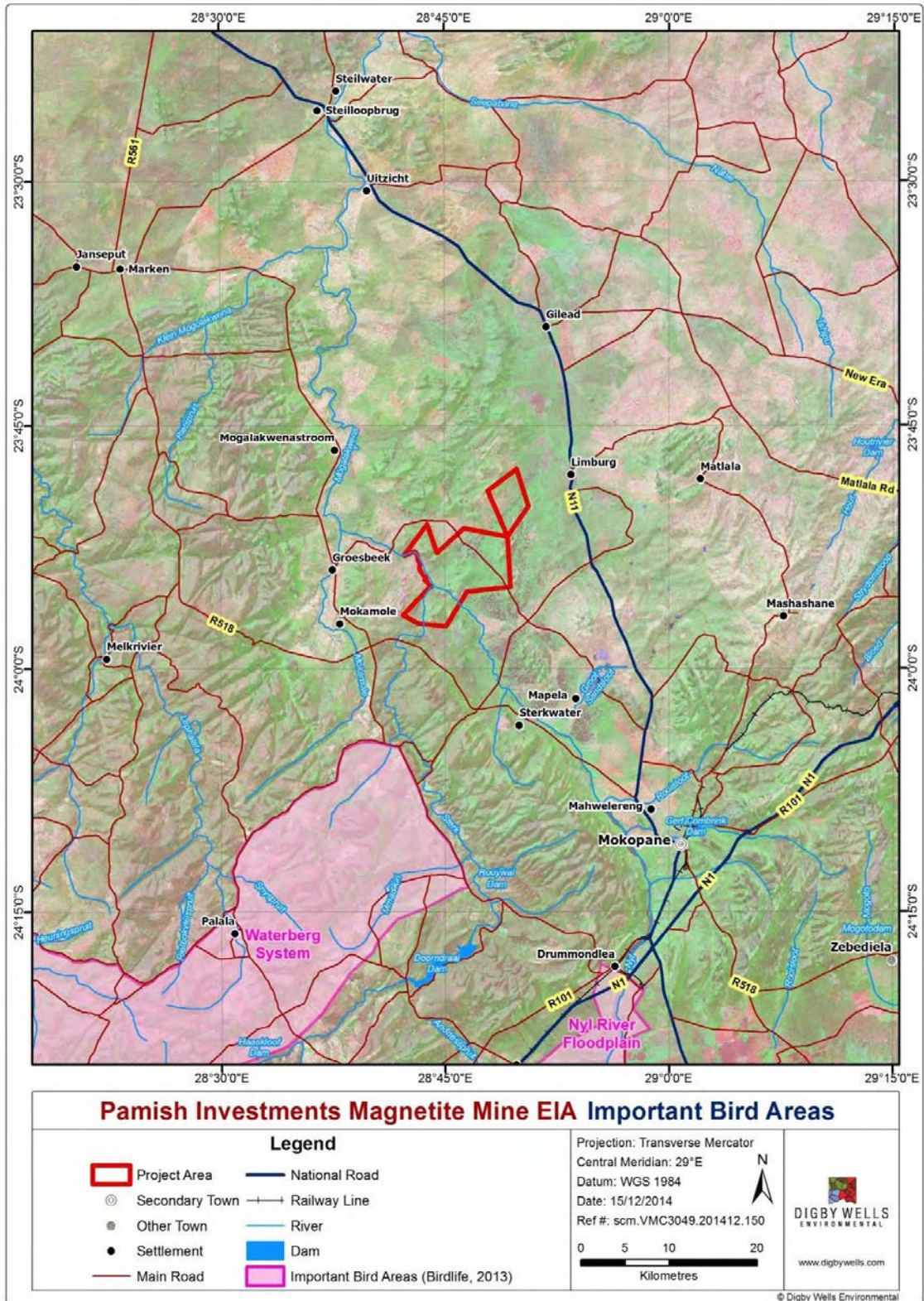


Figure 7-1: Important Bird Areas

7.2 Limpopo Critical Biodiversity Areas

The Limpopo Critical Biodiversity Areas (CBA's) assessment is a bioregional conservation plan, whereby sites were selected based on their biodiversity characteristics, spatial configuration and requirement for meeting targets for both biodiversity pattern and ecological processes. Sites that have been categorised as CBA 1 are regarded as irreplaceable and the conservation of these areas is imperative to meet the biodiversity targets of the Limpopo CBA's. The study area overlies an area that has been classified as CBA 2, as represented in Figure 7-2. CBA 2's are considered "optimal" as there is significant design involved in their identification and should be maintained in their natural state.

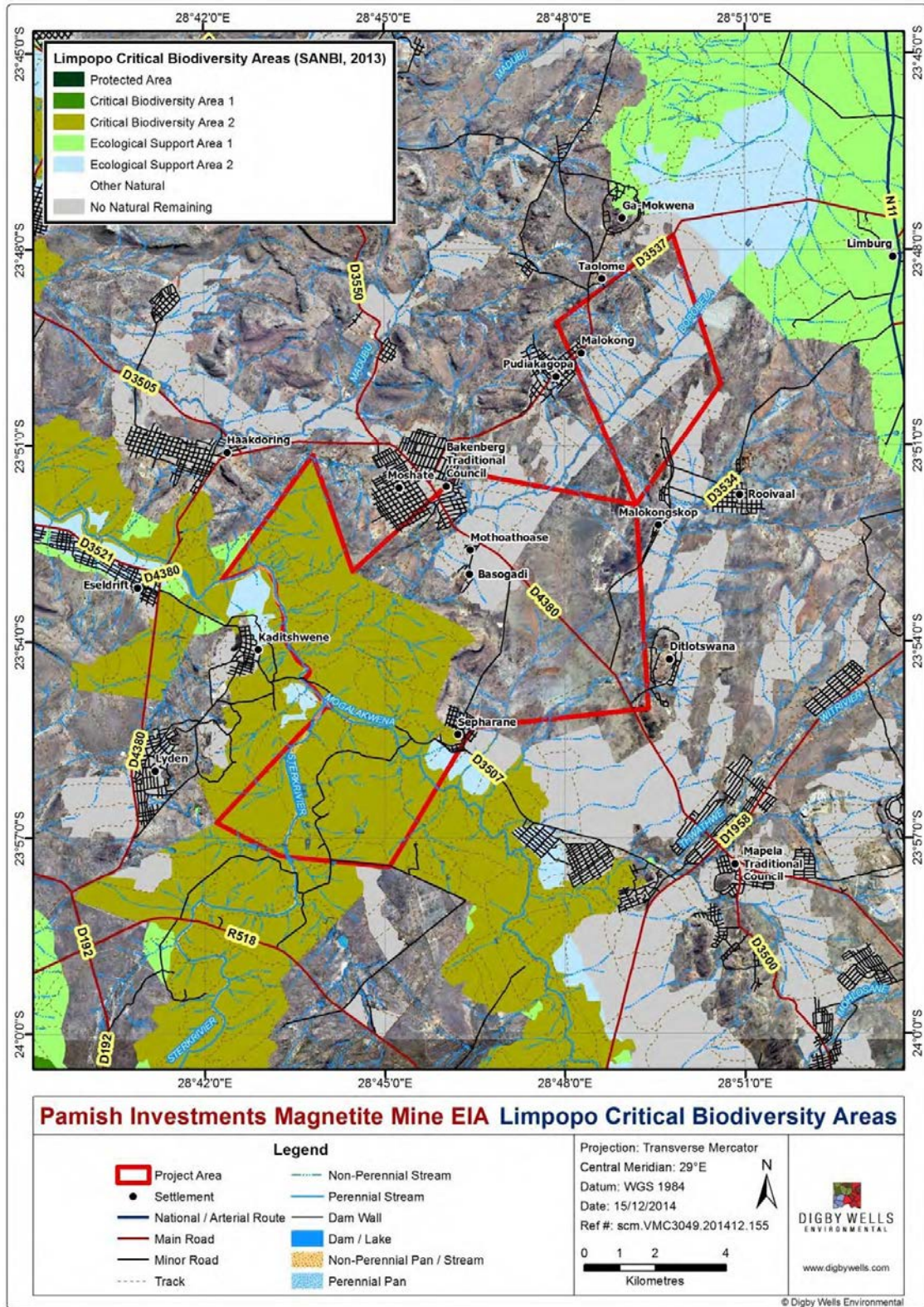


Figure 7-2: Limpopo Critical Biodiversity Areas

7.3 Site-specific Sensitivity

The site-specific ecological sensitivity map is represented in Figure 7-3. The most significant habitat is the rocky outcrops, allocated a high sensitivity. The habitat sensitivity was determined based on the presence of Species of Special Concern and intact habitat. Areas that provided suitable habitat for Species of Special Concern were allocated a High sensitivity; relatively intact habitat that had undergone some level of disturbance was allocated a Medium sensitivity and Low sensitivity areas were no longer considered as natural.

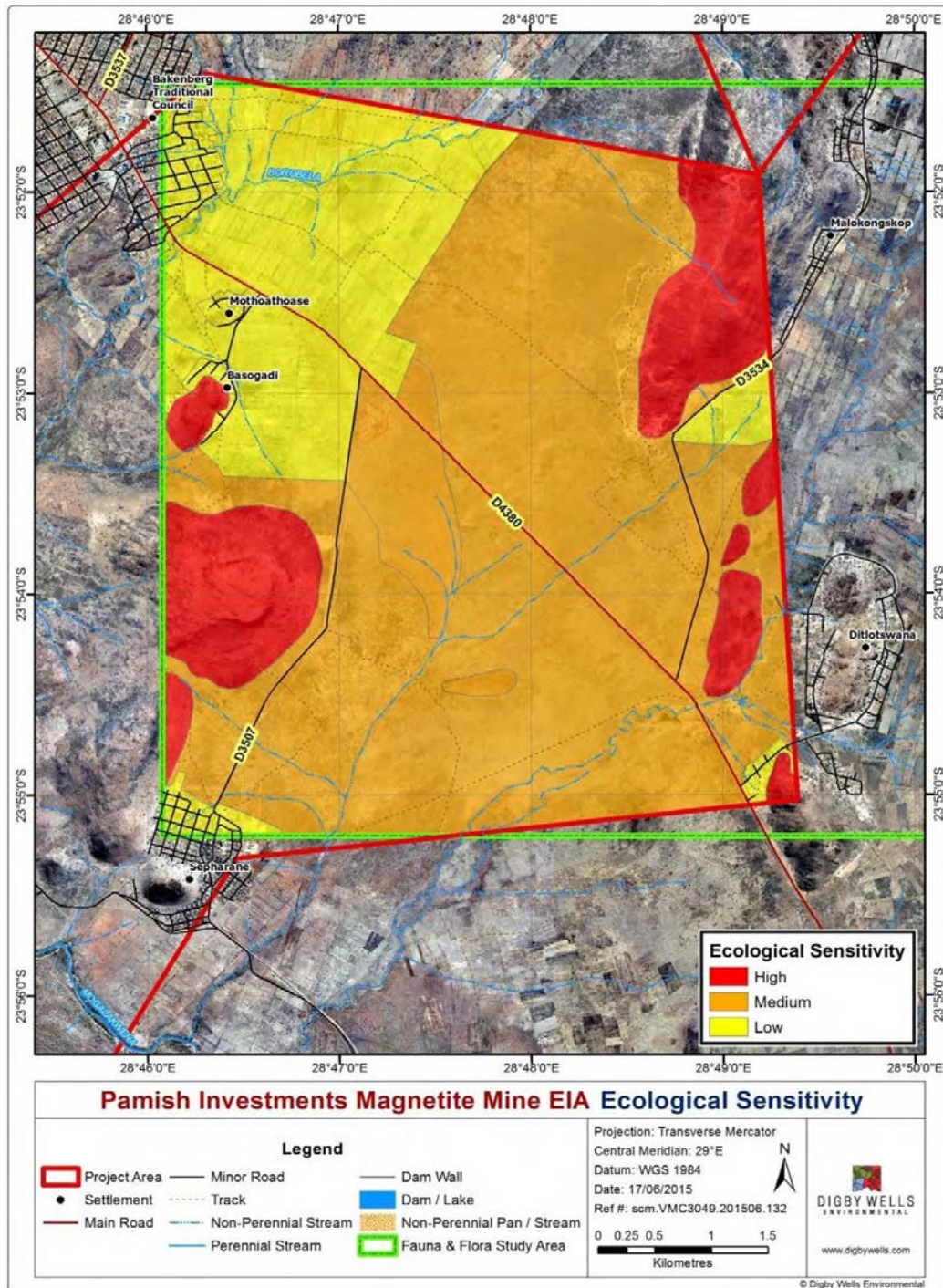


Figure 7-3: Ecological Sensitivity

8 Impacts Assessment

Standardised rating tables are used for the impact assessment of the proposed development at various stages throughout the project life. The aim of the impact assessment is to strive to

avoid damage or loss of ecosystems and services that they provide, 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 Figure 8-1.

