

**(EIA) ECOLOGICAL SURVEY REPORT FOR THE PROPOSED TOWNSHIP
ESTABLISHMENT ON PORTION 8 OF THE FARM BOSCHOEK 103 JQ, RUSTENBERG
LOCAL MUNICIPALITY, NORTH WEST PROVINCE**

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This report is certified correct and represents the findings on the proposed site capability and suitability to support intended development

I declare that this report reflect a true reflection of what is existing on site and we have no conflict of interests to the project proposed.

Report signed off:



Munzhelele HE

08/03/2021

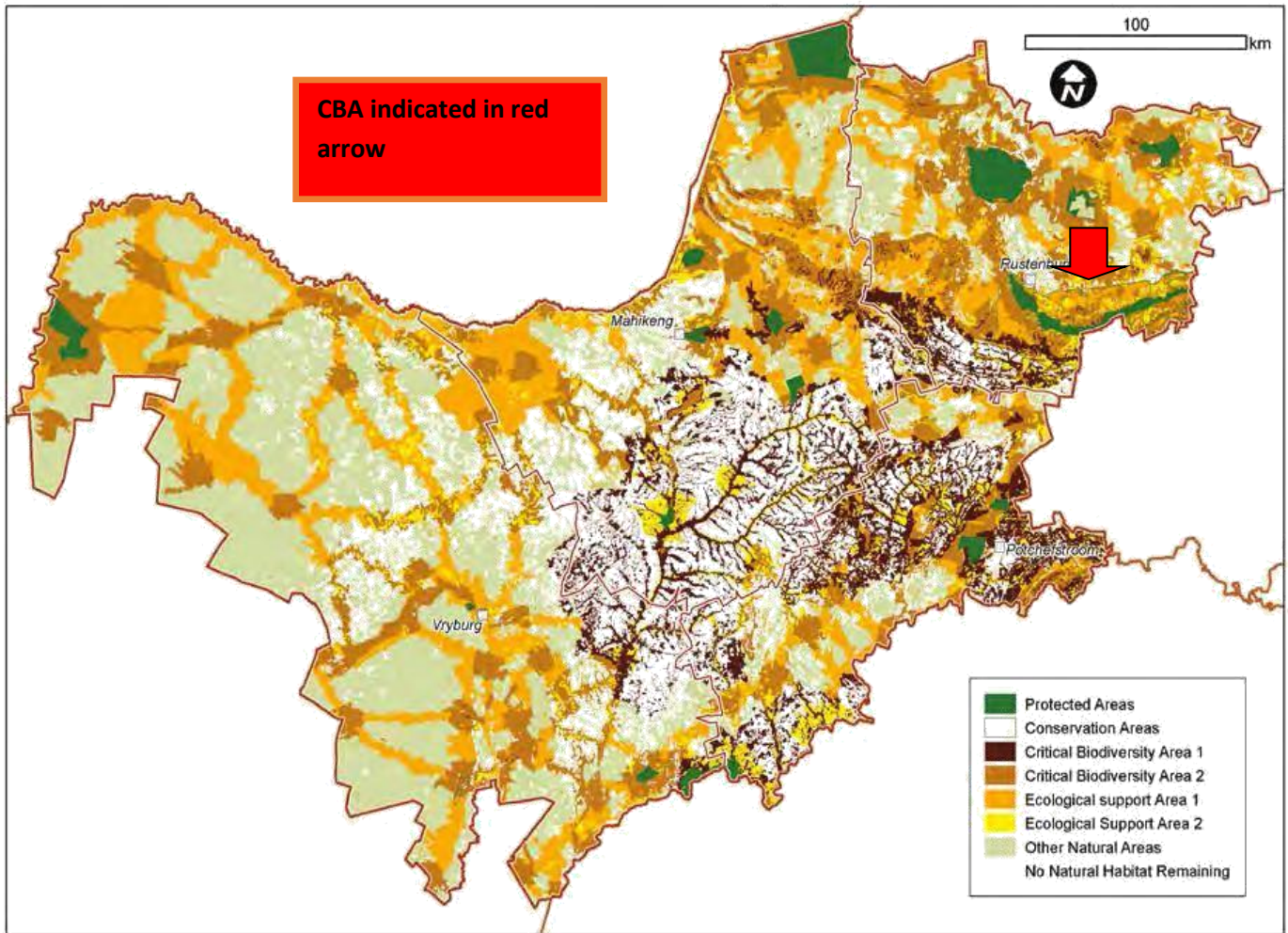
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EXECUTIVE SUMMARY

An extensive survey was undertaken on 28 February 2021 to confirm conditions of site proposed on which findings of the surveys undertaken revealed a site suitability and capability for the proposed development in conjunction with the existing rules and regulations although with some issues identified that requires restrictions based on nature of the environment. Following the findings of different surveys undertaken the outcomes the necessary measures developed will be abided with. North West provincial biodiversity sector plan was also reviewed for more relevant background information during desktop study analysis prior to visiting the site.

There was no indicators or existence of sensitive areas such as flood plains; wetlands and streams on the proposed area and its surroundings. With reference to biodiversity sector plan it was confirmed that site is falling within critical biodiversity area number 2(CBA2).(Refer to CBA map below; Map of terrestrial Critical Biodiversity Areas and Ecological Support Areas for the North West (Desmet and Schaller, 2015)



1. INTRODUCTION

1.1 Background

As stipulated in the master National environmental management Act and National Environmental management biodiversity Act and other environmental legislations; South African government is committed to sustainable development without a compromise on both human needs and protection of natural resources. Sustainable development principles are well observed and followed when considering authorizations for all development projects.

Due to the nature of the potential impacts of the proposed development on the local ecology, an Ecological study is required. This is required in order to determine the potential presence of ecologically significant species, habitats or wetland areas within the proposed project footprint which may be affected by the proposed development. Proposed mitigation and management measures in accordance with the NEMA (Act 107 of 1998) mitigation hierarchy must also be recommended in order to attempt to reduce/alleviate the identified potential impacts.

Africa Ecological was therefore subsequently appointed as the independent ecological specialist to conduct the required Ecological study for the proposed project. This report constitutes the Ecological Impact Assessment. A site visit/assessment for the proposed development footprint area was conducted on 28 February 2021. This date forms part of the end of the growing season and most plant species present were successfully identified.

This report gives all the details on the current biological diversity, land use and natural resources status of the site where proposed development will take place.

Locality of proposed site did support a proposed activity and has high suitability and capability for sustenance of the kind of envisaged development considering the growing population that led to need for more space for residential area and they also had to force encroachment without authorization.

This specialist report provides a baseline and impact assessment of the ecosystems that could be affected by the proposed development. This report gives details of the

vegetation survey and habitat survey which were done as means to determine the current ecological state of the area.

1.2 Aim and objectives

The aims of this study were as outlined below:

- Provide baseline data on habitat and species on and adjacent to the site
- Investigate potential impacts that may occur during construction and/or operational stages
- Provide advice on legislative framework relating to habitats and species on site.
- Suggest mitigation measures to be employed during the construction and operational stage; and
- Identify and assess the possible impacts that are likely to be caused by the development and their significant.
- Check and assess possibility for existence of threatened ecosystems and species.

2. STUDY AREA

2.1 Geographic Area

The area is situated on portion 08 of the farm BOSCHOEK 103 JQ Rustenburg Local Municipality, Bojanala Platinum District, North West Province.

Site is located at the following geographical positioning system recorded point (GPS):

