

**SCOPING PHASE FLORAL ASSESSMENT REPORT AS PART OF
THE ENVIRONMENTAL AUTHORISATION PROCESS FOR THE
PROPOSED NYAMANE AGRO FOODS (PTY) LTD AND
NATIONAL EMPOWERMENT FUND (NEF) JV PROJECT NEAR IN
THE LEBOWAKGOMO REGION, LIMPOPO PROVINCE, SOUTH
AFRICA**

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LIST OF ABBREVIATIONS

| | |
|----------------|---|
| °C | Degrees Celsius |
| BGIS | Biodiversity Geographic Information Systems |
| BODATSA | Botanical Database of southern Africa |
| CARA | Conservation of Agricultural Resources Act (Act No. 43 of 1983) |
| CBA | Critical Biodiversity Area |
| CITES | Convention on International Trade in Endangered Species of Wild Fauna and Flora |
| C-Plan | Limpopo Conservation Plan version 2. |
| CR | Critically Endangered |
| DAFF | Department of Agriculture, Forestry and Fisheries |
| DDD | Data Deficient – Insufficient Information |
| DDT | Data Deficient – Taxonomically Problematic |
| DEA | Department of Environmental Affairs |
| EIA | Environmental Impact Assessment |
| EN | Endangered |
| ESA | Ecological Support Area |
| EW | Extinct in the Wild |
| GBIF | Global Biodiversity Information Facility |
| ha | Hectares |
| IBA | Important Bird and Biodiversity Area |
| IUCN | International Union for the Conservation of Nature |
| LEDET | Limpopo Department of Economic Development, Environment and Tourism |
| LEMA | Limpopo Environmental Management Act, 2003 (Act No. 7 of 2003) |
| LC | Least Concern |
| m | Metres |
| mm | Millimetre |
| NBA | National Biodiversity Assessment (2011) |
| NEF | National Empowerment Fund |
| NEMA | National Environmental Management Act (Act No. 107 of 1998) |
| NEMBA | National Environmental Management: Biodiversity Act (Act No. 10 of 2004) |
| NFEPA | National Freshwater Ecosystem Priority Area (2011) |
| NNR | No Natural Habitat Remaining |
| NPAES | National Protected Areas Expansion Strategy (2008) |
| NT | Near Threatened |
| ONA | Other Natural Area |
| POSA | Plants of southern Africa |
| QDS | Quarter Degree Square |
| RE | Regionally Extinct |
| SANBI | South African National Biodiversity Institute |
| SACAD | South Africa Conservation Areas Database |
| SAPAD | South African Protected Areas Database |
| SCC | Species of Conservation Concern |
| SCPE | Sekhukhuneland Centre of Plant Endemism |
| TOPS | Threatened or Protected Species |
| TSP | Threatened Species Programme |
| VU | Vulnerable |

1. INTRODUCTION

1.1 Background

Field and Form Landscape Science was appointed to undertake a floral biodiversity and impact assessment for the proposed Nyamane Agro Foods (Pty) Ltd and National Empowerment Fund (NEF) (Nyamane Foods JV) Project in the Lebowakgomo Region, Limpopo Province, South Africa. The project entails the preparation of approximately 1 700 hectare (ha) for the planting of tomatoes and approximately 4ha for the establishment of a tomato processing facility on the following properties, hereafter referred to as the 'study area':

- the remainder of the farm Platdoorns 498 (303.69ha);
- Portion 1 of the farm Platdoorns 498 (295.79ha);
- the remainder of the farm Davidspoort 499 (329.79ha);
- Portion 1 of the farm Davidspoort 499 (329.75ha);
- the remainder of the farm Graslaagte 522 (432.65ha);
- Portion 1 of the farm Graslaagte 522 (177.76ha);
- Portion 2 of the farm Graslaagte 522 (176.39); and
- Portion 3 of the farm Graslaagte 522 (178.87ha).

The total extent of the study area is 2 224.69ha and all of the above properties are zoned for agricultural use.

The study area falls within the boundaries of the Capricorn District Municipality and the Lepelle-Nkumpi Local Municipality and is located within the Quarter Degree Square (QDS) 2429BC. The Olifants River forms the southern boundary of the study area, with the R579 roadway located approximately 6km to the west and the R37 approximately 15km to the north. Various villages and settlements are located in the vicinity of the study area, which include Dithabeneng, Lekurung and Tjiane to the north and northwest. The location of the study area in relation to the surrounding region is illustrated in Figures 1 & 2 below.

This scoping phase floral assessment report forms part of the Scoping Phase of the Environmental Impact Assessment (EIA) process and serves to define the floral ecological setting of the project, based on available background information and literature reviews. This report also includes a preliminary investigation into potential impacts on the floral ecology of the study area as a result of the proposed project, and includes initial mitigation and management measures, as well as a plan of study for the EIA Phase of the project.

The EIA phase floral assessment will be undertaken in line with provincial and national requirements, including compliance with Appendix 6 of the National Environmental Management Act (NEMA; Act No. 107 of 1998) EIA Regulations (2014, as amended 2017).

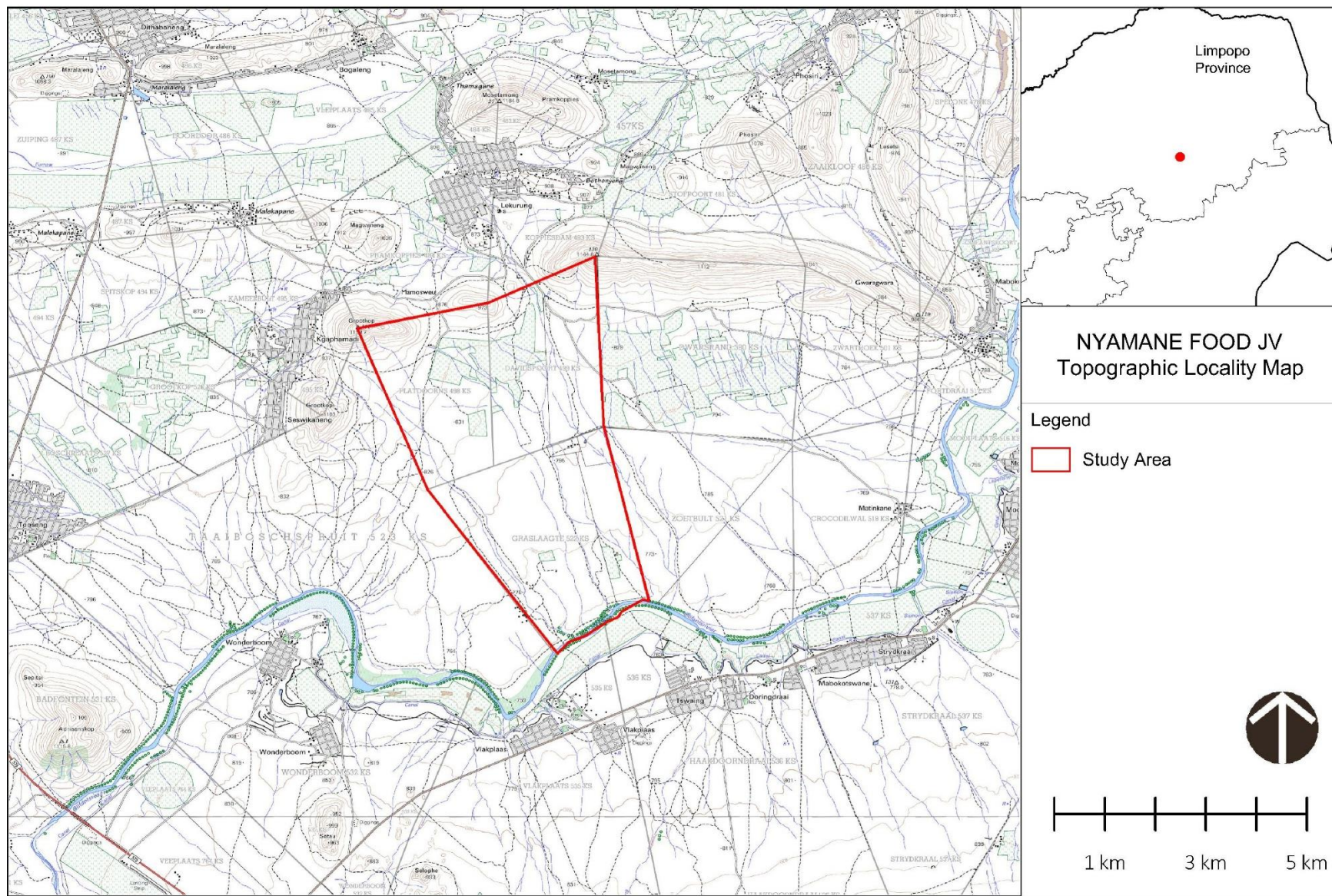


Figure 1. Topographic locality map indicating the location of the study area in relation to the surrounding region.

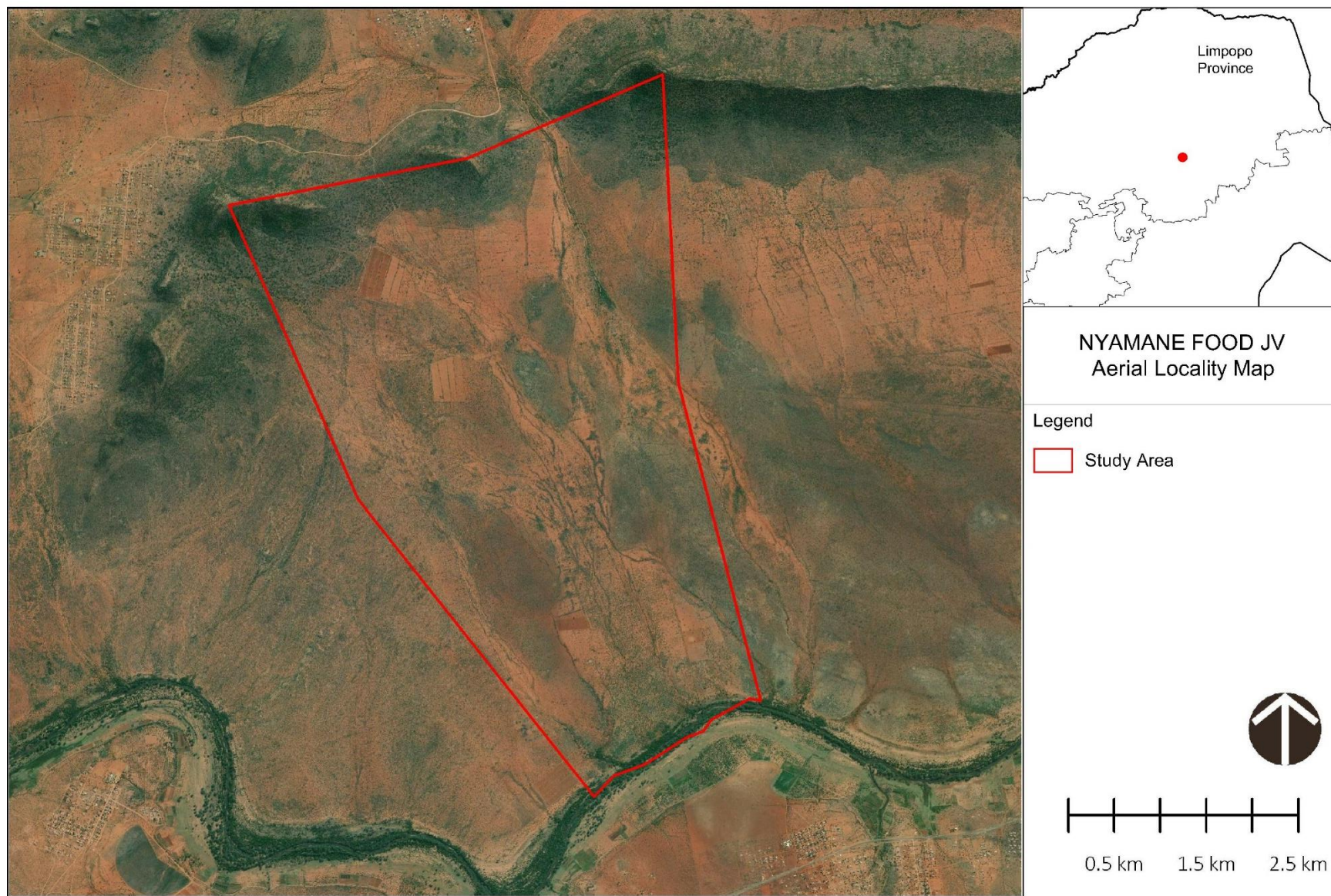


Figure 2. Aerial locality map indicating the location of the study area in relation to the surrounding region.