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

Figure 8-1: Mitigation Hierarchy

8.1 Activity List

The activities associated with the proposed development are listed below in Table 8-1.

Table 8-1: List of Activities

Construction
Site clearance and vegetation removal;
Change of land-use from agriculture to mining;
Topsoil and softs removal and stockpiling;
Development of access and haul roads;
Surface infrastructure development such as stormwater channels, bridges, dams, offices and workshops.
Water abstraction and use;
Waste generation, storage and disposal (hazardous and general);
Use of heavy machinery (Haul Trucks, FEL, Excavators etc.)

Employment and capital expenditure;
Operation
Development of two open pits by drilling and blasting, truck and shovel methods;
Development of one waste rock dump;
Concentrator plant including crushing, grinding and screening;
Conveyor belts at crushing and grinding sections and for concentrate product and tailings;
Hauling of waste rock;
Tailings Storage Facility (TSF);
Pollution control dam, water storage dam and associated pipelines;
Stormwater diversion berms and channels;
Storage of fuels, process concentrate, maintenance/workshop oils, and explosive storage facilities;
Waste generation, storage and disposal (hazardous and general);
Product storage (magnetite concentrate);
Sewerage treatment plant;
Use of heavy machinery (Haul trucks, FEL, Excavators etc.)
Employment and operational expenditure
Closure and Rehabilitation
Dismantling and removal of major equipment and infrastructure
Waste generation, storage and disposal
Rehabilitation of disturbed areas including stockpile dumps and pits etc
Backfilling of the open pits using waste rock only.
Post-closure monitoring

8.2 Impacts of the Proposed Magnetite Mine

Figure 8-2 shows the ecological sensitivity with the infrastructure overlaid. None of the proposed infrastructure falls within the areas assigned a high sensitivity. The Life of Mine is expected to be thirty years. Impacts are rated below.

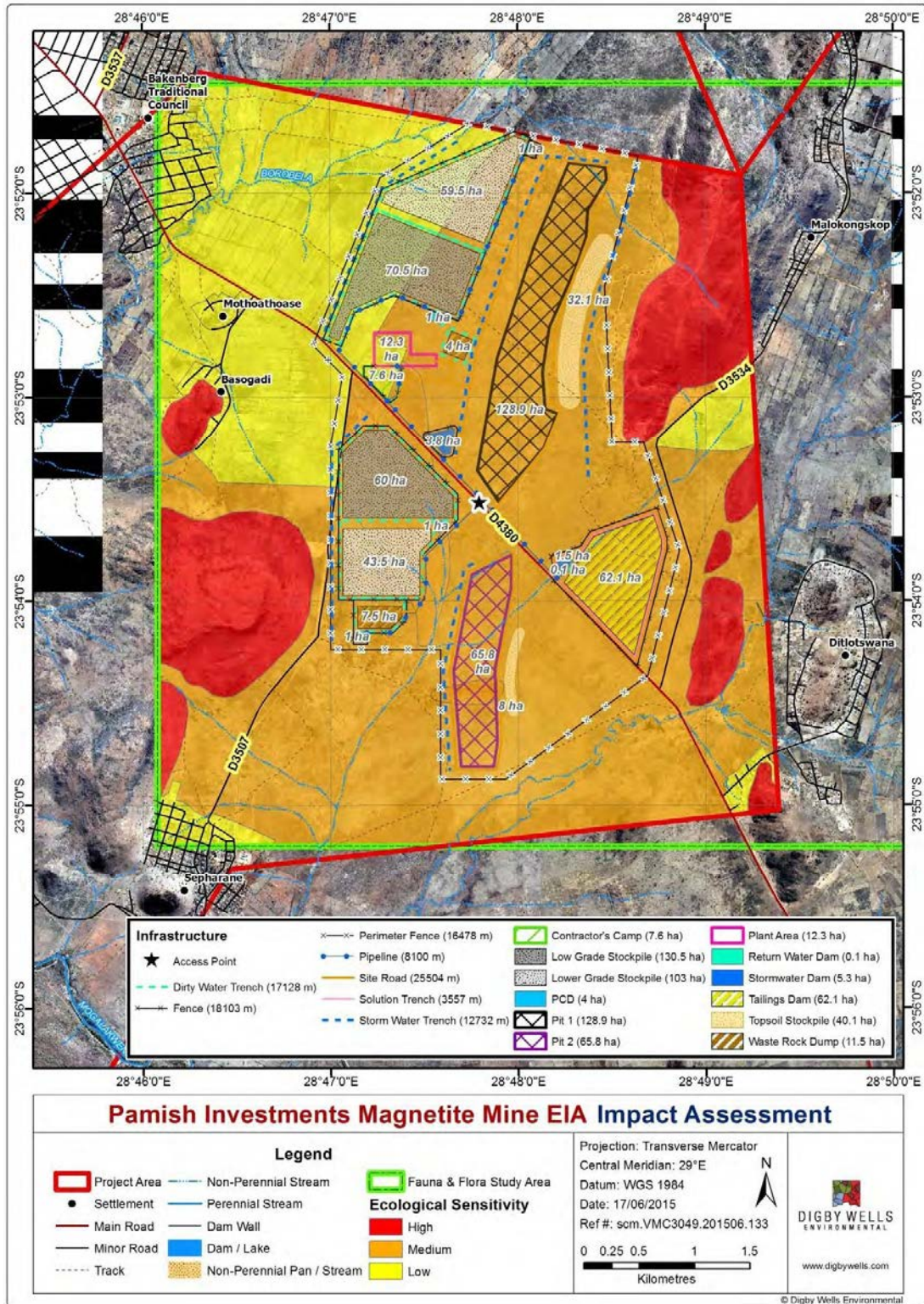


Figure 8-2: Impacts Assessment

8.2.1 Loss of Habitat

8.2.1.1 Construction Phase

Clearing of vegetation during the construction phase will result in a loss of plant species and habitat for animal species. This is particularly significant for Species of Special Concern (as discussed in section 8.2.2.). Loss of vegetation will be irreversible and although rehabilitation can be aimed at reinstating the land to some form of land-use, restoration of the natural habitat on site cannot be achieved.

Dimension	Rating	Motivation	Significance
Clearing of vegetation			
Impact Description: Loss of habitat			
Prior to mitigation/ management			
Duration	Permanent (7)	Clearing of vegetation will take place during the construction phase. The impact will be permanent.	Moderate (Negative) - 84
Extent	Limited (2)	A total of: <ul style="list-style-type: none"> ▪ 40ha of <i>Acacia borleae</i> – <i>Eragrostis rigidior</i> Black Turf Savanna; ▪ 375ha of <i>Acacia tortilis</i> – <i>Eragrostis rigidior</i> Savanna and ▪ None of the <i>Commiphora marlothii</i> – <i>Heteropogon contortus</i> Rocky Woodland will be impacted upon. 	
Intensity (type of impact)	Moderate - negative (-3)	Whilst the extent is limited, loss of vegetation will negatively impact on terrestrial biodiversity.	
Probability	Definite (7)	Clearing of vegetation is inevitable.	
Mitigation/ Management actions			
There is no mitigation for the loss of habitat. Measures are listed below, however, to reduce the impact: <ul style="list-style-type: none"> ▪ Avoid erosion, manage alien invasive species establishment, and ensure the re-establishment of natural vegetation. ▪ Limit degradation and destruction of natural environment to designated project areas by keeping the footprint of the disturbed area to the minimum and within designated areas only. Re-vegetate open areas to limit erosion. ▪ Avoid known areas of faunal and floral SSC as indicated on the relevant map. ▪ Avoid sensitive landscapes such as wetlands and ridges on site. ▪ Limit alien invasive plant recruitment by ensuring the removal of vegetation during construction and operation will be minimised thereby reducing the risk of open areas occurring. ▪ Maintain top soil biological activity by soils stockpiling without compaction to keep the seed bank viable if topsoil is replaced within a year. This viable seedbank will create an excellent basis for rehabilitated areas where these soils are used (Refer to Soils Impact Assessment Report, Digby Wells 2015). 			

Dimension	Rating	Motivation	Significance
<ul style="list-style-type: none"> If this is not possible, there will be no change post-mitigation. 			
Post- mitigation			
Duration	Permanent (7)	No change.	Moderate (Negative) - 84
Extent	Limited (2)	No change.	
Intensity (type of impact)	Moderate - negative (-3)	No change.	
Probability	Definite (7)	No change.	

8.2.1.2 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.

Dimension	Rating	Motivation	Significance
Establishment of alien plants / increased incidence of roadkill			
Impact Description: Loss of habitat			
Prior to mitigation/ management			
Duration	Project Life (5)	Disturbance is expected throughout the project life. No direct vegetation clearing will take place, however.	Minor (Negative) - 40
Extent	Limited (2)	Restricted to existing roads and disturbed areas.	
Intensity (type of impact)	Moderate - negative (-3)	Whilst the extent is limited, alien invasion in particular can erode the natural biodiversity of the habitat associated with the site.	
Probability	Probable (4)	Alien plant invasion and roadkill incidents are common unless managed after disturbance.	
Mitigation/ Management actions			
<ul style="list-style-type: none"> Implement an alien invasive plant management plan and ensure that the site is monitored for alien plant species establishment. A speed limit of 40km/hr should be enforced to reduce the risk of roadkill incidents. In the event that an animal by a vehicle, the incident should be reported immediately to the mine's environmental officer. Roadkill incidents should be monitored and reported to the Endangered Wildlife Trust (EWT) at: https://www.ewt.org.za/WTP/material.html. The EWT Wildlife and Roads Project is an initiative aimed at investigating the effects of roadkill on wildlife populations in South Africa. Should certain stretches of road experience high numbers of roadkill, signage and speed bumps should be erected. 			
Post- mitigation			
Duration	Project Life (5)	Disturbance is expected throughout the	Minor (Negative) -

Dimension	Rating	Motivation	Significance
		project life.	40
Extent	Limited (2)	Restricted to existing roads and disturbed areas.	
Intensity (type of impact)	Minor (1)	If alien plants are monitored and removed as seedlings, the post-mitigation impact will be reduced.	
Probability	Probable (4)	Alien plant invasion and roadkill incidents are common unless managed after disturbance.	

8.2.1.3 Decommissioning Phase

Minor impacts are expected during the decommissioning phase. Existing infrastructure will be dismantled and taken down. In addition, heavy machinery will move through the site. Should exiting roads be utilised, no additional impacts are expected.

