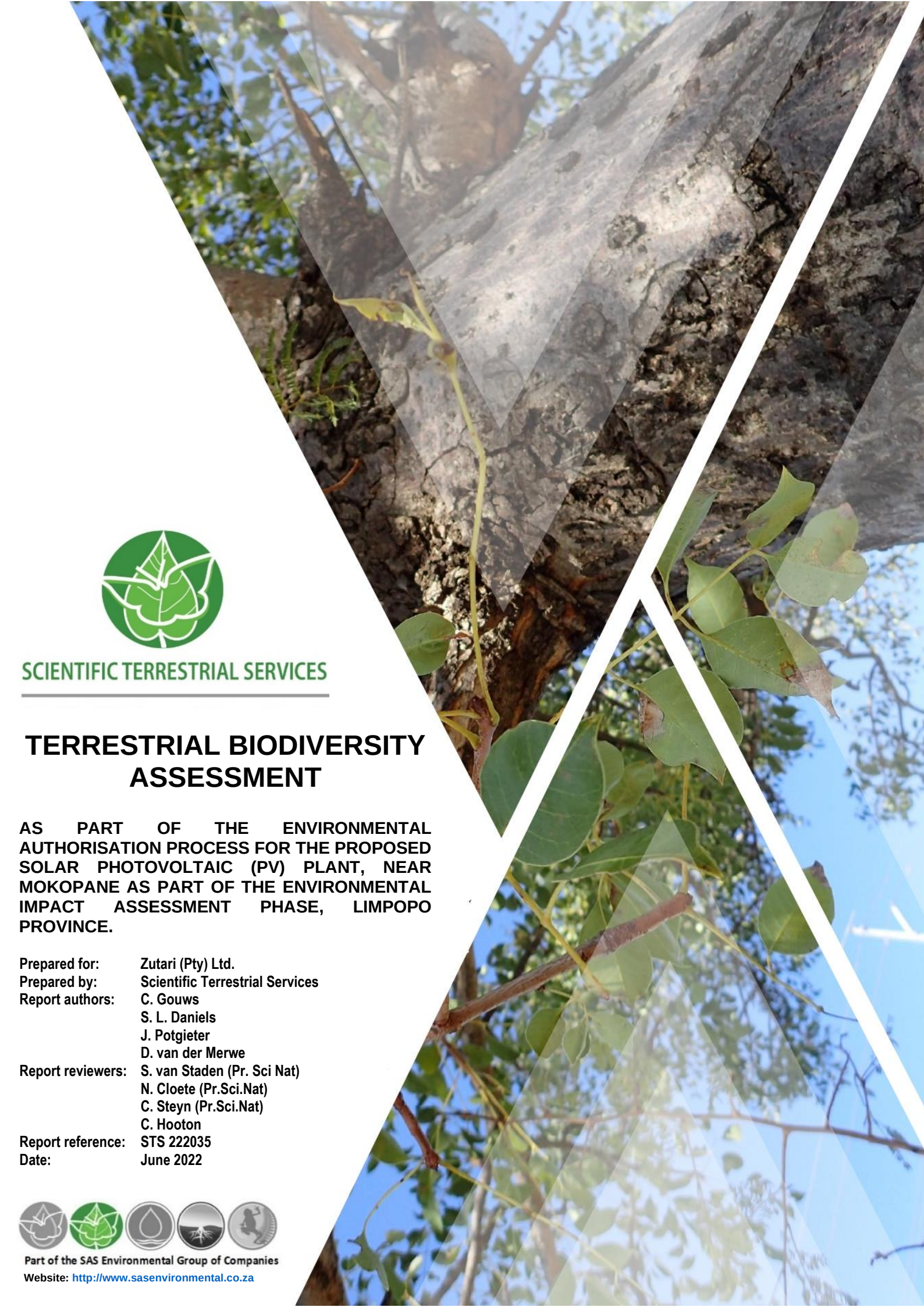


SCIENTIFIC TERRESTRIAL SERVICES

TERRESTRIAL BIODIVERSITY ASSESSMENT

AS PART OF THE ENVIRONMENTAL AUTHORISATION PROCESS FOR THE PROPOSED SOLAR PHOTOVOLTAIC (PV) PLANT, NEAR MOKOPANE AS PART OF THE ENVIRONMENTAL IMPACT ASSESSMENT PHASE, LIMPOPO PROVINCE.

Prepared for:	**Zutari (Pty) Ltd.**
Prepared by:	**Scientific Terrestrial Services**
Report authors:	**C. Gouws**
	S. L. Daniels
	J. Potgieter
	D. van der Merwe
Report reviewers:	**S. van Staden (Pr. Sci Nat)**
	N. Cloete (Pr.Sci.Nat)
	C. Steyn (Pr.Sci.Nat)
	C. Hooton
Report reference:	**STS 222035**
Date:	**June 2022**

Part of the SAS Environmental Group of Companies

Website: http://www.sasenvironmental.co.za

EXECUTIVE SUMMARY

Scientific Terrestrial Services CC (STS) was appointed by Zutari (Pty) Ltd. to conduct a Biodiversity Assessment as part of the Environmental Impact Assessment (EIA) and Environmental Authorisation (EA) process for the proposed development of a Solar Photovoltaic (PV) Plant outside the town of Mokopane at the Mogalakwena Mine, Limpopo Province. The proposed Mogalakwena **Study Area** will comprise the following:

- A substation;
- Site Camp:
- Laydown areas (1, 2 and 3)
- O&M building;
- Existing internal overhead transmission lines (OHL); and
- Two overhead transmission lines connecting to the existing substations – PP Rust North and Sandsloot.

For the purposes of the desktop assessment (Part A), the project boundary and all infrastructure laydowns areas will be referred to as the "**Study Area**" (Figure 3). Previous studies were undertaken for the proposed Solar PV Plant (refer to STS 210042) in 2021 with the layout subsequently updated and reduced in 2022. This 2022 study is focused on the amended "Study Area" boundary (Figure 1 & 2) and further includes specific focus areas that was highlighted by the screening tool as potentially sensitive habitat and/or that was not part of the previously assessed area (Figure 3).

During the field assessment, three habitat units were identified within the Study Area, namely:

1) Bushveld Habitat (comprising of three subunits, i.e., *Dichrostachys* Bushveld, Mixed Bushveld and Degraded Bushveld);
2) Donga Habitat; and
3) Transformed Habitat.

<u>Species diversity and habitat integrity:</u>

The Study Area falls within the Makhado Sweet Thornveld vegetation type (listed as vulnerable in Mucina and Rutherford, 2006, but as Least Concern in the updated 2018 Vegetation Map of South Africa, Lesotho, and Swaziland (SANBI, 2018a)), i.e., the reference state. Overall, the habitat within the Study Area ranged from well-vegetated areas to transformed areas in which indigenous vegetation was scarce.

The *Dichrostachys* Bushveld (of moderately low floral sensitivity) comprised the largest extent of the Bushveld Habitat Unit (approximately 165 ha) and supported a moderately low to moderate species richness. Thorny, woody species, particularly *Dichrostachys cinerea,* dominated within this habitat unit. Most sections of this habitat unit have been historically cultivated and the Study Area is currently utilised for grazing purposes and the grass layer throughout the subunit is dominated by species that are indicative of overgrazing, including *Heteropogon contortus* and *Aristida congesta* subsp. *barbicollisis.*

The Mixed Bushveld (of intermediate floral sensitivity) comprised the smallest extent (approximately 4 ha) of the Bushveld Habitat Unit and supported a higher diversity of floral species, particularly broad-leaf woody species, than the remaining Bushveld Subunits. The subunit has been subjected to grazing pressures and grass species that are indicative of overgrazing, including *Heteropogon contortus* and *Aristida congesta* subsp. *barbicollisis* are common within this subunit.

The Degraded Bushveld (of moderately low floral sensitivity) comprised the second largest extent (approximately 35 ha) of the Bushveld Habitat Unit and supported a low diversity of floral species. This habitat unit is largely degraded in nature and has historically been subjected to edge effects, including dumping, soil disturbance (attributed to vegetation clearing and excavation activities), severe historic and current grazing pressures, AIP infestation, firewood collection, and frequent fires. This subunit is characterised by a high abundance of weedy, pioneer species, most of which are either alien and invasive plants (AIPs) or species that thrive within disturbed conditions.

The Donga[1] Habitat (of moderately low floral sensitivity) is the second smallest habitat unit within the Study Area (approximately 0.4 ha). This habitat unit was characterised by steep-sided erosion gulley's that have formed within the landscape. This habitat, which considered of lose, sandy, somewhat stony soils is likely to be associated with increased moisture (seasonally). Overall vegetation cover within this habitat was scarce. Dominant species recorded within the habitat included *Eleodendron transvaalense, Dodonaea viscosa, Carissa bispinosa* and *Aristida congesta* subsp. *congesta*.

The Transformed habitat unit includes areas associated with the surrounding settlements (e.g., infrastructure associated with houses and buildings), and associated mining development within the Study Area. The Transformed Habitat is the second largest habitat unit within the Study Area (approximately 0.15 ha). Due to anthropogenic activities this habitat unit has an altered physical environment and is scarcely vegetated.

From a faunal perspective the habitat units in the Study Area have been subjected to varying degrees of impacts and as a result, vary in their support of faunal species, with the more degraded habitats having a notably limited diversity of faunal species. Due to existing and past disturbance the Mixed Bushveld provides limited ecological value from a faunal perspective, although there is potential for increased diversity of common, resilient and small bodied insectivorous and herbivorous fauna in the summer months. The Degraded Bushveld, *Dichrostachys* Bushveld, Donga Habitat and Transformed Habitat have the lowest ecological value from a faunal perspective, as bush encroachment and informal settlements have significantly degraded faunal resources in these localities. Outside of the Study Area are several freshwater systems that provide additional habitat and water sources for faunal species, notably water dependant species. These Freshwater habitats are considered to be of increased importance for fauna, as they function as an important ecological system and irreplaceable migratory corridor for fauna. It is important to note however that no development is planned within these freshwater habitats and they have been appropriately buffered.

Species of Conservation Concern (SCC):

The Online EIA Screening Tool for the Study Area indicated that the Plant Species was of low sensitivity. This sensitivity was confirmed during the field assessments as no Red Data Listed (RDL) species were recorded within the Study Area and it is unlikely that suitable habitat to support RDL species is available within the Study Area. The Screening Tool for the Study Area indicated that the Animal Species theme was of medium sensitivity. Triggering species included *Anthene minima minima* (Hairtail butterfly), *Dasymys robertsii* (Robert's shaggy rat) and *Sagittarius serpentarius* (Secretary bird). The Screening Tool for the Study Area indicated that the Terrestrial Biodiversity Theme was of very high sensitivity. Triggering features included CBA 1 and ESA 1 Categories.

No SANBI RDL species were observed during the field assessments. However, protected floral species as per the Limpopo Environmental Management Act, 2003 (Act No.7 of 2003) (LEMA), namely *Huernia* cf. *zebrina* subsp. *magnifolia,* the National Forest Act, 1998 (Act No. 84 of 1998) (NFA), namely *Sclerocarya birrea* subsp*. caffra, Combretum imberbe*, *Elaeodendron,* and *Boscia albitrunca,* and the 2007 Threatened or Protected Species (TOPS) List, namely *Harpagophytum zeyheri* subsp*. zeyheri,* were identified within the Study Area. Permits from LEDET and DFFE should be obtained to remove, cut, or destroy the above-mentioned protected species before any vegetation clearing may take place.

One faunal SCC namely *Ceratogyrus* sp (possibly that of *Ceratogyrus darlingi* (Horned Baboon Spider, VU&P)) was recorded within the proposed footprint areas and there is a reasonable possibility that ten other SCC may utilise the Study Area to for foraging and movement. The areas around the freshwater habitats may additionally be used by amphibian SCC for aestivation, though these species are unlikely to encroach the Study Area itself. Faunal SCC with a medium POC on site, are: *Felis lybica* (African Wild cat), *Panthera pardus* (Leopard, VU), *Parahyaena brunnea* (Brown Hyena, NT), *Aonyx capensis* (Cape Clawless Otter, NT), *Python natalensis* (Southern African Python, VU), *Dasymys robertsii* (Robert's Shaggy Rat, NYBA), *Homoroselaps dorsalis* (Striped Harlequin Snake, R), *Pyxicephalus adspersus* (Giant African Bullfrog, NT), *Anthene minima minima* (Little Hairtail Butterfly, DD) and *Opistophthalmus glabrifrons* (Rough Burrower, P). Herpetofaunal and arachnid SCC face an increased mortality risk during construction due to their habits and poor dispersal abilities. As such, prior to

[1] A dry gully, with steep sidewalls and a stepped longitudinal profile that is actively eroded. These dongas can be the result of several factors including the eroding action of running water, soil properties, geological features, rainfall, topography, vegetation, and land use (i.e., anthropogenic activities).

development, a search and rescue plan in the event of encountering these SCC during construction should be developed and implemented.

Impacts associated with the proposed development on Important Ecological Features within the Study Area:

No threatened ecosystem will be directly impacted by the proposed development. However, a CBA1 is located within and east of the Study Area and is thus susceptible to edge effects. This CBA 1 is entirely within the Dichrostachys Bushveld subunit and, hence, this area was found to no longer represent important natural and ecological important features. This due to the habitat being modified through anthropogenic activities, resulting in a loss of anticipated species composition (significant shift from the reference state), altered species diversity, as well as the loss of key fire and grazing drivers. Effective mitigation measures must be implemented to reduce the potential impacts from associated edge effects on the CBA habitat. The proposed development will directly impact ESA habitat, ESAs are important features in the greater landscape and provide unique conditions for flora and important ecological functionality within the ecosystem. Due to their ecological importance, it is recommended that impacts to ESAs be minimised as far as possible and kept to approved areas only.

Concluding Remarks:

Following the biodiversity assessment within the Study Area, the impacts associated with the proposed development activities were determined. The impacts arising from the proposed development are predominantly **moderate to minor negative** prior to the implementation of mitigation measures. With mitigation measures fully implemented, it is the opinion of the specialist that all impacts can be effectively reduced to **minor to negligible negative levels (**excluding one sensitivity **remaining moderate negative** level**)**. The highest impact is expected during the construction phase pertaining to the Loss of floral habitat, diversity, and the possible loss of SCC as a result of site clearing and the removal of vegetation. Additionally, the highest impact associated with the operational phase is aimed at the loss of floral habitat, diversity and SCC within the direct footprint of the proposed development as a result of displacement (by bush encroachment and/or AIP species proliferation) and potentially poorly managed edge effects including.

The impacts arising from the proposed development from a faunal perspective are predominantly **moderate to minor negative** prior to the implementation of mitigation measures. With mitigation measures fully implemented, it is the opinion of the specialist that all impacts can be effectively reduced to **minor and negligible negative levels.** During the construction phase the vegetation clearing will have an impact on the faunal assemblages and possible SCC in the Study Area, but with the implementation of mitigation measures the impacts can be notably reduced and managed. During the operational phase it is important to manage AIP proliferation and edge effects, especially close to the Freshwater habitats around the Study Area which are an important ecological system.

Integrated Environmental Management (IEM) and to ensure that the best long-term use of the ecological resources in the Study Area will be made in support of the principle of sustainable development.

SCIENTIFIC TERRESTRIAL SERVICES

TERRESTRIAL BIODIVERSITY ASSESSMENT

AS PART OF THE ENVIRONMENTAL AUTHORISATION PROCESS FOR THE PROPOSED SOLAR PHOTOVOLTAIC (PV) PLANT, NEAR MOKOPANE AS PART OF THE ENVIRONMENTAL IMPACT ASSESSMENT PHASE, LIMPOPO PROVINCE.