1.2 Project Description

According to current available information, the proposed project will comprise of various components as outlined below.

Farming Activities

The following will be the infrastructure requirements for the farm:

- Clearing of an initial 500ha of the current site for the planting of tomatoes. This will include bush clearing, tilling and fertilisation for the first crop.
- Clearing of an additional 600ha per year for two years for the planting of tomatoes. This will include bush clearing, tilling and fertilisation of the second and third crop.
- In total 1 700ha will be cleared for the planting of tomatoes at the beginning of the third year.
- It is assumed that in more than 20ha of indigenous vegetation will be cleared for the farming activities up to 1 700ha.
- Construction of roads to and in between the tomato fields. These roads will not be surfaced.
- Construction of water abstraction works for irrigation. This will consist of a weir across or extraction chamber next to the Olifants River or a similar solution.
- Construction of a pump station for pumping water from the water abstraction works at the Olifants River.
- Construction of irrigation water storage pond(s) on the study area (i.e. earth dams with lining).
- Installation of pipelines from the Olifants River pump station to the irrigation water storage pond(s).
- Installation of irrigation lines from the irrigation water storage pond(s) to the tomato fields, for drip irrigation.
- Construction of a propagation unit, including a nursery to establish seedlings for the farm. This may however only be constructed at a later stage. In the case of the latter, seedlings will be sourced from commercial nurseries.

Tomato Processing Facility

The following will be the infrastructure requirements for the tomato processing facility:

- An area of approximately 4ha will be required for the proposed tomato processing facility.
- Process equipment to wash raw tomatoes, chop and juice tomatoes, remove skins and seeds, then extract water from juice to make paste.
- The heat for the condensators will be produced by a boiler, which will be either coal-fired or gas.
- The seeds and skins which will be produced as waste will be sold for animal feed.
- Other waste which will be produced during the process includes the mud from the tomato washing process. In addition, there will be emissions from the boiler.
- Water recycling plant so that the process plant will strive to be “water neutral”.
- Construction of a warehouse to store packing materials as well as the finished product.
- Construction of ancillary structures and parking.
- Construction of a surfaced road from the entrance to the site to the processing facility, less than 1 000m in length.
- No more than approximately 6 600 litres (3 x 2 200 diesel storage tanks) of fuel (diesel) will be stored on site. The fuel storage area(s) will be bunded.

- Construction of a wash bay for equipment which will consist of an oil water separator. It is understood that only minor routine servicing will be undertaken on site, while major services will be done off site.
- A borehole will be sunk for domestic water in order to support approximately 90 people.
- Bulk electrical upgrade from Eskom to provide electricity.

1.3 Terms of Reference

This report presents the results of the desktop assessment for inclusion into the Scoping Report. The terms of reference of the scoping phase floral assessment is defined as follows:

- To provide an overview of any applicable environmental legislation as well as national and regional planning guidelines to be considered in planning the project (Sections 3 and 4);
- To provide a broad description of the biophysical characteristics of the study area and its surroundings as applicable to the floral biodiversity and impact assessment (Section 5);
- To define the expected impacts of the proposed project on the floral ecology associated with the study area and to provide broad mitigation and management measures for consideration (Section 6); and
- To define the plan of study for the project's EIA Phase floral assessment (Section 7);

1.4 Limitations and Assumptions

The following limitations and assumptions are applicable to the scoping phase floral assessment:

- The content of this report is based on information gathered and databases consulted at the time of investigation and does not include any field results;
- It is important to note that although all databases utilised provide useful and often verifiable high-quality data, the various databases consulted do not always provide an entirely accurate indication of the study area's actual site characteristics. This information is however considered to be useful as background information to the study and should serve to guide the proposed project in terms of expected ecological sensitivities. Areas where increased conservation importance is indicated will be paid particular attention to during the field assessment;
- A field assessment will be undertaken during the summer months (from November onwards) and a single wet season assessment over a number of days is planned. As far as possible, the field assessment will be timed to coincide with the flowering season of the majority of floral Species of Conservation Concern (SCC) deemed, based on available information, to have an increased probability of occurring within the study area; and
- Discussions and recommendations included in this report are made on reasonable and informed assumptions based on available information sources and deductive reasoning at the time of compilation of this report.

2. METHOD OF ASSESSMENT

2.1. Desktop Assessment

As part of the scoping phase floral assessment, various background and literature reviews were undertaken. The following method of assessment was followed:

- A review of environmental legislation pertaining to floral biodiversity as applicable to the study area was undertaken;

- Relevant information as applicable to the study area was obtained from the following data sources:
 - Vegetation Map of South Africa, Lesotho and Swaziland (2018);
 - Important Bird and Biodiversity Areas (IBA; 2015);
 - South African National Land Cover database (2014);
 - Limpopo Conservation Plan v.2 (C-Plan; 2013);
 - National Biodiversity Assessment (NBA; 2011); and
 - National List of Threatened Ecosystems (2011).
- Other national and regional databases such as protected areas (SAPAD, 2019), conservation areas (SACAD, 2019), drainage lines and wetlands (as per the National Freshwater Ecosystem Priority Areas database (NFEPA), 2011) and local relief were also used to identify areas where potential sensitive habitat occurs, and also to identify areas where natural, untransformed vegetation is likely to be present which may provide suitable habitat for floral SCC;
- The South African National Biodiversity Institute's (SANBI) Plants of southern Africa (POSA) database, SANBI's Botanical Database of southern Africa (BODATSA, 2016) and the Global Biodiversity Information Facility (GBIF) were used to determine floral SCC and other species that have the potential to occur within the study area;
- An overview of the regional vegetation was obtained from relevant literature such as Mucina & Rutherford (2006), which includes the most recent vegetation classification of South Africa, as well as other publications and information contained in general field guides for the region; and
- Remote sensing, together with information obtained from the databases listed above was used to identify and describe the physical characteristics of the study area.

2.2 Species of Conservation Concern

Prior to the initial field assessment, a record of floral SCC and the habitat requirements of these species will be acquired from various SANBI and other databases for the 2429BC QDS. During the field assessment, special attention will be paid to the identification of these SCC as well as identification of suitable habitat that could potentially sustain these species.

2.2.1 IUCN and SANBI Red Data List Categories

According to the SANBI Threatened Species Programme (TSP)¹, South Africa uses the internationally endorsed International Union for the Conservation of Nature (IUCN) Red List Categories and Criteria in compiling the Red List of South African plants. This scientific system is designed to measure species' risk of extinction, with the purpose of highlighting those species that are most urgently in need of conservation action.

The assessments contained in the Red List of South African plants are regional or national assessments, which mean that if a plant species is not endemic to South Africa, only that part of the species' distribution range falling within South Africa was evaluated in the assessment. Therefore, a species' status on the national Red List may differ from its global status on the IUCN Red List. Non-IUCN, national Red List categories for species not in danger of extinction, but considered of

¹ www.redlist.sanbi.org

conservation concern are also included, with the IUCN equivalent of these categories being Least Concern (LC). Descriptions of the National Red List Categories are included in Table 1 below.

Table 1. National Red List Categories – Version 2017.1 (SANBI, 2017).

| Category | Definition |
|---|--|
| Extinct (EX) | A species is Extinct when there is no reasonable doubt that the last individual has died. |
| Extinct in the Wild (EW) | A species is Extinct in the Wild when it is known to survive only in cultivation or as a naturalised population (or populations) well outside the past range. |
| Regionally Extinct (RE) | A species is Regionally Extinct when it is extinct within the region assessed (in this case South Africa), but wild populations can still be found in areas outside the region. |
| Critically Endangered, Possibly Extinct (CE PE) | Possibly Extinct is a special tag associated with the category CR, indicating species that are highly likely to be extinct, but the exhaustive surveys required for classifying the species as Extinct has not yet been completed. A small chance remains that such species may still be rediscovered. |
| Critically Endangered (CR) | A species is CR when the best available evidence indicates that it meets at least one of the five IUCN criteria for CR, indicating that the species is facing an extremely high risk of extinction. |
| Endangered (EN) | A species is Endangered when the best available evidence indicates that it meets at least one of the five IUCN criteria for Endangered, indicating that the species is facing a very high risk of extinction. |
| Vulnerable (VU) | A species is Vulnerable when the best available evidence indicates that it meets at least one of the five IUCN criteria for Vulnerable, indicating that the species is facing a high risk of extinction. |
| Near threatened (NT) | A species is Near Threatened when available evidence indicates that it nearly meets any of the IUCN criteria for Vulnerable, and is therefore likely to become at risk of extinction in the near future. |
| *Critically Rare | A species is Critically Rare when it is known to occur at a single site, but is not exposed to any direct or plausible potential threat and does not otherwise qualify for a category of threat according to one of the five IUCN criteria. |
| *Rare | A species is Rare when it meets at least one of four South African criteria for rarity, but is not exposed to any direct or plausible potential threat and does not qualify for a category of threat according to one of the five IUCN criteria. The four criteria are as follows: <ul style="list-style-type: none"> • Restricted range: Extent of Occurrence (EOO) <500 km², OR • Habitat specialist: Species is restricted to a specialised microhabitat so that it has a very small Area of Occupancy (AOO), typically smaller than 20 km², OR • Low densities of individuals: Species always occurs as single individuals or very small subpopulations (typically fewer than 50 mature individuals) scattered over a wide area, OR • Small global population: Less than 10 000 mature individuals. |
| *Declining | A species is Declining when it does not meet or nearly meet any of the five IUCN criteria and does not qualify for CR, EN, VU or NT, but there are threatening processes causing a continuing decline of the species. |
| Least Concern (LC) | A species is Least Concern when it has been evaluated against the IUCN criteria and does not qualify for any of the above categories. Species classified as Least Concern are considered at low risk of extinction. Widespread and abundant species are typically classified in this category. |
| Data Deficient - Insufficient Information (DDD) | A species is DDD when there is inadequate information to make an assessment of its risk of extinction, but the species is well defined. Listing of species in this category indicates that more information is required and that future research could show that a threatened classification is appropriate. |
| Data Deficient - Taxonomically Problematic (DDT) | A species is DDT when taxonomic problems hinder the distribution range and habitat from being well defined, so that an assessment of risk of extinction is not possible. |

*Categories marked with * are non-IUCN, national Red List categories for species not in danger of extinction, but considered to be of conservation concern. The IUCN equivalent of these categories is Least Concern (LC).

Threatened species are those species that currently face a high risk of extinction. Any species classified in the IUCN categories Vulnerable (VU), Endangered (EN) or Critically Endangered (CR) is a threatened species.

Floral SCC are species that have a high conservation importance in terms of conserving South Africa's high floristic diversity and include not only threatened species, but also those classified in the categories Extinct in the Wild (EW), Regionally Extinct (RE), Near Threatened (NT), Critically Rare, Rare, Declining, Data Deficient – Insufficient Information (DDD) and Data Deficient – Taxonomically Problematic (DDT).

2.2.2 Other

Other floral SCC include those species as listed under the National Environmental Management: Biodiversity Act, Act No. 10 of 2004 (NEMBA) Threatened or Protected Species (TOPS) regulations (2015), protected tree species listed under the National Forests Act (Act No. 84 of 1998), protected and specially protected floral species as listed under the Limpopo Environmental Management Act (No. 7 of 2003) (LEMA) as well as endemic and near-endemic species of the Sekhukhuneland Centre of Plant Endemism (SCPE) (refer to Sections 3.1.3, 3.2, 3.5 and 4.2).

