



SCIENTIFIC TERRESTRIAL SERVICES

Terrestrial Biodiversity Assessment

**AS PART OF THE ENVIRONMENTAL
AUTHORISATION PROCESS FOR THE
PROPOSED VORNA VALLEY SPARKS
SCHOOL, GAUTENG PROVINCE.**

PART A: BACKGROUND INFORMATION

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EXECUTIVE SUMMARY

Scientific Terrestrial Services (Pty) Ltd. (hereafter “STS”) was appointed to conduct a terrestrial biodiversity impact assessment as part of the Environmental Authorisation (EA) application process for the proposed Vorna Valley Sparks School Development in the Carlswald suburb of Midrand, Gauteng Province. The proposed development is located on the TLC Stables property, henceforth referred to as the “**study area**”. The study area is within an urban landscape where much of the land has been developed into residential properties.

The field assessment undertaken by the faunal and floral specialist occurred on the 19th of June 2025 (winter season).

DESKTOP ASSESSMENT RESULTS

The results of the desktop assessment are summarised in the points below:

- According to the National Vegetation Map Project (VEGMAP), the study area is located in the **Mesic Highveld Grassland Bioregion**, which is situated within the **Grassland Biome**. The associated vegetation type is the **Critically Endangered (CR) Egoli Granite Grassland (Gm10)** vegetation type, which is indicated as **poorly protected** according to the National Biodiversity Assessment (NBA) – 2018 terrestrial database;
- According to the 2022 Red List of Ecosystems (RLE), the Egoli Granite Grassland has a CR threat status and is considered endemic to South Africa;
- The 2024 Gauteng Conservation Plan (V 4.0) indicates that most of the study area occurs in areas classified as a **Critical Biodiversity Area (CBA) 1: Irreplaceable**, and a **non-perennial river tributary** traverses the central sections with associated **river and wetland buffers**. A **Class 4 Ridge** is also present in the northwest and eastern sections of the study area; and
- According to the South African Protected Areas Database (SAPAD) (2025, Q1), the study area is located within approximately 2 km of the **Beaulieu Bird Sanctuary** and 8 km of the **Glen Austin Bird Sanctuary** and **Diepsloot Nature Reserve**.

FLORAL HABITAT

The study area has been significantly transformed over time, such that the original Egoli Granite Grassland reference vegetation condition is no longer represented. The southern portion of the site is largely developed and associated with existing equestrian and agricultural activities and/or infrastructure, while the central section contains a freshwater system and an artificial dam. The northern portion comprises of open veld currently used for grazing, with grassland that is modified and secondary in nature.

Three habitat units were delineated within the study area based on vegetation structure, species composition, habitat integrity, and ecological function:

- **Freshwater Habitat:** A tributary of the Jukskei River traverses the study area and includes an artificial dam constructed prior to 2004. The dam has altered natural flow patterns, contributing to downstream erosion and reduced vegetation cover. Downstream sections are heavily modified and dominated by alien invasive trees, particularly *Eucalyptus camaldulensis* and *Populus × canescens*. Upstream areas are comparatively more diverse from a floral perspective, but remain impacted.
- **Modified Habitat:** This unit comprises areas where natural vegetation has been replaced by development or disturbance. It includes built infrastructure (houses, workshops, and stables), ornamental and alien tree stands, managed grass lawns dominated by *Cenchrus clandestinus*, and previously disturbed areas now supporting herbaceous AIP species.
- **Secondary Grassland:** The remaining grassland patch no longer reflects the reference Egoli Granite Grassland due to extensive historical disturbance, AIP encroachment, fragmentation, and grazing pressure (equine). The habitat is isolated within an urban matrix and represents the last remnant of natural veld in the surrounding area. Species diversity is low and dominated by disturbance-tolerant species, with additional indicators of degradation including AIPs, limited grassland-dependent fauna, and pronounced edge effects.