Part A: Background Information

Prepared for:	**Zutari (Pty) Ltd.**
Prepared by:	**Scientific Terrestrial Services**
Report authors:	**C. Gouws**
Report reviewers:	**N. Cloete (Pr.Sci.Nat)** **C. Steyn (Pr.Sci.Nat)**
Report reference:	**STS 222035**
Date:	**June 2022**

Part of the SAS Environmental Group of Companies
Website: http://www.sasenvironmental.co.za

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

DOCUMENT GUIDE

The table below provides a guide to the reporting of biodiversity impacts as they relate to 1) Government Notice No. 320 Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on **Terrestrial Biodiversity** as published in Government Gazette 43110 dated 20 March 2020, and 2) Government Notice No. 1150 Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on **Terrestrial Plant and Animal Species** as published in Government Gazette 43855 dated 30 October 2020.

Theme-Specific Requirements as per Government Notice No. 320 Terrestrial Biodiversity Theme – Very High Sensitivity Rating as per Screening Tool Output		
No.	**SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS**	**Section in report/Notes**
2	**Terrestrial Biodiversity Specialist Assessment**	
2.1	The assessment must be prepared by a specialist registered with the South African Council for Natural Scientific Professionals (SACNASP) with expertise in the field of terrestrial biodiversity.	**Part A – C:** Cover Page **Part A:** Appendix E
2.2	The assessment must be undertaken on the preferred site and within the proposed development footprint.	**Part A**: Section 1
2.3	**The assessment must provide a baseline description of the site which includes, as a minimum, the following aspects:**	
2.3.1	A description of the ecological drivers or processes of the system and how the proposed development will impact these;	**Part B**: Section 3 (flora) **Part C:** Section 3 (fauna)
2.3.2	Ecological functioning and ecological processes (e.g., fire, migration, pollination, etc.) that operate within the preferred site;	**Part B**: Section 3 (flora) **Part C:** Section 3 (fauna)
2.3.3	The ecological corridors that the proposed development would impede including migration and movement of flora and fauna;	**Part A:** Section 3 (desktop analysis) **Part B**: Section 3 (flora) **Part C:** Section 3 (fauna)
2.3.4	The description of any significant terrestrial landscape features (including rare or important flora-faunal associations, presence of Strategic Water Source Areas (SWSAs) or Freshwater Ecosystem Priority Area (FEPA) sub catchments;	**Part A:** Section 3 (desktop analysis) **Part B:** Section 3.2 – 3.6 (flora) **Part C:** Section 3.2 – 3.7 (fauna) **For descriptions on the presence of FEPAs, please refer to the Freshwater Assessment*
2.3.5	A description of terrestrial biodiversity and ecosystems on the preferred site, including: a) main vegetation types; b) threatened ecosystems, including listed ecosystems as well as locally important habitat types identified; c) ecological connectivity, habitat fragmentation, ecological processes and fine scale habitats; and d) species, distribution, important habitats (e.g. feeding grounds, nesting sites, etc.) and movement patterns identified;	**Part A**: Section 3 (desktop analysis) **Part B**: Section 3 (flora) **Part C:** Section 3 (fauna)
2.3.6	The assessment must identify any alternative development footprints within the preferred site which would be of a "low" sensitivity as identified by the screening tool and verified through the site sensitivity verification; and	Not Applicable.
2.3.7	**The assessment must be based on the results of a site inspection undertaken on the preferred site and must identify:**	
2.3.7.1	Terrestrial Critical Biodiversity Areas (CBAs), including: *a) the reasons why an area has been identified as a CBA;* *b) an indication of whether or not the proposed development is consistent with maintaining the CBA in a natural or near natural state or in achieving the goal of rehabilitation;* *c) the impact on species composition and structure of vegetation with an indication of the extent of clearing activities in proportion to the remaining extent of the ecosystem type(s);* *d) the impact on ecosystem threat status;* *e) the impact on explicit subtypes in the vegetation;* *f) the impact on overall species and ecosystem diversity of the site; and* g) *the impact on any changes to threat status of populations of species of conservation concern in the CBA;*	**Part A**: Section 3 (desktop analysis) **Part B**: Section 3.1-3. 6 **Part C:** Section 3
2.3.7.2	Terrestrial Ecological Support Areas (ESAs), including: *a) the impact on the ecological processes that operate within or across the site;*	

	b) the extent the proposed development will impact on the functionality of the ESA; and c) *loss of ecological connectivity (on site, and in relation to the broader landscape) due to the degradation and severing of ecological corridors or introducing barriers that impede migration and movement of flora and fauna;*	
2.3.7.3	Protected areas as defined by the National Environmental Management: Protected Areas Act, 2004 including- *a) an opinion on whether the proposed development aligns with the objectives or purpose of the protected area and the zoning as per the protected area management plan;*	**Part A**: Section 3 (desktop analysis) However, not applicable as no protected areas or areas of conservation concern are within 10 km of the proposed project,
2.3.7.4	Priority areas for protected area expansion, including- *a) the way in which in which the proposed development will compromise or contribute to the expansion of the protected area network;*	**Part A**: Section 3 (desktop analysis)
2.3.7.5	SWSAs including: *a) the impact(s) on the terrestrial habitat of a SWSA; and* b) *the impacts of the proposed development on the SWSA water quality and quantity (e.g. describing potential increased runoff leading to increased sediment load in water courses);*	Not Applicable
2.3.7.6	FEPA sub catchments, including- *a) the impacts of the proposed development on habitat condition and species in the FEPA sub catchment;*	**For descriptions on the presence of FEPAs, please refer to the Freshwater Biodiversity Assessment (SAS 210042, 2021)*
2.3.7.7	Indigenous forests, including: *a) impact on the ecological integrity of the forest; and* b) *percentage of natural or near natural indigenous forest area lost and a statement on the implications in relation to the remaining areas.*	Not Applicable
2.4	**The findings of the assessment must be written up in a Terrestrial Biodiversity Specialist Assessment Report.**	
	Part B: Results of the **Floral Assessment** as well as conclusions on Terrestrial Biodiversity as it relates to vegetation communities. **Part C:** Results of the **Faunal Assessment** as well as conclusions on Terrestrial Biodiversity as it relates to faunal communities.	
3	**Terrestrial Biodiversity Specialist Assessment Report**	
3.1	**The Terrestrial Biodiversity Specialist Assessment Report must contain, as a minimum, the following information:**	
3.1.1	Contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	**Part A:** Appendix E
3.1.2	A signed statement of independence by the specialist;	**Part A:** Appendix E
3.1.3	A statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	**Part B:** Section 1.3 (flora) **Part C:** Section 1.3 (fauna)
3.1.4	A description of the methodology used to undertake the site verification and impact assessment and site inspection, including equipment and modelling used, where relevant;	**Part A**: Appendix C **Part B:** Section 2 (flora) **Part B:** Appendix A (flora) **Part C:** Section 2 (fauna) **Part C**: Appendix A (fauna)
3.1.5	A description of the assumptions made and any uncertainties or gaps in knowledge or data as well as a statement of the timing and intensity of site inspection observations;	**Part B:** Section 1.3 (flora) **Part C:** Section 1.3 (fauna)
3.1.6	A location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);	**Part B:** Section 5 (flora) **Part C:** Section 4 (fauna)
	Impact Assessment Requirements 3.1.7 Additional environmental impacts expected from the proposed development; 3.1.8 Any direct, indirect and cumulative impacts of the proposed development; 3.1.9 The degree to which impacts and risks can be mitigated; 3.1.10 The degree to which the impacts and risks can be reversed; 3.1.11 The degree to which the impacts and risks can cause loss of irreplaceable resources; 3.1.12 Proposed impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	**Part B:** Section 6 (flora) **Part C:** Section 5 (fauna)
3.1.13	A motivation must be provided if there were development footprints identified as per paragraph 2.3.6 above that were identified as having a "low" terrestrial biodiversity sensitivity and that were not considered appropriate;	**Not Applicable to this report**
3.1.14	A substantiated statement, based on the findings of the specialist assessment, regarding the acceptability, or not, of the proposed development, if it should receive approval or not; and	**Part A:** Executive summary **Part B:** Section 7 (flora) **Part C:** Section 6 (fauna)
3.1.15	Any conditions to which this statement is subjected.	**Part B:** Section 6.4 (flora)

		Part C: Section 5.4 (fauna)
3.2	The findings of the Terrestrial Biodiversity Specialist Assessment must be incorporated into the Basic Assessment Report or the Environmental Impact Assessment Report, including the mitigation and monitoring measures as identified, which must be incorporated into the EMPr where relevant.	**Not Applicable to this report**
3.3	A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.	**Not Applicable to this report**

GLOSSARY OF TERMS

Most definitions are based on terms and concepts elaborated by Richardson *et al*. (2011), Hui and Richardson (2017) and Wilson *et al*. (2017), with consideration to their applicability in the South African context, especially South African legislation [notably the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), and the associated Alien and Invasive Plant (AIP) Species Regulations, 2020].

Alien species (syn. exotic species; non-native species)	A species that is present in a region outside its natural range due to human actions (intentional or accidental) that have enabled it to overcome biogeographic barriers.
Biological diversity or Biodiversity (as per the definition in NEMBA)	The variability among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part and also includes diversity within species, between species, and of ecosystems.
Biome - as per Mucina and Rutherford (2006); after Low and Rebelo (1998).	A broad ecological spatial unit representing major life zones of large natural areas – defined mainly by vegetation structure, climate and major large-scale disturbance factors (such as fires).
Bioregion (as per the definition in NEMBA)	A geographic region which has in terms of section 40(1) been determined as a bioregion for the purposes of this Act;
Critical Biodiversity Area (CBA)	A CBA is an area considered important for the survival of threatened species and includes valuable ecosystems such as wetlands, untransformed vegetation and ridges.
Corridor	A dispersal route or a physical connection of suitable habitats linking previously unconnected regions.
Disturbance	A temporal change, either regular or irregular (uncertain), in the environmental conditions that can trigger population fluctuations and secondary succession. Disturbance is an important driver of biological invasions.
Ecoregion	An ecoregion is a "recurring pattern of ecosystems associated with characteristic combinations of soil and landform that characterise that region".
Endangered	Organisms in danger of extinction if causal factors continue to operate.
Endemic species	Species that are only found within a pre-defined area. There can therefore be sub-continental (e.g., southern Africa), national (South Africa), provincial, regional or even within a particular mountain range.
Ecological Support Area (ESA)	An ESA provides connectivity and important ecological processes between CBAs and is therefore important in terms of habitat conservation.
Ground·Truth	To check the accuracy of (remotely sensed data) by means of in-situ observations.
Habitat (as per the definition in NEMBA)	A place where a species or ecological community naturally occurs.
Important Bird and Biodiversity Area (IBA)	The IBA Programme identifies and works to conserve a network of sites critical for the long-term survival of bird species that: are globally threatened, have a restricted range, are restricted to specific biomes/vegetation types or sites that have significant populations.
Indigenous vegetation (as per the definition in NEMA)	Vegetation occurring naturally within a defined area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.
Integrity (ecological)	The integrity of an ecosystem refers to its functional completeness, including its components (species) its patterns (distribution) and its processes.
Invasive species	Alien species that sustain self-replacing populations over several life cycles, produce reproductive offspring, often in very large numbers at considerable distances from the parent and/or site of introduction, and have the potential to spread over long distances.
Listed alien species	All alien species that are regulated in South Africa under the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004), Alien and Invasive Species Regulations, 2020.
Least Threatened	Least threatened ecosystems are still largely intact.
Native species (syn. indigenous species)	Species that are found within their natural range where they have evolved without human intervention (intentional or accidental). Also includes species that have

	expanded their range as a result of human modification of the environment that does not directly impact dispersal (e.g. species are still native if they increase their range as a result of watered gardens, but are alien if they increase their range as a result of spread along human-created corridors linking previously separate biogeographic regions).
Red Data listed (RDL) species	According to the Red List of South African plants (http://redlist.sanbi.org/) and the International Union for Conservation of Nature (IUCN), organisms that fall into the Extinct in the Wild (EW), critically endangered (CR), Endangered (EN), Vulnerable (VU) categories of ecological status.
Species of Conservation Concern (SCC)	The term SCC in the context of this report refers to all RDL (Red Data) and IUCN (International Union for the Conservation of Nature) listed threatened species as well as protected species of relevance to the project.

LIST OF ACRONYMS

AAP	Anglo American Platinum Limited
AIP	Alien and Invasive Plants
BGIS	Biodiversity Geographic Information Systems
BotSoc	Botanical Society of South Africa
CARA	Conservation of Agricultural Resources Act, 1983 [Act No. 43 of 1983]
CBA	Critical Biodiversity Area
C-Plan	Conservation Plan
CR	Critically Endangered
DFFE	Department of Forestry, Fisheries and the Environment
DMRE	Department of Mineral Resources and Energy
DWS	Department of Water and Sanitation
E-GIS	Environmental Geographical Information Systems
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
EN	Endangered
ESA	Ecological Support Area
GIS	Geographic Information System
GN	Government Notice
Ha	Hectare
IBA	Important Bird and Biodiversity Areas
IEM	Integrated Environmental Management
IPP	Independent Power Producer
IUCN	International Union for the Conservation of Nature
LEDET	Limpopo Economic Development, Environmental and Tourism
LEMA	Limpopo Environmental Management Act, 2003 [Act No.7 of 2003]
MAMSL	Meters Above Mean Sea Level
MAP	Mean Annual Precipitation
MAPE	Mean Annual Potential for Evaporation
MASMS	Mean Annual Soil Moisture Stress
MAT	Mean Annual Temperature
MFD	Mean Frost Days
NBA	National Biodiversity Assessment
NEMA	National Environmental Management Act, 1998 [Act No. 107 of 1998]
NEMBA	National Environmental Management: Biodiversity Act, 2004 [Act No. 10 of 2004]
NFA	National Forest Act, 1998 [Act No. 84 of 1998, as amended]
NP	National Park
NPAES	National Protected Areas Expansion Strategy
OHL	Overhead transmission line
PPA	Power Purchase Agreement
QDS	Quarter Degree Square (1:50,000 topographical mapping references)
PNR	Private Nature Reserve
SABAP 2	South African Bird Atlas Project 2
SACAD	South African Conservation Areas Database, Quarter 2
SACNASP	South African Council for Natural Scientific Professions
SANBI	South African National Biodiversity Institute
SANParks	South African National Parks
SAPAD	South African Protected Areas Database, Quarter 2
STS	Scientific Terrestrial Services
SWSA	Strategic Water Source Area
VEGMAP	National Vegetation Map Project
VU	Vulnerable
WUL	Water Use Licence
WULA	Water Use Licence Application
WSAs	Water Source Areas

1 INTRODUCTION

Scientific Terrestrial Services CC (STS) was appointed by Zutari to conduct a Biodiversity Assessment as part of the Environmental Impact Assessment (EIA) for the proposed development of a Solar Photovoltaic (PV) Plant outside the town of Mokopane at the Mogalakwena Mine, Limpopo Province; henceforth referred to as the "**Study Area**". The Study Area is situated east of the N11 main road, 27 km outside and to the north of the town Mokopane (Figure 1 and 2). The Study Area is south of the Sekuruwe settlement, southwest of the Ga-Sekhaolelo settlement, and east of the Ga-Molekana informal settlement.

The purpose of this report (Part A) is to define the biodiversity associated with the Study Area from a desktop conservation database perspective. It is the objective of this desktop assessment to provide detailed information to guide the fieldwork components (discussed in Parts B and C) to ensure that all relevant ecological aspects are considered prior to performing the field assessments. This report is not a standalone report and should be considered in consolidation with the outcome of the biodiversity assessments (floral assessment in Part B and the faunal assessment in Part C).