2.3 Impact Assessment

Direct, indirect and cumulative impacts identified through the specialist study will be assessed in terms of the following criteria during the EIA Phase of the project:

Nature of Impact

The impacts are assessed as either having a:

- Negative effect (i.e. at a 'cost' to the environment)
- Positive effect (i.e. a 'benefit' to the environment)
- Neutral effect on the environment

Extent of the Impact

- (1) Site (site only)
- (2) Local (site boundary and immediate surrounds)
- (3) Regional
- (4) National
- (5) International

Duration of the Impact

The length that the impact will last for is described as either:

- (1) Immediate (<1 year)
- (2) Short term (1-5 years)
- (3) Medium term (5-15 years)
- (4) Long term (ceases after the operational life span of the project)
- (5) Permanent

Magnitude of the Impact

The intensity or severity of the impacts is indicated as either:

- (0) None

- (2) Minor
- (4) Low
- (6) Moderate (environmental functions altered but continue)
- (8) High (environmental functions temporarily cease)
- (10) Very high/ unsure (environmental functions permanently cease)

Probability of Occurrence

The likelihood of the impact actually occurring is indicated as either:

- (0) None (the impact will not occur)
- (1) Improbable (probability very low due to design or experience)
- (2) Low probability (unlikely to occur)
- (3) Medium probability (distinct probability that the impact will occur)
- (4) High probability (most likely to occur)
- (5) Definite

Significance of the Impact

Based on the information contained in the points above, the potential impacts are assigned a significance rating (S). This rating is formulated by adding the sum of the numbers assigned to extent (E), duration (D) and magnitude (M), and multiplying this sum by the probability (P) of the impact.

$$S = (E+D+M) P$$

The significance ratings are given below

- (<30) low (i.e. where this impact would not have a direct influence on the decision to develop in the area)
- (30 – 60) medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated)
- (>60) high (i.e. where the impact must have an influence on the decision process to develop in the area)

3. LEGISLATIVE BACKGROUND

3.1 The National Environmental Management: Biodiversity Act (2004)

3.1.1 National List of Threatened Ecosystems (2011)

The NEMBA provides for the listing of threatened or protected ecosystems in one of four categories: 'Critically Endangered (CR)', 'Endangered (EN)', 'Vulnerable (VU)' or 'Protected'. Threatened ecosystems are listed in order to reduce the rate of ecosystem and species extinction by preventing further degradation and loss of structure, function and composition of threatened ecosystems.

According to the National List of Threatened Terrestrial Ecosystems (2011) database, the study area is not located within the original or remaining extent of any listed threatened ecosystems.

3.1.2 Alien and Invasive Species Regulations (2014)

The NEMBA Alien and Invasive Species Regulations (2014) aim to:

- Prevent the unauthorised introduction and spread of alien and invasive species to ecosystems and habitats where they do not naturally occur;

- Manage and control alien and invasive species, to prevent or minimise harm to the environment and biodiversity; and
- Eradicate alien and invasive species from ecosystems and habitats where they may harm such ecosystems or habitats.

Categories of invasive alien plant species according to the Alien and Invasive Species Regulations (2014) are as follows:

- Category 1a: Invasive species requiring compulsory control. Plants are to be removed and destroyed. Any Category 1a listed plants must be combatted or eradicated.
- Category 1b: Invasive species that require control by means of an invasive species management programme.
- Category 2: Invasive species which require a permit to carry out a restricted activity within an area, as specified in the permit. If an Invasive Species Management Programme has been developed, a person must control the listed invasive species in accordance with such a programme.
- Category 3: Any plant species identified as a Category 3 Listed Invasive Species that occurs in riparian areas, must, for the purpose of the regulation be considered to be a Category 1b Listed Invasive Species. If an Invasive Species Management Programme has been developed, a person must control the listed invasive species in accordance with such a programme.

The most recent NEMBA Alien and Invasive Species Lists (2016) include national lists of floral invasive species to be read together with the Alien and Invasive Species Regulations (2014).

A list of alien and invasive floral species, their ecological status and their eradication and control requirements will be included as part of the EIA Phase floral assessment.

3.1.3 Threatened or Protected Species Regulations (2015)

Chapter 4, Part 2 of NEMBA provides for listing of Threatened or Protected Species (TOPS). If a species is listed as threatened, it must be further classified as CR, EN or VU. In addition to these categories, Protected species are defined as “any species which is of such high conservation value or national importance that it requires national protection”. Species listed in this category will include, among others, species listed in terms of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Certain activities, referred to as Restricted Activities, are regulated on listed species using permits by a special set of regulations published under the Act. Restricted activities regulated under the act are keeping, moving, having in possession, importing and exporting, and selling. The most recent TOPS Regulation were published in 2015 along with relevant species lists.

Should any floral TOPS floral species be encountered within the study area during the field assessment, a list of such species and their conservation requirements will be included as part of the EIA Phase floral assessment.

3.2 National Forests Act (1998)

In terms of section 15(1) of the National Forests Act (Act No. 84 of 1998), no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any product derived from

a protected tree, except under a licence or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated. An updated list of protected tree species was published under section 12(1) (d) of the National Forests Act on 7 September 2018.

Based on tree species indicated to occur within the relevant vegetation types (Section 5.5; Appendix A), and tree species' distribution data, several protected tree species have an increased probability of occurring within the study area. In this regard specific mention is made of *Vachellia (Acacia) erioloba* (Camel thorn), *Boscia albitrunca* (Shepherd's tree), *Catha edulis* (Bushman's tea), *Sclerocarya birrea* subsp. *caffra* (Marula), *Philenoptera violacea* (Apple-leaf), *Balanites maughamii* (Torchwood), *Elaeodendron transvaalensis* (Bushveld saffron) and *Combretum imberbe* (Leadwood).

The presence or absence of the aforementioned and other protected tree species will be confirmed during the field assessment and will be included into the EIA Phase floral assessment report. Should any of these species fall within the proposed project footprint area and require removal, relevant permits should be obtained from the Department of Agriculture, Forestry and Fisheries (DAFF) prior to commencement of site clearance.

3.3 National Environmental Management: Protected Areas Act (2003)

According to the National Biodiversity Assessment database (NBA, 2011), and as supported by the most recent South African Protected Areas Database (SAPAD, 2019) and the South African Conservation Areas Database (SACAD, 2019), the study area is not situated within formally or informally protected or conservation areas. The study area is also not located within a National Protected Area Expansion Strategy (NPAES) Focus Area (2011).

3.4 Conservation of Agricultural Resources Act (1983)

Amendments to regulations under the Conservation of Agricultural Resources Act (CARA; Act No. 43 of 1983) provides for the declaration of weeds and invader plants, with weeds regarded as alien plants with no known useful economic purpose, while invader plants may serve useful purposes as ornamentals, as sources of timber and may provide many other benefits, despite their aggressive nature. Weeds are described as Category 1 plants, while invader plants are described as Category 2 and 3 plants. These regulations provide that Category 1, 2 and 3 plants must be controlled.

3.5 Limpopo Environmental Management Act (2003)

The objectives of the LEMA (Act No. 7 of 2003) are, amongst others, to manage and protect the environment in the Limpopo Province, to secure ecologically sustainable development and responsible use of natural resources in the Province. The LEMA provides for the protection of indigenous plants and lists provincially protected species under Schedules 11 and 12 of this Act.

In terms of the LEMA, no person may pick, be in possession of, sell, purchase, donate, receive as a gift, import into, export or remove from the Province, or convey a protected or specially protected plant as listed. Complete lists of provincially protected floral species are included in Appendix B.

It is possible that species listed as protected in terms of the LEMA may occur within the study area. The presence or absence of such species will be confirmed during the field assessment and will be included into the EIA Phase floral assessment report. Should any of these species fall within the proposed project footprint area and require removal or relocation, relevant permits should be obtained from the Limpopo Department of Economic Development, Environment and Tourism (LEDET).

4. NATIONAL AND REGIONAL PLANNING FRAMEWORKS

The following sections contain data accessed as part of the desktop assessment.

In each instance, the year the database was generated is indicated. All databases used were found to be reliable and corresponded with reasonable accuracy with the field observations.

4.1 Important Bird and Biodiversity Areas (2015)

The study area does not fall within any Important Bird and Biodiversity Areas (IBAs), as defined by BirdLife International². The Wolkberg Forest Belt IBA is the closest IBA to the study area and is located 12.9km to the north.

4.2 Centres of Plant Endemism (2001)

The northern portion of the study area is located within the Sekhukhune Centre of Plant Endemism (SCPE; Figure 3) (Van Wyk & Smith, 2001), and more specifically within the arid Sekhukhune Northern Plains Bushveld region. Siebert *et al.* (2002) indicates that at least 50 endemic and 70 near-endemic species occur in the SCPE. Plant families particularly rich in SCPE endemics include the Araceae, Euphorbiaceae and Vitaceae, and many of the endemic or near-endemic species are also threatened, extremely rare or insufficiently known.

According to Siebert *et al.* (2002), the floristic composition of the arid Sekhukhune Northern Plains Bushveld region, can be described as *Vachellia (Acacia) tortilis-Dichrostachys cinerea* Northern Dry Mixed Bushveld, which is a characteristically sparse thornveld (reaching a height of around 3m) with an open grassy layer. Siebert *et al.* (2002) further describe the vegetation as *Vachellia (Acacia) tortilis*, *Boscia foetida* subsp. *rehmanniana* and *Dichrostachys cinerea* being the most abundant and prominent dominant tree species of the group. The most frequently occurring diagnostic forbs are *Becium filamentosum*, *Felicia clavipilosa*, *Gisekia africana*, *Hermannia odorata* and *Melhania rehmannii*. Together with diagnostic grasses such as *Eragrostis barbinodis* and *Tragus berteronianus*, prominent graminoids of the group include *Aristida congesta*, *Enneapogon cenchroides*, *E. scoparius* and *Urochloa mossambicensis*. Four taxa of conservation value are restricted to this vegetation type and include the succulent near-endemic, *Huernia stapelioides*.

4.3 Limpopo Conservation Plan, v.2 (2013)

In order to facilitate and assist with the management and monitoring of biodiversity in the Province, the LEDET developed the Limpopo Conservation Plan (C-Plan) version 2 (Desmet *et al.*, 2013). The Limpopo C-Plan serves as the current systematic biodiversity plan for the Limpopo Province. The purpose of the Limpopo C-Plan (2013) is to inform land-use planning and development on a provincial scale and to aid in natural resource management and one of the outputs is a map of Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). These are classified into different categories, namely Protected Areas, CBA1 areas, CBA2 areas, ESA1 areas, ESA2 areas, Other Natural Areas (ONAs) and areas with No Natural Habitat Remaining (NNR) based on biodiversity characteristics, spatial configuration and requirements for meeting targets for both biodiversity patterns and ecological processes.

² <https://www.birdlife.org.za/what-we-do/important-bird-and-biodiversity-areas/>

No Protected Areas or CBA1 areas are associated with the study area. From Figure 4, it is evident that the southern portion of the study area falls within a CBA2 area, while the northern portion of the study area falls primarily within an ESA1 area, with smaller areas in the north indicated as ESA, ONA and NNR areas.

The applicable categories listed above are described in more detail in Table 2 below.