Latitude : 25°30'08.0"S

Longitude: 27°05'08.1"E

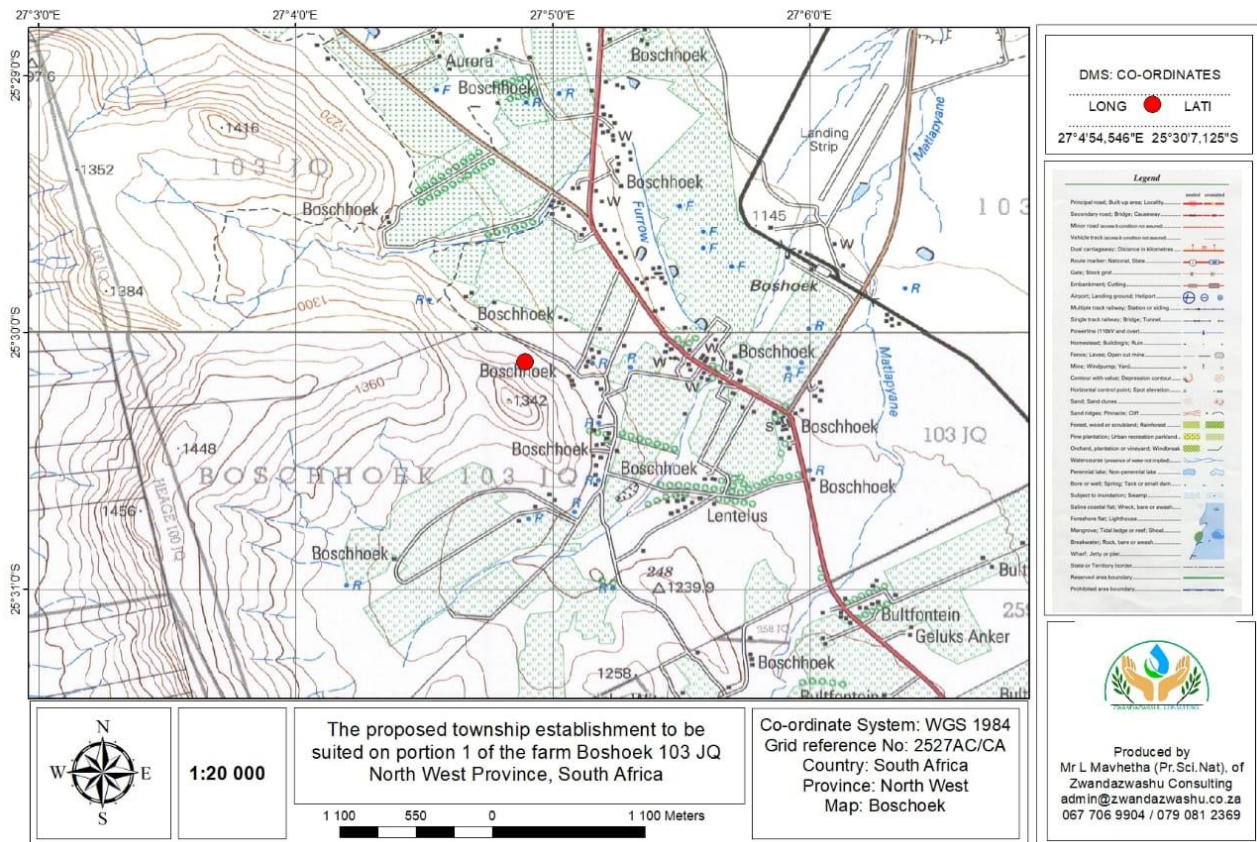


Figure 2.1.1: Topographic map showing site location

2.2 Drainage Areas

The proposed area is located along Pilanesberg mountain range which normally drains in the overall catchment area. Most of well drained soils are located on the existing farms. Most of the soils in the area are high permeable in a way that they promote good drainage of the area when water overflow from the high catchment.

2.3 Relief and Topography

The proposed new Boschoek farm is found on a level area at 1150 meter above sea level. The area is characterized by gentle undulating slopes.

2.4 Climate

Rustenburg, the nearest town to the site with climate data which is located approx. 17 km towards the southeast. The area normally receives about 513mm of rain per year, with most rainfall occurring during mid-summer. Average midday temperatures for Rustenburg range from 19.3°C in June to 29.4°C in January. The region is the coldest during July when temperatures drops to 1.7°C on average during the night; cold dry winter with mean annual rainfall from 600mm to 900mm. Temperatures range from 18C⁰ in June and 36C⁰ in December.

3. Land use

Site is currently located adjacent to recreational facility on the north western side and also there are existing houses and illegal housing in existence. Along the main road as one is accessing the site; there is a brick manufacturing industry. On the eastern south side exist a small shopping complex.

4. METHODOLOGY

The scope of the fieldwork was informed by research informed by desktop data analysis, knowledge of the study area, discussions with Darlington Borough Council, E3 Partnership Report 2005, and the timing and timescale of the study. A detailed field

survey was undertaken with focus on all biological diversity aspects. Variety of surveys that were undertaken are indicated with their findings in this report.

This study considered collection of data considering all existing previous record in order to have informative data for decision making. The following surveys were done as outlined below. Data was collected for both fauna and flora by means of field surveys. The study site and surrounding areas were assessed using a two-phased approach. Firstly, a desktop assessment of the site was conducted in terms of current vegetation classifications and biodiversity programmes and plans. This included the consideration of:

The South African Vegetation Map (Mucina and Rutherford, 2012);

North West Biodiversity Sector Plan (2015);

Department of Agriculture, Fisheries and Forestry (DAFF) - Indigenous forest maps;

National Environmental Management Biodiversity Act (NEMBA) - Biodiversity Regulations; and Plant of South Africa (POSA) – Quarter degree square level.

A site visit was conducted on the 28 February 2021. The site visit was used to conduct ecological observations and to identify potential impacts of the proposed construction for the proposed residential demarcation at Boshhoek surrounding natural environment and to inform the significance of the potential impacts identified.

4.1. Habitat and Vegetation survey

Overall area is amongst one of the critical habitat sites although specific site proposed is now a degraded and fragmented habitat due to illegal residential sites.

Assessment for possible feeding grounds: proposed site is a highly feeding ground supporting area kind of habitat for most of species. Underground burrowing animals also likely to exist in the area.

According to the South African National Biodiversity Institute Map (Mucina and Rutherford; 2012) the proposed new Boshhoek Loop is located in the Savanna biome. This biome is defined by a herbaceous layer dominated by grass species and a discontinuous to sometimes very open tree layer. The proposed new Boshhoek residential township will only occur on a single savanna vegetation type namely: • **Zeerust Thornveld.**

Zeerust Thornveld is a deciduous, open to dense short thorny woodland dominated by Acacia species with an herbaceous layer consisting of mainly grasses SANBI considers this vegetation type as Least Threatened although only 4% is statutory conserved (target is 19%). Some 16% has already been transformed by cultivation and to a lesser extent by urban built-up

Nesting sites assessment: this was done to check existence of rare species such as parrots and ground horn bill. No sites were located.

Species movement patterns was also explored to test if there are any species with consideration of most dominant plant keystone species that might be influential.

Regional vegetation cover overview

The flat, sand cover Kalahari plain in the west supports mostly open savanna type vegetation.

The dolomitic Ghaap Plateau in the south-west and including the dolomitic outlier at Morokweng.

The Bankenveld includes the Magaliesberg, Swartruggens and Dwarsberg on the border with Limpopo, and has broad-leaf woody bushveld vegetation on the hills and broad-leaf (sandy soils) or Vachellia (Acacia) savannas (heavy soils) in the valleys. The hills in the east of the province lying between the Swartruggens and the Vredefort Dome are included in the Bankenveld.

Western Grasslands cover the central and eastern plains of the province. Trees are mostly absent in this landscape except on ridges/koppies or azonal habitats. Grasslands fall into two distinct groups – those on dolomites, which are mostly intact, and those on sandy/loam soils, which are nearly extinct due to habitat loss.

The Bushveld Basin located on the plains, north of the Magaliesberg and Swartruggens hills, is covered mainly by dense to open *Vachellia* (*Acacia*) bushveld on heavy clay soils, with occasional ridges supporting broad-leafed woodlands on sandy soils.

The Lower-Vaal Valley has mostly arid thornveld type vegetation.

The characteristic Vredefort Dome landscape has similar structural vegetation to the Bankenveld (i.e. Gold Reef Mountain Bushveld) with woodland on the hills and grassland in valley or plain situations.

4.2. Vegetation survey findings on tree species

During vegetation survey different plant species were identified on site and recorded focusing on specific site of the proposed development. This included trees, shrubs and grass and herbs. The identified species are presented on a table below as per their different categories. Protected tree species as per National Forest Act 84 of 1998 are also indicated on the table below. Area is still rich in species composition.

Scientific name	Common names	Occurrence level	%cover Dominancy	Protected	Indigenous /invasive	Life Form
<i>Pappea capensis</i>	Jacket plum	Many	50%		Ind	Tree
<i>Sclerocaryabirrea</i>	Marula	Many	18%	Yes	Ind	Tree
<i>Lannea discolor</i>	Tree grape	Few	6%		Ind	Tree
<i>Vachellia karroo</i>	Sweet thorn	Many	11.9%	Yes	Ind	Tree
<i>Rhus leptodictya</i>	Mountain karee	Many	8%		Ind	Tree

<i>Spirostachys Africana</i>	Tamboti	many	15%		Ind	Tree
<i>Rhus lancea</i>	Karee	Many	12%		Ind	Tree
<i>Mondulea sericea</i>	Cork bush	Few	5,7%		Ind	Shrub
<i>Ehretia rigida</i>	puzzle bush	Medium	4,8%		Ind	Shrub
<i>Dichrostachys cinerea</i>	Sickle bush	Many	45%		Ind	Shrub
<i>Dombeya rotundifolia</i>	Wild pear		8,2%		Ind	Tree
<i>Ziziphum mucronata</i>	Buffalo thorn	Few	7%		Ind	Tree
<i>Grewia accidentalis var</i>	Cross berry	Few	3.51%		Ind	Shrub
<i>Piliostigma thonningii</i>	Camel'sfoot	Few	13%		Ind	Tree
<i>Berchemia zeyheri</i>	Red ivory	Few	7.3%		Ind	Tree
<i>Acacia tortilis</i>	Umbrella thorn	Few	15%		Ind	Tree
<i>Senna petersiana</i>	Monkey pod	Few	9%		Ind	shrub
<i>Cussonia spicata</i>	Cabbage tree	Few	4.6%		Ind	Tree
<i>Melia Azedarach</i>	Syringa	Few	1.2%		Alien	Tree
<i>Euphorbia ingens</i>	Candelabra tree	Many	12,6%		Ind	Tree
<i>Vachellia xanthophloea</i>	Fever tree	Few	1,10%		Ind	Tree
<i>Combretum apiculatum</i>	Red bush willow	Many	14%	Yes	Ind	Tree
<i>Combretum erythrophyllum</i>	River Bushwillow	Few	12%		Ind	Tree
<i>Eucalyptus grandis</i>	Red gum tree	Few	1,7%		Alien	Tree
<i>Acacia robusta</i>	Black thorn	Few	1.32%		Ind	Tree
<i>Ficus ingens</i>	Red leaved rock fig	Few	3,77%		Ind	Tree
<i>Acacia Senegal</i>	Slender three hook thorn	Few	2,5%		Ind	Tree
<i>Lannea Schweinfurthii</i>	False marula	Few	3%		Ind	Tree
<i>Grewia bicolor</i>	White raisin	Many	19.5%		Ind	Tree
<i>Opuntia ficus indica</i>	Sweet prickly pear	Few	2,7%		Alien	Cactus
<i>Celtis africana</i>	White stinkwood	Many	9,2%		Ind	Trees
<i>Croton gratissimus</i>	Lavender fever tree	Few	3,12%		Ind	Shrub
<i>Bridelia mollis</i>	Velvet sweetberry	Few	2,64%		Ind	Tree

Table 4.2.1 shows vegetation species composition occurrence on proposed site

A detailed field survey was done through walking crisscrossing the site boundaries in and out but mostly focusing inside the boundaries of demarcated area. Assessment was

done with guidance of vegetation assessment protocols outlined on national environmental management act and national forest act. Critical identified trees that were identified as the main keystone species of the area included marula and jacket plum (*Pappea capensis*). Marula is a protected tree occurring in the area. These two species are the most ones that comprise high percentage of upper canopy of the woodland.