Both the Freshwater and Modified habitats are in poor ecological condition, characterised by historical disturbance, altered vegetation structure, and reduced ecological functionality. The Secondary Grassland is in fair ecological condition, retaining some ecological function despite notable modification and fragmentation.

The site supports a high diversity and abundance of Alien and Invasive Plant (AIP) species, particularly within the Freshwater and Modified habitats. A total of 36 AIP species were recorded during the 2025 assessment, including several species listed under national legislation. While less affected, the Secondary Grassland also shows signs of invasion and disturbance.

The triggered screening tool species, namely *Melolobium subspicatum* (vulnerable (VU)) and Sensitive species¹ 1248 (VU), were not present within the study area. These species are also not expected to occur within the study area, as vegetation and habitat conditions are not considered suitable.

No species protected under the Transvaal Nature Conservation Ordinance, 1983 (Ordinance No. 12 of 1983) (TNCO) were recorded during the site assessment. If present, such species are unlikely to consist of large populations. Nevertheless, species from the genera *Eucomis*, *Gladiolus*, and *Kniphofia* are likely to occupy the habitats within the study area.

FAUNAL HABITAT AND SPECIES OF CONSERVATION CONCERN (SCC)

From a faunal perspective, the study area was divided into three broad habitat units that align with the floral habitats:

- Secondary Grassland – This habitat is a historically grazed grassland with AIP proliferation, resulting in a homogeneous grass layer. These historic impacts, as well as current impacts such as continued grazing, AIP spread, edge effects from surrounding development, and disturbance from domestic pets, have reduced overall faunal diversity and abundance. However, this habitat is still able to support a broader range of common species and some potential SCC than more heavily modified areas;
- Modified Habitat – This habitat comprises areas heavily altered by anthropogenic infrastructure, lawns, and gardens and no longer resembles natural grassland. As a result, it supports a more limited faunal assemblage, dominated by species adapted to highly disturbed or completely transformed environments; and
- Freshwater Habitat - Despite edge effects from grazing and AIP proliferation, this habitat provides elevated moisture levels and open water that supports several potential SCC and a more diverse assemblage of fauna, including amphibians, aquatic invertebrates, and water-dependent birds.

No faunal SCC were recorded during the site assessment. However, 11 SCC are considered to have a high probability of occurrence (POC) and a further 11 a medium POC within the study area, including three TOPS-listed species. Most SCCs with a high POC are associated with the Freshwater Habitat, particularly waterbirds such as *Anas erythrorhyncha* (Red-billed Teal, Near Threatened (NT)) and *Anas undulata* (Yellow-billed Duck, NT). An exception is *Elanus caeruleus* (Black-winged Kite, NT), which may forage in the Secondary Grassland and Modified Habitats. These SCC are generally disturbance-tolerant and able to utilise anthropogenic landscapes. Although potential suitable habitat is present, many of these faunal SCC are expected to utilise the study area on a non-permanent, transient, or foraging-only basis, rather than occurring as resident or breeding populations. In contrast, more habitat-specialist species sensitive to human and domestic pet disturbance have a lower likelihood of occurring in this isolated urban setting, including *Chrysospalax villosus* (Rough-Haired Golden Mole, VU), *Tyto capensis* (African Grass Owl, VU), *Asio capensis* (Marsh Owl, NT), and *Eupodotis senegalensis* (White-bellied Korhaan, VU).

SITE ECOLOGICAL IMPORTANCE (SEI)

All habitats within the study area were allocated an importance category, i.e., an SEI category. SEI is a function of the biodiversity importance (BI) of the receptor (e.g., SCC, the vegetation/fauna community

¹ The names of certain sensitive species will not be made public in this report due to the threat of harvesting or poaching of these species.



or habitat type present on the site) and its resilience to impacts (receptor resilience [RR]). BI, in turn, is a function of the receptor's conservation importance (CI) and the functional integrity (FI).