1.1 Project Background

Mogalakwena Mine is a wholly owned subsidiary of Anglo American Platinum Limited (AAP) and is situated within the Mogalakwena Local Municipality, which forms part of the greater Waterberg District Municipality of the Limpopo Province. AAP seeks to appoint an Independent Power Producer (IPP) for the development, financing, ownership, construction, operation and maintenance of a Solar PV Facility. The PV Facility will supply energy on an exclusive basis to the AAP's Mogalakwena Mine in Limpopo, South Africa in terms of a Power Purchase Agreement (PPA) with an operating Term of 25 years, as may be extended or amended in accordance with the terms of the PPA. The Project will not be transferred to AAP or its selected nominee on the expiry or early termination of the Term.

This IPP shall be chosen through a Request for Proposal process, which is currently underway and nearing completion. The optimal Solar PV generation capacity shall be determined by the IPP based on their own calculations.

Previous studies were undertaken for the proposed Solar PV Plant (refer to STS 210042) in 2021 with the layout subsequently updated and reduced in 2022. This 2022 study is focused on the amended "**Study Area**" boundary (Figure 1 & 2) and further includes specific focus

areas that was highlighted by the screening tool as potentially sensitive habitat and/or that was not part of the previously assessed area (Figure 3).

1.2 Scope of Work

Specific outcomes in terms of Part A of the report are as follows:

- To compile a desktop assessment with all relevant information as presented by South African National Biodiversity Institute's (SANBI's) Biodiversity Geographic Information Systems (BGIS) website (http://bgis.sanbi.org) and the Environmental Geographical Information Systems (E-GIS) website (https://egis.environment.gov.za/). The desktop assessment aims to gain background information on the physical habitat and potential floral and faunal ecology associated with the Study Area;
- To state the indemnity and terms of use of this report (Appendix A) as well as to provide the details of the specialists who prepared the reports (Appendix E);
- To outline the legislative requirements that were considered for the assessment (Appendix B of this report); and
- To provide the methodologies followed relating to the impact assessment and development of the mitigation measures (Appendix C) that were applied in the floral and faunal assessments (Part B and Part C).

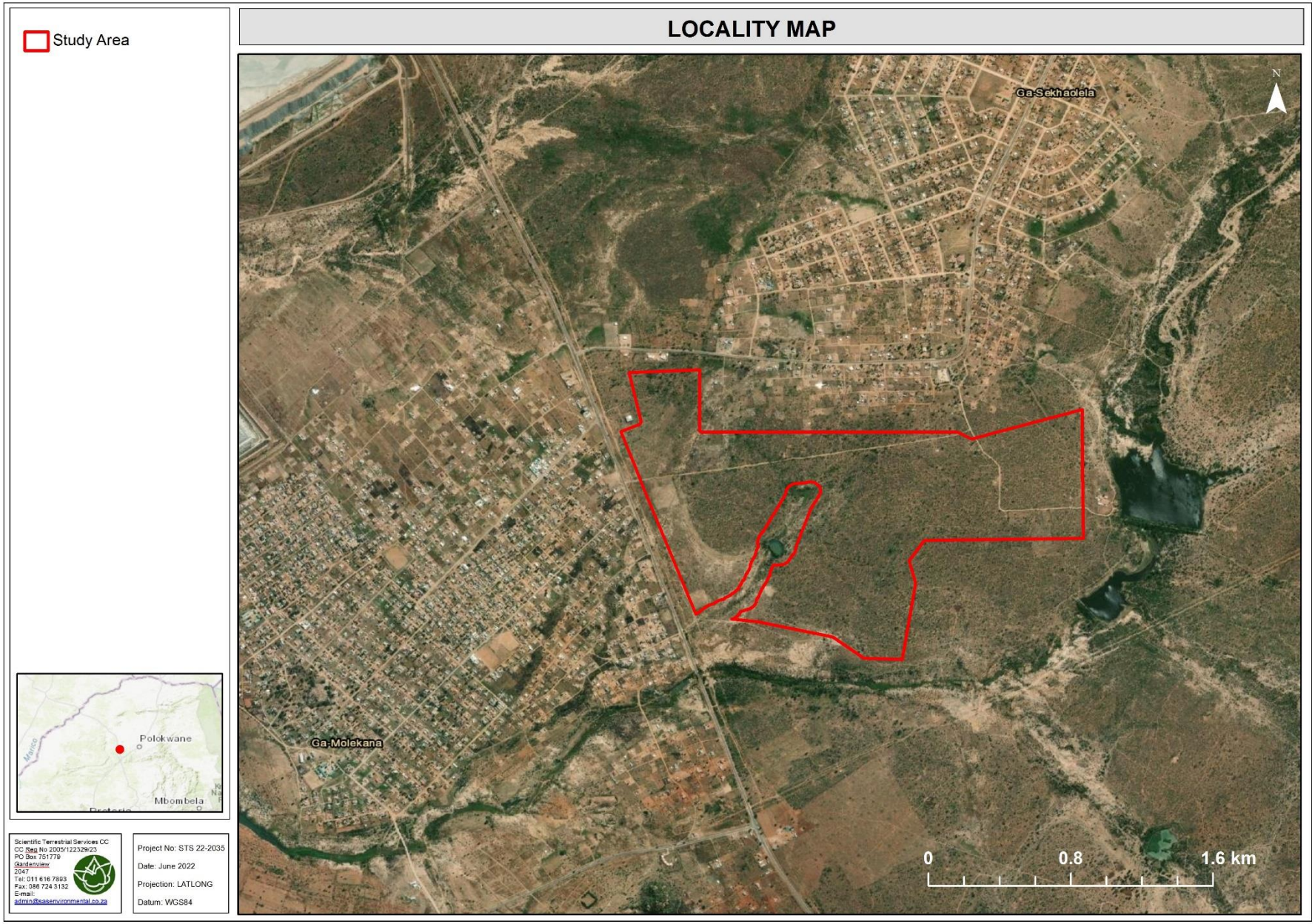


Figure 1: Digital satellite image depicting the Study Area in relation to surrounding area.

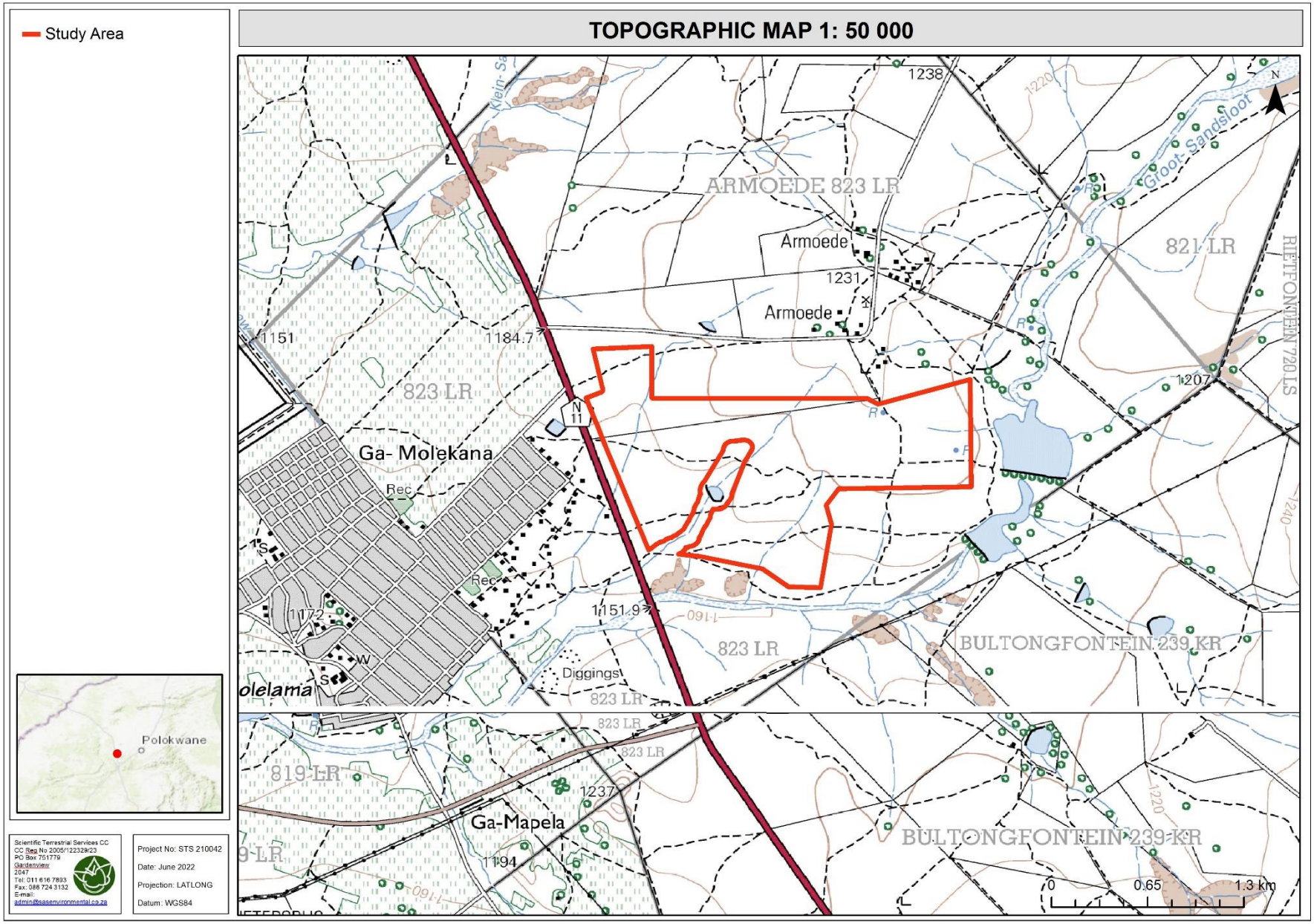


Figure 2: The Study Area depicted on a 1:50 000 topographical map in relation to the surrounding area.

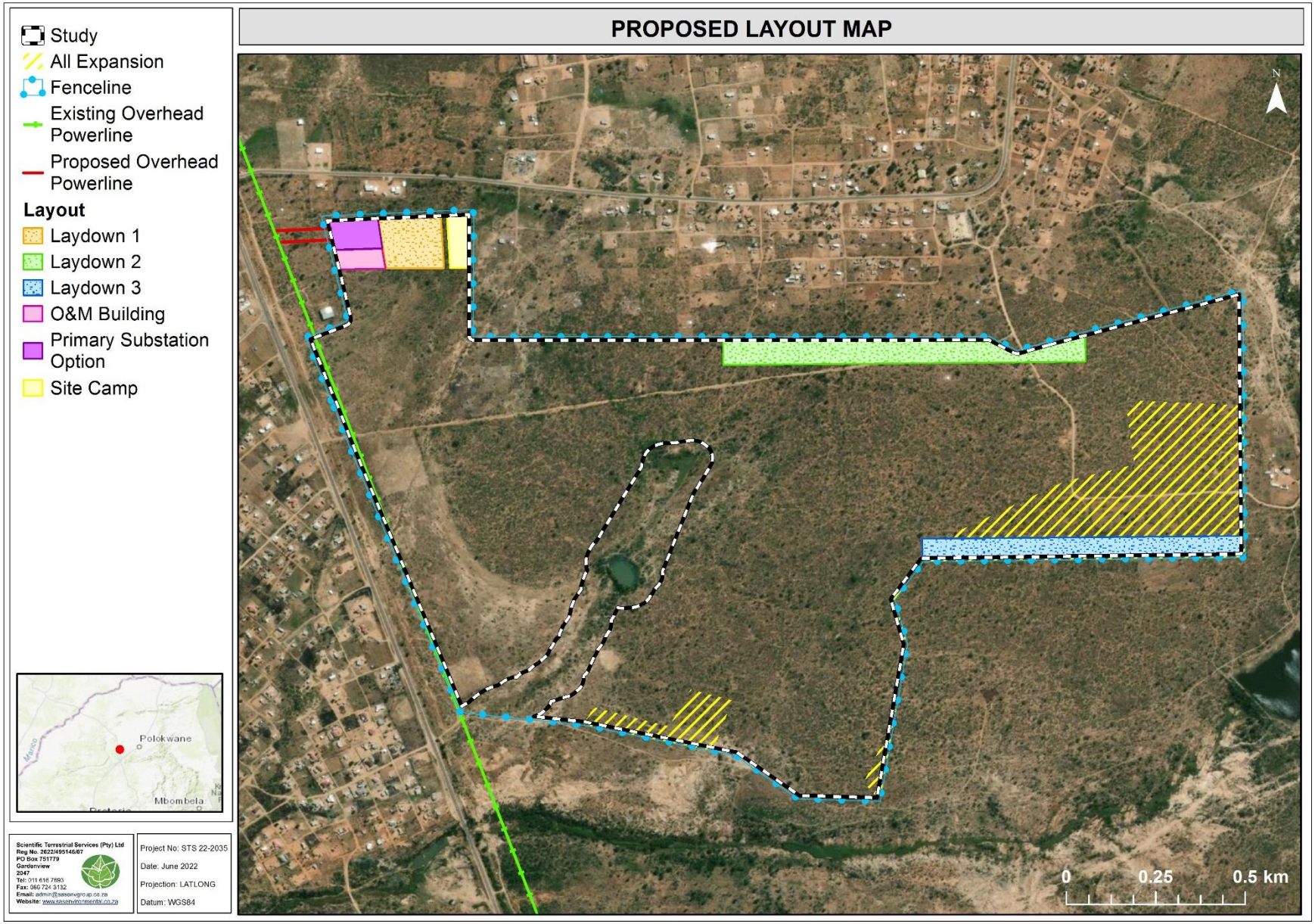


Figure 3: The proposed layout of the Study Area overlaid on digital satellite imagery.

1.3 Assumptions and Limitations

The following assumptions and limitations are applicable to this report:

- The biodiversity desktop assessment is confined to the Study Area and does not include detailed results of the surrounding areas or adjacent properties, although ecologically important or sensitive areas according to the desktop databases of the surrounding areas have been included on the relevant maps;
- It is important to note that although all of the data sources used do provide useful and often verifiable, high-quality data, the various databases do not always provide an entirely accurate indication of the actual site characteristics at the scale required to inform an environmental process and must be 'ground-truthed'. However, this information is useful as background information to the study and, based on the desktop results, sufficient decision making can take place with regards to the proposed Study Area if considered together with the ground-truthed results of the biodiversity assessments (Part B and C); and
- The 2021 field assessment as part of the previous report and assessment was undertaken during winter (1 – 4 June 2021) (STS 210042, 2021). The 2022 assessment for the amended Study Area was undertaken in autumn (24 May 2022). The field assessment aimed to determine the ecological status of the habitat associated with the Study Area, and to "ground-truth" the results of the desktop assessment. Previously filed assessments (Digby Wells Environmental, 2022) have also been included by STS for the previous scoping (September 2020; STS 200051, 2020) and screening assessments (September 2019, STS 19004, 2019) as part of the EIA submitted in 2021.

1.4 Legislative Requirements

The following legislative requirements were considered during the assessment:

- The Constitution of the Republic of South Africa, 1996[2];
- The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA);
- The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA);
- The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA);

[2] Since 1996, the Constitution has been amended by seventeen amendments acts. The Constitution is formally entitled the 'Constitution of the Republic of South Africa, 1996". It was previously also numbered as if it were an Act of Parliament – Act No. 108 of 1996 – but since the passage of the Citation of Constitutional Laws Act, neither it not the acts amending it are allocated act numbers.

- Government Notice (GN) number R.1020: Alien and Invasive Species Regulations, 2020, in Government Gazette 43735 dated September 2020 as it relates to the NEMBA; and
- GN number 1003: Legislation to come into force on the 1st of June 2021: Government Notice number 1003: Alien and Invasive Species Lists, 2020, in Government Gazette 43726 dated 18 September 2020, as it relates to the NEMBA.