Table 2. Land management objectives and recommendations of CBA Map Categories applicable to the proposed project (Limpopo C-Plan 2013).

| Category | Definition/ Description | Land Management Objective | Land Management Recommendations |
|----------|--|---|---|
| CBA2 | <ul style="list-style-type: none"> • Areas selected to meet biodiversity targets. • Alternative sites may be available to meet targets, but these are the optimal sites based on complementarity, connectivity and avoidance of conflict with other land uses. | <ul style="list-style-type: none"> • Maintain in a natural state with limited or no biodiversity loss. • Maintain current agricultural activities. • Ensure that land use is not intensified and that activities are managed to minimise impact on threatened species. • Rehabilitate degraded areas to a natural or near natural state and manage for no further degradation. | <ul style="list-style-type: none"> • Obtain formal conservation protection where possible. • Avoid conversion of agricultural land to more intensive land uses, which may have a negative impact on threatened species or ecological processes. • Implement appropriate zoning to avoid loss of intact habitat or intensification of land use. |
| ESA1 | <ul style="list-style-type: none"> • Natural, near natural and degraded areas that support the ecological functioning of CBAs and protected areas by maintaining ecological processes. | <ul style="list-style-type: none"> • Maintain ecosystem functionality and connectivity allowing for limited loss of biodiversity pattern. | <ul style="list-style-type: none"> • Implement appropriate zoning and land management guidelines to avoid impacting of ecological processes. • Avoid intensification of land use. • Avoid fragmentation of natural landscape. |
| ESA2 | <ul style="list-style-type: none"> • Areas with no natural habitat that are nevertheless important for supporting ecological processes. | <ul style="list-style-type: none"> • Avoid additional / new impacts on ecological processes. • Ensure that land use is not intensified and that activities are managed to minimise impact on threatened species. | <ul style="list-style-type: none"> • Maintain current land use. • Avoid intensification of land use, which may result in additional impact on ecological processes. • Avoid conversion of agricultural land to more intensive land uses, which may have a negative impact on threatened species or ecological processes. |
| ONA | <ul style="list-style-type: none"> • Natural and intact, but not required to meet targets or identified as CBAs or ESAs. | <ul style="list-style-type: none"> • No management objectives, land management recommendations or land-use guidelines are prescribed. These areas are nevertheless subject to all applicable town and regional planning guidelines and policy. Where possible existing NNR areas should be favoured for development before ONAs as ONAs may later be required to meet targets, either due to the identification of previously unknown important biodiversity features on these sites, or alternatively where the loss of CBA has resulted in the need to identify alternative sites. | |
| NNR | <ul style="list-style-type: none"> • Areas with no significant direct biodiversity value. Not Natural or degraded natural areas that are not required as ESAs, including intensive agriculture, urban, industry; and human infrastructure. | | |

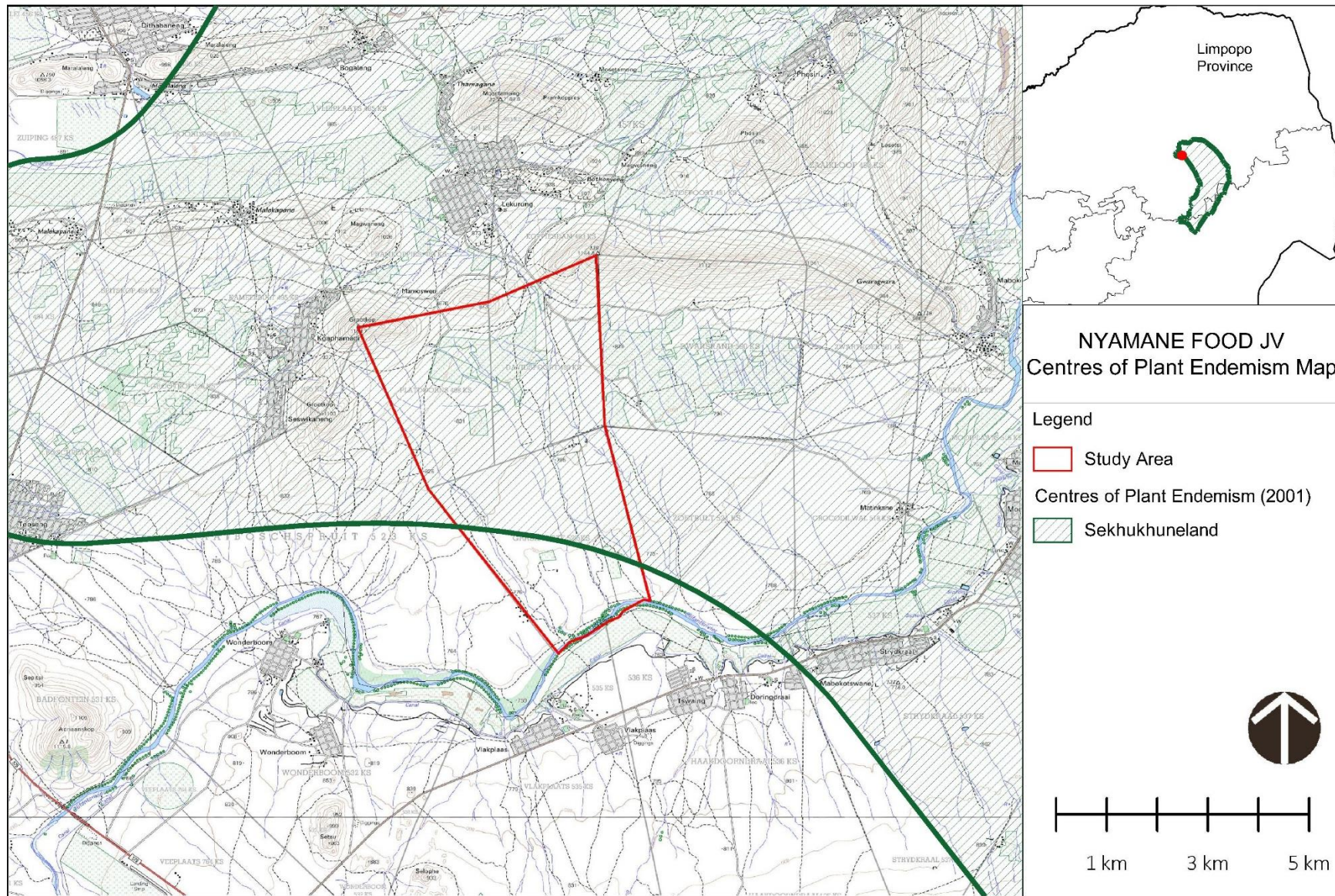


Figure 3. Location of the study area in relation to the Sekhukhune Centre of Plant Endemism (Van Wyk & Smith, 2001).

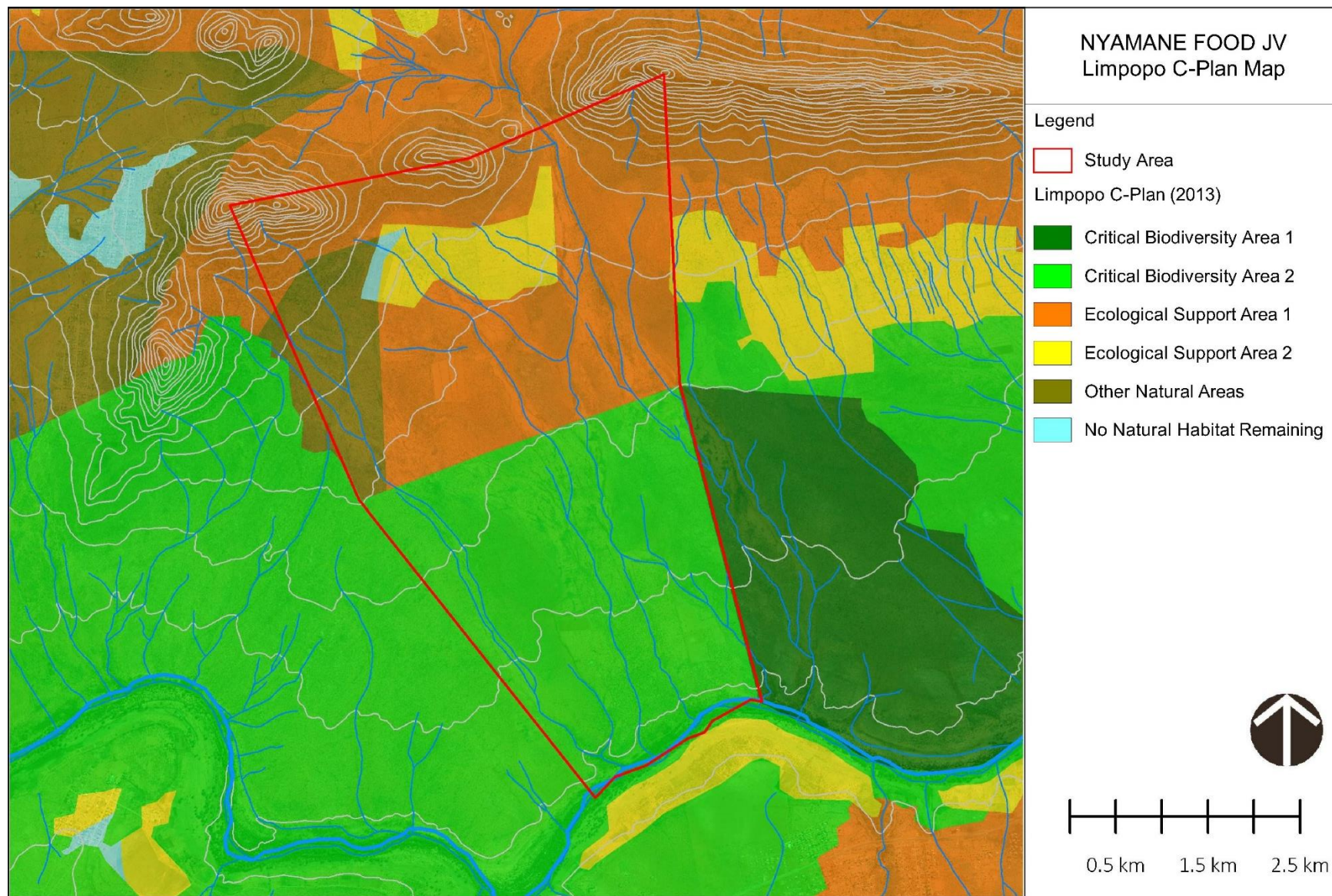


Figure 4. CBA and ESA areas in the vicinity of the study area as indicated by the Limpopo C-Plan (2013)

5. DESCRIPTION OF THE RECEIVING ENVIRONMENT

The study area is located within the Savanna Biome (Rutherford & Westfall, 1994) and within the Central Bushveld Bioregion (Mucina & Rutherford, 2006).

5.1 Climate

The study area is located in the summer rainfall region, with very dry winters and an annual precipitation averaging about 460 mm. When considering the arid northern regions of the Sekhukhune Plains Bushveld, the rainfall pattern is strongly influenced by the area's topography, varying from 416 mm in the east to 499 mm per annum in the west, and 522mm in the south to 478mm per annum in the north. Summer rainfall with very dry winters Daily average temperatures range from a minimum of 8°C in winter to a maximum of 38°C in summer, with an average annual temperature of 20°C. Minimum temperatures of below freezing point are extremely rare, even in the high-lying areas (Siebert et al. 2002).

5.2 Surface Water

The main drainage line in the vicinity of the study area is the Olifants River, which forms the southern boundary of the study area. Various smaller drainage lines traverse the study area, draining into the Olifants River in the south.

5.3 Land Cover

The study area is currently largely vacant, and contains natural veld (low open bushveld), with trees and shrubs. Some areas have previously been used for agricultural purposes, most likely for subsistence farming. Although a power connection is located on Portion 1 of the farm Graslaagte 522, there is no further bulk water, sewer or electrical infrastructure provisions on the site. There is informal housing on the farms that were used by the previous tenants, these tenants will however be vacated from the site before project implementation.

The National Land Cover database (DEA, 2014) indicates the dominant land cover type as Woodland/ Open Bush, with Thicket/ Dense Bush occurring within the ridges in the north of the study area and small portions of Low Shrubland scattered throughout the site. Low intensity cultivated field for subsistence farming are indicated within the north and south of the study area (Figure 5).

5.4 Ridges

The northern portion of the study area is characterised by mountainous/ ridge habitat, and the possibility also exists that smaller rocky outcrops may occur elsewhere in the study area.