The table below breaks down the SEI obtained for the floral and faunal components.

Table A1: Floral and Faunal SEI for the study area's habitat units.

Habitat Unit	Floral SEI	Faunal SEI
Freshwater Habitat	Medium	Medium
Modified Habitat	Very Low	Very Low
Secondary Grassland Habitat	Low	Low

FLORAL IMPACT DISCUSSION AND REASONED OPINION:

The proposed project will result in the loss of floral habitat, with impacts occurring predominantly within areas classified as low to very low SEI. These habitats are already transformed or degraded and are considered of limited floristic value. Only restricted and localised impacts are anticipated within medium SEI habitats, primarily associated with the upgrading of existing road crossings over the Freshwater Habitat.

The impact assessment indicates that most impacts are of low to medium-low significance, with very low residual impacts expected following the implementation of appropriate mitigation measures. Higher-sensitivity components, particularly the Freshwater Habitat and associated Ecological Support Areas (ESAs), show higher pre-mitigation sensitivity; however, impacts can be reduced to acceptable levels through strict application of the mitigation hierarchy. The limited impacts on the Freshwater Habitat can be effectively managed through careful design, construction controls, and post-construction rehabilitation, supported by input from the appointed freshwater ecologist.

No TNCO-protected plant species were recorded during the site assessment. However, suitable habitat for protected geophyte species may occur within parts of the Secondary Grassland and Freshwater Habitat, necessitating pre-construction botanical walkdowns during the summer growing season and permitting requirements for rescue and relocation (at the authorities' discretion), if required.

The proposed development will not impact CBAs, threatened ecosystems, or protected areas. While the ESA associated with the Freshwater Habitat will be locally affected by infrastructure upgrades, these impacts are expected to be medium-low to low in significance and will not compromise ecological functioning if recommended mitigation measures are implemented.

Given the already modified nature of the site, significant cumulative botanical impacts are considered unlikely.

FAUNAL IMPACT DISCUSSION AND REASONED OPINION:

Vegetation clearance and construction activities will result in the loss of faunal habitat, primarily affecting common and widespread species, as well as reducing the availability of suitable habitat for potential SCC. However, significant impacts on faunal populations at a regional scale are unlikely, as common species are expected to persist within surrounding habitats, and effects on SCC are not anticipated to be significant, provided that the recommended mitigation measures are effectively implemented.

Direct faunal impacts will occur primarily during the construction phase across all habitat units. However, portions of the Freshwater and Secondary Grassland habitats will remain intact following development, which may continue to provide habitat for potential SCC. As these retained habitats will be subject to increased edge effects, careful management during both the construction and operational phases will be essential to maintain their ecological functionality.

Based on the current proposed layout and subject to the implementation of the mitigation measures outlined in this report, no significant faunal constraints to the proposed development have been identified, and the development is considered suitable for authorisation.

REASONED OPINION



From a Terrestrial Biodiversity Theme, Plant Species Theme and Animal Species Theme perspective, the proposed development is considered acceptable, provided that the recommended mitigation, monitoring, and rehabilitation measures are fully implemented. Overall, the project is unlikely to result in significant or unacceptable impacts on floral or faunal diversity, habitat integrity, or ecosystem functioning at the site or landscape scale. The assessment indicates that, with appropriate mitigation, the potential terrestrial biodiversity impacts can be managed to an acceptable level.

This study is deemed to provide the relevant information required to implement 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.