8.2.2 Loss of Species of Special Concern

8.2.2.1 Construction Phase

The loss of vegetation habitat on site will reduce the area available for flora and fauna species. Since fauna have the ability to flee the area, the impacts on common animal species is not regarded as highly significant. This is not the case for the Baboon Spider, however, found in the *Acacia borleae* – *Eragrostis rigidior* Black Turf Savanna habitat. Burrows for this species are likely to be lost during the construction phase of the proposed development. The impact of the loss of Species of Special Concern can be reduced by implementing a relocation strategy for plants and also for the Baboon Spiders. Plant Species of Special Concern can be located, removed (and seeds collected) and relocated either in an area within proximity to the site or a nursery. If plants are to be translocated to a different area, it is imperative that the donor and host habitat are similar with regard to topography, geology, soil form and orientation of the slope face. Alternatively, a nursery can be established on site where Species of Special Concern can be relocated to. Loss of some species will invariably occur during either process.

As with Red Data and Protected plant species, it is likely that the proposed development will result in loss of medicinal plant species (as listed in section 6.1.2.). The impact of this will be a loss of cultural resources used by the local human community. Since medicinal plant species are often under persecution due to over-harvesting, further mass eradication of these plants will contribute significantly to their diminishing populations. A nursery should be set up by the client where all medicinal plants that fall within the footprint area should be relocated to. Negotiations should be made with the local community to cooperate in this regard. Alternatively, the client should demarcate a natural area of land that is intended to support medicinal plant species to compensate for the loss of species on site. The community should be allowed controlled access to this site. A community education

programme should be presented to communicate the importance of conserving plant populations that are declining.

Dimension	Rating	Motivation	Significance
Clearing of vegetation			
Impact Description: Loss of Species of Special Concern			
Prior to mitigation/ management			
Duration	Permanent (7)	Clearing of vegetation will take place during the construction phase. Without mitigation, this will result in the permanent loss of medicinal, protected and Red Data plant species on site, as well as Baboon Spiders and their nests.	Moderate (Negative) - 78
Extent	Limited (2)	Medicinal plant species are found throughout the study area, however. The Baboon Spiders were found in the low-lying areas within the <i>Acacia borleae</i> – <i>Eragrostis rigidior</i> Black Turf Savanna habitat.	
Intensity type of impact	Serious - negative (-4)	Plant Species of Special Concern have diminished population sizes and often have unique habitat requirements. They are also protected by national and provincial legislation.	
Probability	Almost certain (6)	Clearing of vegetation in the current footprint area will most likely result in the loss of Species of Special Concern.	
Mitigation/ Management actions			
Measures to reduce the impact are listed below: <ul style="list-style-type: none"> ▪ Species of Special Concern should be left in their natural habitat where possible; ▪ Implement a plant relocation strategy for medicinal, protected and Red Data plants (as a last resort); ▪ Implement a Baboon Spider relocation strategy; ▪ Translocate all of these species to suitable habitat elsewhere within the site or set up a nursery; ▪ Provide the local community with controlled access to the medicinal plant communities. 			
Post- mitigation			
Duration	Medium-term (3)	Species of Special Concern will be removed but relocated to a similar habitat or nursery.	Minor(Negative) - 48
Extent	Limited (2)	Restricted to affected area.	
Intensity x type of impact	Moderate - negative (-3)	Whilst the impact will be reduced if plants are to be relocated, the preferred option would be to leave the plants in their natural habitat. As a consequence, the impact can only be somewhat reduced.	

Dimension	Rating	Motivation	Significance
Probability	Almost certain (6)	Clearing of vegetation in the current footprint area will most likely result in the loss of Species of Special Concern.	

8.2.2.2 Operation and Decommissioning Phases

No loss of Species of Species Concern anticipated.

8.2.3 Impaired Ecosystem Functioning

8.2.3.1 Construction Phase

Ecosystem function is the measure of the combined functioning of the vegetation and associated species, faunal habitats and wetlands, all of which result in the ecosystem health. The construction of the mining infrastructure and initial pit will affect the ecosystem function in two main ways. The first is the fragmentation of the ecosystem, which will occur with large land surface changes. Fragmentation occurs jointly with edge-effects, which change the composition of the ecosystem on the edge of structures such as buildings and roads. The consequence of this is a loss of cohesiveness between larger fragments of habitat which limits the exchange of genes and resources across them.

An additional contributor to loss of ecosystem function is the introduction of alien and invasive species. Disturbance to the soil after vegetation clearing results in the establishment of alien species such as: *Lantana camara*, *Pennisetum setaceum*, *Solanum panduriforme* and *Zinnia peruviana* (found on site), that may form dense monospecific stands.

Dimension	Rating	Motivation	Significance
Clearing of vegetation			
Impact Description: Fragmentation, edge effects and invasion by alien plant species			
Prior to mitigation/ management			
Duration	Beyond Project Life (6)	Fragmentation, edge effects and alien invasion usually persist long after after disturbance.	Moderate (Negative) - 84
Extent	Local (3)	The impact of alien plants may extend outside of the project boundary, as seeds from alien plants are dispersed and plants are established.	
Intensity type of impact	Very Serious – negative (5)	Alien plants form dense, monospecific stands that outcompete natural vegetation. This alters the quality of habitat remaining. In addition, fragmentation also reduces ecological integrity.	
Probability	Almost certain	This impact is likely to occur due to	

Dimension	Rating	Motivation	Significance
	(6)	clearing and disturbance to the soil.	
Mitigation/ Management actions			
Measures to reduce the impact are listed below:			
<ul style="list-style-type: none"> ▪ Implement an alien plant management plan prior to development. All alien plant species should be identified as removed post-construction; and ▪ The mining footprint should be kept as small and linear as possible. 			
Post- mitigation			
Duration	Medium-term (3)	Alien plant invasion can take place long after disturbance has taken place.	Minor(Negative) - 48
Extent	Local (3)	May extend outside of project boundary.	
Intensity type of impact	Minor - negative (-2)	The impact can be reduced if aliens are controlled an on-going monitoring and control measures are put in place.	
Probability	Almost certain (6)	This impact is likely to occur due to clearing and disturbance to the soil.	

8.2.3.2 Operational and Decommissioning Phases

The impact of increased alien plant establishment is discussed in section 8.2.1.2. The impact of habitat fragmentation is due to the initial disturbance associated with the construction phase.

8.3 Cumulative Impacts

When determining the impacts of a development such as this, one needs to consider cumulative impacts. Cumulative impacts take into account impacts of current land use and land use change in the broader area. Ideally, all development should take place within a predefined Strategic Environmental Assessment which defines no-go and conservation areas as well as allowing for development such as housing, roads, agriculture and mining. In the absence of such a strategic plan, one can look at the surrounding activity and land use and determine to a certain extent, the overall impacts in the region with the addition of the proposed mine.

In addition to the direct impacts anticipated to incur due to the proposed development, it is important to discuss the indirect and cumulative impacts to terrestrial biodiversity. Cumulative impacts can be defined as: "...changes to the environment that are caused by an action in combination with other past, present and future human actions." (Hegmann *et al.* 1999, in DEAT 2004). On a regional scale, the study area is situated within two Vulnerable vegetation types, the Makhado Sweet Bushveld and the Central Sandy Bushveld. Since this designation was cited in 2007 (Mucina and Rutherford 2007), it is likely that the impacts of anthropogenic development in the region may have further altered habitat in these vegetation types.



Due to the presence of the Mogalakwena Platinum Mine (12km south of the site), the Platreef Platinum Mine (23km) south of the site) and numerous residential areas and agricultural fields, much of the natural habitat has been altered in the region. Further degradation due to the proposed Magnetite Mine will contribute to the cumulative loss of habitat for flora and fauna in the Waterberg region. This is of particular significance for sedentary Species of Special Concern and habitats such as Red Data plants and the Baboon Spider nests.

The opportunity exists for the proposed development to contribute substantially to the conservation in the region. Conservation of as much of the natural land in the area, and the creation of corridors linking other natural areas would aid in conservation of ecosystems, flora and fauna. If this is achieved (permanently, not just over the life of the mine), then the mine itself will have a net positive impact. These natural corridors can be identified by qualified ecologists for a Biodiversity Action Plan (BAP). The proposed mine would have essentially provided their own offsets, especially if the wetland areas and associated savanna is restored and managed as a conservation and corridor area.

7 Comments and Response

There are wild animals next to the mountain; the mine will chase these away.	Jonas Malapile	Kwenaite / Moutjane	30 March 2015	Village Meeting	A Fauna study has been completed and an ecological sensitivity analysis has been concluded and the findings presented to the client which has resulted in changes to the infrastructure layout with special reference to the rocky outcrops in the project area where a diverse assemblage of fauna occurs.
We use traditional healers. How will medicine be affected that is collected?	Ngoepe	Undisclosed	28 March 2015	Public Meeting	The SIA undertaken for the proposed Project, identified that some medicinal plants, used by the Bakenberg Traditional Healers Association, will likely be displaced by project infrastructure (see Section 8.3.1 and 9.1.4 of the SIA Report). Suitable mitigation measures were identified to address the potential impact on these plants (including translocation), in particular Pamish should consult with the Bakenberg Traditional Healers Association with in regards to the potential relocation of the affected medicinal plants. Published medicinal plant species have been listed in the Flora and Fauna Report. It has been recommended that these species are excluded from the mine plan and if encountered, should be relocated.

8 Discussion and Recommendations

The purpose of this report is to describe the baseline conditions of flora and fauna associated with the study site from field surveys. The proposed Open Pit Magnetite Project is situated in the Savanna Biome, more specifically, in the regional vegetation types: Makhado Sweet Bushveld and Central Sandy Bushveld. Both of these vegetation types hold a Vulnerable conservation status. The site does not fall within any formally protected areas, areas earmarked for future protected status or IBA's.

Three broad vegetation units were delineated in the area demarcated for the placement of infrastructure, namely: *Acacia borleae* – *Eragrostis rigidior* Black Turf Savanna; *Acacia tortilis* – *Eragrostis rigidior* Savanna and *Commiphora marlothii* – *Heteropogon contortus* Rocky Woodland. Three plant Species of Special Concern were recorded, namely: *Combretum imberbe* (Leadwood); *Scadoxus puniceus* (Royal Paint Brush) and *Sclerocarya birrea* (Marula). These species should be avoided as far as possible and where this is not possible, permits should be applied for from the Limpopo Department of Economic Development, Environment and Tourism (LEDET) for their removal. A laminated brochure can be developed with photos and given to operators on site and all Species of Special Concern can be marked with biodegradable tape. Large plants are to be replaced by three young plants, medium plants by two plants and small plants by similar size plants. A database should be set up to include the following: species names, number of individuals, GPS co-ordinates, size, height, whether they are multi-stemmed or not, crown size and a description of the health of each individual. These details will be required for permit applications.

Seventeen mammal, 102 bird, eight reptile and 11 herpetofaunal species were recorded on site. The Baboon Spider was found in low-lying areas associated with the *Acacia borleae* – *Eragrostis rigidior* Black Turf Savanna. This species has not been positively identified but all Baboon Spider's have been assigned protected status by NEMBA.

The Rocky Woodland community was found to be diverse in terms of faunal activity and is regarded as the most sensitive habitat on site. An abundance of the generalist small mammal species: Multimammate Mouse (*Mastomys coucha*), however, is often considered to be sign of low ecological integrity (Avenant, 2011). Further to this, plant diversity was relatively high in the rocky habitat and the vegetation was in good ecological condition, with no alien species recorded here. There is no legislation that protects rocky outcrops in the Limpopo Province. The Gauteng Department of Agriculture and Development (GDARD), however, recommend a 200m buffer for outcrops such as those identified on site. It is therefore recommended that a buffer of 200m be placed around all rocky outcrops on site. This is regarded as essential for the maintenance of biodiversity and must be implemented.