5.5 Vegetation Types

The study area is located within the Savanna Biome (Rutherford & Westfall, 1994; Rutherford, 1997) and within the Central Bushveld Bioregion (Mucina & Rutherford, 2006). Two vegetation types are present within the study area, with the majority of the site located within the Sekhukhune Plains Bushveld vegetation type and the northwestern portion of the study area located within the Central Sandy Bushveld vegetation type. Both these vegetation types are indicted by Mucina & Rutherford to be Vulnerable (VU) (Figure 6).

The main characteristics of each vegetation type are summarised in the table below.

Table 3. Summary of vegetation types associated with the study area (Mucina & Rutherford, 2006).

| Vegetation Type | Gm27 Sekhukhune Plains Bushveld | SVcb12 Central Sandy Bushveld |
|---------------------------|--|--|
| Landscape | Mainly semi-arid plains and open valleys between chains of hills and small mountains running parallel to the escarpment. | Low undulating areas, sometimes between mountains, and along sandy plains and catenas. |
| Geology and Soils | Complex geology, with mainly mafic and ultramafic intrusive rocks of the main to lower zones of the Rustenberg Layered Suite on the eastern lobe of the Bushveld Igneous Complex (Vaalian). The zones (subsuites) are dominated by concentric belts of norite, gabbro, anorthosite and pyroxenite, with localised protrusions of magnetite, chromitite, serpentinised harzburgite, olivine diorite, shale, dolomite and quartzite. Most of the area consists of red apedal soils. Deep, loamy Valsrivier soils are characteristic of the plains and shallow Glenrosa soils are found on the low-lying, rocky hills. Patches of erodable black, melanic structured horizons are common around small mountains. Some Steendal soils are underlain by gypsum. Land types mainly Ae, Ib, Ea and Ia. | The large southern and eastern parts of this area are underlain by granite of the Lebowa Granite Suite and some granophyre of the Rashoop Granophyre Suite (both Bushveld Complex, Vaalian). In the north, the sedimentary rocks of the Waterberg Group (Mokolian Erathem) are most important. Specifically, sandstone, conglomerate and siltstone of the Alma Formation and sandstone, siltstone and shale of the Vaalwater Formation. Well-drained, deep Hutton or Clovelly soils often with a catenary sequence from Hutton at the top to Clovelly on the lower slopes; shallow, skeletal Glenrosa soils also occur. Land types mainly Bb, Fa, Ba, Bd and Ac. |
| Characteristic vegetation | Predominantly short, open to closed thornveld with an abundance of <i>Aloe</i> species and other succulents. Heavily degraded in places and overexploited for cultivation, mining and urbanisation. Both man-made and natural erosion dongas occur in areas containing clays rich in heavy metals. Encroachment by indigenous microphyllous trees and invasion by alien species is common throughout the area. | Tall, deciduous <i>Terminalia sericea</i> and <i>Burkea africana</i> woodland on deep sandy soils (with the former often dominant on the lower slopes of sandy catenas) and low, broad-leaved <i>Combretum</i> woodland on shallow rocky or gravelly soils. Species of <i>Vachellia</i> , <i>Senegalia</i> , <i>Ziziphus</i> and <i>Euclea</i> are found on flats and lower slopes on eutrophic sands and some less sandy soils. <i>V. tortilis</i> may dominate some areas along valleys. Grass-dominated herbaceous layer with relatively low basal cover on dystrophic sands. |
| Conservation | Vulnerable , with a conservation target of 19%. Nearly 2% statutorily conserved in Potlake, Bewaarkloof and Wolkberg Caves Nature Reserves. Approximately 25% of this area has been transformed and is mainly under dry-land subsistence cultivation. A small area is under pressure from chrome and platinum mining activities and the associated urbanisation. Depending on commodities, this threat could increase in the future. There is a high level of degradation of much of the remaining vegetation by unsustainable harvesting and utilisation. Erosion is widespread at usually high to very high levels with donga formation. Alien Agave species, <i>Caesalpinia decapetala</i> , <i>Lantana camara</i> , <i>Melia azedarach</i> , <i>Nicotiana glauca</i> , <i>Opuntia</i> species, <i>Verbescina encelioides</i> and <i>Xanthium strumarium</i> are widespread but scattered. | Vulnerable , with a conservation target of 19%. Less than 3% statutorily conserved spread thinly across many nature reserves including the Doorndraai Dam and Skuinsdraai Nature Reserves. An additional 2% is conserved in other reserves. About 24% transformed, including about 19% cultivated and 4% urban and built-up areas. 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 <i>Cereus jamacaru</i> , <i>Eucalyptus</i> species, <i>Lantana camara</i> , <i>Melia azedarach</i> , <i>Opuntia ficus-indica</i> and <i>Sesbania punicea</i> . Erosion very low to high, especially in some places northeast of Groblersdal. |

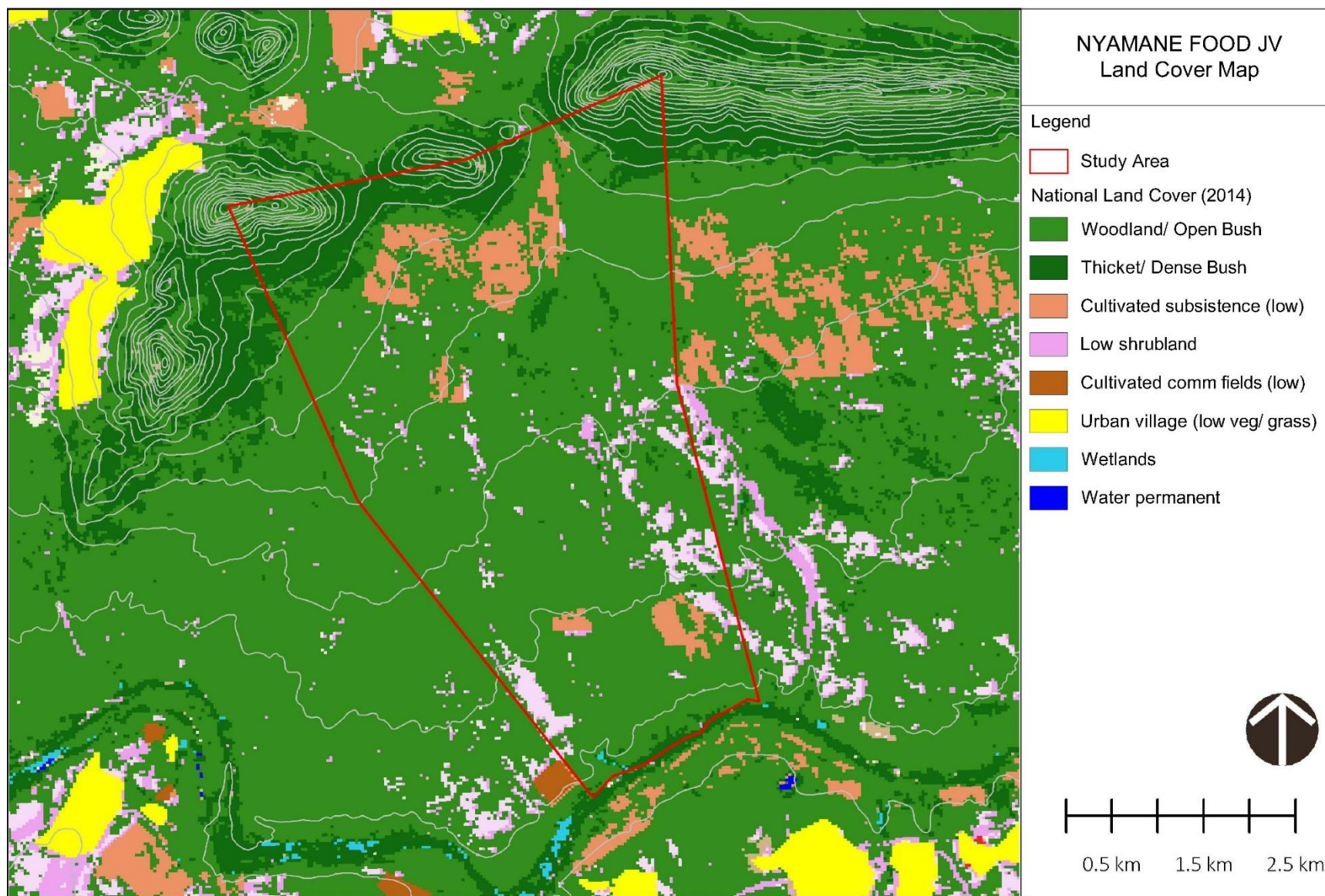


Figure 5. Land cover types in the vicinity of the study area as indicated by the National Land Cover database (2014).

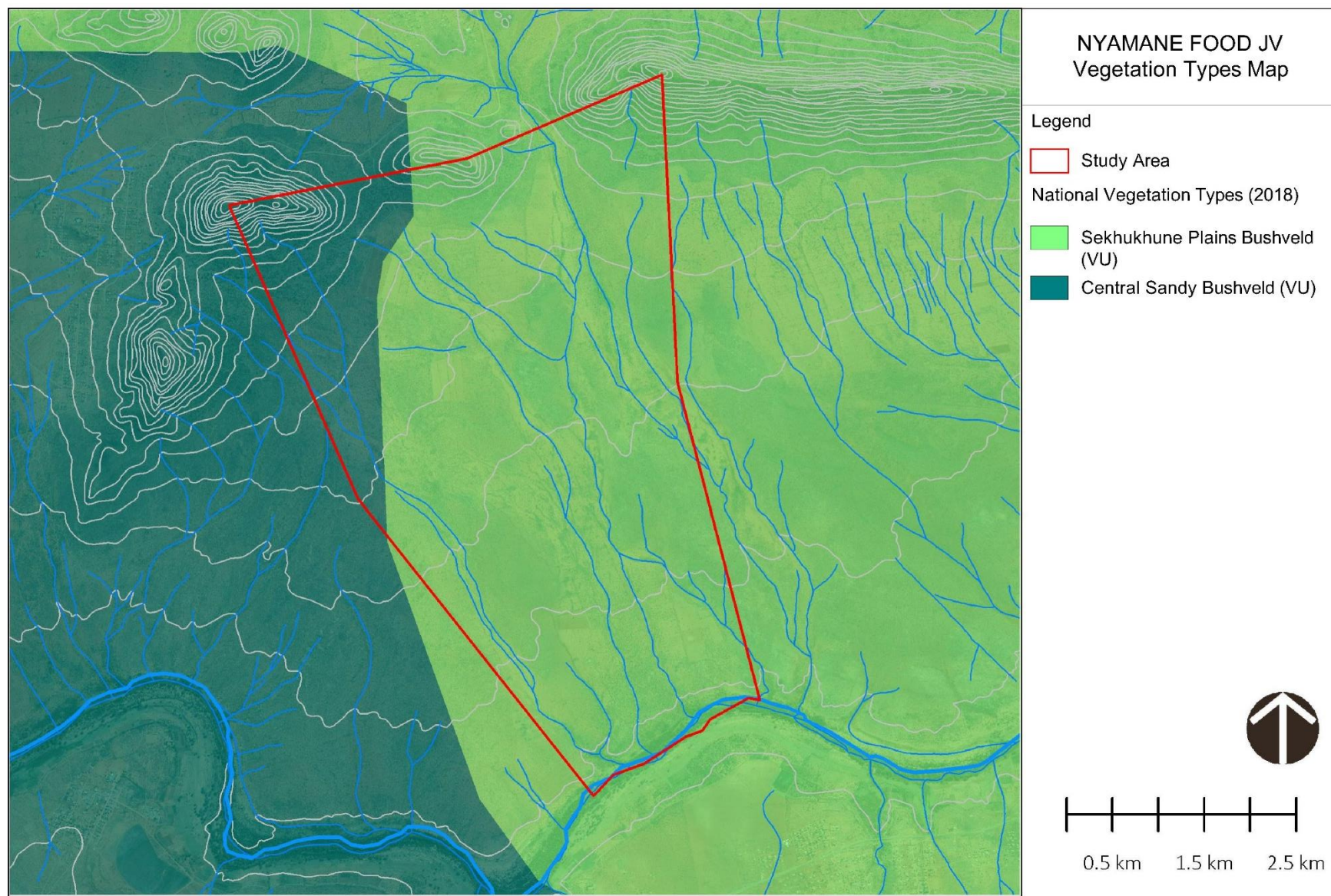


Figure 6. Vegetation types associated with the study area and surrounds as indicated by the National Vegetation Map database (2018).