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DOCUMENT GUIDE

The table below provides a guide to the reporting of biodiversity impacts as they relate to 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 June 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) None associated with the study area.
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	Part B: Section 4 (flora) Part C: Section 4 (fauna)
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) <i>the reasons why an area has been identified as a CBA;</i> b) <i>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;</i> c) <i>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);</i> d) <i>the impact on ecosystem threat status;</i> e) <i>the impact on explicit subtypes in the vegetation;</i> f) <i>the impact on overall species and ecosystem diversity of the site; and</i>	Part A: Section 3 (desktop analysis) Part B: Section 3 Part C: Section 3



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
	g) <i>the impact on any changes to threat status of populations of species of conservation concern in the CBA;</i>	
2.3.7.2	Terrestrial Ecological Support Areas (ESAs), including: a) <i>the impact on the ecological processes that operate within or across the site;</i> b) <i>the extent the proposed development will impact on the functionality of the ESA; and</i> c) <i>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;</i>	
2.3.7.3	Protected areas as defined by the National Environmental Management: Protected Areas Act, 2004 including- a) <i>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;</i>	Part A: Section 3 (desktop analysis). Part B: Section 3
2.3.7.4	Priority areas for protected area expansion, including- a) <i>the way in which the proposed development will compromise or contribute to the expansion of the protected area network;</i>	Part A: Section 3 (desktop analysis).
2.3.7.5	SWSAs including: a) <i>the impact(s) on the terrestrial habitat of a SWSA; and</i> b) <i>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);</i>	Part A: Section 3 (desktop analysis). None associated with the study area.
2.3.7.6	FEPA sub catchments, including- a) <i>the impacts of the proposed development on habitat condition and species in the FEPA sub catchment;</i>	None associated with the study area.
2.3.7.7	Indigenous forests, including: a) <i>impact on the ecological integrity of the forest; and</i> b) <i>percentage of natural or near natural indigenous forest area lost and a statement on the implications in relation to the remaining areas.</i>	None associated with the study area.
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 floral 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 & 2 (flora) Part C: Section 1 (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 D Part B: Section 2 (flora) & Appendix A (flora) Part C: Section 2 (fauna) & 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: Sections 1 & 2 (flora) Part C: Section 1 (fauna)



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
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 4 (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: Sections 5 & 6 (flora) Part C: Sections 5 & 6 (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;	Part B: Section 4 (flora) Part C: Section 4 (fauna)
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	To be completed by the EAP.
3.1.15	Any conditions to which this statement is subjected.	Part B: Section 6 (flora) Part C: Section 6 (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.	To be completed by the EAP.
3.3	A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.	



GLOSSARY OF TERMS

Alien species (syn. exotic species; non-native species) (SANBI, 2020)	(a) a species that is not an indigenous species; or (b) an indigenous species translocated or intended to be translocated to a place outside of 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.
Biological diversity or Biodiversity (National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (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 includes diversity within species, between species, and of ecosystems.
Biodiversity priority areas (Skowno et al., 2019)	Features in the landscape or seascape that are important for conserving a representative sample of ecosystems and species, for maintaining ecological processes, or for the provision of ecosystem services. They include the following categories, most of which are identified based on systematic biodiversity planning principles and methods: protected areas, Critically Endangered (CR) and Endangered (EN) ecosystems, Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA), Freshwater Ecosystem Priority Areas (FEPA), high water yield areas, flagship free-flowing rivers, priority estuaries, focus areas for land-based protected area expansion, and focus areas for offshore protection. Marine ecosystem priority areas and coastal ecosystem priority areas have yet to be identified but will be included in future. The different categories are not mutually exclusive and, in some cases, overlap, often because a particular area or site is important for more than one reason. They should be complementary, with overlaps reinforcing the importance of an area.
Biome (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 (Mucina and Rutherford (2006))	A bioregion is a composite of spatial (vegetation) units sharing similar biotic and physio-geographical features and connected by processes operating on a regional scale.
Corridor (van Wilgen et al., 2020)	A dispersal route or a physical connection of suitable habitats linking previously unconnected regions.
Critical Biodiversity Areas (CBA) (SANBI, 2020)	An area that must be maintained in a good ecological condition (natural or semi-natural state) to meet biodiversity targets. CBAs collectively meet biodiversity targets for all ecosystem types, as well as for species and ecological processes that depend on natural or semi-natural habitat that have not already been met in the protected area network. CBAs are identified through a systematic biodiversity planning process in a configuration that is complementary, efficient and avoids conflict with other land uses where possible.
Critically Endangered (CR), i.e., International Union for Conservation of Nature (IUCN) Red List category (Skowno et al., 2019)	Applied to both species/taxa and ecosystems: A species is CR when the best available evidence indicates that it meets at least one of the five IUCN criteria for CR, indicating that the species is facing an extremely high risk of extinction. CR ecosystem types are at an extremely high risk of collapse. Most of the ecosystem type has been severely or moderately modified from its natural state. The ecosystem type is likely to have lost much of its natural structure and functioning, and species associated with the ecosystem may have been lost. CR species are those considered to be at extremely high risk of extinction.
Development footprint (as per the National Environmental Management Act, 1998 [Act No. 107 of 1998] - NEMA definition)	“In respect of land, means any evidence of its physical transformation as a result of the undertaking of any activity”
Driver (ecological) (Lead et al., 2005)	A driver is any natural or human-induced factor that directly or indirectly causes a change in ecosystem. A direct driver clearly influences ecosystem