The impacts of the proposed development are expected to be minor to moderate negative. Flora and fauna monitoring using the stratified random sampling technique across transects through the site must take place and fauna and flora species must be recorded when encountered. Alien species should be monitored for up to five years unless no recruitment is recorded for one year. Fixed-point photography should be undertaken at specific points on either side of each transect, at 1.5 m from the ground. The following should be adhered to

for the monitoring programme:

- Monitoring must take place annually;
- Monitoring must be completed by qualified botanical specialist;
- Adaptive management must be applied;
- Monitoring during the wet season is essential; and
- Findings must be compared to previous years.

The following management and monitoring plans are recommended as part of the project:

- Biodiversity Land Management Plan;
- Fauna and Flora Monitoring plan and
- Alien Invasive Management Plan.

9 References

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Fauna and Flora Report

Proposed Open Pit Magnetite Mine and Concentrator Plant, Mokopane, Limpopo Province

VMC3049



Appendix A: Declaration of Independence

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I, Crystal Rowe, as duly authorised representative of Digby Wells and Associates (South Africa) (Pty) Ltd., hereby confirm my independence (as well as that of Digby Wells and Associates (South Africa) (Pty) Ltd.) and declare that neither I nor Digby Wells and Associates (South Africa) (Pty) Ltd. have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of Pamish Investment Company, other than fair remuneration for work performed, specifically in connection with the proposed Magnetite Mine, Limpopo South Africa.



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Title/ Position: Flora and Wetlands Ecologist

Qualification(s): Bsc Honours

Experience (years): 3 years and 8 months

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Fauna and Flora Report

Proposed Open Pit Magnetite Mine and Concentrator Plant, Mokopane, Limpopo Province

VMC3049



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Appendix B: Expected Plant Species

Family	Species	Threat status
ACANTHACEAE	<i>Barleria rotundifolia</i> Oberm.	LC
ACANTHACEAE	<i>Blepharis subvolubilis</i> C.B.Clarke	LC
ACANTHACEAE	<i>Crabbea angustifolia</i> Nees	LC
ACANTHACEAE	<i>Crossandra greenstockii</i> S.Moore	LC
ACANTHACEAE	<i>Dicliptera fruticosa</i> K.Balk will	NT
ACANTHACEAE	<i>Dyschoriste erecta</i> C.B.Clarke	LC
ACANTHACEAE	<i>Dyschoriste fischeri</i> Lindau	LC
ACANTHACEAE	<i>Dyschoriste rogersii</i> S.Moore	LC
ACANTHACEAE	<i>Justicia odora</i> (Forssk.) Vahl	LC
ACANTHACEAE	<i>Petalidium oblongifolium</i> C.B.Clarke	LC
AMARANTHACEAE	<i>Kyphocarpa angustifolia</i> (Moq.) Lopr.	LC
AMARYLLIDACEAE	<i>Cyrtanthus stenanthus</i> Baker var. <i>major</i> R.A.Dyer	LC
AMARYLLIDACEAE	<i>Haemanthus montanus</i> Baker	LC
ANACARDIACEAE	<i>Ozoroa sphaerocarpa</i> R.Fern. & A.Fern.	LC
ANACARDIACEAE	<i>Searsia discolor</i> (E.Mey. ex Sond.) Moffett	LC
ANACARDIACEAE	<i>Searsia engleri</i> (Britten) Moffett	LC
ANACARDIACEAE	<i>Searsia keetii</i> (Schönland) Moffett	LC
ANACARDIACEAE	<i>Searsia leptodictya</i> (Diels) T.S.Yi, A.J.Mill. & J.Wen forma <i>leptodictya</i>	Not Evaluated
ANACARDIACEAE	<i>Searsia sekhukhuniensis</i> (Moffett) Moffett	Rare
ANACARDIACEAE	<i>Searsia tumulicola</i> (S.Moore) Moffett var. <i>meeuseana</i> (R.& A.Fern.) Moffett forma <i>meeuseana</i>	Not Evaluated
ANEMIACEAE	<i>Mohria vestita</i> Baker	LC
ANTHERICACEAE	<i>Chlorophytum cyperaceum</i> (Oberm.) Nordal	LC
APOCYNACEAE	<i>Carissa bispinosa</i> (L.) Desf. ex Brenan	LC
APOCYNACEAE	<i>Ceropegia ampliata</i> E.Mey. var. <i>ampliata</i>	LC
APOCYNACEAE	<i>Ceropegia stapeliiformis</i> Haw. subsp. <i>serpentina</i> (E.A.Bruce) R.A.Dyer	LC
APOCYNACEAE	<i>Huernia stapelioides</i> Schltr.	LC
APOCYNACEAE	<i>Huernia zebrina</i> N.E.Br. subsp. <i>insigniflora</i> (C.A.Maass) Bruyns	LC
APOCYNACEAE	<i>Orbea carnososa</i> (Stent) Bruyns subsp. <i>carnososa</i>	LC
APOCYNACEAE	<i>Piранthus atrosanguineus</i> (N.E.Br.) Bruyns	LC
APOCYNACEAE	<i>Raphionacme galpinii</i> Schltr.	LC
ARACEAE	<i>Stylochaeton natalensis</i> Schott	LC
ARACEAE	<i>Zantedeschia jucunda</i> Letty	VU
ARALIACEAE	<i>Cussonia natalensis</i> Sond.	LC

Family	Species	Threat status
ARALIACEAE	<i>Cussonia paniculata</i> Eckl. & Zeyh. subsp. <i>sinuata</i> (Reyneke & Kok) De Winter	LC
ASPARAGACEAE	<i>Asparagus suaveolens</i> Burch.	LC
ASPHODELACEAE	<i>Aloe castanea</i> Schönland	LC
ASPHODELACEAE	<i>Aloe greatheadii</i> Schönland var. <i>davyana</i> (Schönland) Glen & D.S.Hardy	LC
ASPHODELACEAE	<i>Aloe pretoriensis</i> Pole-Evans	LC
ASPHODELACEAE	<i>Bulbine latifolia</i> (L.f.) Schult. & J.H.Schult. var. <i>latifolia</i>	LC
ASTERACEAE	<i>Amphiglossa triflora</i> DC.	LC
ASTERACEAE	<i>Artemisia afra</i> Jacq. ex Willd. var. <i>afra</i>	LC
ASTERACEAE	<i>Berkheya subulata</i> Harv. var. <i>subulata</i>	LC
ASTERACEAE	<i>Brachylaena ilicifolia</i> (Lam.) E.Phillips & Schweick.	LC
ASTERACEAE	<i>Dicoma anomala</i> Sond. subsp. <i>gerrardii</i> (Harv. ex F.C.Wilson) S.Ortiz & Rodr.Oubiña	LC
ASTERACEAE	<i>Emilia transvaalensis</i> (Bolus) C.Jeffrey	LC
ASTERACEAE	<i>Felicia clavipilosa</i> Grau subsp. <i>transvaalensis</i> Grau	LC
ASTERACEAE	<i>Geigeria burkei</i> Harv. subsp. <i>fruticulosa</i> Merxm.	LC
ASTERACEAE	<i>Gerbera jamesonii</i> Bolus ex Adlam	LC
ASTERACEAE	<i>Helichrysum athrixifolium</i> (Kuntze) Moeser	LC
ASTERACEAE	<i>Helichrysum harveyanum</i> Wild	LC
ASTERACEAE	<i>Hilliardiella nudicaulis</i> (DC.) H.Rob.	LC
ASTERACEAE	<i>Kleinia stapeliiformis</i> (E.Phillips) Stapf	LC
ASTERACEAE	<i>Laggera decurrens</i> (Vahl) Hepper & J.R.I.Wood	LC
ASTERACEAE	<i>Psiadia punctulata</i> (DC.) Vatke	LC
ASTERACEAE	<i>Senecio microglossus</i> DC.	LC
ASTERACEAE	<i>Senecio oxyriifolius</i> DC. subsp. <i>oxyriifolius</i>	LC
ASTERACEAE	<i>Seriphium plumosum</i> L.	Not Evaluated
BRASSICACEAE	<i>Heliophila acuminata</i> (Eckl. & Zeyh.) Steud.	LC
BRYACEAE	<i>Bryum capillare</i> Hedw.	
BRYACEAE	<i>Bryum cellulare</i> Hook.	
BUDDLEJACEAE	<i>Nuxia gracilis</i> Engl.	LC
BURSERACEAE	<i>Commiphora glandulosa</i> Schinz	LC
BURSERACEAE	<i>Commiphora mollis</i> (Oliv.) Engl.	LC
CAPPARACEAE	<i>Boscia albitrunca</i> (Burch.) Gilg & Gilg-Ben.	LC
CAPPARACEAE	<i>Boscia foetida</i> Schinz subsp. <i>rehmanniana</i> (Pestal.) Toelken	LC



Family	Species	Threat status
CAPPARACEAE	<i>Cleome angustifolia</i> Forssk. subsp. <i>petersiana</i> (Klotzsch ex Sond.) Kers	LC
CAPPARACEAE	<i>Maerua cafra</i> (DC.) Pax	LC
CELASTRACEAE	<i>Catha edulis</i> (Vahl) Forssk. ex Endl.	LC
CELASTRACEAE	<i>Elaeodendron transvaalense</i> (Burt Davy) R.H.Archer	NT
CELASTRACEAE	<i>Gymnosporia tenuispina</i> (Sond.) Szyszyl.	LC
CELASTRACEAE	<i>Lydenburgia cassinoides</i> N.Robson	NT
CELASTRACEAE	<i>Maytenus undata</i> (Thunb.) Blakelock	LC
CELASTRACEAE	<i>Mystroxyton aethiopicum</i> (Thunb.) Loes. subsp. <i>schlechteri</i> (Loes.) R.H.Archer	LC
COLCHICACEAE	<i>Ornithoglossum vulgare</i> B.Nord.	LC
COMBRETACEAE	<i>Combretum molle</i> R.Br. ex G.Don	LC
COMBRETACEAE	<i>Combretum zeyheri</i> Sond.	LC
COMBRETACEAE	<i>Terminalia prunioides</i> M.A.Lawson	LC
COMMELINACEAE	<i>Commelina africana</i> L. var. <i>lancispata</i> C.B.Clarke	LC
CONVOLVULACEAE	<i>Ipomoea bathycolpos</i> Hallier f.	LC
CONVOLVULACEAE	<i>Seddera suffruticosa</i> (Schinz) Hallier f.	LC
CONVOLVULACEAE	<i>Xenostegia tridentata</i> (L.) D.F.Austin & Staples subsp. <i>angustifolia</i> (Jacq.) Lejoly & Lisowski	LC
CRASSULACEAE	<i>Crassula acinaciformis</i> Schinz	LC
CRASSULACEAE	<i>Crassula brevifolia</i> Harv. subsp. <i>brevifolia</i>	LC
CRASSULACEAE	<i>Kalanchoe luciae</i> Raym.-Hamet subsp. <i>luciae</i>	LC
CUCURBITACEAE	<i>Cucumis anguria</i> L. var. <i>longaculeatus</i> J.H.Kirkbr.	LC
CUCURBITACEAE	<i>Cucumis myriocarpus</i> Naudin subsp. <i>myriocarpus</i>	LC
CYPERACEAE	<i>Cyperus austro-africanus</i> C.Archer & Goetgh.	LC
CYPERACEAE	<i>Cyperus congestus</i> Vahl	LC
CYPERACEAE	<i>Cyperus cyperoides</i> (L.) Kuntze subsp. <i>cyperoides</i>	LC
CYPERACEAE	<i>Cyperus cyperoides</i> (L.) Kuntze subsp. <i>pseudoflavus</i> (Kük.) Lye	LC
CYPERACEAE	<i>Cyperus decurvatus</i> (C.B.Clarke) C.Archer & Goetgh.	LC
CYPERACEAE	<i>Cyperus keniensis</i> Kük.	LC
CYPERACEAE	<i>Fuirena pubescens</i> (Poir.) Kunth var. <i>pubescens</i>	LC
DIOSCOREACEAE	<i>Dioscorea sylvatica</i> Eckl. var. <i>brevipes</i> (Burt Davy) Burkill	Not Evaluated
DIOSCOREACEAE	<i>Dioscorea sylvatica</i> Eckl. var. <i>sylvatica</i>	Not Evaluated
EBENACEAE	<i>Diospyros lycioides</i> Desf. subsp. <i>nitens</i> (Harv. ex Hiern) De Winter	LC