6. PRELIMINARY IDENTIFICATION OF IMPACTS

Any activities, whether historic, current, or proposed, associated with a natural system will impact on the surrounding environment, usually in a negative way. As part of the scoping phase floral assessment, preliminary potential impacts on the receiving natural environment have been identified. Such impacts are likely to include the following:

- Direct impacts: Impacts directly linked to the proposed project which can be either temporary or remain as residual impacts.
- Indirect impacts: Impacts attributed to the proposed project that may extend beyond the project site during or after the project has ceased.
- Cumulative impacts: Impacts occurring from the proposed project combined with past, existing and future projects and associated impacts. These impacts will affect the same natural resources.

For the purpose of the Scoping Phase of the project, the identification of impacts largely focuses on direct and indirect impacts. Tables 4 – 6 serve to provide an initial indication of potential impacts identified, with preliminary significance ratings provided for the envisioned pre- and post-mitigation scenarios, provided that suitable management and mitigation measures be developed and implemented.

Based on the impact assessment methodology provided in Section 2.3, the preliminary impacts and initial corrective actions as included in Tables 4 – 6 have been identified. The impact assessment description, ratings and corrective actions/ mitigation measures will be further refined based on the findings of the field assessment.

6.1 Loss of Floral Habitat

Loss of floral habitat will take place during the construction phase of the project, mainly as result of clearing for agricultural purposes and may continue during the operational phase as a result of the project activities outlined below.

Construction Phase

- Clearing of vegetation for the purpose of preparing land for the planting of tomatoes (approximately 1 700ha), construction of infrastructure and temporary infrastructure such as access roads, water abstraction works, a pump station, water storage ponds, pipelines, irrigation lines, a propagation unit (nursery) as well as contractors' laydown areas and construction of a tomato processing facility (approximately 4ha) and ancillary infrastructure.
- Loss of riparian habitat due to placement and construction of infrastructure within the riparian zone.
- Construction of infrastructure and temporary infrastructure, including contractors' laydown areas within areas of increased ecological sensitivity, such as riparian areas and watercourses/ drainage lines, ridges and rocky outcrops.
- Movement of construction vehicles through ecologically sensitive habitat leading to soil compaction and dust generation.
- Disturbance of soils due to construction activities leading to increased erosion, particularly on steep slopes and erosion-prone soils.
- Littering and dumping of waste material outside of designated areas.

- Ineffective rehabilitation of exposed and impacted areas.

Operational Phase

- Ongoing disturbance within the study area and surrounds due to increased human activity and operational vehicles.
- Ongoing proliferation of alien and invasive floral species may outcompete certain species.
- Altered runoff patterns leading to erosion and sedimentation.
- Alteration of riparian vegetation structure and composition due to altered hydrological regimes and subsequent changes to riparian and watercourse habitat.

Table 4. Loss of Floral Habitat: Preliminary Impact Ratings

| Issue | Project Phase | Impact Rating Criteria | | | | | Significance |
|------------------------------------|---|------------------------|--------|----------|-----------|-------------|--------------|
| | | Nature | Extent | Duration | Magnitude | Probability | |
| Without mitigation measures | | | | | | | |
| Loss of Floral Habitat | Construction | Negative | 3 | 5 | 8 | 5 | 80 High |
| | Operational | Negative | 2 | 5 | 8 | 4 | 60 High |
| With mitigation measures | | | | | | | |
| Loss of Floral Habitat | Construction | Negative | 2 | 5 | 8 | 4 | 60 High |
| | Operational | Negative | 1 | 5 | 8 | 3 | 42 Medium |
| Corrective Actions | <p>The following preliminary mitigation measures are proposed in order to limit or reduce the impact of the proposed project on the floral ecology within the study area:</p> <ul style="list-style-type: none"> • No areas should be cleared of natural vegetation if not required for construction and operational purposes of the tomato farming and processing facilities. • The location and extent of areas of increased ecological importance and sensitivity (such as riparian areas, watercourses and drainage lines (including associated buffer zones), ridges and rocky outcrops, as well as other ecologically sensitive areas identified during the field assessment) should be considered during the pre-construction and planning phases and as far as possible in the positioning of areas to be planted for tomatoes. • All permanent and temporary project infrastructure should avoid areas of increased ecological sensitivity. • As far as possible ecological connectivity between areas of increased ecological sensitivity should be maintained. • Where areas of increased ecological sensitivity can be avoided, these areas should be indicated on site and be off limits to construction vehicles and workers. • Construction vehicles should be restricted to travelling on designated roadways only and vehicle access beyond the designated project footprint areas should be prohibited. • Construction camps, contractors' laydown areas and other temporary infrastructure are to be placed within areas that have already been modified and existing roads and tracks should be used during the construction process as far as possible. • No littering or dumping of waste and construction material within natural areas beyond the project footprint areas may be allowed. All excess and waste material must be removed from the construction areas once works have been completed. | | | | | | |

| | |
|--|---|
| | <ul style="list-style-type: none"> • Edge effects from construction activities, such as erosion and alien floral species proliferation and spread within disturbed areas, should be managed throughout all the development phases through the implementation of erosion control measures where required and the implementation of an alien and invasive species control plan. • Any disturbed and compacted areas outside of the project footprint must be ripped, reprofiled and revegetated with an indigenous grass species mixture upon completion of construction works. Indigenous plant species naturally growing within the area should be used for this purpose. |
|--|---|

6.2 Loss of Floral Species Diversity

Loss of floral species diversity may take place during the construction and operational phases of the project as a result of the project activities outlined below.

Construction Phase

- Clearing of vegetation for the planting of tomatoes, construction of a tomato processing facility and other infrastructure.
- Movement of construction vehicles through areas hosting an increased floral diversity.
- Disturbance beyond the project footprint area, leading to loss of habitat with increased floral diversity and species with limited representation in the region.
- Illegal harvesting of floral species with a limited representation within the study area.
- Accidental fires due to increased human activity.
- Failure to implement alien and invasive floral species control throughout all development phases.

Operational Phase

- Ongoing disturbance within the study area and surrounds due to increased human activity and movement of operational vehicles.
- Dust generation from unpaved roads impacting on floral species.
- Ongoing proliferation of alien and invasive floral species may outcompete certain species.
- Failure to undertake ongoing alien and invasive plants species management during the operational phase of the project.

Table 5. Loss of Floral Species Diversity: Preliminary Impact Ratings

| Issue | Project Phase | Impact Rating Criteria | | | | | Significance |
|------------------------------------|---------------|------------------------|--------|----------|-----------|-------------|--------------|
| | | Nature | Extent | Duration | Magnitude | Probability | |
| Without mitigation measures | | | | | | | |
| Loss of Floral Species Diversity | Construction | Negative | 2 | 5 | 8 | 4 | 60 High |
| | Operational | Negative | 2 | 5 | 8 | 3 | 45 Medium |
| With mitigation measures | | | | | | | |
| Loss of Floral Species Diversity | Construction | Negative | 1 | 5 | 6 | 3 | 36 Medium |
| | Operational | Negative | 1 | 5 | 6 | 2 | 24 Low |

| | |
|---------------------------|---|
| Corrective Actions | <p>The following preliminary mitigation measures are proposed in order to limit or reduce the impact of the proposed project on the floral ecology within the study area:</p> <ul style="list-style-type: none"> • No areas should be cleared of natural vegetation if not required for construction and operational purposes of the tomato farming and processing facilities. • The location and extent of areas of increased ecological importance and sensitivity (such as riparian areas, watercourses and drainage lines (including associated buffer zones), ridges and rocky outcrops, as well as other ecologically sensitive areas identified during the field assessment) should be considered during the pre-construction and planning phases and as far as possible in the positioning of areas to be planted for tomatoes. All permanent and temporary project infrastructure should avoid these areas. • As far as possible ecological connectivity between areas of increased ecological sensitivity should be maintained. • Where areas of increased ecological sensitivity can be avoided, these areas should be indicated on site and be off limits to construction vehicles and workers. • Construction vehicles should be restricted to travelling on designated roadways only and vehicle access beyond the designated project footprint areas should be prohibited. • Construction camps, contractors' laydown areas and other temporary infrastructure are to be placed within areas that have already been modified and existing roads and tracks should be used during the construction process as far as possible. • Edge effects from construction activities, such as erosion and alien floral species proliferation and spread within disturbed areas, should be managed throughout all the development phases. • No littering or dumping of waste and construction material within natural areas beyond the project footprint areas may be allowed. All excess and waste material must be removed from the construction areas once works have been completed. • Any fires made by construction workers, if unavoidable, should be restricted to designated areas, where accidental spread thereof can be avoided. • Any proposed landscaping in the vicinity of the vicinity of operational infrastructure (such as offices or parking areas) should only include locally indigenous species. • The establishment of a nursery for the purposes of propagating and conserving floral species that occur within the study area may be considered. Such species could be used in any proposed landscaping areas or in rehabilitation of disturbed areas. |
|---------------------------|---|

6.3 Loss of Floral SCC

Should floral SCC (including threatened, protected and endemic/ near-endemic floral species) be recorded within the study area during the field assessment, loss of such species may occur during both the construction and operational phases of the project, as a result of the of the project activities outlined below.

Construction Phase

- Clearing of vegetation for construction purposes, particularly within areas of increased ecological sensitivity known to provide habitat for floral SCC.
- Construction of infrastructure and temporary infrastructure such as access roads and contractors' laydown areas through or within areas of increased ecological sensitivity known to provide habitat for floral SCC.

- Illegal harvesting of floral SCC and floral species with a limited representation within the study area.
- Loss of floral species providing ecosystem goods and services (such as medicinal species) due to disturbance beyond the project footprint.

Operational Phase

- Ongoing disturbance within the study area and surrounds due to increased human activity and movement of operational vehicles.
- Illegal harvesting of floral SCC and floral species with a limited representation within the study area.
- Movement of operational vehicles through areas of increased ecological sensitivity known to provide habitat for floral SCC.

Table 6. Loss of Floral SCC: Preliminary Impact Ratings

| Issue | Project Phase | Impact Rating Criteria | | | | | Significance |
|------------------------------------|---|------------------------|--------|----------|-----------|-------------|--------------|
| | | Nature | Extent | Duration | Magnitude | Probability | |
| Without mitigation measures | | | | | | | |
| Loss of Floral SCC | Construction | Negative | 2 | 5 | 8 | 4 | 60 High |
| | Operational | Negative | 2 | 5 | 8 | 3 | 45 Medium |
| With mitigation measures | | | | | | | |
| Loss of Floral SCC | Construction | Negative | 1 | 5 | 6 | 3 | 36 Medium |
| | Operational | Negative | 1 | 5 | 6 | 2 | 24 Low |
| Corrective Actions | <p>The following preliminary mitigation measures are proposed in order to limit or reduce the impact of the proposed project on the floral ecology within the study area:</p> <ul style="list-style-type: none"> • Any fires made by construction workers, if unavoidable, should be restricted to designated areas, where accidental spread thereof can be avoided. • No harvesting of firewood or collection of floral species from natural areas surrounding the project footprint should be allowed by construction workers. • As far as possible, any floral SCC recorded during the field assessment should be conserved in situ and the loss of such species should be avoided. Where this is not possible or practical (due to the location of such species, their growth form/ habit or size), permits for the destruction, or rescue and relocation of floral SCC to nearby similar habitat within the study area, should be obtained from the LEDET or Department of Environmental Affairs (DEA), depending on the national and provincial conservation status of such species. Permits should also be obtained from DAFF for the destruction or relocation of any protected tree species in terms of the National Forests Act (Act No. 84 of 1998) which cannot be conserved <i>in situ</i>. | | | | | | |

7. PLAN OF STUDY FOR THE EIA PHASE

The EIA phase floral assessment will be undertaken in line with provincial and national requirements, including compliance with Appendix 6 of the NEMA (Act No. 107 of 1998) EIA Regulations (2014, as amended). The Plan of Study for the EIA Phase of the project is described in the sections below.