	processes, where indirect driver influences ecosystem processes through altering one or more direct drivers.
Ecological processes	The functions and processes that operate to maintain and generate biodiversity. To include ecological processes in a biodiversity plan, their spatial components need to be identified and mapped.
Ecological Support Areas (ESA) (Skowno et al., 2019)	An ESA provides connectivity and important ecological processes between CBAs and is therefore important in terms of habitat conservation.
Ecoregion	An ecoregion is a "recurring pattern of ecosystems associated with characteristic combinations of soil and landform that characterise that region."
Endangered (EN) (Red List category: Skowno et al. (2019))	Applied to both species/taxa and ecosystems: A species is EN when the best available evidence indicates that it meets at least one of the five IUCN criteria for EN, indicating that the species is facing a very high risk of extinction. EN ecosystem types are at a very high risk of collapse. EN species are those considered to be at very high risk of extinction.
Ground-truth	Ground truth is a term used in various fields to refer to information provided by direct observation (i.e., empirical evidence) as opposed to information provided by inference.
Important Bird and Biodiversity Area (IBA) (Marnewick et al, 2015a; 2015b)	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.
Least Threatened	Least threatened ecosystems are still largely intact.
Near Threatened (NT) (according to IUCN)	Close to being at high risk of extinction in the near future.
Quarter Degree Square (QDS) (SANBI, 2020)	A way of dividing the longitude and latitude degree square cells into smaller squares of 15' × 15' (roughly 24 × 27 kilometres (km)), forming in effect a system of geocodes.
Red Data Listed (RDL) species	According to the Red List of South African plants (http://redlist.sanbi.org/) and the IUCN, organisms that fall into the Extinct in the Wild (EW), CR, 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 and IUCN listed threatened species as well as provincially and nationally protected species of relevance to the project.
Threatened ecosystem (Skowno et al., 2019)	An ecosystem that has been classified as CR, EN or VU, based on an analysis of ecosystem threat status. A threatened ecosystem has lost or is losing vital aspects of its structure, function, or composition. The NEMBA allows the Minister of Environmental Affairs or a provincial Member of the Executive Council for Environmental Affairs to publish a list of threatened ecosystems. To date, threatened ecosystems have been listed only in the terrestrial environment. In cases where no list has yet been published by the Minister, such as for all aquatic ecosystems, the ecosystem threat status assessment in the National Biodiversity Assessment (NBA) can be used as an interim list in planning and decision making.
Vulnerable (VU) (Red List category: Skowno et al. (2019))	Applied to both species/taxa and ecosystems: A species is VU when the best available evidence indicates that it meets at least one of the five IUCN criteria for VU, indicating that the species is facing a high risk of extinction. An ecosystem type is VU when the best available evidence indicates that it meets any of the criteria A to E for VU and is then considered to be at a high risk of collapse.