Family	Species	Threat status
EBENACEAE	<i>Diospyros whyteana</i> (Hiern) F.White	LC
EBENACEAE	<i>Euclea crispa</i> (Thunb.) Gürke subsp. <i>crispa</i>	LC
EBENACEAE	<i>Euclea daphnoides</i> Hiern	LC
EBENACEAE	<i>Euclea linearis</i> Zeyh. ex Hiern	LC
EBENACEAE	<i>Euclea sekhukhuniensis</i> Retief, Siebert & A.E.van Wyk	
EBENACEAE	<i>Euclea undulata</i> Thunb.	LC
EUPHORBIACEAE	<i>Croton gratissimus</i> Burch. var. <i>gratissimus</i>	LC
EUPHORBIACEAE	<i>Euphorbia enormis</i> N.E.Br.	LC
EUPHORBIACEAE	<i>Euphorbia schinzii</i> Pax	LC
EUPHORBIACEAE	<i>Jatropha latifolia</i> Pax var. <i>angustata</i> Prain	LC
EUPHORBIACEAE	<i>Jatropha latifolia</i> Pax var. <i>latifolia</i>	LC
FABACEAE	<i>Acacia ataxacantha</i> DC.	LC
FABACEAE	<i>Acacia gerrardii</i> Benth. subsp. <i>gerrardii</i> var. <i>gerrardii</i>	LC
FABACEAE	<i>Acacia grandicornuta</i> Gerstner	LC
FABACEAE	<i>Argyrolobium wilmsii</i> Harms	LC
FABACEAE	<i>Bolusanthus speciosus</i> (Bolus) Harms	LC
FABACEAE	<i>Dichrostachys cinerea</i> (L.) Wight & Arn. subsp. <i>africana</i> Brenan & Brummitt var. <i>africana</i>	LC
FABACEAE	<i>Elephantorrhiza praetermissa</i> J.H.Ross	LC
FABACEAE	<i>Indigastrum costatum</i> (Guill. & Perr.) Schrire subsp. <i>macrum</i> (E.Mey.) Schrire	LC
FABACEAE	<i>Indigofera alternans</i> DC. var. <i>alternans</i>	LC
FABACEAE	<i>Indigofera sanguinea</i> N.E.Br.	LC
FABACEAE	<i>Lotononis laxa</i> Eckl. & Zeyh.	LC
FABACEAE	<i>Mundulea sericea</i> (Willd.) A.Chev. subsp. <i>sericea</i>	LC
FABACEAE	<i>Ormocarpum kirkii</i> S.Moore	LC
FABACEAE	<i>Pearsonia cajanifolia</i> (Harv.) Polhill subsp. <i>cryptantha</i> (Baker) Polhill	LC
FABACEAE	<i>Pearsonia uniflora</i> (Kensit) Polhill	LC
FABACEAE	<i>Peltophorum africanum</i> Sond.	LC
FABACEAE	<i>Rhynchosia minima</i> (L.) DC. var. <i>minima</i>	LC
FABACEAE	<i>Senna italica</i> Mill. subsp. <i>arachoides</i> (Burch.) Lock	LC
FABACEAE	<i>Sphenostylis angustifolia</i> Sond.	LC
FABACEAE	<i>Tephrosia longipes</i> Meisn. subsp. <i>longipes</i> var. <i>longipes</i>	LC
FUNARIACEAE	<i>Funaria bergiana</i> (Hornsch.) Broth.	
HEDWIGIACEAE	<i>Braunia secunda</i> (Hook.) Bruch & Schimp.	
HYACINTHACEAE	<i>Dipcadi rigidifolium</i> Baker	LC



Family	Species	Threat status
HYACINTHACEAE	<i>Dipcadi viride</i> (L.) Moench	LC
HYACINTHACEAE	<i>Drimia intricata</i> (Baker) J.C.Manning & Goldblatt	LC
HYACINTHACEAE	<i>Resnova humifusa</i> (Baker) U.& D.Müll.-Doblies	LC
HYPOXIDACEAE	<i>Hypoxis rigidula</i> Baker var. <i>rigidula</i>	LC
IRIDACEAE	<i>Freesia laxa</i> (Thunb.) Goldblatt & J.C.Manning subsp. <i>laxa</i>	LC
IRIDACEAE	<i>Gladiolus dalenii</i> Van Geel subsp. <i>dalenii</i>	LC
IRIDACEAE	<i>Gladiolus densiflorus</i> Baker	LC
IRIDACEAE	<i>Gladiolus reginae</i> Goldblatt & J.C.Manning	
IRIDACEAE	<i>Hesperantha coccinea</i> (Backh. & Harv.) Goldblatt & J.C.Manning	LC
KIRKIAEAE	<i>Kirkia wilmsii</i> Engl.	LC
LAMIACEAE	<i>Clerodendrum ternatum</i> Schinz	LC
LAMIACEAE	<i>Karomia speciosa</i> (Hutch. & Corbishley) R.Fern. forma <i>speciosa</i>	Not Evaluated
LAMIACEAE	<i>Leucas capensis</i> (Benth.) Engl.	LC
LAMIACEAE	<i>Ocimum tubiforme</i> (R.D.Good) A.J.Paton	LC
LAMIACEAE	<i>Orthosiphon fruticosus</i> Codd	LC
LAMIACEAE	<i>Plectranthus hadiensis</i> (Forssk.) Schweinf. ex Spreng. var. <i>tomentosus</i> (Benth.) Codd	LC
LAMIACEAE	<i>Rothea louwalbertsii</i> (P.P.J.Herman) P.P.J.Herman & Retief	LC
LAMIACEAE	<i>Syncolostemon concinnus</i> N.E.Br.	LC
LAMIACEAE	<i>Tetradenia brevispicata</i> (N.E.Br.) Codd	LC
LAMIACEAE	<i>Tinnea rhodesiana</i> S.Moore	LC
LAMIACEAE	<i>Vitex obovata</i> E.Mey. subsp. <i>wilmsii</i> (Gürke) C.L.Bredenkamp & D.J.Botha	LC
LORANTHACEAE	<i>Tapinanthus forbesii</i> (Sprague) Wiens	LC
LORANTHACEAE	<i>Tapinanthus quequensis</i> (Weim.) Polhill & Wiens	LC
MAESACEAE	<i>Maesa lanceolata</i> Forssk.	LC
MALPIGHIACEAE	<i>Triaspis glaucophylla</i> Engl.	LC
MALPIGHIACEAE	<i>Triaspis hypericoides</i> (DC.) Burch. subsp. <i>nelsonii</i> (Oliv.) Immelman	LC
MALVACEAE	<i>Corchorus asplenifolius</i> Burch.	LC
MALVACEAE	<i>Grewia bicolor</i> Juss. var. <i>bicolor</i>	LC
MALVACEAE	<i>Grewia flava</i> DC.	LC
MALVACEAE	<i>Grewia vernicosa</i> Schinz	LC
MALVACEAE	<i>Hermannia modesta</i> (Ehrenb.) Mast.	LC
MALVACEAE	<i>Hermannia montana</i> N.E.Br.	LC

Family	Species	Threat status
MALVACEAE	<i>Hibiscus meyeri</i> Harv. subsp. <i>meyeri</i>	LC
MALVACEAE	<i>Hibiscus microcarpus</i> Garcke	LC
MALVACEAE	<i>Hibiscus pusillus</i> Thunb.	LC
MALVACEAE	<i>Hibiscus trionum</i> L.	
MALVACEAE	<i>Melhania rehmannii</i> Szyszyl.	LC
MALVACEAE	<i>Waltheria indica</i> L.	LC
MELASTOMATACEAE	<i>Dissotis canescens</i> (E.Mey. ex R.A.Graham) Hook.f.	LC
MELIACEAE	<i>Turraea obtusifolia</i> Hochst.	LC
MORACEAE	<i>Ficus ingens</i> (Miq.) Miq.	LC
MORACEAE	<i>Ficus sur</i> Forssk.	LC
OCHNACEAE	<i>Ochna inermis</i> (Forssk.) Schweinf.	LC
OLACACEAE	<i>Ximenia americana</i> L. var. <i>americana</i>	
OLEACEAE	<i>Jasminum multipartitum</i> Hochst.	LC
OLEACEAE	<i>Jasminum quinatum</i> Schinz	LC
OLEACEAE	<i>Olea capensis</i> L. subsp. <i>enervis</i> (Harv. ex C.H.Wright) I.Verd.	LC
OLEACEAE	<i>Olea europaea</i> L. subsp. <i>africana</i> (Mill.) P.S.Green	LC
OLINIACEAE	<i>Olinia emarginata</i> Burt Davy	LC
ORCHIDACEAE	<i>Eulophia hereroensis</i> Schltr.	LC
ORCHIDACEAE	<i>Eulophia leontoglossa</i> Rchb.f.	LC
ORCHIDACEAE	<i>Eulophia ovalis</i> Lindl. var. <i>bainesii</i> (Rolfe) P.J.Cribb & la Croix	LC
ORCHIDACEAE	<i>Eulophia parvilabris</i> Lindl.	LC
ORCHIDACEAE	<i>Eulophia speciosa</i> (R.Br. ex Lindl.) Bolus	Declining
ORCHIDACEAE	<i>Habenaria lithophila</i> Schltr.	LC
ORCHIDACEAE	<i>Habenaria tridens</i> Lindl.	LC
ORCHIDACEAE	<i>Mystacidium capense</i> (L.f.) Schltr.	LC
OROBANCHACEAE	<i>Alectra orobanchoides</i> Benth.	LC
OROBANCHACEAE	<i>Graderia subintegra</i> Mast.	LC
OROBANCHACEAE	<i>Striga asiatica</i> (L.) Kuntze	LC
OROBANCHACEAE	<i>Striga gesnerioides</i> (Willd.) Vatke	LC
PEDALIACEAE	<i>Holubia saccata</i> Oliv.	LC
PEDALIACEAE	<i>Sesamum triphyllum</i> Welw. ex Asch. var. <i>triphyllum</i>	LC
PHYLLANTHACEAE	<i>Flueggea virosa</i> (Roxb. ex Willd.) Voigt subsp. <i>virosa</i>	LC
PHYLLANTHACEAE	<i>Phyllanthus parvulus</i> Sond. var. <i>garipensis</i> (E.Mey. ex Drège) Radcl.-Sm.	LC
POACEAE	<i>Aristida diffusa</i> Trin. subsp. <i>burkei</i> (Stapf) Melderis	LC
POACEAE	<i>Aristida rhinochloa</i> Hochst.	LC



Family	Species	Threat status
POACEAE	<i>Bewsia biflora</i> (Hack.) Gooss.	LC
POACEAE	<i>Enneapogon scoparius</i> Stapf	LC
POACEAE	<i>Eragrostis curvula</i> (Schrad.) Nees	LC

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Appendix C: Plant Species Recorded on Site