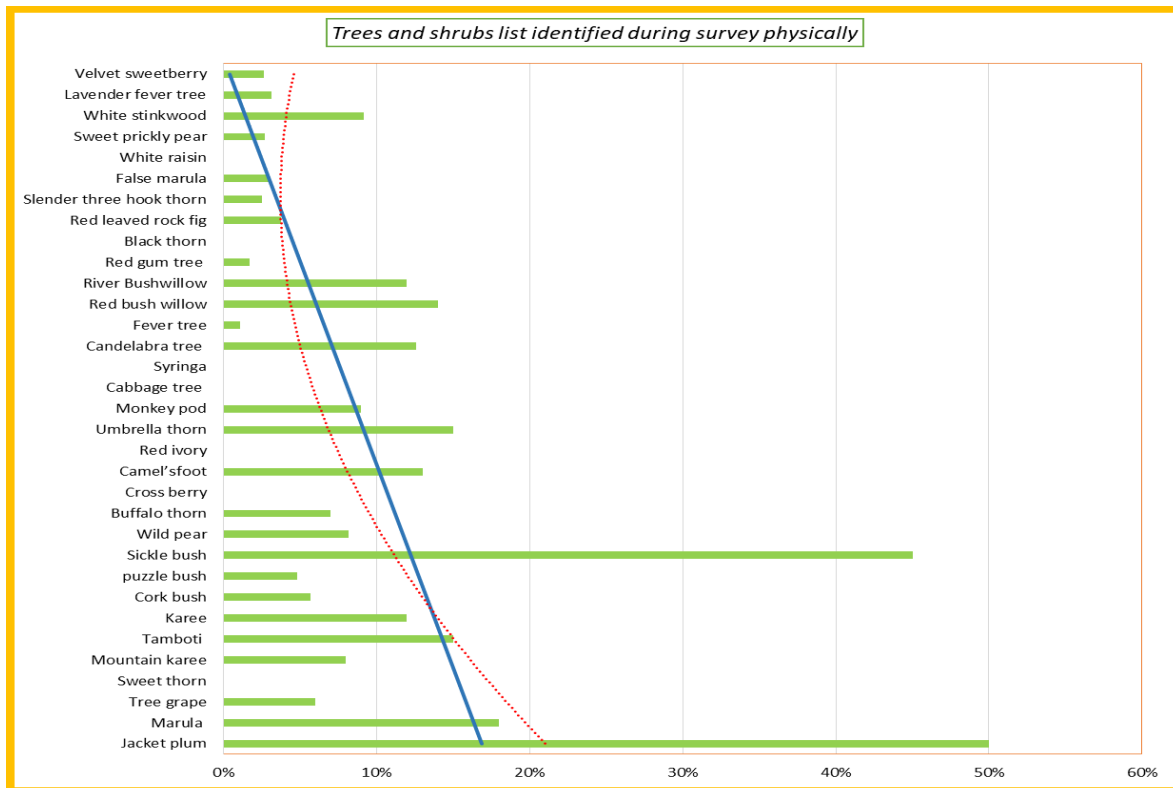
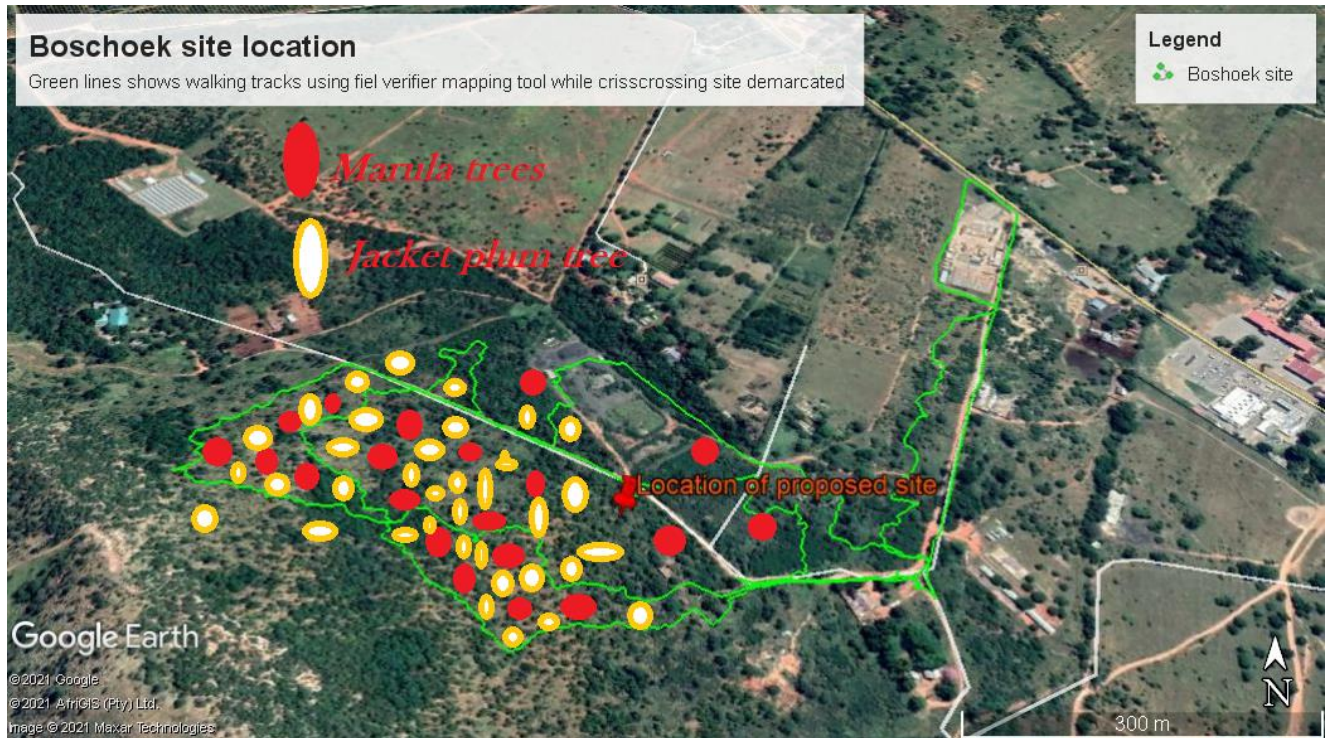


Figure 4.2.1: Graph showing species composition trend



Grass were also identified during field survey by means of walking through a line transect which was demarcated at an interval of 10m apart and 30m long. Grass are one of the important habitat species as they also comprise a habitat biome. Grass plays an essential role in nature as they are a major source of food. They provide shelter and nesting material. They also form important part of food chain for those species that utilize grass. They play a major habitat for Rodents; Birds and Insects species Survey timing was a good one since it was during growing season on which grass were still green and with seeds which made it easy to identify them.

Most rodents eat either grass seeds or grass roots while many birds eat grass seeds and build their nests with grass or in grass. Hence most grazers that eat much grass do have influence on the condition of the veld.

Data on grass composition identified is presented on a table below:

Scientific name	Common name
<i>Oropetium capense</i>	Dwarf grass
<i>Cymbopogon plurinodis</i>	Narrow leaved turpentine grass
<i>Cymbopogon excavatus</i>	Broad leaved turpentine grass
<i>Themeda triandra</i>	Red grass
<i>Enteropogon macrostachyus</i>	Mopane grass
<i>Cenchrus ciliaris</i>	Foxtail buffalo grass
<i>Panicum maximum</i>	Guinea grass
<i>Eragrostis rigidior</i>	Curly leaf grass
<i>Eragrostis trichophora</i>	Hairy love grass
<i>Monocymbium cresiiforme</i>	Boat grass
<i>Hyparrhena tamba</i>	Berg grass
<i>Eragrostis racemosa</i>	Narrow heart love grass
<i>Merxmuller disticha</i>	Mountain wire grass
<i>Tragus berteronianus</i>	Carrot seed grass
<i>Hyparrhena hirta</i>	Thatching grass
<i>Hyperthelia Dissoluta</i>	Yellow thatching grass
<i>Andropogon Gayanus</i>	Blue grass
<i>Monocymbium cerasiiforme</i>	Boat grass
<i>Heteropogon Contortus</i>	Spear grass
<i>Aristida congesta</i>	Tassel three awn
<i>Setaria Sphacelata</i>	Golden bristle grass
<i>Setaria verticillata</i>	Bur bristle grass

Table 4.1.2: Shows grass composition of the proposed area

4.2.1 Problem plants and herbaceous plants identified

Most of the identified plants were the indicators of disturbed area especially considering extent of bush encroachment of sickle bush.