LIST OF ACRONYMS

BGIS	Biodiversity Geographic Information Systems
C-Plan	Conservation Plan
CARA	Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)
CBA	Critical Biodiversity Areas
CR	Critically Endangered
DFFE	Department of Forestry, Fisheries and the Environment
E-GIS	Environmental Geographical Information Systems
EN	Endangered
ESA	Ecological Support Areas
EW	Extinct in the Wild
FEPA	Freshwater Ecosystem Priority Areas
GDARD	Gauteng Department of Agriculture and Rural Development
GN	Government Notice
IBA	Important Bird and Biodiversity Area
IUCN	International Union for Conservation of Nature
km²	square kilometres
LC	Least Concern
MAP	Mean annual precipitation
MAPE	Mean Annual Potential 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)
NEMPAA	National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)
NFA	National Forest Act, 1998 (Act No. 84 of 1998, as amended)
NFEPA	National Freshwater Ecosystem Priority Areas
NPAES	National Protected Areas Expansion Strategy
QDS	Quarter Degree Squares
RLE	Red List of Ecosystems
SABAP 2	South African Bird Atlas Project 2
SACAD	South African Conservation Areas Database
SACNASP	South African Council for Natural Scientific Professions
SANBI	South African National Biodiversity Institute
SAPAD	South African Protected Areas Database
SCC	Species of Conservation Concern
STS	Scientific Terrestrial Services (Pty) Ltd
SWSA	Strategic Water Source Areas
TNCO	Transvaal Nature Conservation Ordinance, 1983 (Ordinance No. 12 of 1983)
VEGMAP	National Vegetation Map Project
VU	Vulnerable
WSA	Water Source Area



1 INTRODUCTION

Scientific Terrestrial Services (Pty) Ltd. (“STS” hereafter) was appointed to conduct a terrestrial biodiversity assessment for the proposed new Vorna Valley Spark School, Gauteng Province – referred to as the **study area**. The location, extent, and proposed school layout are depicted in Figures 1 – 3.

The biodiversity reports are structured as follows:

- **Part A** of this report introduces the study area and outlines 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. The site verification outcome also forms part of Part A;
- **Part B** presents the results of the floral field assessment, data analyses and discussion of the results. Part B further presents the outcome of the impact assessment for the proposed project; and
- **Part C** presents the results of the faunal field assessment, data analyses and discussion of the results. Part C further presents the outcome of the impact assessment for the proposed project.