- The National Forest Act, 1998 (Act No. 84 of 1998, amended) (NFA);
  - GN 536: List of Protected Tree Species as published in the Government Gazette 41887 dated 7 September 2018, as it relates to the NFA;
- Government Gazette 45421 dated 10 May 2019 as it relates to the Department of Forestry, Fisheries and the Environment (DFFE)'s national environmental screening report required with an application for environmental authorisation as identified in regulation 16(1)(v) of Environmental Impact Assessment (EIA) Regulations:
  - For the Terrestrial Biodiversity Theme: GN 320 Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity as published in Government Gazette 43110 dated 20 March 2020; and
  - For Animal and Plant Species Themes**:** GN 1150 Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Plant and Animal Species as published in Government Gazette 43855 dated 30 October 2020; and
- The Limpopo Environmental Management Act, 2003 (Act No.7 of 2003) (LEMA).

The details of each of the above, as they pertain to this study, are provided in Appendix B of this report.

2 ASSESSMENT APPROACH

Maps and digital satellite images were generated prior to the field assessment to determine broad habitats, vegetation types and potentially sensitive sites. The biodiversity desktop assessment is confined to the Study Area and does not include the neighbouring and adjacent properties, although the sensitivity of surrounding areas is included on the respective maps. Relevant databases and documentation that were considered during the assessment of the Study Area includes [3]:

- 2010 National Protected Area Expansion Strategy (NPAES) (Government of South Africa. 2010; DEA & SANBI, 2009), including the below listed vector datasets:
  - NPAES Focus Areas 2010: National Protected Areas Expansion Strategy: Focus areas for protected area expansion (South African National Parks (SanParks), 2010);
  - NPAES Formal: Polygons of formal protected national parks areas in South Africa (SANParks/SANBI, 2013); and
  - NPAES Protected Areas – Informal: Informal conservation areas in South Africa (SANParks/SANBI, 2012).
- The South African Conservation Areas Database, Quarter 4 (SACAD, 2021);
- The South African Protected Areas Database, Quarter 4 (SAPAD, 2021);
- The Limpopo Conservation Plan (C-Plan) v2 CBAs 2013 (LEDET, 2018);
- The National Vegetation Map Project (VEGMAP), with the below vector dataset used for information on Biomes, Bioregions and Vegetation Type(s):
  - 2018 Final Vegetation Map of South Africa, Lesotho and Swaziland (SANBI, 2018a)
- The National List of Threatened Ecosystems 2011 (SANBI 2011; South Africa, 2011);
- From the National Biodiversity Assessment (NBA, 2018) Terrestrial Assessment project (Skowno et al, 2019):
  - 2018 Terrestrial ecosystem threat status and protection level - remaining extent8(SANBI, 2018b); and
  - 2018 Terrestrial ecosystem threat status and protection level layer (SANBI, 2018c).

[3] Datasets obtained from:

- SANBI BGIS (2019). The South African National Biodiversity Institute - Biodiversity GIS (BGIS) [online]. URL: http://bgis.sanbi.org as retrieved in 2019; and
- Department of Environmental Affairs (DEA) Environmental Geographical Information Systems (E-GIS) website. URL: https://egis.environment.gov.za/

- The Important Bird and Biodiveristy Areas (IBA) Programme and vector dataset (BirdLife South Africa, 2015; Marnewick et al, 2015a and 2015b), in conjunction with the South African Bird Atlas Project 2 (SABAP 2);
- The International Union for Conservation of Nature (IUCN);
- The National Web-Based Environmental Screening Tool (accessed 2021); and
- From the 2017 Strategic Water Source Areas (SWSA) project:
    - 2017 SWSA **Surface water** (Water Research Commission, 2017).

The field assessment took place during late autumn early winter (1 – 4 June 2021 and 24th May 2022) to "ground-truth" the results of the desktop assessment. Results of the field assessment are presented in Parts B and C.

3 RESULTS OF THE DESKTOP ANALYSIS

3.1 Conservation Characteristics of the Study Area based on National and Provincial Datasets

The following section contains data accessed as part of the desktop assessment and are presented as a "dashboard" report below (Table 1). The dashboard report aims to present concise summaries of the data on as few pages as possible to allow for improved assimilation of results by the reader to take place. Where required, further discussion and interpretation are provided.

Table 1: Summary of the biodiversity characteristics associated with the Study Area [Quarter Degree Square (QDS) 2328DD.

Details of the Study Area in terms of the national VEGMAP project (SANBI, 2018a)		**Description of the vegetation type associated with the Study Area**	
Biome	The Study Area is situated within the **Savanna Biome**.	**Vegetation Type**	Makhado Sweet Bushveld (SVcb 20)
Bioregion	The Study Area is located within the **Central Bushveld Bioregion**	**Climate**	Summer rainfall with very dry winters
Vegetation Type	The Study Area is located within the **Makhado Sweet Bushveld** (SVcb 20) vegetation type.	**Altitude (m)**	850 to 1200
		MAP* (mm)	454
		MAT* (°C)	18.5
Conservation details pertaining to the area of interest (various databases)		**MFD* (Days)**	7
NBA (2018) (Figure 4)	Most of the Study Area falls within the remaining extent of the **Makhado Sweet Bushveld** which is currently **Least Concerned** and **Poorly Protected.** Ecosystem types are categorised[4] as "not protected", "poorly protected", "moderately protected" and "well protected" based on the proportion of each ecosystem type that occurs within a protected area recognised in the Protected Areas Act, 2003 (Act No. 57 of 2003), and compared with the biodiversity target for that ecosystem type.	**MAPE* (mm)**	2174
		MASMS* (%)	81
		Distribution	Limpopo Province
		Conservation	**Vulnerable** in Mucina and Rutherford (2006) but the status of the vegetation type has been updated in the 2018 Final Vegetation Map of South Africa, Lesotho and Swaziland (SANBI, 2018a) to now being of Least Concern (LC). Target 19%. About 1% statutorily conserved, mainly in the Bellevue Nature Reserve. Some 27% transformed, mainly by cultivation, with some urban and built-up areas. The southwestern half of the unit has densely populated rural communities. Erosion is low to high.
National Threatened Ecosystems (2011)	The Study Area is not situated within a threatened ecosystem, according to the National Threatened Ecosystem Database (2011). The purpose of listing protected ecosystems is primarily to preserve witness sites of exceptionally high conservation value. The first national list of threatened terrestrial ecosystems for South Africa was gazetted on 9 December 2011 (National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, (G 34809, GoN 1002), 9 December 2011). **Note**: *The National List of Threatened Terrestrial Ecosystems published in terms of the NEMBA in 2011 remains in legal force. The data contained in NBA 2018 represents an update of the assessment of threat status for terrestrial ecosystems, but the National List of Threatened Terrestrial Ecosystems has not yet been revised*.	**Geology and Soils**	The area is underlain by the gneisses and migmatites of the Hout River Gneiss (Randian Erathem) and the potassium-deficient gneisses of the Goudplaats Gneiss (Swazian Erathem). Sandstones and mudstones of the Matlabas Subgroup (Mokolian Waterberg Group) are also found. Soils include deep, greyish sands, eutrophic plinthic catenas, red-yellow apedal freely drained soils with high base status, clayey in bottomlands. Land types mainly Bd, Bc, Ae and Ia.

[4] The ecosystem protection level status is assigned using the following criteria:

i. If an ecosystem type has more than 100% of its biodiversity target protected in a formal protected area either A or B, it is classified as Well Protected;
ii. When less than 100% of the biodiversity target is met in formal A or B protected areas it is classified it as Moderately Protected;
iii. If less than 50% of the biodiversity target is met, it is classified it as Poorly Protected; and
iv. If less than 5% it is Hardly Protected.

SAPAD (2021) [5]; SACAD (2021) [6]; NPAES (2009) (Figure 5) and Limpopo C-Plan (Figure 6)	According to the South Africa Protected Areas Database (SAPAD, 2021_Q4) and the National Protected Areas Expansion Strategy Database (NPAES, 2009) the **Witvinger Nature Reserve** (a formally protected area) is situated approximately 2.7 km south east of the Study Area, which is managed by the LEDET. This corresponds with the Limpopo C-Plan database which included buffers around protected areas as defined in "Listing Notice 3" (National Environmental Management Act, 1998 (Act No. 107 of 1998). The South Africa Conservation Areas Database (SACAD, 2021_Q4) does not indicate the presence of any additional conservation areas within 10 km of the Study Area.	**Vegetation & landscape features**	Slightly to moderately undulating plains sloping generally down to the north, with some hills in the southwest. Short and shrubby bushveld with a poorly developed grass layer. **Remark:** This area is transitional between the higher-lying Polokwane Plateau and the lower-lying vegetation units of the Limpopo River Valley.
IBA (2015)	The Study Area is not located within 10 km of an Important Bird and Biodiversity Area (IBA, 2015). The **Waterberg System IBA** is however located approximately 13.5 km south west of the proposed OHL Corridor.		
Detail of the Study Area in terms of the Limpopo Conservation Plan v2 (2018) – Figure 6			
CBA 1	A small south-eastern portion of the Study Area falls within a **Category 1 Critical Biodiversity Area (CBA)**. These are **Irreplaceable Sites** required to meet biodiversity pattern and / or ecological processes targets. It should be noted that the proposed layout footprint does not fall within the CBA. Land Management Recommendations: Obtain formal conservation protection where possible. Implement appropriate zoning to avoid net loss of intact habitat or intensification of land use. Incompatible Land-Use: Urban land-uses including Residential (including golf estates, rural residential, resorts), Business, Mining & Industrial; Infrastructure (roads, power lines, pipelines).		
ESA 1	The majority of the Study Area, the central portion, falls within a **Category 1 Ecological Support Area (ESA)**. These are natural, near natural and/or degraded areas that are selected to support CBAs by maintaining ecological processes. Land Management Recommendations: Implement appropriate zoning and land management guidelines to avoid impacting on ecological processes. Avoid intensification of land use and fragmentation of natural landscapes. Incompatible Land-Use: Urban land-uses including Residential (including golf estates, rural residential, resorts), Business, Mining & Industrial; Infrastructure (roads, power lines, pipelines).		

[5] **SACAD (2021):** The types of conservation areas that are currently included in the database are the following: 1. Biosphere reserves, 2. Ramsar sites, 3. Stewardship agreements (other than nature reserves and protected environments), 4. Botanical gardens, 5. Transfrontier conservation areas, 6. Transfrontier parks, 7. Military conservation areas and 8. Conservancies.

[6] **SAPAD (2021):** The definition of protected areas follows the definition of a protected area as defined in the National Environmental Management: Protected Areas Act, (Act 57 of 2003). Chapter 2 of the National Environmental Management: Protected Areas Act, 2003 sets out the "System of Protected Areas", which consists of the following kinds of protected areas - 1. Special nature reserves; 2. National parks; 3. Nature reserves; 4. Protected environments (1-4 declared in terms of the National Environmental Management: Protected Areas Act, 2003); 5. World heritage sites declared in terms of the World Heritage Convention Act; 6. Marine protected areas declared in terms of the Marine Living Resources Act; 7. Specially protected forest areas, forest nature reserves, and forest wilderness areas declared in terms of the National Forests Act, 1998 (Act No. 84 of 1998); and 8. Mountain catchment areas declared in terms of the Mountain Catchment Areas Act, 1970 (Act No. 63 of 1970).

	Note: Certain elements of these activities could be allowed subject to detailed impact assessment to ensure that developments were designed to maintain the overall ecological functioning of ESAs.
Other Natural Areas	The remaining northern portion of the Study Area falls within an area considered to be **other natural areas**. These are natural and intact areas but are not required to meet targets, nor have they been identified as Critical Biodiversity Areas or Ecological Support Areas. 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 "Not Natural" areas should be favoured for development before "Other natural areas".
National Web-based Screening Tool (2020)	
The screening tool is intended to allow for pre-screening of sensitivities in the landscape to be assessed within the EA process. This assists with implementing the mitigation hierarchy by allowing developers to adjust their proposed development footprint to avoid sensitive areas. The different sensitivity ratings pertaining to the Plant [and Animal] Protocols are described below: ➢ **Very High:** Habitat for species that are endemic to South Africa, where all the known occurrences of that species are within an area of 10 km^2 are considered Critical Habitat, as all remaining habitat is irreplaceable. Typically, these include species that qualify under Critically Endangered (CR), Endangered (EN), or Vulnerable (VU) D criteria of the IUCN or species listed as Critically/ Extremely Rare under South Africa's National Red List Criteria. For each species reliant on a Critical Habitat, all remaining suitable habitat has been manually mapped at a fine scale. ➢ **High:** Recent occurrence records for all threatened (CR, EN, VU) and/or rare endemic species are included in the high sensitivity level. ➢ **Medium:** Model-derived suitable habitat areas for threatened and/or rare species are included in the medium sensitivity level. ➢ **Low:** Areas where no SCC are known or expected to occur.	
Terrestrial Biodiversity Theme (Figure 7)	For the terrestrial biodiversity theme, the Study Area is considered to have an overall **sensitivity of very high**. The triggered sensitivity features include CBA Category 1 and ESA Category 1.
Animal Species Theme (Figure 8)	For the animal species theme, the majority of the Study Area is considered to have an overall **sensitivity of medium,** with a small eastern section classified as **high sensitivity** (associated with Focus Area 3; Figure 3). Species identified by the EIA Screening tool include: *Mycteria ibis* (Yellow Billed Stork; LC), *Dasymys robertsii* (Robert's shaggy rat), *Lycaon pictus* (African Wild Dog: EN) and *Sagittarius serpentarius* (Secretary bird; EN).
Plant Species Theme (Figure 9)	For the plant species theme, the entire Study Area is considered to have a **low sensitivity**.
Strategic Water Source Areas (SWSA)	
Surface water SWSAs are defined as areas of land that supply a disproportionate (i.e., relatively large) quantity of mean annual surface water runoff in relation to their size. They include transboundary areas that extend into Lesotho and Swaziland. The sub-national Water Source Areas (WSAs) are not nationally strategic as defined in the report but were included to provide a complete coverage.	
Name and Criteria	The Study Area is not within 10 km of a Strategic Water Source Area.

NBA = National Biodiversity Assessment; SAPAD = South African Protected Areas Database; SACAD = South African Conservation Areas Database; NPAES = National Protected Areas Expansion Strategy; IBA = Important Bird Area; MAP = Mean annual precipitation; MAT = Mean annual temperature; MAPE = Mean annual potential evaporation; MFD = Mean Frost Days; MASMS = Mean annual soil moisture stress (% of days when evaporative demand was more than double the soil moisture supply); CBA = Critical Biodiversity Areas; ESA = Ecological Support Areas.