Scientific Name	Common Names	Life form	Category
<i>Boerhavia diffusa</i>	spiderling	Herb	Exotic
<i>Trichodesma zeylanicum</i>	Late weed	Herb	Indigenous
<i>Achyranthes aspera</i>	Burweed ,Moxato	Herb	Probably exotic
<i>Amaranthus deflexus</i>	Perennial pig weed	Herb	Indigenous
<i>Amaranthus hybridus</i>	Pig weed	Herb	Exotic
<i>Amaranthus spinosus</i>	Thorny pig weed	Herb	Exotic
<i>Amaranthus viridis</i>	Slender amaranth	Herb	Exotic
<i>Ageratina adenophora</i>	Crofton weed	Herb	Exotic
<i>Bidens pilosa</i>	Common black jack	Herb	Exotic
<i>Conyza sumatrensis</i>	Tall fleabane	Herb	Exotic
<i>Portulaca oleracea</i>	porslein	Herb	Exotic
<i>Senecio consanguineous</i>	Starvation senecio	Herb	Exotic
<i>Tagetes minuta</i>	Tall khaki weed	Herb	Exotic
<i>Xanthium strumarium</i>	Large cocklebur	Herb	Exotic
<i>Corchorus trilocularis</i>	Wild jute /delele	Herb	Indigenous
<i>Mirabilis jalapa</i>	Four-o'clocks	Herb	Exotic
<i>Datura ferox</i>	Large thorn apple	Herb	Exotic
<i>Solanum elaeagnifolium</i>	Silver leaf bitter apple	Herb	Exotic
<i>Richardia brasiliensis</i>	Mexican richardia	Herb	Exotic
<i>Stylochiton natalensis</i>	Bushveld arum	Herb	Indigenous
<i>Pseudognaphalium luteo-album</i>	Jersey cudweed	Herb	Exotic

Table 4.2.1.1: Shows problem plant species composition

4.3. Reptile and amphibian survey

This was done by direct observation during a transect walk and indirect observation of callings from amphibians and reptile movement over the dry plants. No reptiles were identified during field visit although the following are likely to be found: Moles, Chameleons, and Lizards various snakes. Area is also a favorable snake such as green mambas and pythons. These are indicated on the attached appendix(s). Amphibians are unlikely to be found in the area and if occurring will be the tree frogs that are only found during rainy seasons since the area does not have any wetland or river. Although snakes were not physically sited they definitely exist in this suitable habitat.

4.4. Bird survey

Birds are known to be some of the mobile species that once and again fly over to different habitats searching for food and also for breeding sites. Birds were observed during site assessment. Also there were no protected bird species that were identified during field visit or either on existing documents but they are highly likely to be sighted considering that the area is located near a protected area which already support complex diversity of species. Since bird species are not stationed at one area; they are likely to be observed and or be occurring on the nearby habitats. In general, this area falls under the area of high ecological value which tends to support more bird species such as doves because of tree species that are loved by birds. More bird's callings were heard during field survey although couldn't easily be spotted.

The following birds species were seen during site assessments: mostly prominent crests (brownbul); hadeba ibis; African mourning dove; red eyed dove; dark –capped bulbul. Sparrows and eagles together with owls are also likely to be found in this area.

The following birds occur within the Magaliesberg IBA and may also be observed at the mountain located just on the southern side of the proposed site:

Scientific name	Common name	Occurrence
Torgos tracheliotu	Lappet-faced Vulture	
Aquila verreauxii	Verreaux Eagle	Breeds in the Magaliesberg
Falco biarmicus	Lanner falcon	Throughout IBA
Tyto capensis	African Grass Owl	Recorded regularly throughout the IBA
Sagittarius serpentarius	Secretary bird	Recorded regularly throughout the IBA
Lophaetus occipitalis	Long-crested Eagle	Is a more recent coloniser of the range
Eupodotis senegalensis	White-bellied Korhaan	Found in grassland at the top of the Magaliesberg and Witwatersberg.
Ciconia nigra	Black Stork	One pair of breeds at Skeerpoort
Alcedo semitorquata	Half-collared Kingfisher	Densely wooded valleys along overgrown, slow-flowing streams
Podica senegalensis	African Finfoot	Recorded regularly along rivers in the IBA, such as the Hennops and Magalies

Table 4.4.1: common birds that occur in the greater Pilanesberg mountain range and Boschoek area.

The proposed Boshhoek township site is located approximately 14km north of the Magaliesberg Important Bird Area (IBA). Previously known as the Magaliesberg and Witwatersberg IBA, this IBA consists mainly of the Magaliesberg mountain range, which extends in an arc from just north-west of Rustenburg in the west to the N1 in the east

near Pretoria. To the south, the Witwatersberg mountain range runs parallel to the Magaliesberg, extending from the town of Magaliesburg in the west to Hartbeespoort Dam in the east.

The following protected bird species occur within the Magaliesberg IBA and may be found at Magaliesberg IBA as indicated by: Marnewick et al. (2015): Cape Vulture; Verreauxs Eagle; Lanner falcon; African Grass Owl; Half-collared-Kingfisher; Barred Wren-Warbler; White-bellied sunbird; Kurrichane thrush; White-throated Robin-chat.

4.5 Mammal survey

Literature on local fauna was limited. All information for faunal groups occurring within the region was therefore obtained from the Magaliesberg IBA literature description (Marnewick et al; 2015).

Mammals are one of the species that are sensitive to disturbed and human settlement areas. Of the 112 mammal species that occur in the area, brown hyena (***Hyena brunnea***) and leopard (***Panthera pardus***) are the major large predators (Marnewick et al, 2005).

The leopard is the apex predator, while the brown hyena shares the scavenging guild with the vultures, however, a temporal separation in that the hyena is largely nocturnal. It is however highly unlikely that any of these mammal species will occur within the proposed site.

Smaller mammals like field mice, porcupines, aardvark etc. may occur although they were not observed during the site assessment. Although mammals were not sited but they are likely to be found in the area. It is still favorable habitat for most of mammals.

4.6 Butterfly; Beetles; Locusts, Ants and dragon fly survey

Butterflies and dragon fly are species that like to be found in wet areas and also during flowering season. Although this is the case none of these species were identified in the area; and are also likely to be found during wet seasons when temporary ponds can be established after rains. None of protected species or rare have been identified under this category. Dragon flies are also having a potential of existing in this area.

Locusts were also sited on site with more variety of species; with site having lot of grass which created a good micro ground habitat for ants and beetles that like feeding on grass and also nesting.

4.7 Stream; wetland survey and existence of sensitive area(s)

An intensive survey was done using wetland identification and delineation observation criteria and none of wetlands were found to be occurring on site. There is no need for doing a wetland delineation or investigation. Site visit was done just after rains that occurred but none of stream was identified.

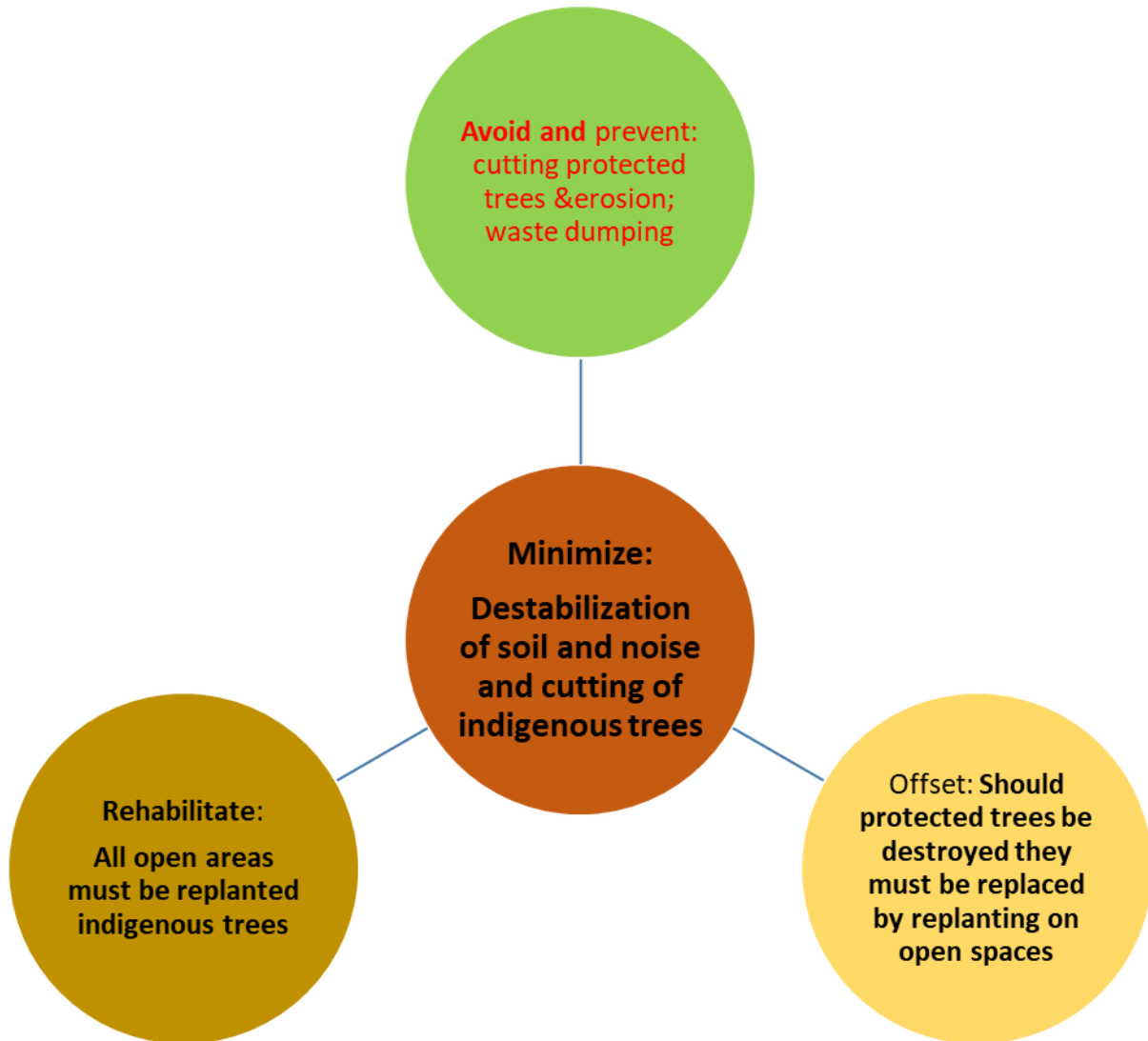
4.8 CRITICAL BIODIVERSITY AREAS ASSESSMENT (North West biodiversity sector plan and North West Province Biodiversity Conservation Assessment Technical Report)