7.1 Field Assessment

A field assessment will be undertaken during the summer months (from November onwards) and a single wet season assessment over a number of days is planned. As far as possible, the field assessment will be timed to coincide with the flowering season of the majority of floral SCC deemed to have an increased probability of occurring within the study area, based on available information.

The purpose of the field assessment will be:

- To categorise and describe the vegetation present within the study area according to relatively homogeneous vegetation units;
- To provide an inventory of the floral species composition present within each of the vegetation units identified in the study area;
- To identify, list and categorise alien and invasive floral species in line with the NEMBA Alien and Invasive Species Regulations (2014) and Alien and Invasive Species Lists (2016) and CARA (Act No. 43 of 1983);
- To identify floral SCC that could potentially occur in the study area and surrounds, and to confirm the presence of such species where possible. Floral SCC will include:
 - IUCN and SANBI threatened plant species;
 - NEMBA TOPS species;
 - Protected trees in terms of the National Forests Act (Act No. 84 of 1998) list of Protected Tree Species (2018);
 - Protected plant species in terms of the LEMA (Act No. 7 of 2003); and
 - SCPE endemic or near-endemic species.
- To assign a conservation importance to each vegetation unit identified within the study area, based on the field assessments and also taking the results of the desktop assessment into consideration. A floral ecological sensitivity map will be produced (refer to Section 7.2); and
- To assess the potential impacts that may occur as a result of the proposed project and to provide site-specific mitigation measures and ongoing management measures that will be required to reduce such impacts (refer to Section 7.3).

7.2 Sensitivity Mapping

The ecological sensitivity of each vegetation unit identified during the field assessment will be determined by calculating the mean of five different parameters which influence floral communities and provide an indication of the overall floristic ecological integrity, importance and sensitivity of the vegetation unit. Each of the following parameters will be rated on a scale of 1 to 5 (where a score of '1' is lowest and '5' is highest):

- Floral SCC: The confirmed presence or potential for floral SCC or any other significant species, as outlined above, to occur within the vegetation unit;
- Unique Landscapes: The presence of unique landscapes, including watercourses and ridges, or the presence of an ecologically intact vegetation units in a transformed region;
- Conservation Status: The conservation status of the ecosystem or vegetation type in which the vegetation unit is situated based on local, regional and national databases;

- **Floral Diversity:** The recorded floral diversity compared to a suitable reference condition such as surrounding natural areas or available floristic databases including descriptions of the applicable vegetation types; and
- **Habitat Integrity:** The degree to which the habitat unit is transformed based on observed disturbances which may affect habitat integrity.

Each of these values contribute equally to the mean score, which determines the floral habitat sensitivity class in which each vegetation unit falls. A conservation and land-use objective is also assigned to each sensitivity class which aims to guide the responsible and sustainable utilisation or development of the applicable habitat unit in question. The different classes and land-use/conservation objectives are presented in the table below.

Table 7. Floral habitat sensitivity rankings and associated conservation objectives.

| Score | Rating Significance | Conservation objective |
|-------------|---|--|
| >4.2 - ≤5 | High: Ecologically sensitive, intact vegetation and valuable habitat, with high species richness, sensitive ecosystems or floral SCC. | Conserve and enhance the biodiversity of the vegetation unit, the no-go alternative must be considered. |
| >3.4 - ≤4.2 | Medium High: Intact, valuable habitat with limited modification, that is still ecologically sensitive to development and disturbance. | Conserve and enhance the biodiversity of the vegetation unit, limit development and disturbance. |
| >2.6 - ≤3.4 | Medium: Habitat that has undergone some disturbance, but that is still relatively ecologically intact and in a largely natural condition. | Conserve and enhance biodiversity of the habitat unit and surrounds while optimising development potential. Low-impact development with limited impact on the ecosystem could be considered, but it is still recommended that certain portions of the natural habitat be maintained. |
| >2 - ≤2.6 | Medium-low: Habitat that is mostly disturbed and the area in general has little conservation value. | Optimise development potential while improving biodiversity integrity of surrounding natural habitat and managing edge effects. Small sections could be considered for conservation or excluded from development. |
| >1 - ≤2 | Low: Habitat that has been significantly impacted within no little to no natural habitat remaining. | Optimise development potential within these areas. Land that has little conservation value and that could be considered for developed with little to no impact on the habitats or avifauna. |

7.3 Impact Assessment

As part of the EIA Phase of the project, the preliminary impacts and initial corrective actions as included in Section 6 will be refined based on the findings of the field assessment according to the method defined in Section 2.3. Together with impacts that may occur during the construction and operational phases of the proposed development, and residual and cumulative impacts will also be considered. Practical and feasible corrective actions and mitigation measures will be further development for implementation by the applicant. Monitoring requirements will also be considered.

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APPENDIX A REPRESENTATIVE SPECIES OF THE SEKHUKHUNE PLAINS BUSHVELD AND CENTRAL SANDY BUSHVELD VEGETATION TYPES

Floral species, typical of natural-state Sekhukhune Plains Bushveld and Central Sandy Bushveld vegetation, are presented in the table below. The species listed here do not necessarily occur within the study area and are presented in order to compare the recorded floral diversity with the typical floristic species composition.

Sekhukhune Plains Bushveld (Mucina & Rutherford, 2006)

Important Taxa (d – dominant)

- Tall Trees: *Vachellia (Acacia) erioloba*, *Philenoptera violacea*.
- Small Trees: *Senegalia (Acacia) mellifera* subsp. *detinens* (d), *Vachellia (Acacia) nilotica* (d), *Vachellia (Acacia) tortilis* subsp. *heteracantha* (d), *Boscia foetida* subsp. *rehmanniana* (d), *Vachellia (Acacia) grandicornuta*, *Albizia anthelmintica*, *Balanites maughamii*, *Combretum imberbe*, *Commiphora glandulosa*, *Maerua angolensis*, *Markhamia zanzibarica*, *Myroxylon aethiopicum* subsp. *schlechteri*, *Ptaeroxylon obliquum*, *Schotia brachypetala*, *Ziziphus mucronata*.
- Succulent Tree: *Euphorbia tirucalli* (d).
- Tall Shrubs: *Searsia engleri* (d), *Cadaba termitaria*, *Dichrostachys cinerea*, *Ehretia rigida* subsp. *rigida*, *Grewia bicolor*, *Karomia speciosa*, *Maerua decumbens*, *Rhigozum brevispinosum*, *R. obovatum*, *Tinnea rhodesiana*, *Triaspis glaucophylla*.
- Low Shrubs: *Felicia clavipilosa* subsp. *transvaalensis* (d), *Seddera suffruticosa* (d), *Lasiosiphon polycephalus*, *Gossypium herbaceum* subsp. *africanum*, *Jamesbrittenia atropurpurea*, *Jatropha latifolia* var. *latifolia*, *Lantana rugosa*, *Melhanie rehmannii*, *Monechma divaricatum*, *Myrothamnus flabellifolius*, *Pechuel-Loeschea leubnitziae*, *Plinthus rehmannii*.
- Succulent Shrubs: *Aloe cryptopoda* (d), *Euphorbia enormis* (d), *Kleinia longiflora* (d), *Aloe castanea*, *A. globuligemma*.
- Woody Succulent Climber: *Sarcostemma viminalis*.
- Herbaceous Climbers: *Coccinia rehmannii*, *Decorsea schlechteri*.
- Graminoids: *Cenchrus ciliaris* (d), *Enneapogon cenchroides* (d), *Panicum maximum* (d), *Urochloa mosambicensis* (d), *Aristida adscensionis*, *A. congesta*, *Eragrostis barbinodis*, *Paspalum distichum*, *Schmidtia pappophoroides*, *Stipagrostis hirtigluma* subsp. *patula*, *Tragus berteronianus*. Herbs: *Becium filamentosum* (d), *Phyllanthus maderaspatensis* (d), *Blepharis integrifolia*, *Corchorus asplenifolius*, *Hibiscus praeteritus*, *Ipomoea magnusiana*.
- Geophytic Herbs: *Drimia altissima*, *Sansevieria pearsonii*.

Biogeographically Important Taxa (^NNorthern Sourveld endemic, ^{CB}Central Bushveld endemic, ^{SK}Sekhukhune endemic, ^DBroadly disjunct distribution)

- Small Tree: *Lydenburgia cassinoides*^{SK}.
- Tall Shrub: *Nuxia gracilis*^D.
- Low Shrubs: *Amphiglossa triflora*^D, *Asparagus fourei*^N, *Hibiscus barnardii*^{SK}, *Orthosiphon fruticosus*^{CB}, *Petalidium oblongifolium*^{CB}, *Searsia batophylla*^{SK}.
- Woody Climber: *Asparagus sekukuniensis*^{SK}.
- Herb: *Aneilema longirrhizum*^{SK}.
- Geophytic Herb: *Chlorophytum cyperaceum*^{SK}.
- Succulent Herb: *Piaranthus atrosanguineus*^{CB}.

Central Sandy Bushveld (Mucina & Rutherford, 2006)

Important Taxa (d – dominant)

- Tall Trees: *Senegalia (Acacia) burkei* (d), *Vachellia (Acacia) robusta*, *Sclerocarya birrea* subsp. *caffra*. Small Trees: *Burkea africana* (d), *Combretum apiculatum* (d), *C. zeyheri* (d), *Terminalia sericea* (d), *Ochna pulchra*, *Peltophorum africanum*, *Searsia leptodictya*.
- Tall Shrubs: *Combretum hereroense*, *Grewia bicolor*, *G. monticola*, *Strychnos pungens*.
- Low Shrubs: *Agathisanthemum bojeri* (d), *Indigofera filipes* (d), *Felicia fascicularis*, *Lasiosiphon sericocephalus*
- Geoxylic Suffrutex: *Dichapetalum cymosum* (d).
- Woody Climber: *Asparagus buchananii*.

- Graminoids: *Brachiaria nigropedata* (d), *Eragrostis pallens* (d), *E. rigidior* (d), *Hyperthelia dissoluta* (d), *Panicum maximum* (d), *Perotis patens* (d), *Antheophora pubescens*, *Aristida scabrivalvis* subsp. *scabrivalvis*, *Brachiaria serrata*, *Elionurus muticus*, *Eragrostis nindensis*, *Loudetia simplex*, *Schmidtia pappophoroides*, *Themeda triandra*, *Trachypogon spicatus*.
- Herbs: *Dicerocaryum senecioides* (d), *Barleria macrostegia*, *Blepharis integrifolia*, *Crabbea angustifolia*, *Evolvulus alsinoides*, *Geigeria burkei*, *Hermannia lancifolia*, *Indigofera daleoides*, *Justicia anagalloides*, *Kyphocarpa angustifolia*, *Lophiocarpus tenuissimus*, *Waltheria indica*, *Xerophyta humilis*.
- Geophytic Herb: *Hypoxis hemerocallidea*.
- Succulent Herb: *Aloe greatheadii* var. *davyana*.

Biogeographically Important Taxa (Central Bushveld endemics)

- Graminoid: *Mosdenia leptostachys*.
- Herb: *Oxygonum dregeanum* subsp. *canescens* var. *dissectum*.

APPENDIX B: PROTECTED SPECIES IN TERMS OF THE LIMPOPO ENVIRONMENTAL MANAGEMENT ACT, 2003 (ACT NO. 7 OF 2003)

Schedule 11 Specially Protected Plants

All plants, of all indigenous cycads of the Genus *Encephalartos*, excluding cultivated seedlings of plants.

Schedule 12 Protected Plants

The plants referred to in this schedule, do not include plants which have been improved by selection or crossbreeding.