Family	Species	Threat Status
Amaranthaceae	<i>Hermbstaedtia odorata</i>	LC
Amarillidaceae	<i>Crinum sp.</i>	
Anacardiaceae	<i>Sclerocarya birrea</i>	LC/Protected
Anacardiaceae	<i>Searsia lancea</i>	LC
Anacardiaceae	<i>Searsia pyroides</i>	LC
Apocynaceae	<i>Pentarrhinium sp.</i>	
Apocynaceae	<i>Sarcostemma viminale</i>	LC
Asparagaceae	<i>Asparagus sp.</i>	
Asphodelaceae	<i>Aloe sp.</i>	
Asteraceae	<i>Aspilia mossambicensis</i>	LC
Asteraceae	<i>Vernonia fastigiata</i>	LC
Asteraceae	<i>Zinnia peruviana</i>	Alien
Boraginaceae	<i>Heliotropium nelsonii</i>	LC
Burseraceae	<i>Commiphora marlothii</i>	LC
Capparaceae	<i>Boscia albitrunca</i>	LC
Combretaceae	<i>Combretum imberbe</i>	LC/Protected
Combretaceae	<i>Combretum hereroense</i>	LC
Combretaceae	<i>Combretum nelsonii</i>	LC
Commelinaceae	<i>Commelina africana</i>	LC
Convolvulaceae	<i>Ipomoeae crassipes</i>	LC
Euphorbiaceae	<i>Croton gratissimus</i>	LC
Euphorbiaceae	<i>Euphorbia ingens</i>	LC
Fabaceae	<i>Acacia borleae</i>	-
Fabaceae	<i>Acacia karoo</i>	LC
Fabaceae	<i>Acacia luedertizii</i>	-
Fabaceae	<i>Acacia nigrescens</i>	LC
Fabaceae	<i>Acacia tortilis</i>	LC
Fabaceae	<i>Elephantorrhiza praetermissa</i>	LC
Fabaceae	<i>Lablab purpureus</i>	LC
Fabaceae	<i>Peltephorum africanum</i>	LC
Fabaceae	<i>Senna italica</i>	LC
Hyacinthaceae	<i>Albuca sp.</i>	-
Lamiaceae	<i>Becium obovatum</i>	LC
Lamiaceae	<i>Hemizygia elliotii</i>	LC
Malvaceae	<i>Corchorus asplenifolius</i>	LC
Malvaceae	<i>Gossypium herbaceum</i>	LC
Malvaceae	<i>Grewia bicolor</i>	LC
Malvaceae	<i>Grewia flava</i>	LC



Family	Species	Threat Status
Malvaceae	<i>Grewia flavescens</i>	LC
Malvaceae	<i>Hibiscus trionum</i>	-
Nyctaginaceae	<i>Commicarpus pentandrus</i>	LC
Ochnaceae	<i>Ochna pulchra</i>	LC
Orobanchaceae	<i>Striga bilabiata subsp. bilabiata</i>	LC
Pedaliaceae	<i>Ceratotheca triloba</i>	LC
Phyllanthaceae	<i>Flueggea virosa</i>	LC
Poaceae	<i>Aristida diffusa</i>	LC
Poaceae	<i>Cenchrus ciliaris</i>	LC
Poaceae	<i>Chloris virgata</i>	LC
Poaceae	<i>Dichanthium annulatum</i>	LC
Poaceae	<i>Dichrostachys cinerea</i>	LC
Poaceae	<i>Digitaria eriantha</i>	LC
Poaceae	<i>Ehretia rigida</i>	LC
Poaceae	<i>Eragrostis rigidior</i>	LC
Poaceae	<i>Fingerhuthia africana</i>	LC
Poaceae	<i>Heterpogon contortus</i>	LC
Poaceae	<i>Hyparrhenia hirta</i>	LC
Poaceae	<i>Ischaemum afrum</i>	LC
Poaceae	<i>Lintonia nutans</i>	LC
Poaceae	<i>Melinis repens</i>	LC
Poaceae	<i>Panicum maximum</i>	LC
Poaceae	<i>Pennesetum setaceum</i>	Alien
Poaceae	<i>Schmidtia pappophoroides</i>	LC
Poaceae	<i>Seteria sphacelata</i>	LC
Poaceae	<i>Sporobolus festivus</i>	LC
Poaceae	<i>Sporobolus pyramidalis</i>	LC
Poaceae	<i>Themeda triandra</i>	LC
Poaceae	<i>Tragus berterianus</i>	LC
Poaceae	<i>Urochloa mossambicensis</i>	LC
Rhamnaceae	<i>Ziziphus mucronata</i>	LC
Sinopteridaceae	<i>Pellaea calemalanos</i>	LC
Solanaceae	<i>Solanum panduriforme</i>	Alien
Thelotremaceae	<i>Steganotaenia araliacea</i>	LC
Verbenaceae	<i>Lantana camara</i>	Alien
Vitaceae	<i>Cyphostemma sp.</i>	-
Vitaceae	<i>Rhoicissus tridentata</i>	LC

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Appendix D: Expected Mammal Species List



Common Name	Species	IUCN Status (Global)	IUCN Status (National)	NEMBA Status	Probability of Occurrence
Cheetah	<i>Acinonyx jubatus</i>	VU	VU	VU	Low
African Clawless Otter	<i>Aonyx capensis</i>	LC	LC	Protected	Low
South African Hedgehog	<i>Atelerix frontalis</i>	LC	NT	Protected	Medium
Yellow Golden Mole	<i>Calcochloris obtusirostris</i>	LC	VU	Not listed	Medium
Side-striped Jackal	<i>Canis adustus</i>	LC	NT	Not listed	Low
Caracal	<i>Caracal</i>	LC	LC	Not listed	Medium
White Rhinoceros	<i>Ceratotherium simum</i>	NT	LC	Protected	Low
Percival's Trident Bat	<i>Cloeotis percivali</i>	NT	CR	Not listed	Medium
Giant Rat	<i>Cricetomys gambianus</i>	LC	VU	VU	Medium
Maquassie Musk Shrew	<i>Crocidura maquassiensis</i>	LC	VU	Not listed	Medium
Spotted Hyaena	<i>Crocuta crocuta</i>	LC	NT	Protected	Low
Tsessebe	<i>Damaliscus lunatus</i>	LC	EN	EN	Low
Water Rat	<i>Dasymys incomtus</i>	LC	NT	Not listed	Low
Black Rhino	<i>Diceros bicornis minor</i>	CR	VU	Not listed	Low
Butterfly Bat	<i>Glauconycteris variegatus</i>	LC	NT	Not listed	Medium
Roan Antelope	<i>Hippotragus equinus</i>	LC	VU	VU	Low
Sable Antelope	<i>Hippotragus niger</i>	LC	VU	Not listed	Low
Brown Hyaena	<i>Hyaena brunnea</i>	NT	NT	Protected	Medium
Damara Woolly Bat	<i>Kerivoula argentata</i>	LC	EN	Not listed	Medium
Lesser Woolly Bat	<i>Kerivoula lanosa</i>	LC	NT	Not listed	Medium
Botswana Long-eared Bat	<i>Laephotis botswanae</i>	NT	VU	Not listed	Medium
African Elephant	<i>Loxodonta africana</i>	EN	LC	Protected	Low
Spotted-necked Otter	<i>Lutra maculicollis</i>	VU	NT	Protected	Low



Common Name	Species	IUCN Status (Global)	IUCN Status (National)	NEMBA Status	Probability of Occurrence
African Wild Dog	<i>Lycaon pictus</i>	VU	EN	EN	Low
Pangolin	<i>Manis temminckii</i>	NT	VU	VU	Medium
Honey Badger	<i>Mellivora capensis</i>	LC	NT	Not listed	Medium
Lesser Long-fingered Bat	<i>Miniopterus fraterculus</i>	NT	NT	Not listed	Medium
Schreibers' Long-fingered Bat	<i>Miniopterus schreibersii</i>	NT	NT	Not listed	Medium
Temminck's Hairy Bat	<i>Myotis tricolor</i>	Not Evaluated	NT	Not listed	Medium
Welwitsch's Hairy Bat	<i>Myotis welwitschii</i>	LC	NT	Not listed	Medium
Gunning's Golden Mole	<i>Neamblysomus gunningi</i>	VU	EN	EN	Medium
Juliana's Golden Mole	<i>Neamblysomus julianae</i>	CR	VU	VU	Medium
Wood's Slit-faced Bat	<i>Nycteris woodi</i>	NT	NT	Not listed	Medium
Leopard	<i>Panthera pardus</i>	LC	LC	VU	Medium
Springhare	<i>Pedetes capensis</i>	VU	LC	Not listed	Medium
Four-toed Elephant-shrew	<i>Petrodromus tetradactylus</i>	LC	EN	EN	Medium
Anchieta's Pipistrelle	<i>Pipistrellus anchietae</i>	VU	NT	Not listed	Medium
Rusty Bat	<i>Pipistrellus rusticus</i>	LC	NT	Not listed	Medium
Sharp's Grysback	<i>Raphicerus sharpei</i>	LC	NT	Protected	Low
Common Reedbuck	<i>Redunca arundinum</i>	LC	LC	Protected	Medium
Peak-saddle Horseshoe Bat	<i>Rhinolophus blasii</i>	LC	VU	Not listed	Medium
Geoffroy's Horseshoe Bat	<i>Rhinolophus clivosus</i>	LC	NT	Not listed	Medium
Darling's Horseshoe Bat	<i>Rhinolophus darlingi</i>	LC	NT	Not listed	Medium
Rüppell's Horseshoe Bat	<i>Rhinolophus fumigatus</i>	LC	NT	Not listed	Medium



Common Name	Species	IUCN Status (Global)	IUCN Status (National)	NEMBA Status	Probability of Occurrence
Hildebrandt's Horseshoe Bat	<i>Rhinolophus hildebrandtii</i>	LC	NT	Not listed	Medium
Lander's Horseshoe Bat	<i>Rhinolophus landeri</i>	LC	NT	Not listed	Medium
Swinny's Horseshoe Bat	<i>Rhinolophus swinnyi</i>	LC	EN	Not listed	Medium
Cape Fox	<i>Vulpes chama</i>	LC	LC	Protected	Low

Fauna and Flora Report

Proposed Open Pit Magnetite Mine and Concentrator Plant, Mokopane, Limpopo Province

VMC3049



Appendix E: Expected Bird Species List

Species Name	Common Name	SA Red-data Status
<i>Phalacrocorax lucidus</i>	White-breasted (Great) Cormorant	
<i>Microcarbo africanus</i>	Reed (Long-tailed) Cormorant	
<i>Phalacrocorax lucidus</i>	African Darter	
<i>Ardea cinerea</i>	Grey Heron	
<i>Ardea melanocephala</i>	Black-headed Heron	
<i>Ardea purpurea</i>	Purple Heron	
<i>Ardea alba</i>	Great Egret	
<i>Coccyzus americanus</i>	Yellow-billed	
<i>Egretta ardesiaca</i>	Black Heron	
<i>Bubulcus ibis</i>	Cattle Egret	
<i>Scopus umbretta</i>	Hamerkop	
<i>Ciconia ciconia</i>	White Stork	
<i>Threskiornis aethiopicus</i>	African Sacred (Sacred) Ibis	
<i>Geronticus calvus</i>	Southern Bald (Bald) Ibis	VU
<i>Plegadis falcinellus</i>	Glossy Ibis	
<i>Bostrychia hagedash</i>	Hadeda Ibis	
<i>Platalea alba</i>	African Spoonbill	
<i>Dendrocygna viduata</i>	White-faced (Whistling-) Duck	
<i>Alopochen aegyptiaca</i>	Egyptian Goose	
<i>Anas undulata</i>	Yellow-billed Duck	
<i>Anas sparsa</i>	African Black Duck	
<i>Anas hottentota</i>	Hottentot Teal	
<i>Anas erythrorhyncha</i>	Red-billed Teal (Duck)	
<i>Anas smithii</i>	Cape Shoveler	
<i>Netta erythrophthalma</i>	Southern Pochard	
<i>Nettapus auritus</i>	African Pygmy-Goose	NT
<i>Sarkidiornis melanotos</i>	Comb (Knob-billed) Duck	
<i>Plectropterus gambensis</i>	Spur-winged Goose	
<i>Sagittarius serpentarius</i>	Secretarybird	NT
<i>Gyps coprotheres</i>	Cape Vulture (Griffon)	VU
<i>Verreaux's (Black) Eagle</i>	Verreaux's (Black) Eagle	
<i>Aquila wahlbergi</i>	Wahlberg's Eagle	
<i>Stephanoaetus coronatus</i>	African Crowned (Crowned) Eagle	NT
<i>Circaetus cinereus</i>	Brown Snake-Eagle	
<i>Circaetus pectoralis</i>	Black-chested (Breasted) Snake-Eagle	
<i>Haliaeetus vocifer</i>	African Fish-Eagle	