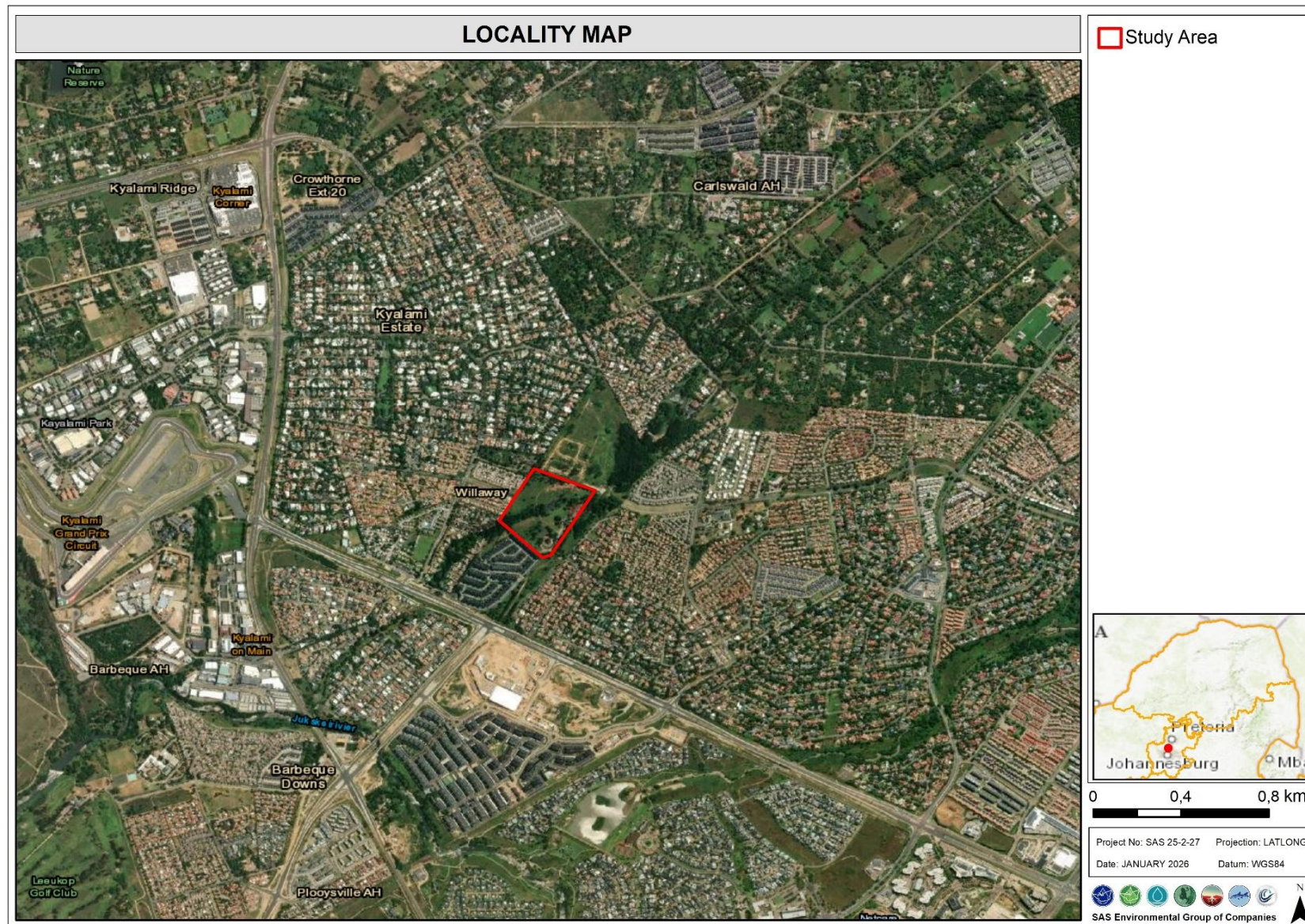


Figure 1: Digital satellite image depicting the location of the study area.





Figure 2: Topographical map of the study area.