Cycads

| Common name | Scientific name |
|---|--------------------------|
| All cultivated seedlings of indigenous cycads | <i>Encephalartos</i> spp |

Trees and Shrubs

| Common name | Scientific name |
|---|---|
| The following <i>Adenia</i> species | <i>Adenia fruticosa</i> subsp. <i>simplicifolia</i> |
| Baobab | <i>Adansonia digitata</i> |
| Beech | <i>Faurea macnaughtonii</i> |
| Bitter False Thorn | <i>Albizia amara</i> subsp. <i>sericocephala</i> |
| The following <i>Boscia</i> species: | <i>Boscia angustifolia</i> var. <i>corymbosa</i> |
| | <i>Boscia foetida</i> subsp. <i>minima</i> |
| Borassus/ Selati Palm | <i>Borassus aethiopicum</i> |
| Brackenridgea | <i>Brackenridgea zanguebarica</i> |
| Capper Bush | <i>Capparis sepiaria</i> var. <i>subglabra</i> |
| The following <i>Combretum</i> species: | <i>Combretum collinum taborense</i> |
| | <i>Combretum padoides</i> |
| | <i>Combretum petrophilum</i> |
| | <i>Combretum vendae</i> |
| The following <i>Commiphora</i> species: | <i>Commiphora zanzibarica</i> |
| Currant | <i>Allophylus ainifolius</i> |
| The following <i>Elephantorrhiza</i> species: | <i>Elephantorrhiza praetermissa</i> |
| The following <i>Grewia</i> species: | <i>Grewia rogersii</i> |
| The following <i>Hibiscus</i> species: | <i>Hibiscus articulatus</i> |
| | <i>Hibiscus barnardii</i> |
| | <i>Hibiscus sabiensis</i> |
| Large Cape Myrtle | <i>Myrsine pillansii</i> |
| Large-leaved Dragon Tree | <i>Dracaena alteriformis</i> |
| Large-leaved Saucer-berry | <i>Cordia africana</i> |
| The following <i>Maytenus</i> species: | <i>Gymnosporia (Maytenus) oxycarpa</i> |
| | <i>Gymnosporia (Maytenus) pubescens</i> |
| The following <i>Ochna</i> species: | <i>Ochna glauca</i> |
| Pepperbark Tree | <i>Warburgia salutaris</i> |
| Pincushion | <i>Leucospermum saxosum</i> |
| The following <i>Searsia (Rhus)</i> species: | <i>Searsia (Rhus) batophylla</i> |
| Sand ironplum | <i>Drypetes mossambicensis</i> |

| | |
|--------------------------------|-------------------------------------|
| Black Stinkwood | <i>Ocotea bullata</i> |
| Transvaal Stinkwood | <i>Ocotea kenyensis</i> |
| Tamboti | <i>Spirostachys africana</i> |
| The following Tarenna species: | <i>Coptosperma (Tarenna) zygoon</i> |
| Transvaal Red Balloon | <i>Erythrophysa transvaalensis</i> |
| Venda Beadstring | <i>Alchornea laxiflora</i> |
| Wild Banana | <i>Ensete ventricosum</i> |
| Wild Teak | <i>Pterocarpus angolensis</i> |

Succulents

| Common name | Scientific name |
|--|---|
| All species of Aloe, excluding the following species: | |
| - | <i>Aloe aculeata</i> |
| Catstail Aloe | <i>Aloe castanea</i> |
| Krans Aloe | <i>Aloe arborescens</i> |
| Mountain Aloe | <i>Aloe marlothii</i> |
| - | <i>Aloe ammophila</i> |
| - | <i>Aloe greatheadii</i> var. <i>davyana</i> |
| - | <i>Aloe fosteri</i> |
| - | <i>Aloe globuligemma</i> |
| - | <i>Aloe grandidentata</i> |
| - | <i>Aloe greatheadii</i> var. <i>greatheadii</i> |
| - | <i>Aloe lutescens</i> |
| - | <i>Aloe mutans</i> |
| - | <i>Aloe parvibracteata</i> |
| - | <i>Aloe wickensii</i> |
| All species of Brachystelma | <i>Brachystelma</i> spp. |
| All species of Ceropogia | <i>Ceropogia</i> spp. |
| All species of Duvalia | <i>Duvalia</i> spp. |
| The following species Euphorbias: | <i>Euphorbia barnardii</i> |
| | <i>Euphorbia divicola</i> |
| | <i>Euphorbia grandialata</i> |
| | <i>Euphorbia groenewaldii</i> |
| | <i>Euphorbia louwii</i> |
| | <i>Euphorbia restricta</i> |
| | <i>Euphorbia rowlandii</i> |
| | <i>Euphorbia tortirama</i> |
| | <i>Euphorbia waterbergensis</i> |
| Ghaap | <i>Hoodia lugardii</i> (now <i>Hoodia currorii</i> subsp. <i>lugardii</i>) |
| All species of Ghaap | <i>Tavaresia</i> spp. |
| All species of Huernia | <i>Huernia</i> spp. |
| All species of Huerniopsis | <i>Huerniopsis</i> spp. |
| The following Impala Lilies: | <i>Adenium multiflorum</i> |
| | <i>Adenium oleifolium</i> |
| Kudu Lily | <i>Pachypodium saundersii</i> |
| All species of Orbeanthus | <i>Orbeanthus</i> spp. |
| All species of Orbeas | <i>Orbea</i> spp. |
| All species of Orbeopsis | <i>Orbeopsis</i> spp. |
| All species of Pachycymbiums (now mostly Orbea) | <i>Pachycymbium</i> spp. |
| All species of Riocreuxias | <i>Riocreuxia</i> spp. |
| All species of Stapeliads | <i>Stapelia</i> spp. |
| Stone Plant | <i>Lithops leslei</i> |

Other Plants

| Common name | Scientific name |
|--|--|
| The following Agapanthus species | <i>Agapanthus coddii</i> |
| | <i>Agapanthus dyeri</i> |
| The following Anacampseros species: | <i>Avonia (Anacampseros) bemenkampii</i> (now <i>A. rhodesica</i>) |
| All species of Anomatheca (now mostly <i>Freesia</i> spp.) | <i>Anomatheca</i> spp. |
| The following Anthericum species | <i>Chlorophytum (Anthericum) cyperaceum</i> |
| The following Arum Lilies: | <i>Zantedeschia jucunda</i> , |
| | <i>Z.pentlandii</i> , |

| | |
|---|---|
| | <i>Z. rehmannii</i> |
| The following Babiana species: | <i>Babiana hypogea</i> var. <i>longituba</i> |
| The following Gasteria species: | <i>Gasteria batesiana</i> |
| Blue Squill | <i>Scilla natalensis</i> (now <i>Merwillia plumbea</i>) |
| Clivia | <i>Clivia caulescens</i> |
| The following Cyathula species: | <i>Cyathula natalensis</i> |
| The following Eragrostis species: | <i>Eragrostis arenicola</i> |
| The following Eriosema species: | <i>Eriosema transvaalense</i> |
| The following Eulophia species: | <i>Eulophia coddii</i> |
| | <i>E. leachii</i> |
| The following Felicia species: | <i>Felicia fruticosa</i> subsp. <i>brevipendunculata</i> |
| The following Festuca species: | <i>Festuca dracomontana</i> |
| All species of Fire Lily | <i>Cyrtanthus</i> spp. |
| The following Freylinia species: | <i>Freylinia tropica</i> |
| The following Gladiolus species: | <i>Gladiolus macneilii</i> |
| The following Habernaria species: | <i>Habernaria kraenzliniana</i> |
| The following Heinsia species: | <i>Heinsia crinita</i> |
| The following Hermbstaedtia species: | <i>Hermbstaedtia capitata</i> |
| The following Hippocratea species: | <i>Hippocratea parvifolia</i> |
| The following Hymenodictyon species: | <i>Hymenodictyon parvifolium</i> subsp. <i>parvifolium</i> |
| The following Hyptis species: | <i>Hyptis spicigera</i> |
| The following Inula species: | <i>Inula paniculata</i> |
| The following Jasminum species: | <i>Jasminum abyssinicum</i> |
| The following Kalanchoe species: | <i>Kalanchoe crundallii</i> |
| | <i>Kalanchoe rogersii</i> |
| The following Kniphofia species: | <i>Kniphofia coralligemma</i> |
| | <i>Kniphofia crassifolia</i> |
| | <i>Kniphofia rigidifolia</i> |
| The following Kotschya species: | <i>Kotschya thymodora</i> |
| The following Melinus species: | <i>Melinis tenuissima</i> |
| The following Mondia species: | <i>Mondia whitei</i> |
| The following Monsonia species: | <i>Monsonia lanuginosa</i> |
| The following Neobolusia species (Family Orchidaceae): | <i>Neobolusia tysonii</i> |
| The following Nervillia species: | <i>Nervillia bicarinata</i> (previously <i>N. umbrosa</i>) |
| The following Nymphaea species: | <i>Nymphaea lotus</i> |
| The following Oberonia species: | <i>Oberonia disticha</i> |
| The following Oreosyce species: | <i>Cucumis (Oreosyce) africana</i> |
| Paint Brush | <i>Haemanthus montanus</i> |
| The following Peristrophe (now Dicliptera) species: | <i>Dicliptera (Peristrophe) cliffordii</i> |
| | <i>Dicliptera (Peristrophe) gillilandiorum</i> |
| | <i>Dicliptera (Peristrophe) transvaalensis</i> |
| The following Phyllanthus species: | <i>Phyllanthus pinnatus</i> |
| The following Pilea species: | <i>Pilea rivularis</i> |
| The following Plinthus species: | <i>Plinthus rehmannii</i> |
| The following Polycarpaea species: | <i>Polycarpaea eriantha</i> var. <i>effusa</i> |
| The following Polystachya species (Family Orchidaceae): | <i>Polystachya albescens</i> subsp. <i>imbricata</i> |
| The following Portulaca species: | <i>Portulaca foliosa</i> |
| | <i>Portulaca trianthemoides</i> |
| The following Rhyncosia species: | <i>Rhyncosia vendae</i> |
| Royal Paint Brush (Blood lily) | <i>Scadoxys puniceus</i> |
| The following Sartidia species: | <i>Sartidia jucunda</i> |
| The following Schizagyrium species: | <i>Schizagyrium brevifolium</i> |
| All species of South African Orchid | Family Orchidaceae |
| The following Stadmania species: | <i>Stadmania oppositifolia</i> |
| The following Streptocarpus species: | <i>Streptocarpus decipiens</i> |
| The following Strophanthus species: | <i>Strophanthus luteolus</i> |
| The following Sutera species: | <i>Sutera maerantha</i> |
| The following Thornecroftia species: | <i>Thornecroftia media</i> |
| All species of Tree Ferns: | <i>Cyathea</i> spp. |
| All species of Tree Moss: | <i>Porothamnium</i> spp. |
| | <i>Pilotrichella</i> spp. |
| | <i>Papillaria</i> spp. |
| The following Trilepisium species: | <i>Trilepisium madagascariensis</i> |

| | |
|--|-----------------------------------|
| The following <i>Tristachya</i> species: | <i>Tristachya trifaria</i> |
| The following <i>Turbina</i> species: | <i>Turbina shirensis</i> |
| The following <i>Watsonia</i> species: | <i>Watsonia densiflora</i> |
| | <i>Watsonia transvaalensis</i> |
| | <i>Watsonia wilmsii</i> |
| Wild Ginger | <i>Burmannia madagascariensis</i> |
| Wild Ginger | <i>Siphonochilus aethiopicus</i> |
| The following <i>Xylopia</i> species: | <i>Xylopia parviflora</i> |

APPENDIX C: SPECIALIST DECLARATION

DECLARATION OF INDEPENDENCE

I, **Michelle Pretorius**, declare that -

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in our possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by ourselves for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Michelle Pretorius, Pr.Sci.Nat (Ecological and Botanical Science)

A full CV will be included in the EIA Phase floral assessment.