A confirmation has been done using desktop analysis on GIS and field validation to confirm status of critical biodiversity area. Site is located on a critical CBA 2 layer in terms of critical biodiversity area.

As confirmed during field survey vegetation on proposed site at the center and were layout plan is much narrow it has been transformed with mostly alien plants and bush encroaching species occurring. Moving to the west site has high dense vegetation and also moving up to the mountain is where was found to be more dense with more big trees forming a to canopy layer.

5. MITIGATION MEASURES TO BE TAKEN INTO ACCOUNT

The following mitigation measures must be taken into account during development should there be such kind of resources to be taken care of during development.



The Impact Mitigation Hierarchy (DEA et al., 2013)

5.1 Restrictions based on issues findings to minimize ecological impacts

Considering that the site is located in a CBA2 area which is still having high biodiversity the following restrictions must be considered to avoid and or minimize possible impacts on trees: Measures to prevent people to disturb or destroy indigenous must be strictly -

be imposed as indicated in the national forest act which also guide how forest resources must be used. Illegal housing was found to have taken over most of the proposed site where people already put their own fences. People who have started occupying the site are removing trees without permission or any authorization.

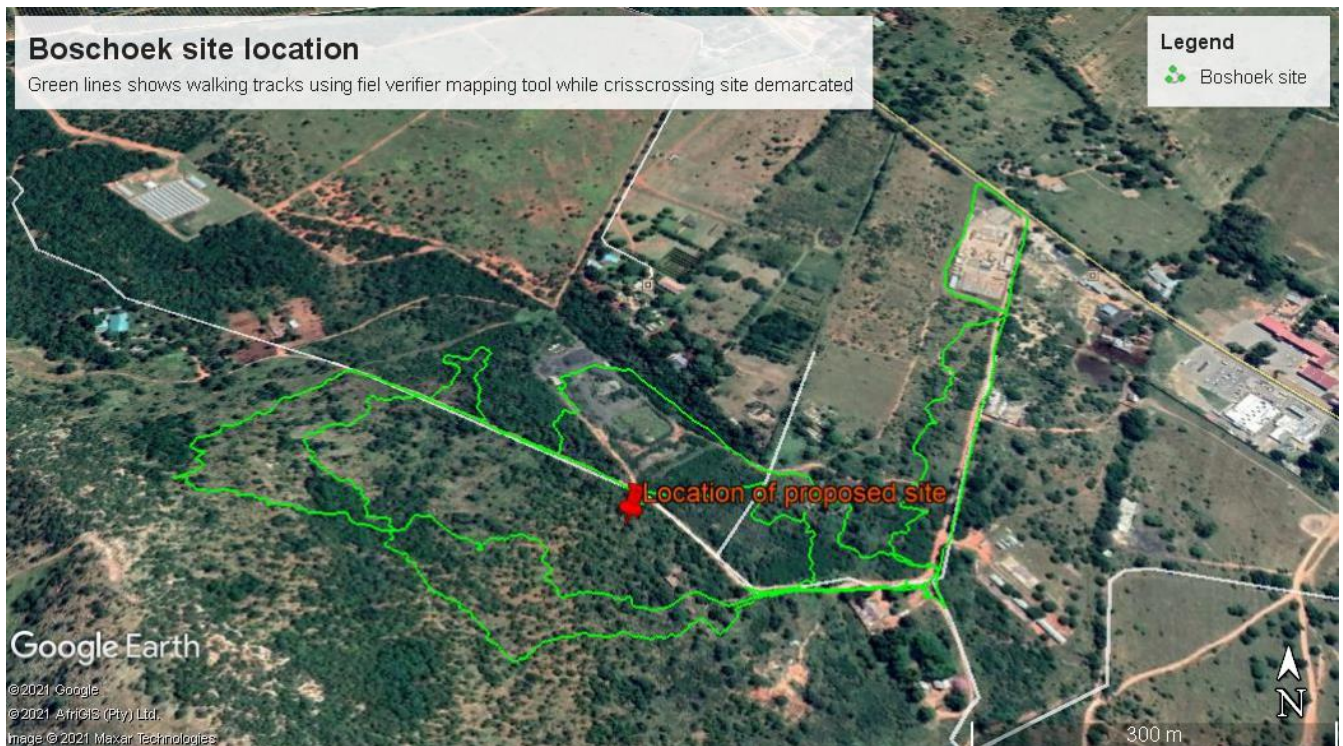


Figure 5.1.1: Shows site boundaries as walked through

6. RED DATA PLANT EXISTENSE ON SITE

A review on red data plant list was done to check their existence on proposed site and those that were identified are indicated on a table list below

SA AFRICAN RED DATA PLANT LIST BASED ON IUCN CLASSIFICATION		
SCIENTIFIC NAME	COMMON NAMES	CATEGORY
<i>Sclero carya birea</i>	Marula/mufula(v)	Least concern(LC)
<i>Lannea discolor</i>	Wild plum	Least concern(LC)
<i>Dichrostachyscinerea</i>	Sickle bush	Least concern(LC)
<i>Dombeya rotundifolia</i>	Wild pear	Least concern(LC)
<i>Combretum collinum</i>	Weeping bush willow	Least concern(LC)
<i>Lannea schweiafurthii</i>	False marula	Least concern(LC)
<i>Ehretia rigida</i>	Puzzle bush	Least concern(LC)
<i>Grewia bicolar</i>	White raisin	Least concern(LC)
<i>Spirostachys Africana</i>	Tamboti	Least concern(LC)
<i>Acacia Senegal</i>	Slender three hook thorn	Least concern(LC)
<i>Acacia tortilis</i>	Umbrella thorn	Least concern(LC)
<i>Ziziphus mucronata</i>	Buffalo thorn	Least concern(LC)

Table 6.1: shows red data plant species

7. EVALUATION OF ECOLOGICAL IMPACTS

The criteria for the description and assessment of environmental impacts were drawn from the EIA Regulations, published by the Department of Environmental Affairs and Tourism (April 1998) in terms of the Environment Conservation Act (ECA), 1989 (Act 107 of 1989). Although the ECA EIA Regulations have been repealed, the Guideline Document still provides good guidance for significance determination (Charles J.K. 1994).

The level of detail as depicted in the EIA regulations were fine-tuned by assigning specific values to each impact. In order to establish a coherent framework within which all impacts could be objectively assessed, it was necessary to establish a rating system, which was applied consistently to all the criteria. For such purposes each aspect was

assigned a value, ranging from one (1) to five (5), depending on its definition. This assessment is a relative evaluation within the context of all the activities and the other impacts within the framework of the project. The impact assessment criteria used to determine the impact of the proposed development are as follows:

- Nature of the impact;
- The Source of the Impact;
- Affected Stakeholders;
- Extent - The physical and spatial scale of the impact;
- Duration - The lifetime of the impact, that is measured in relation to the lifetime of the proposed development;

Below table outline impact ranking of the proposed development in and around the proposed area. Due to the area being a farm the impact ranking results came at a very low level to most of possible impacts. But in consideration of indirect impacts that might exist adjustment of scores was also done to cover that.