Species Name	Common Name	SA Red-data Status
<i>Buteo buteo</i>	Steppe (Common) Buzzard	
<i>Buteo rufofuscus</i>	Jackal Buzzard	
<i>Accipiter rufiventris</i>	Rufous-chested (Red-breasted) Sparrowhawk	
<i>Accipiter badius</i>	Shikra (Little Banded Goshawk)	
<i>Circus ranivorus</i>	African Marsh-Harrier	VU
<i>Circus maurus</i>	Black Harrier	NT
<i>Polyboroides typus</i>	African Harrier-Hawk (Gymnogone)	
<i>Pandion haliaetus</i>	Osprey	
<i>Falco biarmicus</i>	Lanner Falcon	NT
<i>Falco subbuteo</i>	Eurasian Hobby	
<i>Falco amurensis</i>	Amur (Eastern Red-footed) Falcon (Kestrel)	
<i>Falco tinnunculus</i>	Rock Kestrel	
<i>Falco rupicoloides</i>	Greater Kestrel	
<i>Peliperdix coqui</i>	Coqui Francolin	
<i>Scleroptila africanus</i>	Grey-winged Francolin	
<i>Scleroptila shelleyi</i>	Shelley's Francolin	
<i>Scleroptila levaillantii</i>	Red-winged Francolin	
<i>Pternistis natalensis</i>	Natal Spurfowl (Francolin)	
<i>Pternistis swainsonii</i>	Swainson's Spurfowl (Francolin)	
<i>Numida meleagris</i>	Helmeted Guineafowl	
<i>Bugeranus carunculatus</i>	Wattled Crane	CR
<i>Anthropoides paradiseus</i>	Blue Crane	VU
<i>Balearica regulorum</i>	Grey Crowned- (Crowned) Crane	VU
<i>Rallus caerulescens</i>	African Rail	
<i>Porphyrio porphyrio</i>	African Purple (Purple) Swamphen (Gallinule)	
<i>Gallinula chloropus</i>	Common Moorhen	
<i>Fulica cristata</i>	Red-knobbed Coot	
<i>Eupodotis senegalensis</i>	White-bellied Korhaan	VU
<i>Actophilornis africanus</i>	African Jacana	
<i>Charadrius tricollaris</i>	Three-banded Plover	
<i>Vanellus coronatus</i>	Crowned Lapwing (Plover)	
<i>Vanellus armatus</i>	Blacksmith Lapwing (Plover)	
<i>Vanellus senegallus</i>	African Wattled Lapwing (Plover)	
<i>Actitis hypoleucos</i>	Common Sandpiper	

Species Name	Common Name	SA Red-data Status
<i>Tringa glareola</i>	Wood Sandpiper	
<i>Tringa stagnatilis</i>	Marsh Sandpiper	
<i>Calidris minuta</i>	Little Stint	
<i>Philomachus pugnax</i>	Ruff	
<i>Gallinago nigripennis</i>	African (Ethiopian) Snipe	
<i>Burhinus capensis</i>	Spotted Thick-knee (Dikkop)	
<i>Chlidonias hybridus</i>	Whiskered Tern	
<i>Chlidonias leucopterus</i>	White-winged Tern	
<i>Columba guinea</i>	Speckled (Rock) Pigeon	
<i>Columba arquatrix</i>	African Olive- (Rameron) Pigeon	
<i>Streptopelia semitorquata</i>	Red-eyed Dove	
<i>Streptopelia capicola</i>	Cape Turtle (Ring-necked) Dove	
<i>Spilopelia senegalensis</i>	Laughing (Palm) Dove	
<i>Oena capensis</i>	Namaqua Dove	
<i>Turtur tympanistria</i>	Tambourine Dove	
<i>Tauraco porphyreolophus</i>	Purple-crested Turaco	
<i>Cuculus solitarius</i>	Red-chested Cuckoo	
<i>Cuculus clamosus</i>	Black Cuckoo	
<i>Chrysococcyx caprius</i>	Dideric (Diederik) Cuckoo	
<i>Asio capensis</i>	Marsh Owl	
<i>Caprimulgus tristigma</i>	Freckled Nightjar	
<i>Apus barbatus</i>	African Black (Black) Swift	
<i>Asio capensis</i>	White-rumped Swift	
<i>Apus horus</i>	Horus Swift	
<i>Apus affinis</i>	Little Swift	
<i>Tachymarptis melba</i>	Alpine Swift	
<i>Cypsiurus parvus</i>	African Palm-Swift	
<i>Colius striatus</i>	Speckled Mousebird	
<i>Urocolius indicus</i>	Red-faced Mousebird	
<i>Ceryle rudis</i>	Pied Kingfisher	
<i>Megaceryle maxima</i>	Giant Kingfisher	
<i>Alcedo cristata</i>	Malachite Kingfisher	
<i>Halcyon albiventris</i>	Brown-hooded Kingfisher	
<i>Halcyon chelicuti</i>	Striped Kingfisher	
<i>Merops apiaster</i>	European Bee-eater	
<i>Upupa epops</i>	African Hoopoe	



Species Name	Common Name	SA Red-data Status
<i>Tockus leucomelas</i>	Southern Yellow-billed Hornbill	
<i>Lybius torquatus</i>	Black-collared Barbet	
<i>Tricholaema leucomelas</i>	Acacia Pied (Pied) Barbet	
<i>Pogoniulus chrysoconus</i>	Yellow-fronted Tinkerbird (Tinker Barbet)	
<i>Trachyphonus vaillantii</i>	Crested Barbet	
<i>Indicator indicator</i>	Greater Honeyguide	
<i>Campethera abingoni</i>	Golden-tailed Woodpecker	
<i>Jynx ruficollis</i>	Red-throated Wryneck	
<i>Mirafra africana</i>	Rufous-naped Lark	
<i>Calandrella cinerea</i>	Red-capped Lark	
<i>Hirundo rustica</i>	Barn (European) Swallow	
<i>Hirundo albigularis</i>	White-throated Swallow	
<i>Cecropis semirufa</i>	Red-breasted (Rufous-chested) Swallow	
<i>Cecropis cucullata</i>	Greater Striped-Swallow	
<i>Ptyonoprogne fuligula</i>	Rock Martin	
<i>Delichon urbicum</i>	Common House-Martin	
<i>Riparia paludicola</i>	Brown-throated (Plain) Martin	
<i>Riparia cincta</i>	Banded Martin	
<i>Psalidoprocne pristoptera</i>	Black Saw-wing	
<i>Dicrurus adsimilis</i>	Fork-tailed Drongo	
<i>Oriolus larvatus</i>	Black-headed (Eastern) Oriole	
<i>Corvus capensis</i>	Cape (Black) Crow	
<i>Corvus albus</i>	Pied Crow	
<i>Pycnonotus barbatus</i>	Dark-capped (Black-eyed) Bulbul	
<i>Turdus libonyana</i>	Kurrichane Thrush	
<i>Psophocichla litsitsirupa</i>	Olive Thrush (pre-split)	
<i>Monticola rupestris</i>	Groundscraper Thrush	
<i>Monticola rupestri</i>	Cape Rock-Thrush	
<i>Monticola explorator</i>	Sentinel Rock-Thrush	
<i>Oenanthe monticola</i>	Mountain Chat (Wheatear)	
<i>Oenanthe pileata</i>	Capped Wheatear	
<i>Campicoloides bifasciatus</i>	Buff-streaked Chat (Wheatear)	
<i>Cercomela familiaris</i>	Familiar Chat	
<i>Thamnolaea cinnamomeiventris</i>	Mocking Cliff-Chat	
<i>Myrmecocichla formicivora</i>	Ant-eating Chat	

Species Name	Common Name	SA Red-data Status
<i>Saxicola rubicola</i>	African (Common) Stonechat	
<i>Cossypha caffra</i>	Cape Robin-Chat	
<i>Cossypha humeralis</i>	White-throated Robin-Chat	
<i>Cercotrichas leucophrys</i>	White-browed (Red-backed) Scrub-Robin	
<i>Acrocephalus baeticatus</i>	African (African Marsh-Warbler) Reed-Warbler	
<i>Acrocephalus schoenobaenus</i>	Sedge Warbler	
<i>Acrocephalus gracilirostris</i>	Lesser Swamp- (Cape Reed) Warbler	
<i>Iduna natalensis</i>	Dark-capped Yellow (Yellow) Warbler	
<i>Bradypterus baboecala</i>	Little Rush- (African Sedge) Warbler	
<i>Phylloscopus trochilus</i>	Willow Warbler	
<i>Apalis thoracica</i>	Bar-throated Apalis	
<i>Camaroptera brevicaudata</i>	Grey-backed camaroptera	
<i>Sphenoeacus afer</i>	Cape Grassbird	
<i>Cisticola juncidis</i>	Zitting (Fan-tailed) Cisticola	
<i>Cisticola textrix</i>	Cloud (Tink-tink) Cisticola	
Cisticola ayresii	Wing-snapping (Ayre's) Cisticola	
<i>Cisticola cinnemoneus</i>	Pale-crowned Cisticola	
<i>Cisticola lais</i>	Wailing Cisticola	
<i>Cisticola chiniana</i>	Rattling Cisticola	
Cisticola tinniens	Le Vaillant's (Tinkling) Cisticola	
<i>Cisticola aberrans</i>	Lazy Cisticola	
Cisticola fulvicapilla	Neddicky (Piping Cisticola)	
<i>Prinia subflava</i>	Tawny-flanked Prinia	
<i>Prinia flavicans</i>	Black-chested Prinia	
<i>Prinia maculosa</i>	Spotted Prinia (pre-split)	
<i>Muscicapa striata</i>	Spotted Flycatcher	
<i>Myioparus plumbeus</i>	Grey Tit-Flycatcher	
<i>Melaenornis pammelaina</i>	Southern Black-Flycatcher	
<i>Sigelus silens</i>	Fiscal Flycatcher	
<i>Batis capensis</i>	Cape Batis	
<i>Batis molitor</i>	Chinspot Batis	
<i>Terpsiphone viridis</i>	African Paradise-Flycatcher	
<i>Motacilla clara</i>	Mountain (Long-tailed) Wagtail	
<i>Motacilla capensis</i>	Cape Wagtail	
<i>Anthus cinnamomeus</i>	African (Grassveld/Grassland) Pipit	