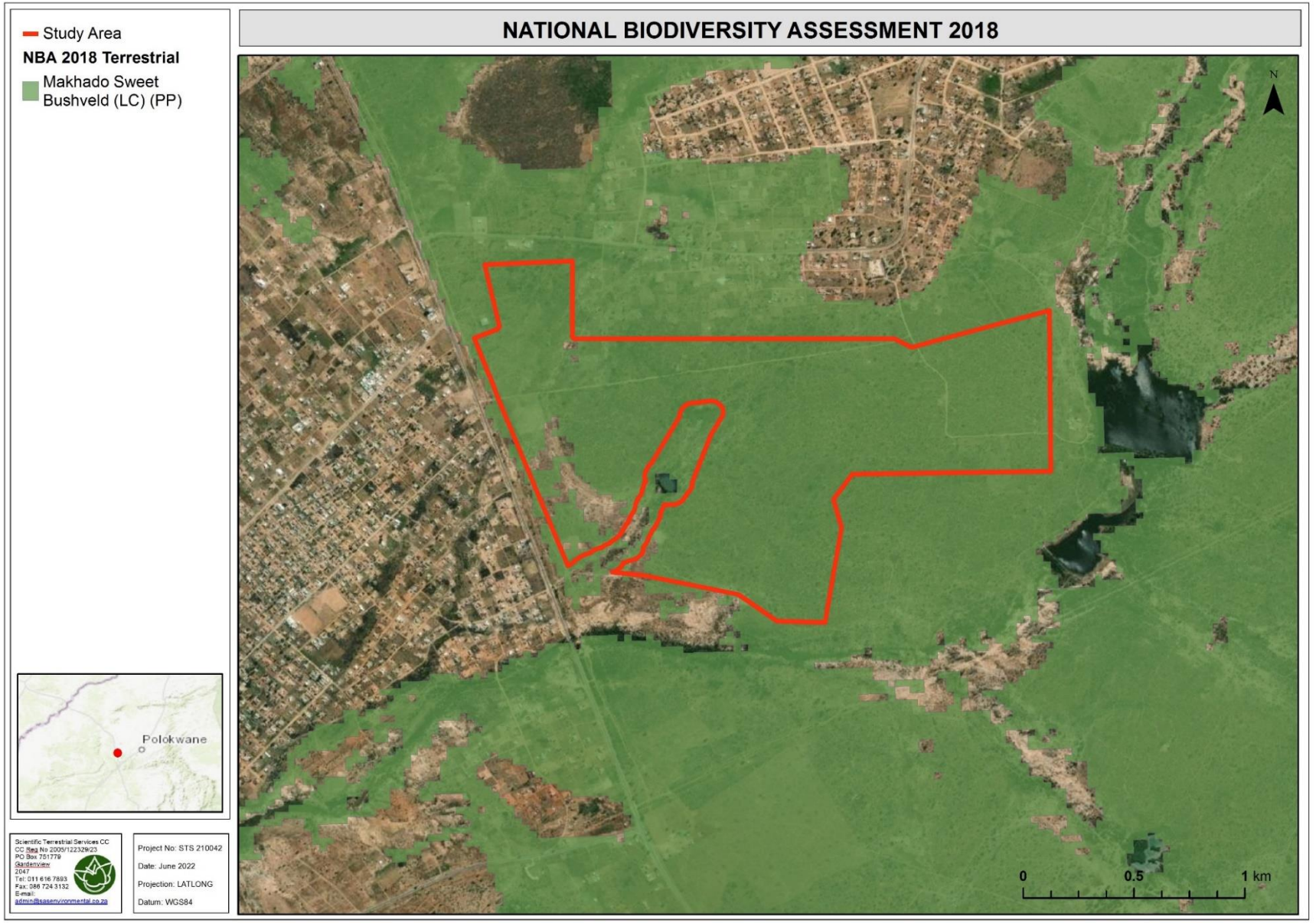


Figure 4: The remaining extent of the vegetation type associated with the Study Area, according to the National Biodiversity Assessment (NBA, 2018).

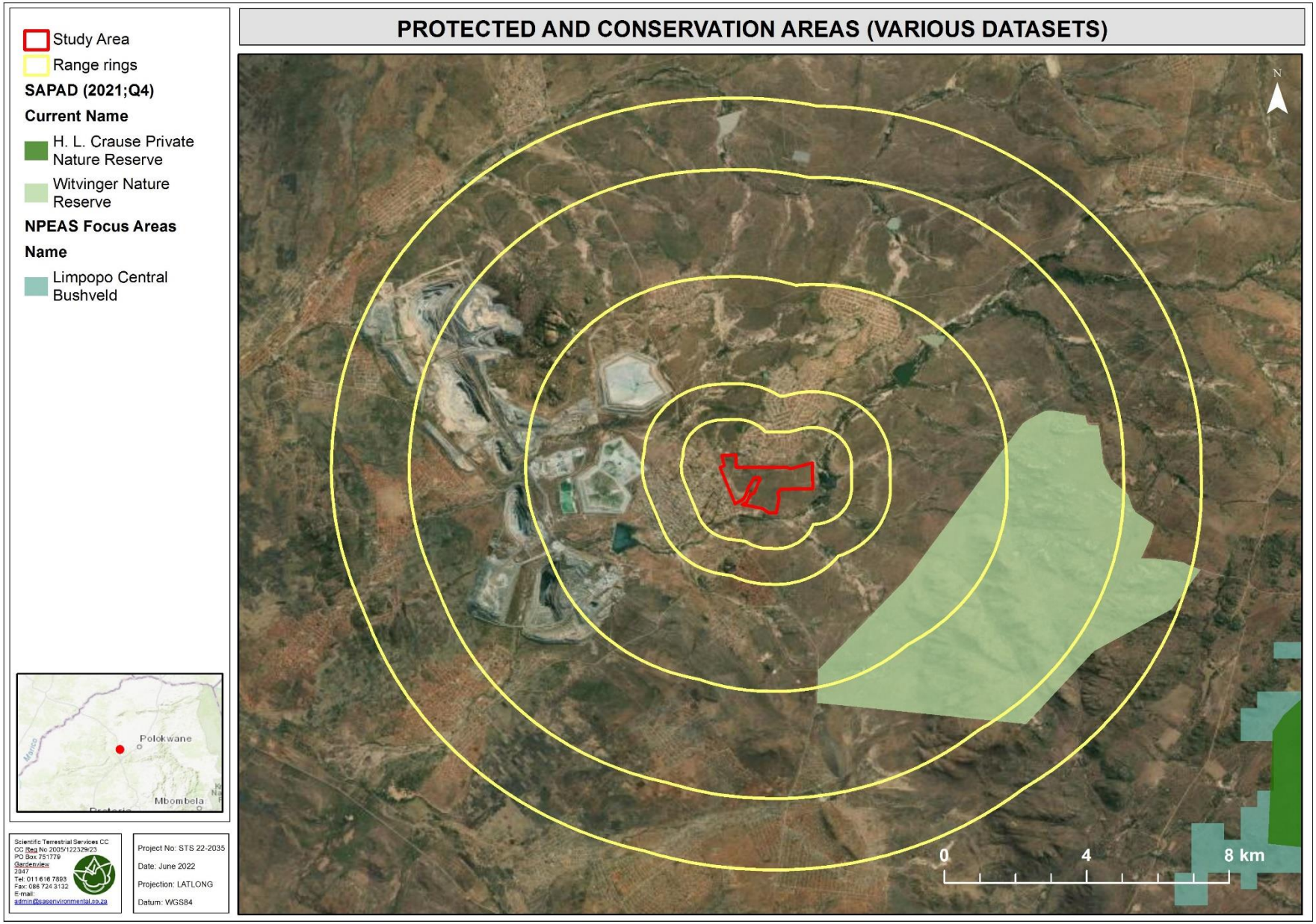


Figure 5: The protected area and important bird and biodiversity area within a 10 km radius of the Study Area (various datasets).

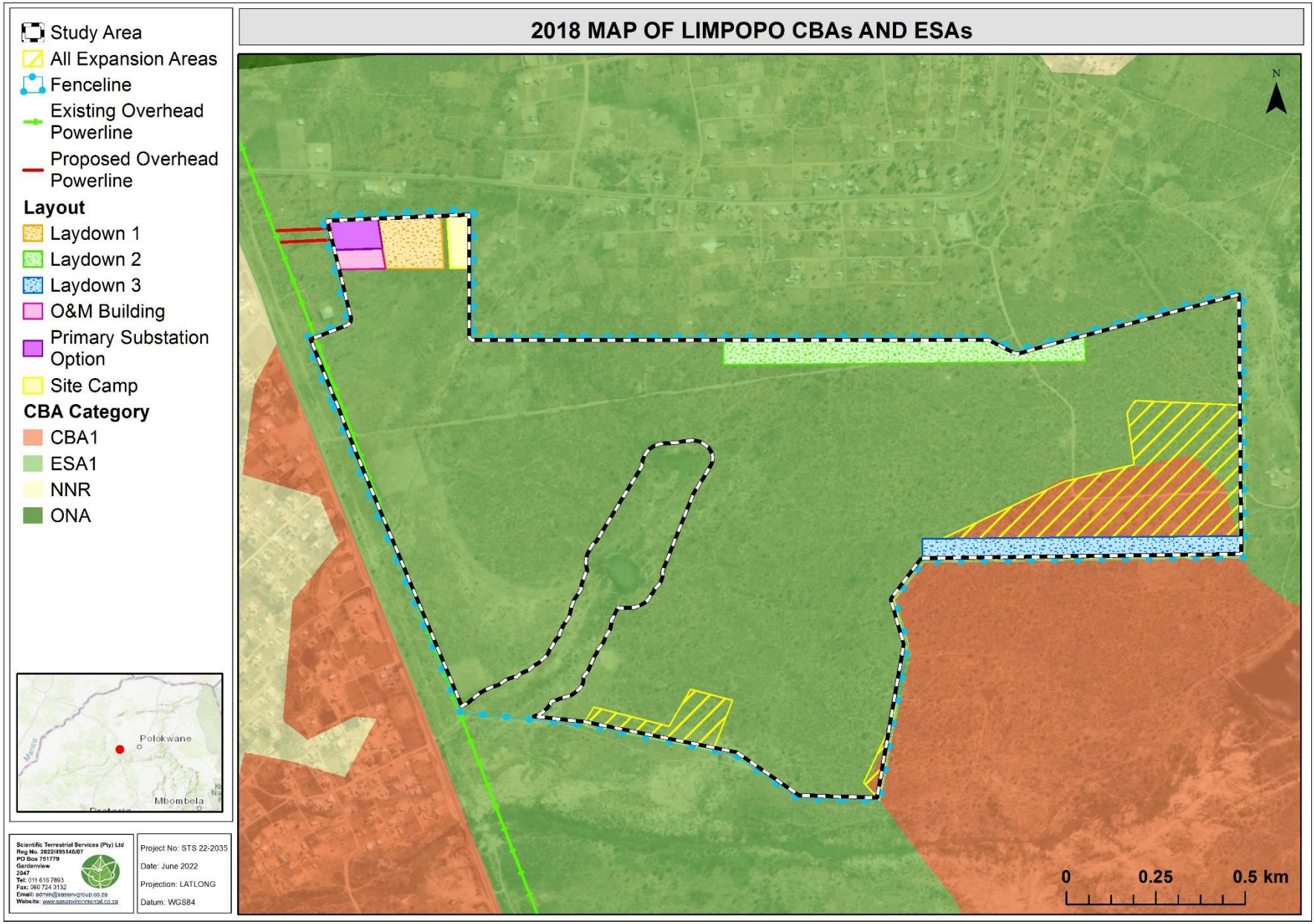


Figure 6: The Study Area in relation to the Limpopo Conservation Plan Version 2 (2018) categories.

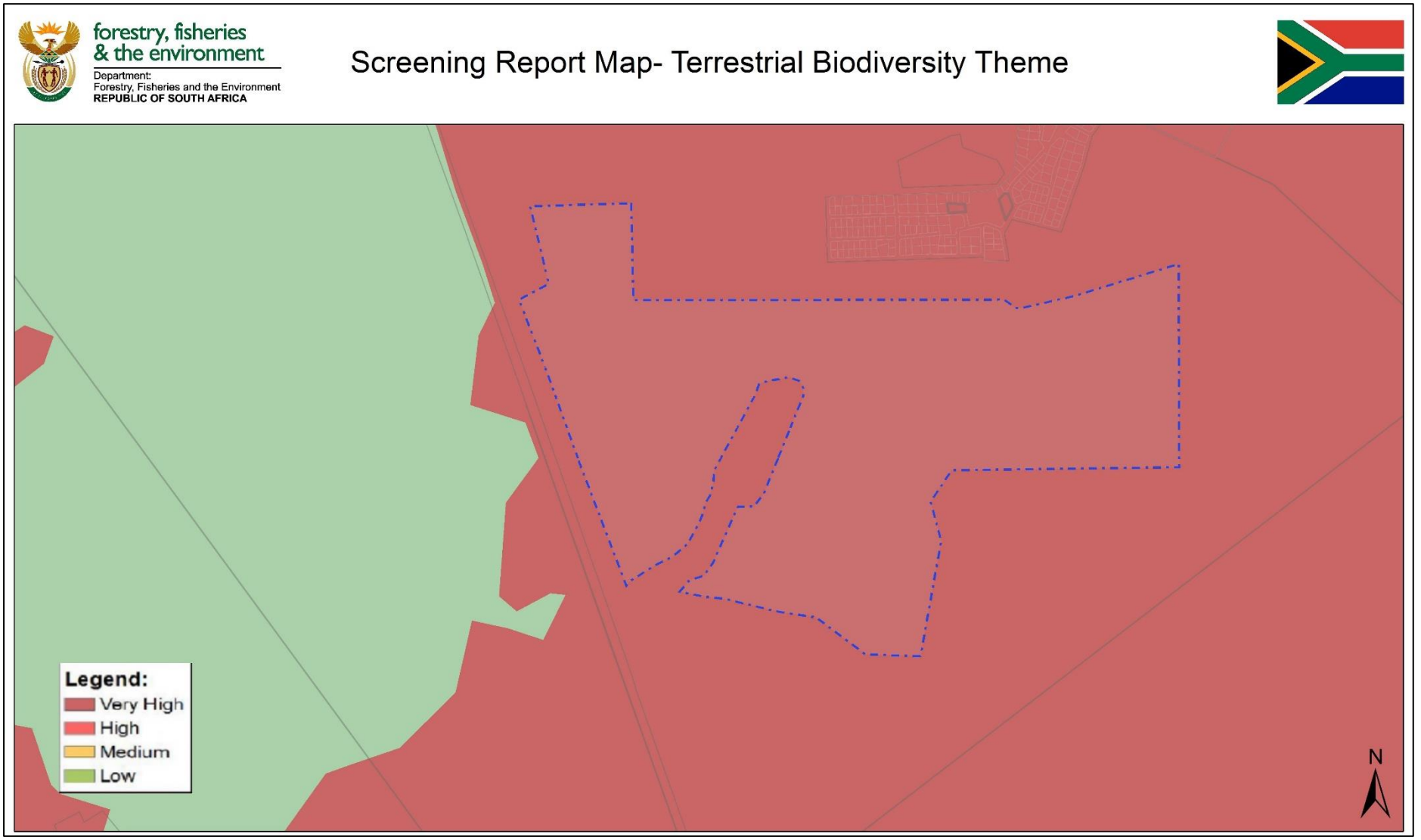


Figure 7: Terrestrial Biodiversity Theme sensitivity map generated by the National Web-based Screening Tool.