Nature of Impact	Development stage associated with	IMPACT RANKING, WEGHING AND SCALING							
		extent	Duration	Intensity	Probabili ty	Weightin g factor	Significa nce	Mitigatio n efficiency	Significa nce
Removal of vegetation	A	5	3	4	5	5	10-1	4.0	0-3
Destabilization of soil	A								
	B	3	3	3		3	20-39	1.0	20-39
Compaction of soil	A								
	B	1-2	2	3	3	3	20-39	1.0	20-39

Spread of invasive alien plant seeds	A	2	2	1	3	2	20-39	0.6	20-39
Habitat fragmentation	A	3	3	3	3	3	0-19	1.0	0-1

Figure 7.1: Assessment of impact which is likely to happen during development

Above impact ranking confirm that there will be impact on vegetation cover when sites get to be developed although based on findings impact on removal of trees have already started due to illegal occupation of land where people have put their tin houses.

8. CONCLUSION AND RECOMMENDATIONS

The proposed development will be located on the on a savannah biome of bushveld which is having high number of species composition with shrubs and trees. Main land use in the area is agriculture and some industrial activities. No wetlands or stream are in existence. It is concluded that site is suitable for residential purpose provided all measures will be followed.

- A specialist (Environmental officer) must be appointed to deal with all environmental issues as indicated on the impact assessment. This will assist in implementing an environmental friendly development.
- A license to disturb or cut indigenous trees and also protected trees must be applied for from the Department of Agriculture, forestry and fisheries as per National Forest Act, 1998 (Act No. 84 of 1998)

- National Environmental management biodiversity 2004 (Act No 10 of 2004) (NEMBA) must also be considered when dealing with invasive alien plants so that all measure can be based on this legislation and its regulations.
- Environmental management plan must be developed to cater for detailed mitigations during all development phases and for a catchment possible indirect impacts.
- Minimize cutting down of big indigenous trees where possible but also ensure that protected get conserved.
- Transportation of material must be done with care in order to minimize the transportation of alien plants seeds from one point to another.
- People must be encouraged to include big trees within their plans in order to promote conservation of vegetation. This will help to promote insitu conservation of most of species.
- Municipality must promote an eco-township development in the area in order to safe guard existing vegetation.
- Indigenous trees must not be cut; disturbed or removed without a permit from forestry as required by the national forest Act.

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APPENDIX A: LEGISLATION CONSIDERED AND RELEVANT

The criteria it was necessary to list relevant legislation for reference while working in the area and further guidance in order to improve compliance. Therefore all legislations applicable are listed below:

Name	Overview
National Environmental Management Act (Act No. 107 of 1998)	To provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote cooperative governance and procedures for co-ordinating environmental functions exercised by organs of state; to provide for certain aspects of the administration and
National Environmental Management	The purpose of the Biodiversity Act is to provide for the management and conservation of South Africa's biodiversity within the framework set out by NEMA and the protection of species and ecosystems that warrant
National Environmental Management: Protected Areas Act (Act No. 57 of	The Act provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes; for the establishment of a national register of all national, provincial and local protected areas; for the management of those areas in accordance with national norms and
National Spatial Biodiversity Assessment, 2004	The National Spatial Biodiversity Assessment (NSBA) classifies areas as worthy of protection based on its biophysical characteristics, which are ranked according to priority levels
National Biodiversity Assessment, 2011 (NBA)	The purpose of the NBA is to assess the state of South Africa's biodiversity based on best available science, with a view to understanding trends over time and informing policy and decision-making across a range of sectors.
National Biodiversity Framework	The purpose of the NSF is to provide a framework to co-ordinate and align the efforts of the many organisations and individuals involved in conserving and managing South Africa's biodiversity, in support of sustainable development. The NBF provides a framework for conservation and
List of Threatened species / ecosystems	<p>The purpose of listing threatened ecosystems is primarily to reduce the rate of ecosystem and species extinction. This includes preventing further degradation and loss of structure, function and composition of threatened ecosystems. Threatened ecosystems are identified using different criteria such as:</p> <ul style="list-style-type: none"> • Irreversible loss of natural habitat • Ecosystem degradation and loss of integrity • Limited extent and imminent threat • Threatened plant and animal species associations • Priority areas for meeting explicit biodiversity targets as defined
National Forests Act (Act No. 84 of 1998):	This Act provides for the management, utilisation and protection of forests through the enforcement of permitting requirements associated with the removal of protected tree species, as indicated in a list of
The National Water Act (Act No. 36 of	This Act aims to provide management of the national water resources to achieve sustainable use of water for the benefit of all
Municipal Systems Act (Act No. 32 of 2000)	This Act aims to empower local government to fulfil its Constitutional objects, regulate key municipal organisational, planning participatory and

Spatial Planning and Land Use Management Act / Act	This Act is a framework act for all spatial planning and land use management legislation in South Africa. It seeks to promote consistency
Convention of Biological Diversity (CBD)	South Africa is a signatory to the CBD, which requests countries to: <ul style="list-style-type: none"> • Establish a system of protected areas to conserve biodiversity; • Develop guidelines for the selection, establishment and management of protected areas;
Name	Overview
<i>National Environmental Management</i>	To provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote cooperative
National Environmental Management:	The purpose of the Biodiversity Act is to provide for the management and conservation of South Africa's biodiversity within the framework set out by NEMA and the protection of
National Environmental Management:	The Act provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes;
National Spatial Biodiversity Assessment,	The National Spatial Biodiversity Assessment (NSBA) classifies areas as worthy of protection based on its biophysical characteristics, which are ranked according to
National Biodiversity Assessment,	The purpose of the NBA is to assess the state of South Africa's biodiversity based on best available science, with a view to understanding trends over time and informing policy and
National Biodiversity Framework	The purpose of the NSF is to provide a framework to co-ordinate and align the efforts of the many organisations and individuals involved in conserving and managing South Africa's
List of Threatened species /	The purpose of listing threatened ecosystems is primarily to reduce the rate of ecosystem and species extinction. This includes preventing further degradation and loss of structure,
National Forests Act (Act No.	This Act provides for the management, utilisation and protection of forests through the enforcement of permitting requirements associated with the removal of protected tree
The National Water Act (Act No. 36 of 1998)	This Act aims to provide management of the national water resources to achieve sustainable use of water for the benefit of all water users.
Municipal Systems Act (Act No. 32 of	This Act aims to empower local government to fulfil its Constitutional objects, regulate key municipal organisational, planning participatory and service delivery systems.

Spatial Planning and Land Use Management Act (Act No. 16)	This Act is a framework act for all spatial planning and land use management legislation in South Africa. It seeks to promote consistency and uniformity in procedures and decision-making in this field.
Convention of Biological Diversity (CBD)	South Africa is a signatory to the CBD, which requests countries to: <ul style="list-style-type: none"> • Establish a system of protected areas to conserve

APPENDIX B: Red data Species Checklist Considered

(National Environmental Management Biodiversity Act (Act 10 of 2004))

REPTILIA						
SCIENTIFIC NAME	COMMON NAME	CRITICALLY ANDANGERED	ENDANGERED	VULNERABLE	PROTECTED	LIKELY TOEXIST ON PROPOSED AREA
<i>Caretta caretta</i>	Loggerhead Sea Turtle	✓				
<i>Dermochelys coriacea</i>	Leatherback Sea Turtle	✓				
<i>Eretmochelys imbricate</i>	Hawksbill Sea Turtle	✓				
<i>Chelonia mydas</i>	Green Turtle		✓			
<i>Cordylus giganteus</i>	Giant Girdled Lizard		✓			✓
<i>Lepidochelys olivacea</i>	Olive Ridley Turtle		✓			
<i>Psarnrnobates geornetricus</i>	Geometric Tortoise		✓			
<i>Bitis gabonica</i>	Gabon Adder				✓	✓
<i>Bitis schneideri</i>	Namaqua Dwarf Adder				✓	
<i>Bradypodion taeniabronchum</i>	Smith's Dwarf Chameleon				✓	
<i>Cordylus cataphractus</i>	Armadillo Girdled Lizard				✓	
<i>Crocodylus niloticus</i>	Nile crocodile				✓	
<i>Python natalensis</i>	African Rock Python				✓	✓
AVES						

SCIENTIFIC NAME	COMMON NAME	CRITICALLY ANDANGERED	ENDANGERED	VULNERABLE	PROTECT ED	LIKELY TOEXIST ON PROPOSED AREA
<i>Grus carunculatus</i>	Wattled Crane	✓				
<i>Hirundo atrocaerulea</i>	Blue Swallow	✓				
<i>Neophron percnopterus</i>	Egyptian Vulture	✓				
<i>Poicephalus robustus</i>	Cape Parrot			✓		
<i>Trigonoceps occipitalis</i>	White-headed Vulture			✓		
<i>Aquila rapax</i>	Tawny Eagle			✓		
<i>A rdeotis kori</i>	Kori Bustard			✓		
<i>Ciconia nigra</i>	Black Stork			✓	✓	
<i>Circaetus fasciolatus</i>	Southern Banded Snake Eagle			✓	✓	
<i>Eupodotis caerulescens</i>	Blue Korhaan			✓	✓	
<i>Falco fasciinucha</i>	Taita Falcon			✓		
<i>Falco naumanni</i>	Lesser Kestrel			✓		
<i>Falco peregrinus</i>	Peregrine Falcon			✓		
<i>Geronticus calvus</i>	Bald Ibis			✓		
<i>Neotis ludwigii</i>	Ludwig's Bustard			✓		
<i>Polemaetus bellicosus</i>	Martial Eagle			✓		
<i>Terathopius ecaudatus</i>	Bateleur			✓		
<i>Tyto capensis</i>	Grass Owl			✓		✓
<i>Bucowus leadeateri</i>	Southern Ground-Hornbill				✓	
<i>Circus ranivorus</i>	African Marsh Harrier				✓	
<i>Neotis denhami</i>	Denham's Bustard				✓	
<i>Spheniscus demersus</i>	Jackass Penguin				✓	