Species Name	Common Name	SA Red-data Status
<i>Anthus similis</i>	Long-billed Pipit	
<i>Anthus vaalensis</i>	Buffy Pipit	
<i>Anthus lineiventris</i>	Striped Pipit	
<i>Macronyx capensis</i>	Cape (Orange-throated) Longclaw	
<i>Lanius minor</i>	Lesser Grey Shrike	
<i>Lanius collaris</i>	Common Fiscal	
<i>Laniarius ferrugineus</i>	Douthern Boubou	
<i>Dryoscopus cubla</i>	Black-backed (Southern) Puffback	
<i>Nilaus afer</i>	Brubru	
<i>Tchagra senegala</i>	Black-crowned Tchagra	
<i>Telophorus zeylonus</i>	Bokmakierie	
<i>Acridotheres tristis</i>	Common Myna	
<i>Spreo bicolor</i>	Pied (African Pied) Starling	
<i>Lamprotornis nitens</i>	Cape Glossy (Glossy) Starling	
<i>Onychognathus morio</i>	Red-winged Starling	
<i>Promerops gurneyi</i>	Gurney's Sugarbird	
<i>Nectarinia famosa</i>	Malachite Sunbird	
<i>Cinnyris afer</i>	Greater Double-collared Sunbird	
<i>Cinnyris talatala</i>	White-bellied (breasted) Sunbird	
<i>Chalcomitra amethystina</i>	Amethyst (Black) Sunbird	
<i>Zosterops virens</i>	Cape White-eye	
<i>Passer domesticus</i>	House Sparrow	
<i>Passer melanurus</i>	Cape Sparrow	
<i>Passer griseus</i>	Greyheaded Sparrow	
<i>Petronia supercilialis</i>	Yellow-throated Petronia	
<i>Ploceus cucullatus</i>	Village (Spotted-backed) Weaver	
<i>Ploceus capensis</i>	Cape Weaver	
<i>Ploceus velatus</i>	Southern Masked-Weaver	
<i>Ploceus subaureus</i>	Golden-Weaver	
<i>Anomalospiza imberbis</i>	Cuckoo Finch (Parasitic Weaver)	
<i>Quelea quelea</i>	Red-billed Quelea	
<i>Euplectes orix</i>	Southern Red (Red) Bishop	
<i>Euplectes afer</i>	Yellow-crowned (Golden) Bishop	
<i>Euplectes capensis</i>	Yellow (Yellow-rumped) Bishop (Widow)	
<i>Euplectes axillaris</i>	Fan-tailed (Red-shouldered) Widowbird	
<i>Euplectes albonotatus</i>	White-winged Widowbird	

Species Name	Common Name	SA Red-data Status
<i>Euplectes ardens</i>	Red-collared Widowbird	
<i>Euplectes progne</i>	Long-tailed Widowbird	
<i>Lagonosticta rubricata</i>	African (Blue-billed) Firefinch	
<i>Uraeginthus angolensis</i>	Blue Waxbill	
<i>Estrilda astrild</i>	Common Waxbill	
<i>Coccyzygia melanotis</i>	Swee (Black-faced) Waxbill (Swee)	
<i>Ortygospiza fuscocrissa</i>	African Quailfinch	
<i>Amandava subflava</i>	Orange-breasted (Zebra) Waxbill	
<i>Amadina erythrocephala</i>	Red-headed Finch	
<i>Lonchura cucullata</i>	Bronze Mannikin	
<i>Vidua macroura</i>	Pin-tailed Whydah	
<i>Vidua funerea</i>	Dusky Indigobird	
<i>Serinus mozambicus</i>	Yellow-fronted (eyed) Canary	
<i>Serinus atrogularis</i>	Black-throated Canary	
<i>Serinus flavivertex</i>	Cape (Yellow-crowned) Canary	
<i>Serinus gularis</i>	Streaky-headed Seed-eater (Canary)	
<i>Emberiza flaviventris</i>	Golden-breasted Bunting	
<i>Emberiza capensis</i>	Cape Bunting	
<i>Emberiza tahapisi</i>	Cinnamon-breasted (Rock) Bunting	
<i>Milvus aegyptius</i>	Yellow-billed Kite	
<i>Milvus migrans</i>	Black Kite	

Appendix F: Expected Herpetofauna Species List



Scientific name	Common name	Distribution within Limpopo
<i>Acanthocercus atricollis</i>	Southern Tree Agama	Limited
<i>Acontias percivali</i>	Percival's Legless Skink	Narrow
<i>Acontias plumbeus</i>	Giant Legless Skink	Limited
<i>Agama aculeata</i>	Ground Agama	Wide
<i>Agama armata</i>	Peter's Ground Agama	Wide
<i>Agama atra</i>	Southern Rock Agama	Limited
<i>Amblyodipsas concolor</i>	Natal Purple glossed Snake	Narrow
<i>Amblyodipsas polylepis</i>	Common Purple glossed Snake	Wide
<i>Aparallactus capensis</i>	Cape Centipede Eater	Wide
<i>Aspidelaps scutatus</i>	Shield nose Snake	Limited
<i>Bitis arietans</i>	Puff Adder	Wide
<i>Causus defilippii</i>	Snouted Night Adder	Limited
<i>Causus rhombeatus</i>	Common Night Adder	Wide
<i>Chamaeleo dilepsis</i>	Flap neck Chameleon	Wide
<i>Cordylus breyeri</i>	Waterberg Girdled Lizard	Narrow
<i>Cordylus tropidosternum</i>	Tropical Girdled Lizard	Limited
<i>Cordylus vandami</i>	Van Dam's Girdled Lizard	Narrow
<i>Cordylus vittifer</i>	Transvaal Girdled Lizard	Wide
<i>Crotaphopeltis hotamboeia</i>	Herald Snake	Wide
<i>Dalophia pistillum</i>	Blunt tailed Worm Lizard	Narrow
<i>Dasypeltis scabra</i>	Common Egg eater	Wide
<i>Dendroaspis polylepis</i>	Black Mamba	Limited
<i>Dispholidus typus</i>	Boomslang	Wide
<i>Duberria lutrix</i>	Common Slug eater	Wide
<i>Elapsoidea boulengeri</i>	Boulenger's Garter Snake	Limited
<i>Elapsoidea sundervallii</i>	Sundervall's Garter Snake	Wide
<i>Geochelone pardalis</i>	Leopard Tortoise	Wide
<i>Gerrhosaurus flavigularis</i>	Yellow throated Plated Lizard	Wide
<i>Gerrhosaurus major</i>	Roughscaled Plated Lizard	Limited
<i>Gerrhosaurus nigrolineatus</i>	Black lined Plated Lizard	Limited
<i>Gerrhosaurus validus</i>	Giant Plated Lizard	Limited
<i>Hemachatus haemachatus</i>	Rinkhals	Limited
<i>Hemidactylus mabouia</i>	Moreau's Tropical House Gecko	Wide
<i>Homopholis wahlbergii</i>	Wahlberg's Velvet Gecko	Limited
<i>Homoroselaps lacteus</i>	Spotted Harlequin Snake	Limited
<i>Ichnotropis capensis</i>	Cape Rough scaled Lizard	Limited
<i>Ichnotropis squamulosa</i>	Common Rough scaled Lizard	Wide

Scientific name	Common name	Distribution within Limpopo
<i>Kinixys lobatsiana</i>	Lobatse Hinged Tortoise	Limited
<i>Kinixys spekii</i>	Speke's Hinged Tortoise	Limited
<i>Lamprophis aurora</i>	Aurora House Snake	Wide
<i>Lamprophis fuliginosus</i>	Brown House Snake	Wide
<i>Lamprophis guttatus</i>	Spotted House Snake	Limited
<i>Lamprophis inornatus</i>	Olive House Snake	Limited
<i>Leptotyphlops conjunctus</i>	Cape Thread Snake	Limited
<i>Leptotyphlops longicaudus</i>	Long tailed Thread Snake	Limited
<i>Leptotyphlops scutifrons</i>	Peters' Thread Snake	Wide
<i>Lycodonomorphus rufulus</i>	Common Brown Water Snake	Wide
<i>Lycophidion capense</i>	Cape Wolf Snake	Wide
<i>Lycophidion variegatum</i>	Variegated Wolf Snake	Limited
<i>Lygodactylus capensis</i>	Cape Dwarf Gecko	Wide
<i>Lygosoma sundervallii</i>	Sundervall's Writhing Skink	Limited
<i>Mabuya capensis</i>	Cape Skink	Wide
<i>Mabuya striata</i>	Striped Skink	Wide
<i>Mabuya varia</i>	Variable Skink	Wide
<i>Mehelya capensis</i>	Cape File Snake	Wide
<i>Mehelya nyassae</i>	Black File Snake	Wide
<i>Monopeltis infuscata</i>	Dusky Spade snouted Worm Lizard	Wide
<i>Naja annulifera</i>	Snouted Cobra	Limited
<i>Naja mossambica</i>	Mozambique Spitting Cobra	Wide
<i>Nucras holubi</i>	Holub's Sandveld Lizard	Wide
<i>Nucras intertexta</i>	Spotted Sandveld Lizard	Wide
<i>Nucras ornata</i>	Ornate Sandveld Lizard	Wide
<i>Pachydactylus punctatus</i>	Speckled Thicktoed Gecko	Limited
<i>Pachydactylus turneri</i>	Turner's Thicktoed Gecko	Limited
<i>Panaspis sp.</i>	Spotted neck Snake-eyed Skink	Limited
<i>Panaspis wahlbergii</i>	Wahlberg's Snake-eyed Skink	Wide
<i>Pedioplanis lineocellata</i>	Spotted Sand Lizard	Limited
<i>Pelomedusa subrufa</i>	Marsh or Helmeted Terrapin	Wide
<i>Pelusios sinuatus</i>	Serrated Hinged Terrapin	Limited
<i>Philothamnus hoplogaster</i>	Green Water Snake	Wide
<i>Philothamnus natalensis</i>	Eastern Green Snake	Limited
<i>Philothamnus semivariatus</i>	Spotted Bush Snake	Wide
<i>Prosymna bivittata</i>	Twostriped Shovelnout	Limited
<i>Prosymna sundervallii</i>	Sundervall's Shovelnout	Limited

Scientific name	Common name	Distribution within Limpopo
<i>Psammophis brevirostris</i>	Shortsnouted Grass Snake	Wide
<i>Psammophis crucifer</i>	Cross marked Grass Snake	Limited
<i>Psammophis mossambicus</i>	Olive Grass Snake	Wide
<i>Psammophis subtaeniatus</i>	Stripe bellied Sand Snake	Limited
<i>Psammophylax rhombeatus</i>	Rhombic Skaapsteker	Wide
<i>Psammophylax tritaeniatus</i>	Striped Skaapsteker	Wide
<i>Pseudaspis cana</i>	Mole Snake	Wide
<i>Python natalensis</i>	Southern African Python	Wide
<i>Rhinotyphlops lalandei</i>	Delalande's Beaked Blind Snake	Wide
<i>Telescopus semiannulatus</i>	Eastern Tiger Snake	Wide
<i>Thelotornis capensis</i>	Vine Snake	Limited
<i>Typhlops bibronii</i>	Bibron's Blind Snake	Wide
<i>Varanus albigularis</i>	Rock Monitor	Wide
<i>Varanus niloticus</i>	Water Monitor	Wide

Appendix G: Expected Invertebrate Species List



Common Name	Species	Status	Probability
Stag Beetles	<i>Colophon spp (All Species)</i>	EN	Low
Horned Baboon Spiders	<i>Ceratogyrus spp (All Species)</i>	Protected	High
Tiger Beetles	<i>Dromica spp (All Species)</i>	Protected	High
Velvet Ground Beetle	<i>Graphipterus assimilis</i>	Protected	High
Flat Rock Scorpions	<i>Hadogenes Spp (All Species)</i>	Protected	High
Common Baboon Spiders	<i>Xarpactira Spp (All Species)</i>	Protected	High
Fruit Chafer Beetles	<i>Ichneustoma spp(All Species)</i>	Protected	High
Monster Tiger Beetles	<i>Manticora spp (All Species)</i>	Protected	High
Tiger Beetle	<i>Megacephala asperata</i> <i>Megacephala regalis</i> <i>Platychile pallida</i> <i>Prothyma guttipennis</i>	Protected	High
Stag Beetle	<i>Nigidius auriculatus</i> <i>Oonotus adspersus</i> <i>Oonotus interioris</i> <i>Oonotus rex</i> <i>Oonotus serceus</i> <i>Prosopocoilus petitclerei</i>	Protected	Low
Creeping Scorpions	<i>Opisthacanthus spp (All Species)</i>	Protected	High
Burrowing Scorpions	<i>Opisthophthalmus spp (All Species)</i>	Protected	High
Golden Baboon Spiders	<i>Pterinochilus spp (All Species)</i>	Protected	High