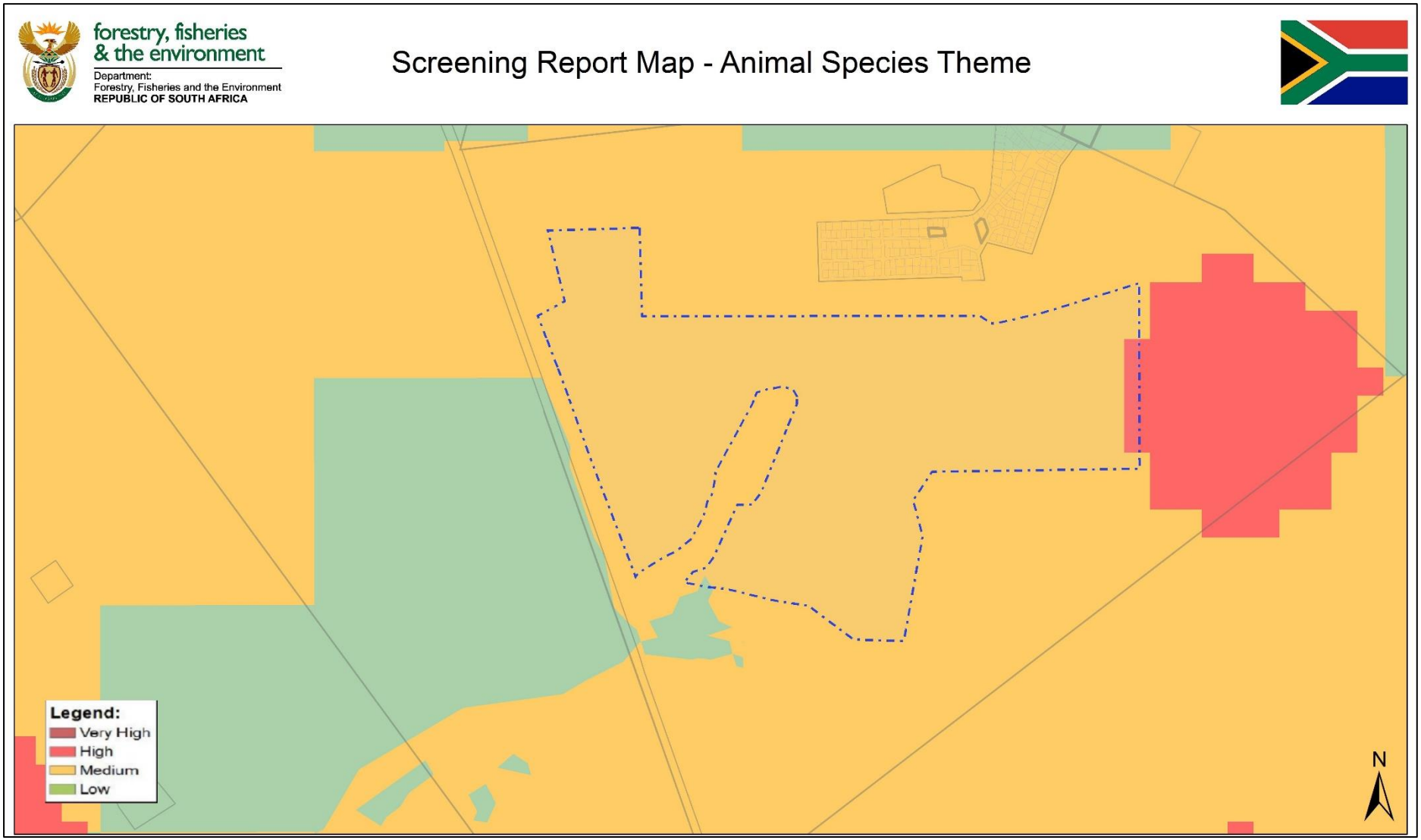


Figure 8: Animal Species Theme sensitivity map generated by the National Web-based Screening Tool.

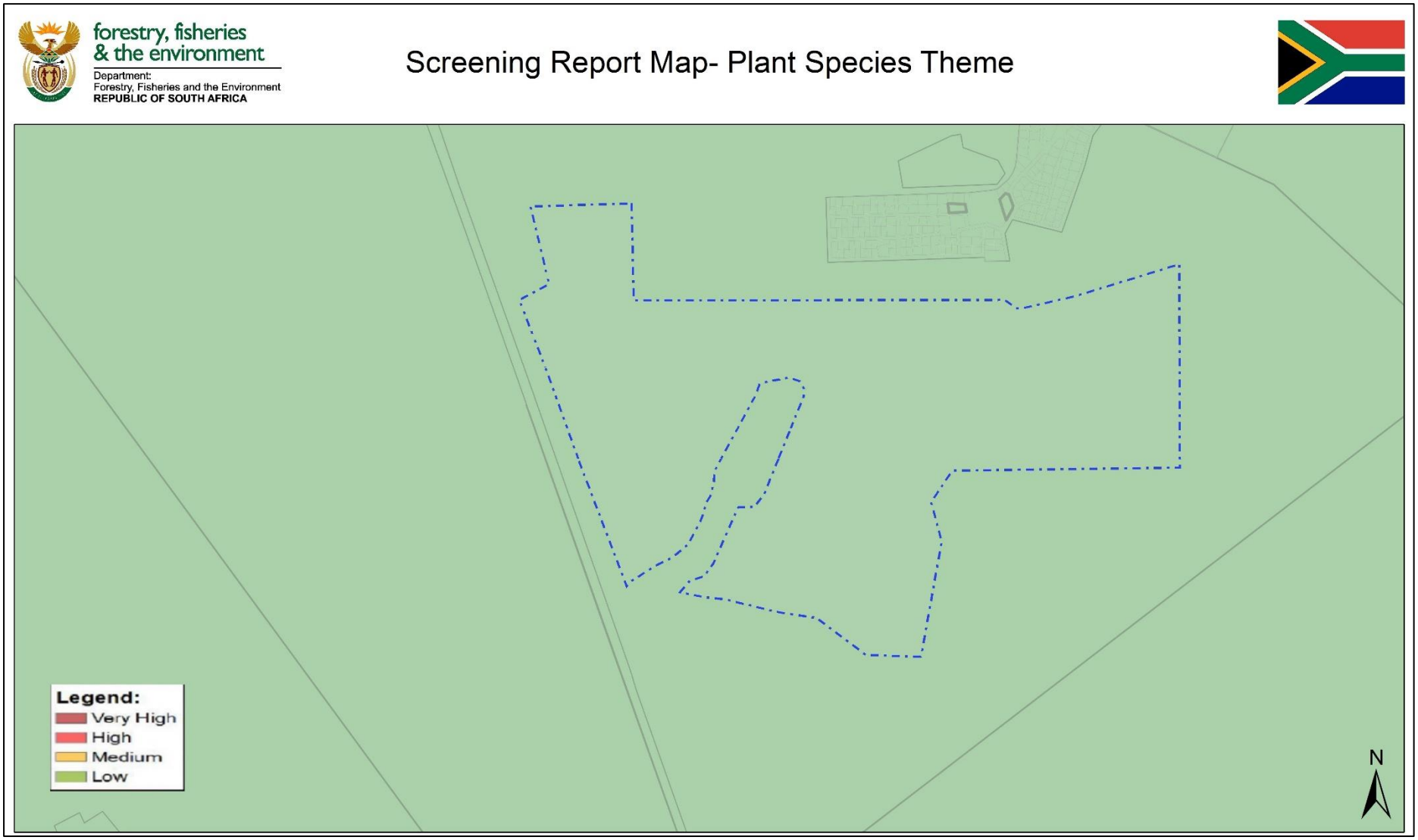


Figure 9: Plant Species Theme sensitivity map generated by the National Web-based Screening Tool.

4 STRUCTURE OF THE BIODIVERSITY REPORT

Part A of this report served to introduce the Study Area, as well as the general approach to the study. Part A also presents the results of general desktop information reviewed as part of the study including the information generated by the relevant authorities as well as the context of the site in relation to the surrounding anthropogenic activities and ecological character.

Part B presents the results of the floral field assessment, data analyses and discussion of the results. Part B then presents the results of the impact assessment where the impacts on floral ecology and biodiversity are discussed.

Part C presents the results of the faunal field assessment, data analyses and discussion of the results. Part C then presents the results of the impact assessment where the impacts on faunal ecology and biodiversity are discussed.

5 REFERENCES

BirdLife South Africa. 2015. Important Bird Areas 2015 [vector geospatial dataset] 2015. Available from the Biodiversity GIS website.

Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA)

Constitution of the Republic of South Africa, 1996

DEA & SANBI. 2009. National Protected Area Expansion Strategy Resource Document.

Desmet, P. G., Holness, S., Skowno, A. & Egan, V.T. 2013. Limpopo Conservation Plan v.2: Technical Report. Contract Number EDET/2216/2012. Report for Limpopo Department of Economic Development, Environment & Tourism (LEDET) by ECOSOL GIS.

Digby Wells Environmental. 2022. Mogalakwena Platinum Mine: Significant Biodiversity Features and Priority Ecosystem Services Baseline. Project Number: AAT7284.

Government of South Africa. 2010. National protected area expansion strategy for South Africa 2008. Priorities for expanding the protected area network for ecological sustainability and climate change adaptation. Pretoria, South Africa: The Government of South Africa.

Government Notice R598 Alien and Invasive Species Regulations as published in the Government Gazette 37885 dated 1 September 2014 as it relates to the National Environmental Management Biodiversity Act, 1998 (Act No. 107 of 1998)

Hui C, Richardson DM (2017) Invasion dynamics. Oxford University Press, Oxford. https://doi.org/10.1093/acprof:oso/9780198745334.001.0001

LEDET (Limpopo Department of Economic Development & Tourism). 2013. Limpopo Conservation Plan v2 CBAs 2013 [vector geospatial dataset] 2013. Available from the Biodiversity GIS website.

Marnewick MD, Retief EF, Theron NT, Wright DR, Anderson TA. 2015a. Important Bird and Biodiversity Areas of South Africa. Johannesburg: BirdLife South Africa.

Marnewick MD, Retief EF, Wright DR, Theron NT. 2015b. South Africa's Important Bird and Biodiversity Areas Status Report 2015. Johannesburg: BirdLife South Africa.

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

National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)

National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA)

National Web Based Environmental Screening Tool (2021). Accessible online: https://screening.environment.gov.za/screeningtool/#/pages/welcome

Richardson DM, Pyšek P, Carlton JT (2011) A compendium of essential concepts and terminology in invasion ecology. In: Richardson DM (ed) Fifty years of invasion ecology. The legacy of Charles Elton. Wiley-Blackwell, Oxford, pp 409–420. https://doi.org/10.1002/9781444329988. ch30

SABAP2, 2015. The South Africa Bird Atlas Project 2 database

SACAD: Department of Environmental Affairs. 2020. South Africa Conservation Areas Database (SACAD_OR_2020_Q3). Online available: [http://egis.environment.gov.za]

SANBI. 2011. National List of Threatened Ecosystems 2011 [vector geospatial dataset] 2011. Available from the Biodiversity GIS website.

SANBI. 2018a. 2018 Final Vegetation Map of South Africa, Lesotho and Swaziland [Vector] 2018. Available from the Biodiversity GIS website.

SANBI. 2018b. Terrestrial ecosystem threat status and protection level - remaining extent [Vector] 2018. URL: http://bgis.sanbi.org

SANBI. 2018c. Terrestrial ecosystem threat status and protection level layer [Vector] 2018. URL: http://bgis.sanbi.org

SANParks/SANBI. 2013. NPAES Formal [vector geospatial dataset] 2013. Available from the Biodiversity GIS website

SANParks/SANBI. 2012. NPAES Protected Areas - Informal 2010 [vector geospatial dataset] 2012. Available from the Biodiversity GIS website.

South African National Parks (SANParks). 2010. NPAES Focus Areas 2010 [vector geospatial dataset] 2010. Available from the Biodiversity GIS website.

SAPAD: Department of Environmental Affairs. 2020. South Africa Protected Areas Database (SAPAD_OR_2020_Q3). Online available: [http://egis.environment.gov.za]

SAS (Scientific Aquatic Services) 2021, project number 210042. Freshwater Ecological Assessment as part of the Environmental Authorisation Process for the Proposed Solar Photovoltaic (PV) associated with the Anglo-American Mine near Mokopane, Limpopo Province. Prepared for Zutari Pty (Ltd).

STS (Scientific Terrestrial Services) 2020, project number 200051. Biodiversity Scoping Report as Part of The Environmental Impact Assessment and Authorisation Process for the Proposed PV Solar Plant Development Near Mokopane, Limpopo Province. Prepared for Zutari Pty (Ltd).

STS (Scientific Terrestrial Services) 2020, project number 19004. Ecological Status Quo Determination and Ecological Input into the Feasibility of the Study Area for the Proposed PV Solar Plant Development and Powerline Routes Near Mokopane, Limpopo Province. Prepared for Zutari Pty (Ltd).

STS (Scientific Terrestrial Services) 2021, project number 210042. Terrestrial biodiversity assessment as part of the Environmental Authorisation process for the proposed solar Photovoltaic (PV) plant, near Mokopane as part of the Environmental Impact Assessment phase, Limpopo Province. Prepared for Zutari (Pty) Ltd. June 2021.

Skowno, Andrew & C.J., Poole, & Raimondo, Domitilla & K.J., Sink, & Van Deventer, Heidi & Van Niekerk, Lara & Harris, Linda & Smith-Adao, Lindie & Tolley, Krystal & Zengeya, Tsungai & W.B., Foden, & G.F., Midgley, & Driver, Amanda. 2019. National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity. Synthesis Report. South African National Biodiversity Institute, an entity of the Department of Environment, Forestry and Fisheries, Pretoria.

South Africa. 2011. National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection. Government Gazette, 558(34809): 1 – 544, December 9.

Van Wyk, A. E., & Smith, G. F. (2001). Regions of floristic endemism in southern Africa: a review with emphasis on succulents. Umdaus press

Water Research Commission. 2017. SWSA Surface water [Vector] 2017. Available from the Biodiversity GIS website.

Wilson JRU, Gaertner M, Richardson DM et al (2017) Contributions to the national status report on biological invasions in South Africa. Bothalia 47:a2207. https://doi.org/10.4102/abc.v47i2.2207

APPENDIX A: Indemnity and Terms of Use of this Report

The findings, results, observations, conclusions, and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information. The report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken and STS and its staff reserve the right to, at their sole discretion, modify aspects of the report including the recommendations if and when new information may become available from ongoing research or further work in this field, or pertaining to this investigation.

Although STS CC exercises due care and diligence in rendering services and preparing documents, STS CC accepts no liability and the client, by receiving this document, indemnifies STS CC and its directors, managers, agents and employees against all actions, claims, demands, losses, liabilities, costs, damages, and expenses arising from, or in connection with, services rendered, directly or indirectly by STS CC and by the use of the information contained in this document.

This report must not be altered or added to or used for any other purpose other than that for which it was produced without the prior written consent of the author(s). This also refers to electronic copies of this report which are supplied for the purposes of inclusion as part of other reports, including main reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must make reference to this report. If these form part of a main report relating to this investigation or report, this report must be included in its entirety as an appendix or separate section to the main report.

APPENDIX B: Legislative Requirements

THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA, 1996

The environment and the health and well-being of people are safeguarded under the Constitution of the Republic of South Africa, 1996 by way of section 24. Section 24(a) guarantees a right to an environment that is not harmful to human health or well-being and to environmental protection for the benefit of present and future generations. Section 24(b) directs the state to take reasonable legislative and other measures to prevent pollution, promote conservation, and secure the ecologically sustainable development and use of natural resources (including water and mineral resources) while promoting justifiable economic and social development. Section 27 guarantees every person the right of access to sufficient water, and the state is obliged to take reasonable legislative and other measures within its available resources to achieve the progressive realisation of this right. Section 27 is defined as a socio-economic right and not an environmental right. However, read with section 24 it requires of the state to ensure that water is conserved and protected and that sufficient access to the resource is provided. Water regulation in South Africa places a great emphasis on protecting the resource and on providing access to water for everyone.

THE CONSERVATION OF AGRICULTURAL RESOURCES ACT, 1983 (ACT NO. 43 OF 1983) (CARA)

Removal of the alien and weed species encountered in the application area must take place in order to comply with existing legislation (amendments to the regulations under the CARA, 1983 and Section 28 of the NEMA, 1998). Removal of species should take place throughout the construction and operation, phases.

THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) (NEMA)

The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the associated Environmental Impact Assessment (EIA) Regulations (GN R326 as amended in 2017 and well as listing notices 1, 2 and 3 (GN R327, R325 and R324 of 2017), state that prior to any development taking place which triggers any activity as listed within the abovementioned regulations, an environmental authorisation process needs to be followed. This could follow either the Basic Assessment process or the Environmental Impact Assessment process depending on the nature of the activity and scale of the impact.

THE NATIONAL ENVIRONMENTAL MANAGEMENT BIODIVERSITY ACT, 2004 (ACT NO. 10 OF 2004) (NEMBA)

The objectives of this act are (within the framework of NEMA) to provide for:

- The management and conservation of biological diversity within the Republic of South Africa and of the components of such diversity;
- The use of indigenous biological resources in a sustainable manner;
- The fair and equitable sharing among stakeholders of the benefits arising from bio prospecting involving indigenous biological resources;
- To give effect to ratify international agreements relating to biodiversity which are binding to the Republic;
- To provide for cooperative governance in biodiversity management and conservation; and
- To provide for a South African National Biodiversity Institute to assist in achieving the objectives of this Act.

This act alludes to the fact that management of biodiversity must take place to ensure that the biodiversity of the surrounding areas are not negatively impacted upon, by any activity being undertaken, in order to ensure the fair and equitable sharing among stakeholders of the benefits arising from indigenous biological resources.

Furthermore, a person may not carry out a restricted activity involving either:

a) A specimen of a listed threatened or protected species;
b) Specimens of an alien species; or
c) A specimen of a listed invasive species without a permit.

GOVERNMENT NOTICE NUMBER R.1020: ALIEN AND INVASIVE SPECIES REGULATIONS, 2020 (IN GOVERNMENT GAZETTE 43735), INCLUDING GOVERNMENT NOTICE NUMBER 1003: ALIEN AND INVASIVE SPECIES LISTS, 2020 (IN GOVERNMENT GAZETTE 43726) AS IT RELATES TO THE NEMBA

NEMBA is administered by the Department of Environmental Affairs and aims to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA. In terms of alien and invasive species. This act in terms of alien and invasive species aims 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 species and invasive species from ecosystems and habitats where they may harm such ecosystems or habitats.

Alien species are defined, in terms of the National Environmental Management: Biodiversity Act, 2004 (Act no 10 of 2004) as:

(a) A species that is not an indigenous species; or
(b) An indigenous species translocated or intended to be translocated to a place outside its natural distribution range in nature, but not an indigenous species that has extended its natural distribution range by natural means of migration or dispersal without human intervention.

Categories according to NEMBA (Alien and Invasive Species Regulations, 2020):

- **Category 1a**: Invasive species that require compulsory control;
- **Category 1b**: Invasive species that require control by means of an invasive species management programme;
- **Category 2**: Commercially used plants that may be grown in demarcated areas, provided that there is a permit and that steps are taken to prevent their spread; and
- **Category 3**: Ornamentally used plants that may no longer be planted.

NATIONAL ENVIRONMENTAL MANAGEMENT: PROTECTED AREAS ACT, 2003 (ACT NO. 57 OF 2003) AS AMENDED[7] (NEMPAA)

The objective of this act is to provide for the protection and conservation of ecologically viable areas representative of South Africa's biological biodiversity 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 standards; for intergovernmental co-operation and public consultation in matters concerning protected areas; for the continued existence, governance and functions of South African National Parks; and for matters in connection thereof.

[7] Amendments to the NEMPAA:

- National Environmental Management: Protected Areas Amendment Act 31 of 2004 – Gazette No. 27274, No. 131. Commencement date: 1 November 2005 [Proc. No. R. 58, Gazette No, 28123]
- National Environment Laws Amendment Act 14 of 2009 – Gazette No.32267, No. 617. Commencement date: 18 September 2009 [Proc. 65, Gazette No. 32580]
- National Environmental Management: Protected Areas Amendment Act 15 of 2009 – Gazette No. 32660, No. 748. Commencement date: 23 October 2009 – except for sections 1 and 8 [Proc. No. 69, Gazette No. 32660]
- Schedule 2 amended by Government Notice R236 in Government Gazette 36295 dated 27 March 2013. Commencement date: 1 April 2013 of sections 1 and 8 (relating to Schedule 2) of the National Environmental Management Protected Areas Amendment Act, 15 of 2009 [Proc. No. 7, Gazette No. 36296]
- National Environmental Management: Protected Areas Amendment Act 21 of 2014 - Government Notice 445 in Government Gazette 37710 dated 2 June 2014. Commencement date: 2 June 2014.
- Schedule 2 amendment by General Notice 2 of 2016 in Government Gazette 39728 dated 25 February 2016. Commencement date: 25 February 2016.

THE NATIONAL FOREST ACT, 1998 (ACT NO. 10 OF 1998), AS AMENDED IN SEPTEMBER 2011 (NFA)

According to the department of Department of Forestry, Fisheries and the Environment (DFFE) (previously the Department of Agriculture, Forestry and Fisheries (DAFF)) ©2019 website (https://www.daff.gov.za/daffweb3/):
"In terms of the National Forests Act of 1998 certain tree species (types of trees) can be identified and declared as protected. The Department of Water Affairs and Forestry followed an objective, scientific and participative process to arrive at the new list of protected tree species, enacted in 2004. All trees occurring in natural forests are also protected in terms of the Act. Protective actions take place within the framework of the Act as well as national policy and guidelines. Trees are protected for a variety of reasons, and some species require strict protection while others require control over harvesting and utilisation."

Applicable sections of the NFA pertaining to the proposed project include the below:
Section 12:
Declaration of trees as protected

1) The Minister may declare-
    a. particular tree,
    b. a particular group of trees,
    c. a particular woodland; or
    d. trees belonging to a particular species,
    to be a protected tree, group of trees, woodland or species.
2) The Minister may make such a declaration only if he or she is of the opinion that the tree, group of trees, woodland or species is not already adequately protected in terms of other legislation.
3) In exercising a discretion in terms of this section, the Minister must consider the principles set out in section 3(3) of the NFA.

Section 15(1):
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 forest product derived from a protected tree, except under a licence granted by the Minister or in terms of an exemption from the provisions of this subsection published by the Minister in the Gazette.

Contravention of this declaration is regarded as a first category offence that may result in a person who is found guilty of being sentenced to a fine or imprisonment for a period up to three years, or both a fine and imprisonment.

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

The objectives of this Act are:

- to manage and protect the environment in the Province;
- to secure ecologically sustainable development and responsible use of natural resources in the
- Province;
- generally, to contribute to the progressive realisation of the fundamental rights contained in section 24 of the Constitution of the Republic of South Africa Act, 1996 (Act No. 108 of 1996), and
- to give effect to international agreements effecting environmental management which are binding on the Province.

This Act must be interpreted and applied in accordance with the national environmental management principles set out in Section 2 of the National Environmental Management Act, 1998 (Act No. 107 of 1998).

APPENDIX C: Impact Assessment Methodology (Zutari)

CRITERIA	CATEGORY	DESCRIPTION	
Project phase	Construction		
	Operation		
	Decommissioning		
Mitigatability	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts	
	Medium	Mitigation exists and will notably reduce significance of impacts	
	High	Mitigation exists and will considerably reduce the significance of impacts	
Nature	Positive		1
	Negative		-1
Duration	Immediate	Impact will self-remedy immediately	1
	Brief	Impact will not last longer than 1 year	2
	Short term	impact will last between 1 and 5 years	3
	Medium term	Impact will last between 5 and 10 years	4
	Long term	Impact will last between 10 and 15 years	5
	On-going	Impact will last between 15 and 20 years	6
	Permanent	Impact may be permanent, or in excess of 20 years	7
Extent	Very limited	Limited to specific isolated parts of the site	1
	Limited	Limited to the site and its immediate surroundings	2
	Local	Extending across the site and to nearby settlements	3
	Municipal area	Impacts felt at a municipal level	4
	Regional	Impacts felt at a regional / provincial level	5
	National	Impacts felt at a national level	6
	International	Impacts felt at an international level	7
Intensity	Negligible	Natural and/ or social functions and/ or processes are negligibly altered	1
	Very low	Natural and/ or social functions and/ or processes are slightly altered	2
	Low	Natural and/ or social functions and/ or processes are somewhat altered	3
	Moderate	Natural and/ or social functions and/ or processes are moderately altered	4
	High	Natural and/ or social functions and/ or processes are notably altered	5
	Very high	Natural and/ or social functions and/ or processes are majorly altered	6
	Extremely high	Natural and/ or social functions and/ or processes are severely altered	7
Probability	Highly unlikely / none	Expected never to happen	1
	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere	2
	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur	3
	Probable	The impact has occurred here or elsewhere and could therefore occur	4
	Likely	The impact may occur	5
	Almost certain / Highly probable	It is most likely that the impact will occur	6
	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	7
Confidence	Low	Judgement is based on intuition	
	Medium	Determination is based on common sense and general knowledge	
	High	Substantive supportive data exists to verify the assessment	
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	
	Medium	The affected environment will only recover from the impact with significant intervention	
	High	The affected environmental will be able to recover from the impact	
	Low	The resource is not damaged irreparably or is not scarce	

Resource irreplaceability	**Medium**	The resource is damaged irreparably but is represented elsewhere	
	High	The resource is irreparably damaged and is not represented elsewhere	
Significance	**Negligible**		
	Minor		
	Moderate		
	Major		

Significance:	negative	positive
Negligible	Negligible - negative	Negligible - positive
Minor	Minor - negative	Minor - positive
Moderate	Moderate - negative	Moderate - positive
Major	Major - negative	Major - positive

Mitigation measure development

The following points presents the key concepts considered in the development of mitigation measures for the proposed construction:

- Mitigation and performance improvement measures and actions that address the risks and impacts[8] are identified and described in as much detail as possible. Mitigating measures are investigated according to the impact minimisation hierarchy as follows:
  - Avoidance or prevention of impact;
  - Minimisation of impact; and
  - Rehabilitation.
- Measures and actions to address negative impacts will favour avoidance and prevention over minimisation, mitigation or compensation; and
- Desired outcomes are defined and have been developed in such a way as to be measurable events with performance indicators, targets and acceptable criteria that can be tracked over defined periods, wherever possible.

Recommendations

Recommendations were developed to address and mitigate impacts associated with the proposed projects. These recommendations also include general management measures which apply to the proposed projects as a whole. Mitigation measures have been developed to address issues in all phases throughout the life of the projects from planning, through to construction and operation.

[8] Mitigation measures should address both positive and negative impacts

APPENDIX D: Vegetation Type

Makhado Sweet Bushveld (SVcb 20)

Remarks: This area is transitional between the higher-lying Polokwane Plateau and the lower-lying vegetation units of the Limpopo River Valley.

Table D1: Dominant & typical floristic species of the Makhado Sweet Bushveld (Mucina & Rutherford, 2006)

Group	Species
Woody Species	
Small trees	*Senegalia erubescens* (d), *Vachellia gerrardii* (d), *S. mellifera* subsp. *detinens* (d), *V. rehmanniana* (d), *Boscia albitrunca* (d), *Combretum apiculatum* (d), *V tortilis* subsp. *heteracantha*, *Terminalia sericea*
Tall shrubs	*Commiphora pyracanthoides*, *Dichrostachys cinerea*, *Grewia flava*, *Hibiscus calyphyllus*, *Lycium shawii*, *Rhigozum obovatum*
Low shrubs	*Barleria lancifolia*, *Hirpicium bechuanense*, *Indigofera poliotes*, *Melhania rehmannii*, *Pechuel-Loeschea leubnitziae*
Succulents	
Succulent shrubs	*Euphorbia bergii, Kalanchoe rotundifolia*, *Lycium cinereum*.
Herbaceous species	
Herbs	*Chamaecrista absus*, *Corbichonia decumbens*, *Geigeria acaulis*, *Harpagophytum procumbens* subsp. *transvaalense*, *Heliotropium steudneri*, *Syncolostemon elliottii*, *Hermbstaedtia odorata*, *Leucas sexdentata*, *Osteospermum muricatum*, *Tephrosia purpurea* subsp. *leptostachya*
Graminoids	
Grasses	*Anthephora pubescens* (d), *Aristida stipitata* subsp. *graciliflora* (d), *Cenchrus ciliaris* (d), *Enneapogon scoparius* (d), *Brachiaria nigropedata*, *Eragrostis trichophora*, *Panicum coloratum*, *P. maximum*, *Schmidtia pappophoroides*, *Urochloa mosambicensis*

***(d) – Dominant species for the vegetation type**

APPENDIX E: Details, Expertise And Curriculum Vitae of Specialists

1. (a) (i) Details of the specialist who prepared the report

Charne Gouws	MSc Plant Science (University of Pretoria)
Christopher Hooton	BTech Nature Conservation (Tshwane University of Technology)
Christien Steyn	MSc Plant Science (University of Pretoria)
Daryl van der Merwe	MSc Conservation Biology (University of Cape Town)
Jandre Potgieter	BSc (Hons) Zoology(University of Pretoria)
Nelanie Cloete	MSc Botany and Environmental Management (University of Johannesburg)
Paige Ezzey (now van Niekerk)	Hons. BSc Zoology (University of Witwatersrand)
Sam. L. Daniels	PhD candidate Plant Science (University of Pretoria)
Stephen van Staden	MSc Environmental Management (University of Johannesburg)

1. (A). (ii) The expertise of that specialist to compile a specialist report including a curriculum vitae

Company of Specialist:	Scientific Terrestrial Services		
Name / Contact person:	Christien Steyn		
Postal address:	PO. Box 751779, Gardenview		
Postal code:	2047	Fax:	086 724 3132
Telephone:	011 616 7893		
E-mail:	christien@sasenvgroup.co.za		
Qualifications	MSc (Plant Science) (University of Pretoria) BSc (Hons) Plant Science (Invasion Biology) (University of Pretoria) BSc Environmental Science (University of Pretoria)		
Registration / Associations	Member of the South African Association of Botanists (SAAB) Member of the Botanical Society of South Africa (BotSoc) Professional member of the South African Council for Natural Scientific Professions (SACNASP) Member of the Grassland Society of South Africa (GSSA) Member of the Land Rehabilitation Society of Southern Africa (LARSSA)		

Company of Specialist:	Scientific Terrestrial Services		
Name / Contact person:	Nelanie Cloete		
Postal address:	PO. Box 751779, Gardenview		
Postal code:	2047	Cell:	084 311 4878
Telephone:	011 616 7893	Fax:	086 724 3132
E-mail:	Nelanie@sasenvgroup.co.za		
Qualifications	MSc Environmental Management (University of Johannesburg) MSc Botany (University of Johannesburg) BSc (Hons) Botany (University of Johannesburg) BSc (Botany and Zoology) (Rand Afrikaans University)		
Registration / Associations	Professional member of the South African Council for Natural Scientific Professions (SACNASP) Member of the South African Association of Botanists (SAAB) Member of the International Affiliation for Impact Assessments (IAIAsa) South Africa group Member of the Grassland Society of South Africa (GSSA)		

Company of Specialist:	Scientific Terrestrial Services		
Name / Contact person:	Stephen van Staden		
Postal address:	29 Arterial Road West, Oriel, Bedfordview		
Postal code:	1401	Fax:	011 615 6240/ 086 724 3132
Telephone:	011 616 7893		
E-mail:	stephen@sasenvgroup.co.za		
Qualifications	MSc (Environmental Management) (University of Johannesburg) BSc (Hons) Zoology (Aquatic Ecology) (University of Johannesburg) BSc (Zoology, Geography and Environmental Management) (University of Johannesburg)		
Registration / Associations	Registered Professional Natural Scientist at South African Council for Natural Scientific Professions (SACNASP) Accredited River Health Practitioner by the South African River Health Program (RHP) Member of the South African Soil Surveyors Association (SASSO) Member of the Gauteng Wetland Forum		

1. (b) a declaration that the specialist is independent in a form as June be specified by the competent authority

I, Charne Gouws, 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 declare that 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 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 my 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 myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct.