MAMMALIA

SCIENTIFIC NAME	COMMON NAME	CRITICALLY ANDANGERED	ENDANGERED	VULNERABLE	PROTECT ED	LIKELY TOEXIST ON PROPOSED AREA
<i>Bunolagus monticularis</i>	Riverine Rabbit	✓				
<i>Chrysospalax villosus</i>	Rough-haired Golden Mole	✓				

<i>Arnblysomus robustus</i>	Robust Golden Mole					
<i>Damaliscus lunatus</i>	Tsesebe			✓		
<i>Diceros bicornis</i>	Black Rhinoceros		✓			
<i>Lycaon pictus</i>	African Wild Dog		✓			
<i>Neamblysomus gunningi</i>	Gunning's Golden Mole		✓		✓	
<i>Ourebia ourebi</i>	Oribi		✓		✓	✓
<i>Paraxerus palliatus</i>	Red Squirrel		✓		✓	✓
<i>Acinonyx jubatus</i>	Cheetah		✓			
<i>Cricetomys gambianus</i>	Giant rat		✓			
<i>Manis temminckii</i>	Pangolin		✓			✓
<i>Neamblysomus julianae</i>	Juliana's Golden Mole		✓			
<i>Otomops martiensseni</i>	Large-eared Free-tailed Bat		✓			
<i>Panthera leo</i>	Lion		✓			
<i>Panthera pardus</i>	Leopard		✓			
<i>Philantomba monticola</i>	Blue Duiker		✓			
<i>Atelerix frontalis</i>	South African Hedgehog		✓			
<i>Connochaetes gnou</i>	Black Wildebeest		✓			
<i>Crocuta</i>	Spotted Hyena		✓			
<i>Felis nigripes</i>	Black-footed Cat		✓			
<i>Parahyaena brunnea</i>	Brown Hyena		✓			
<i>Loxodonta africana</i>	African elephant		✓			
<i>Lutra maculicollis</i>	Spotted-necked Otter		✓			✓
<i>Mellivora capensis</i>	Honey Badger		✓			✓
<i>Redunca arundinum</i>	Reedbuck		✓			
INVERTEBRATA						
SCIENTIFIC NAME	COMMON NAME	CRITICALLY ANDANGERED	ENDANGERED	VULNERABLE	PROTECTED	LIKELY TOEXIST ON PROPOSED AREA

<i>Colophon spp</i> - All species	Stag Beetles		✓			
<i>Aloeides clarki</i>	Coega Copper Butterfly					
<i>Ceratogyrus spp</i> - All species	Horned Baboon Spiders					
<i>Echinodiscus bisperforatus</i>	Pansy Shell			✓		
<i>Dromica spp</i> - All species	Tiger Beetles		✓			✓
<i>Graphipterus assimilis</i>	Velvet Ground Beetle					
<i>Xadogenes spp</i> - All species	Flat Rock Scorpions					
<i>Halite's midae</i>	South African Abalone				✓	
<i>Xarpactira spp</i> - All species	Common Baboon Spiders				✓	✓
<i>Ichneustoma spp</i> - All species	Fruit Chafer Beetles				✓	
<i>Manticora spp</i> - All species	Monster Tiger Beetles				✓	
<i>Megacephala asperata</i>	Tiger Beetle				✓	
<i>Megacephala regalis</i>	Tiger Beetle				✓	
<i>Nigidius auriculatus</i>	Stag Beetle				✓	✓
<i>Oonotus adpersus</i>	Stag Beetle				✓	
<i>Oonotus interioris</i>	Stag Beetle				✓	✓
<i>Oonotus rex</i>	Stag Beetle				✓	
<i>Oonotus sericeus</i>	Stag Beetle				✓	
<i>Opisthacanthus spp</i> - All species	Creeping Scorpions				✓	
<i>Opisththalmus spp</i> - All species	Burrowing Scorpions				✓	✓
AMPHIBIA						
SCIENTIFIC NAME	COMMON NAME	CRITICALLY ANDANGERED	ENDANGERED	VULNERABLE	PROTECTED	LIKELY TOEXIST ON PROPOSED AREA
<i>Pyxicephalus adpersus</i>	Giant Bullfrog				✓	
<i>Pyxicephalus edulis</i>	African Bullfrog				✓	

APENDIX C: Photos: Listed photos below shows view of the site in terms of vegetation cover and condition of the land as found during field surveys.



Photo 1: grass cover on site



Photo 2: shows overview of site at the bottom

Open space with grass cover and foot passes; old hosing structures; big standing gum tress and syringe trees being the most attractive features as one enters the site. This is where most illegal housing starts.



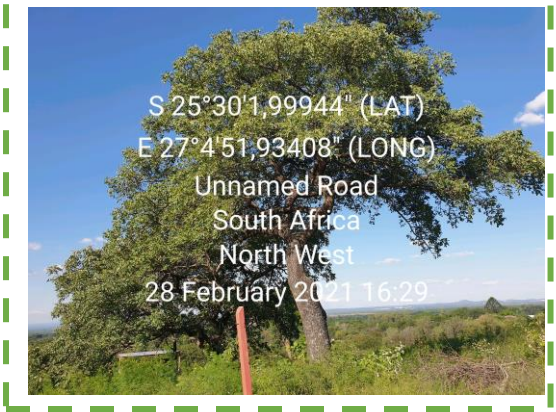
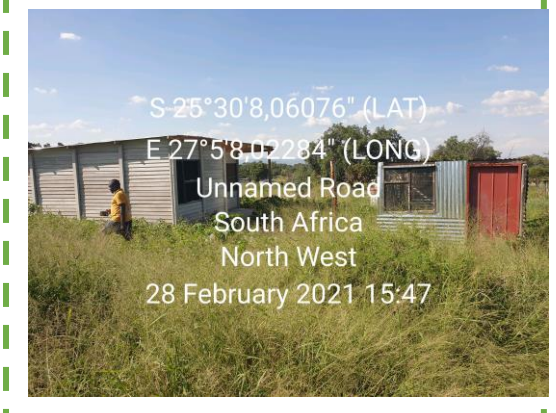
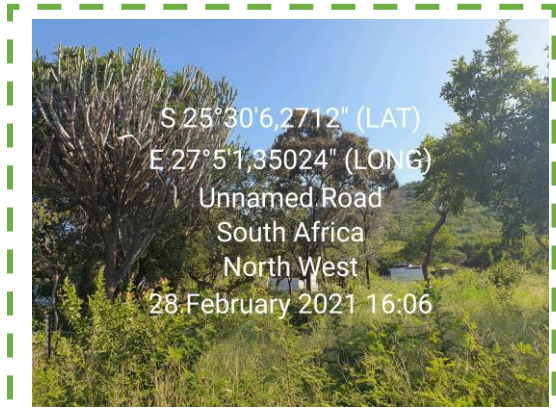
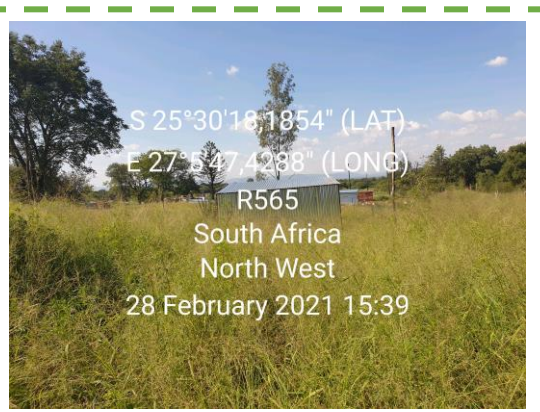
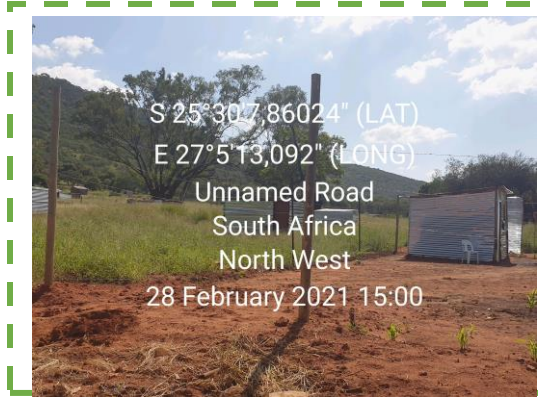
Photos above shows illegal housing taking place on site



Photo: view of vegetation cover destruction



Photo 7: show shacks encroaching towards the mountain



Photos above shows existing illegal housing taking place at proposed site.

Some are still built while some already occupied. As seen some are causing vegetation destruction.