Specialist Signature

I, Christopher Hooton, declare that -

- I act as the **independent specialist (reviewer)** 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 declare that 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 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 my 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 myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct.

Specialist Signature

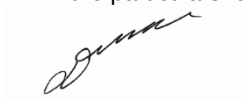
I, Christien Steyn, declare that -

- I act as the **independent specialist (reviewer)** 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 declare that 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 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 my 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 myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct

Signature of the Specialist

I, Daryl van der Merwe, 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 declare that 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 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 my 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 myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct.



Specialist Signature

I, Jandre Potgieter, declare that -

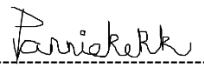
- I act as the **independent specialist** in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that June compromise my objectivity 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 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 my possession that reasonably has or June 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 myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct

Signature of the Specialist

I, Paige Ezzey, declare that -

- I act as the **independent specialist** in this application;

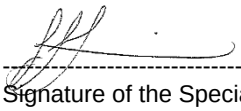
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the 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 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 my 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 myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct.



Specialist Signature

I, Sam L Daniels, declare that -

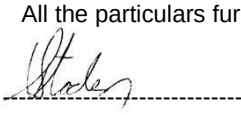
- I act as the **independent specialist** in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity 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 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 my 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 myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct



Signature of the Specialist

I, Stephen van Staden, declare that -

- I act as the **independent specialist (reviewer)** 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 declare that 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 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 my 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 myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct



Signature of the Specialist

I, Nelanie Cloete, declare that -

- I act as the **independent specialist (reviewer)** 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 declare that 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 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 my 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 myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct

Signature of the Specialist

SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF CHARNE GOUWS

PERSONAL DETAILS

Position in Company	Floral Ecologist
Joined SAS Environmental Group of Companies	2022

MEMBERSHIP IN PROFESSIONAL SOCIETIES

SANAP (South African National Antarctic Programme)
Golden Key Honorary Society

EDUCATION

Qualifications

MSc Plant Science (University of Pretoria)	2021
BSc (Hons) Plant Science (Invasion Biology) (University of Pretoria)	2018
BSc Environmental Science (University of Pretoria)	2017

Short courses and Training

- Advanced Grass Identification Course (2019)
- CREW Tree Identification Course (2019)
- ISO 140001 Environmental Management Course (2020)
- Ecological Practices and Theory Short Course (2020)

AREAS OF WORK EXPERIENCE

South Africa – Gauteng, Limpopo, KwaZulu-Natal and Eastern Cape

KEY SPECIALIST DISCIPLINES

Biodiversity Assessments

- Floral Assessments
- Desktop Studies, Mapping and Background Information Research

SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF CHRISTIEN STEYN

PERSONAL DETAILS

Position in Company	Floral Ecologist
Joined SAS Environmental Group of Companies	2018

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Professional member of the South African Council for Natural Scientific Professions (SACNASP – Reg No. 127823/21)
Member of the Botanical Society of South Africa (BotSoc)
Member of the Grassland Society of South Africa (GSSA)
Member of the Land Rehabilitation Society of Southern Africa (LARSSA)
Member of the South African Association of Botanists (SAAB)

EDUCATION

Qualifications

MSc Plant Science (University of Pretoria)	2017
BSc (Hons) Plant Science (Invasion Biology) (University of Pretoria)	2014
BSc Environmental Science (University of Pretoria)	2013

Short courses and Training

- BotSoc Branch: Environmental Impact Assessment (EIA) Course (2022).
- Advanced Grass Identification Course (2021).
- Practical Plant Identification, including Herbarium Usage and Protocols.
- Vegetation Classification and Mapping: Use of Geographic Information System for understanding vegetation pattern and biodiversity conservation.
- Introduction to Statistics for Biologists: Applications of plant ecology principles in plant conservation, i.e., species distribution modelling, alien plant invasions, conservation planning.
- International Plant Functional Trait Course: Hands-on, field-based exploration of plant functional traits, along with experience in the usage of plant traits data in climate-change research and ecosystem ecology. https://www.uib.no/en/rg/EECRG/97477/plant-functional-traits-course-2

AREAS OF WORK EXPERIENCE

South Africa – Gauteng, Mpumalanga, North West, Limpopo, KwaZulu-Natal, Northern Cape, Free State

KEY SPECIALIST DISCIPLINES

Biodiversity Assessments

- Terrestrial Ecological and Biodiversity Scoping Assessments
- Terrestrial Ecological and Biodiversity Screening Assessments
- Floral Assessments
- Input into Terrestrial Rehabilitation Plan design with the focus on the re-establishment of vegetation
- Floral Rescue and Relocation Plans
- Alien and Invasive Plant Control and Management Plans (AIPCPs)
- Alien and Invasive Plant Identification and awareness training
- Terrestrial Monitoring
- Protected Tree and Floral Marking and Reporting
- Desktop Studies, Mapping and Background Information Research

SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF CHRISTOPHER HOOTON

PERSONAL DETAILS

Position in Company	Senior Scientist, Member Biodiversity Specialist
Joined SAS Environmental Group of Companies	2013

EDUCATION

Qualifications

BTech Nature Conservation (Tshwane University of Technology)	2013
National Diploma Nature Conservation (Tshwane University of Technology)	2008

Short Courses

Certificate – Department of Environmental Science in Legal context of Environmental Management, Compliance and Enforcement (UNISA)	2009
Introduction to Project Management - Online course by the University of Adelaide	2016
Integrated Water Resource Management, the National Water Act, and Water Use Authorisations, focusing on WULAs and IWWMPs	2017

AREAS OF WORK EXPERIENCE

South Africa – Gauteng, Mpumalanga, North West, Limpopo, KwaZulu-Natal, Eastern Cape, Western Cape, Northern Cape, Free State
Africa - Zimbabwe, Sierra Leone

KEY SPECIALIST DISCIPLINES

Biodiversity Assessments

- Floral Assessments
- Faunal Assessments
- Biodiversity Actions Plan (BAP)
- Biodiversity Management Plan (BMP)
- Alien and Invasive Control Plan (AICP)
- Ecological Scan
- Protected Tree and Floral Marking and Reporting
- Biodiversity Offset Plan

Freshwater Assessments

- Freshwater Verification Assessment
- Freshwater (wetland / riparian) Delineation and Assessment
- Freshwater Eco Service and Status Determination
- Rehabilitation Assessment / Planning

SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF DARYL VAN DER MERWE

PERSONAL DETAILS

Position in Company	Field Biologist, Terrestrial Ecology
Joined SAS Environmental Group of Companies	2019

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Member of the South African Environmental Observation Network (SAEON)
SCANASP registration in process.

EDUCATION

Qualifications

MSc (Conservation Biology) (University of Cape Town)	2019
BSc (Hons) Plant Science (Ecology) (University of Pretoria)	2014
BSc Environmental Science (University of Pretoria)	2013

AREAS OF WORK EXPERIENCE

South Africa – Gauteng, Mpumalanga, North West, KwaZulu-Natal, Limpopo, Free State, Western Cape and Northern Cape

KEY SPECIALIST DISCIPLINES

Biodiversity Assessments

- Faunal Assessments
- Specialist Invertebrate Assessments
- Invertebrate Monitoring
- Specialist Avifaunal Assessments
- Avifaunal Monitoring
- Alien and Invasive Control Plan (AICP)
- Ecological Scan
- Terrestrial Monitoring
- Protected Tree and Floral Marking and Reporting

Legislative Requirements, Processes and Assessments

- Water Use Applications (Water Use Licence Applications / General Authorisations)
- Environmental and Water Use Audits
- Freshwater Resource Management and Monitoring as part of EMPR and WUL conditions

SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF JANDRE POTGIETER

PERSONAL DETAILS

Position in Company	Faunal Ecologist
Joined SAS Environmental Group of Companies	2022

EDUCATION

Qualifications

PGCE Senior and intermediate phase (UNISA)	2021
BSc (Hons) Entomology (University of Pretoria)	2014
BSc Entomology (University of Pretoria)	2013

AREAS OF WORK EXPERIENCE

South Africa – Gauteng, Easter Cape

KEY SPECIALIST DISCIPLINES

Biodiversity Assessments

- Faunal Assessments

SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF NELANIE CLOETE

PERSONAL DETAILS

Position in Company	Senior Scientist, Member Water Resource and Botanical Discipline Lead
Joined SAS Environmental Group of Companies	2011

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Professional member of the South African Council for Natural Scientific Professions (SACNASP – Reg No. 400503/14)
Member of the South African Association of Botanists (SAAB)
Member of the International Affiliation for Impact Assessments (IAIAsa) South Africa group
Member of the Grassland Society of South Africa (GSSA)
Member of the Botanical Society of South Africa (BotSoc)
Member of the Gauteng Wetland Forum (GWF)
Member of the South African Wetland Society (SAWS)

EDUCATION

Qualifications

MSc Environmental Management (University of Johannesburg)	2013
MSc Botany (University of Johannesburg)	2007
BSc (Hons) Botany (University of Johannesburg)	2005
BSc (Botany and Zoology) (Rand Afrikaans University)	2004

Short Courses

Certificate – Department of Environmental Science in Legal context of Environmental Management, Compliance and Enforcement (UNISA)	2009
Introduction to Project Management - Online course by the University of Adelaide	2016
Integrated Water Resource Management, the National Water Act, and Water Use Authorisations, focusing on WULAs and IWWMPs	2017
Environmental legal compliance, Monitoring and Auditing	2021

AREAS OF WORK EXPERIENCE

South Africa – Gauteng, Mpumalanga, North West, Limpopo, KwaZulu-Natal, Northern Cape, Eastern Cape, Free State
Africa - Democratic Republic of the Congo (DRC)

KEY SPECIALIST DISCIPLINES

Biodiversity Assessments

- Floral Assessments
- Biodiversity Actions Plan (BAP)
- Biodiversity Management Plan (BMP)
- Alien and Invasive Control Plan (AICP)
- Ecological Scan
- Terrestrial Monitoring
- Protected Tree and Floral Marking and Reporting
- Biodiversity Offset Plan

Freshwater Assessments

- Desktop Freshwater Delineation
- Freshwater Verification Assessment
- Freshwater (wetland / riparian) Delineation and Assessment
- Freshwater Eco Service and Status Determination
- Rehabilitation Assessment / Planning
- Plant species and Landscape Plan

Legislative Requirements, Processes and Assessments

- Water Use Applications (Water Use Licence Applications / General Authorisations)
- Environmental and Water Use Audits
- Freshwater Resource Management and Monitoring as part of EMPR and WUL conditions
- Environmental Control Officer monitoring

SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF SAMANTHA-LEIGH DANIELS

PERSONAL DETAILS

Position in Company	Junior Floral Ecologist
Joined SAS Environmental Group of Companies	2020

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Member of the South African Association of Botanists (SAAB)
Member of the Botanical Society of South Africa (BotSoc)
Member of the Association for Tropical Biology and Conservation (ATBC)

EDUCATION

Qualifications

PhD (Plant Science) (University of Pretoria)	Present
MSc (Plant Science) (University of Pretoria)	2017
BSc (Hons) Zoology & Entomology (University of Pretoria)	2014
BSc Zoology & Entomology (University of Pretoria)	2013

AREAS OF WORK EXPERIENCE

South Africa – Gauteng, Mpumalanga, North West, Limpopo, KwaZulu-Natal, Free State

KEY SPECIALIST DISCIPLINES

Biodiversity Assessments

- Terrestrial Ecological and Biodiversity Scoping Assessments
- Terrestrial Ecological and Biodiversity Screening Assessments
- Floral Assessments
- Alien and Invasive Control Plan (AICP)
- Terrestrial Monitoring
- Desktop Studies, Mapping and Background Information Research

Training

- Plant species identification
- Herbarium usage and protocols

SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF STEPHEN VAN STADEN

PERSONAL DETAILS

Position in Company	Group CEO, Water Resource Discipline Lead, Managing Member, Ecologist, Aquatic Ecologist
Joined SAS Environmental Group of Companies	2003 (year of establishment)

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Registered Professional Scientist at South African Council for Natural Scientific Professions (SACNASP)
Accredited River Health Practitioner by the South African River Health Program (RHP)
Member of the South African Soil Surveyors Association (SASSO) Member of the Gauteng Wetland Forum
Member of the Gauteng Wetland Forum
Member of International Association of Impact Assessors (IAIA) South Africa;
Member of the Land Rehabilitation Society of South Africa (LaRSSA)

EDUCATION

Qualifications

MSc Environmental Management (University of Johannesburg)	2003
BSc (Hons) Zoology (Aquatic Ecology) (University of Johannesburg)	2001
BSc (Zoology, Geography and Environmental Management) (University of Johannesburg)	2000

Short Courses

Integrated Water Resource Management, the National Water Act, and Water Use Authorisations, focusing on WULAs and IWWMPs	2017
Tools for Wetland Assessment (Rhodes University)	2017
Legal liability training course (Legricon Pty Ltd)	2018
Hazard identification and risk assessment training course (Legricon Pty Ltd)	2018
Wetland Management: Introduction and Delineation (WLID1502S) (University of the Free State)	2018
Hydropedology and Wetland Functioning (TerraSoil Science and Water Business Academy)	2018

AREAS OF WORK EXPERIENCE

South Africa – All Provinces
Southern Africa – Lesotho, Botswana, Mozambique, Zimbabwe Zambia
Eastern Africa – Tanzania Mauritius
West Africa – Ghana, Liberia, Angola, Guinea Bissau, Nigeria, Sierra Leona
Central Africa – Democratic Republic of the Congo

DEVELOPMENT SECTORS OF EXPERIENCE

1. Mining: Coal, chrome, Platinum Group Metals (PGMs), mineral sands, gold, phosphate, river sand, clay, fluorspar
2. Linear developments (energy transmission, telecommunication, pipelines, roads)
3. Minerals beneficiation
4. Renewable energy (Hydro, wind and solar)
5. Commercial development
6. Residential development
7. Agriculture
8. Industrial/chemical

KEY SPECIALIST DISCIPLINES

Legislative Requirements, Processes and Assessments

- Water Use Applications (Water Use Licence Applications / General Authorisations)
- Environmental and Water Use Audits
- Freshwater Resource Management and Monitoring as part of EMPR and WUL conditions

Freshwater Assessments

- Freshwater (wetland / riparian) Delineation and Assessment

- Freshwater Eco Service and Status Determination
- Rehabilitation Assessment / Planning
- Maintenance and Management Plans
- Plant Species and Landscape Plans
- Freshwater Offset Plans
- Hydropedological Assessment
- Pit Closure Analysis

Aquatic Ecological Assessment and Water Quality Studies

- Habitat Assessment Indices (IHAS, HRC, IHIA & RHAM)
- Aquatic Macro-Invertebrates (SASS5 & MIRAI)
- Fish Assemblage Integrity Index (FRAI)
- Fish Health Assessments
- Riparian Vegetation Integrity (VEGRAI)
- Toxicological Analysis
- Water quality Monitoring
- Screening Test
- Riverine Rehabilitation Plans

Biodiversity Assessments

- Floral Assessments
- Biodiversity Actions Plan (BAP)
- Biodiversity Management Plan (BMP)
- Alien and Invasive Control Plan (AICP)
- Ecological Scan
- Terrestrial Monitoring
- Biodiversity Offset Plan

Soil and Land Capability Assessment

- Soil and Land Capability Assessment
- Hydropedological Assessment

Visual Impact Assessment

- Visual Baseline and Impact Assessments
- Visual Impact Peer Review Assessments