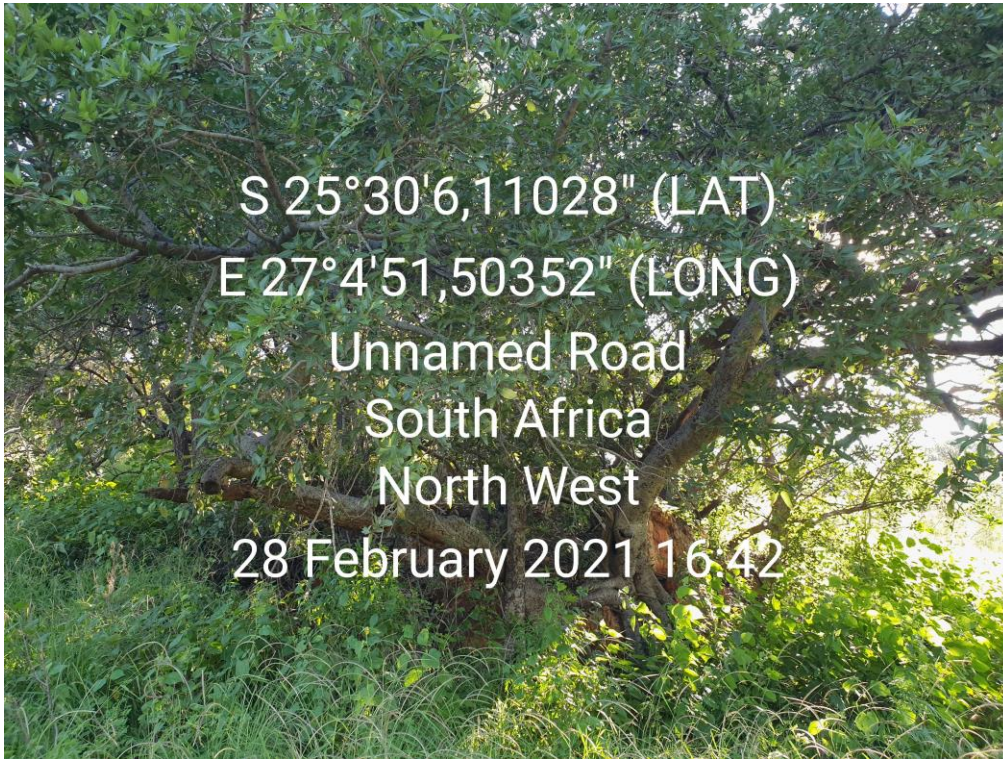


Photo showing ficus tree located on site where stands will not reach.



Shows tamboti tree on site

APPENDIX D: AREA SENSITIVITY OVERVIEW AS REVEALED DURING ENVIRONMENTAL SCREENING

An overview of the area was undertaken through a desktop study using a recommended screening environmental tool as mandated by the national department of environmental forestry and fisheries which gazette that for every environmental impact assessment to be done for development projects screening for environmental sensitivity must be done.

Development footprint will not have impact on the area in consideration of the type of development and a buffer zone outlined.

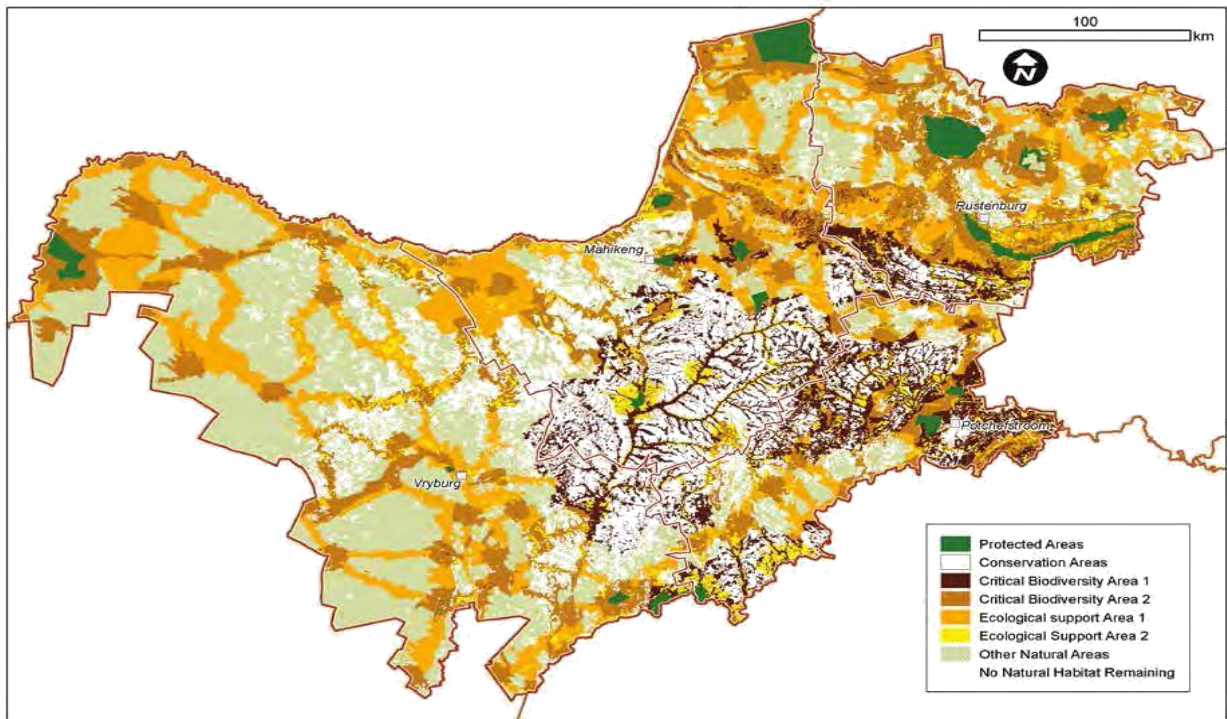
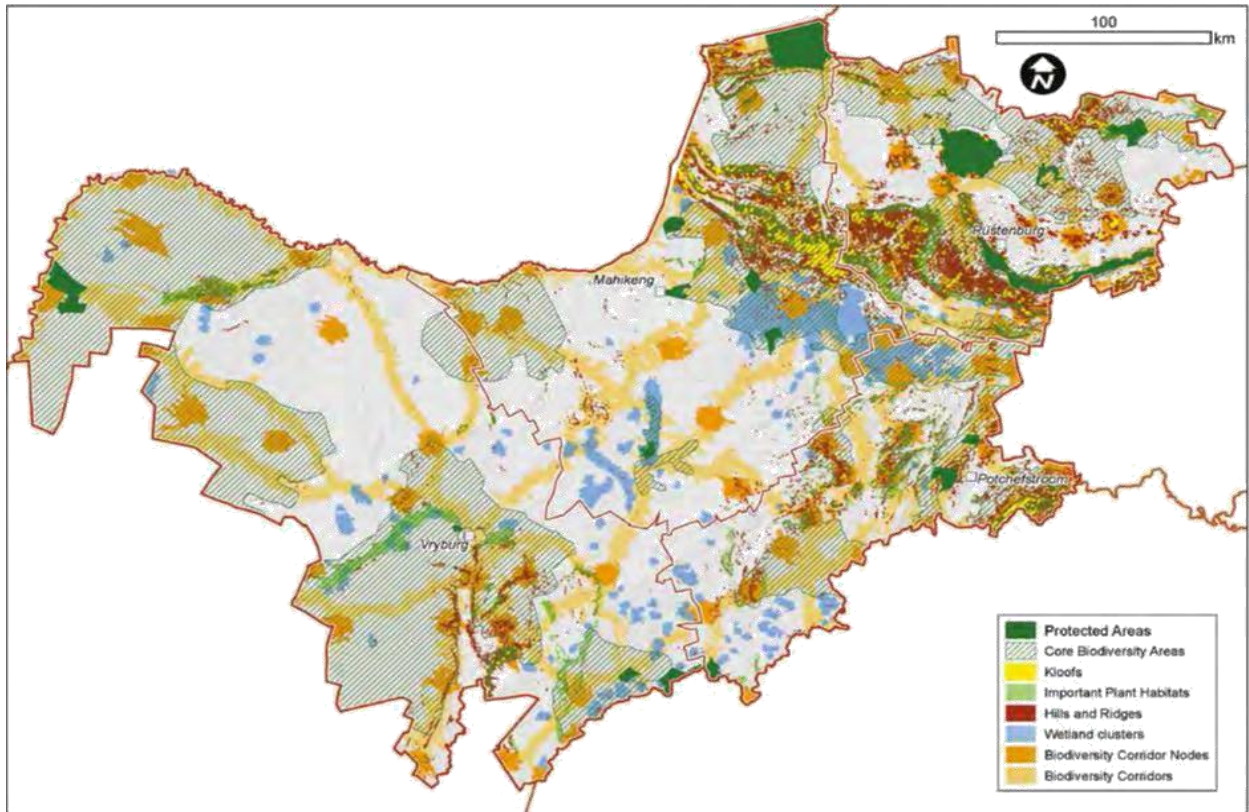
High sensitivity:

These areas include various Marula trees (*Sclerocarya birrea*) that is protected by the NFA and require a permit from DAFF for removal prior to commencement of construction. These areas also include *Aloe grandidendata*. These species also require removal and should be relocated to nearby areas that will not be affected by construction. This should be done through a Search and Rescue exercise to be conducted by a qualified botanist

Moderate sensitivity:

Most of the site is considered as moderate sensitive areas. These areas may include *Aloe grandidendata*. These species require removal and should be relocated to nearby areas that will not be affected by construction. A Search and Rescue exercise conducted by a qualified botanist is required prior to commencement of development.

The following maps are maps that have been used during desktop study in preparation for a site visit.



Map of terrestrial Critical Biodiversity Areas and Ecological Support Areas for the North West (Desmet and Schaller, 2015).