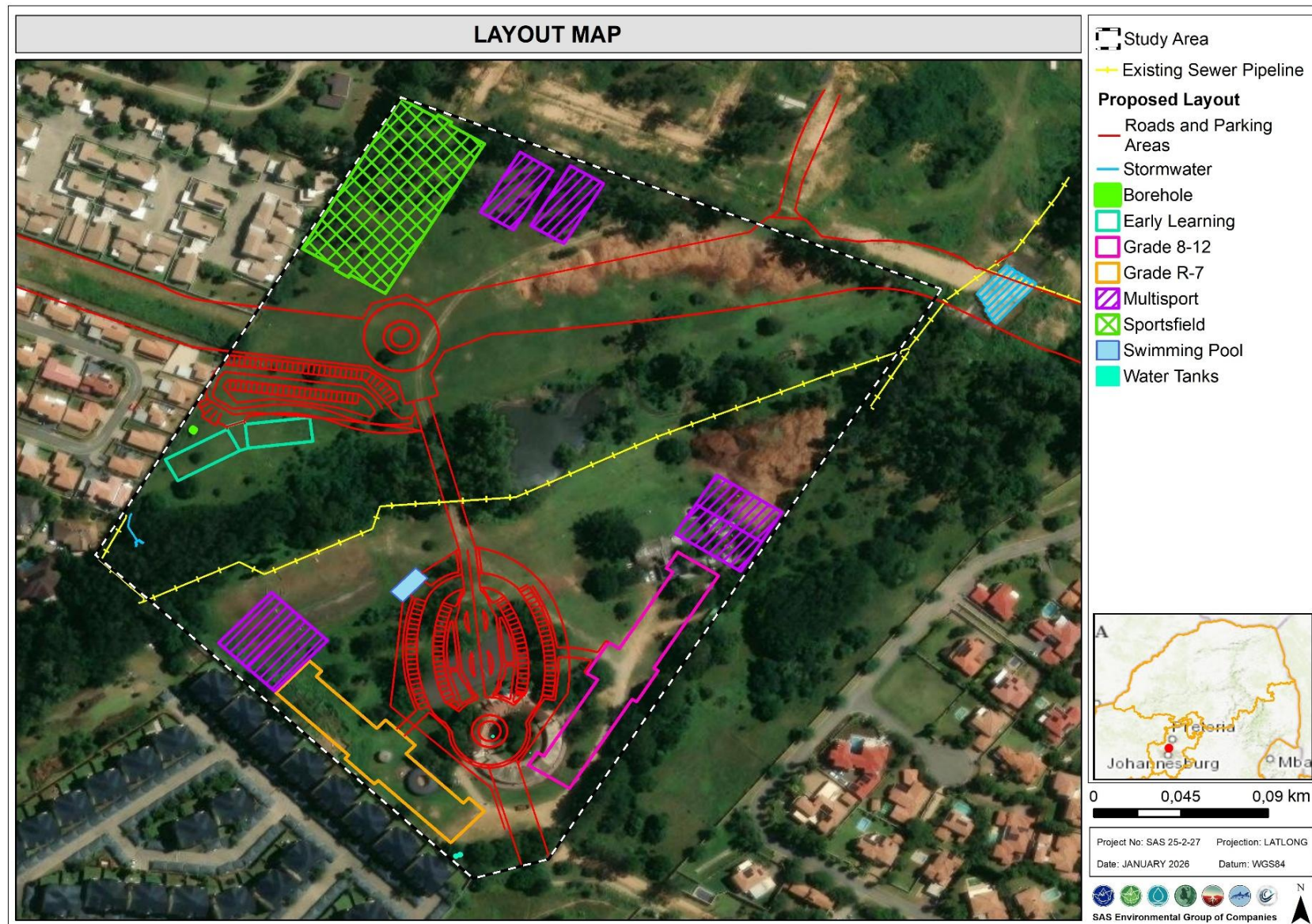


Figure 3: Layout of the proposed development.



1.1 Scope of Work

The purpose of this report (Part A) is to define the biodiversity of the study area from a desktop conservation database perspective (Section 3) and to provide a site sensitivity verification (Section 4). The objective of this desktop assessment is to provide detailed information to guide the fieldwork components (discussed in Parts B and C) and to ensure that all relevant ecological aspects are considered before conducting the field assessments. The objective of the site sensitivity verification is to guide the biodiversity reporting and to ensure the minimum reporting requirements (as per Government Notice (GN) 320 and GN 1150) are met in Parts B and C. This report (Part A) is therefore not a standalone document and must be considered alongside the outcome of the biodiversity assessments (floral assessment in Part B and the faunal assessment in Part C).

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

- To undertake a desktop assessment using all relevant information as presented by the South African National Biodiversity Institute's (SANBI) Biodiversity Geographic Information Systems (BGIS) website (<http://bgis.sanbi.org>) and the Department of Forestry, Fisheries and the Environment's (DFFE) Environmental-GIS (E-GIS) website (<https://egis.environment.gov.za/>);
- To provide a Site Sensitivity Verification based on the outcome of the site assessment (Section 4);
- 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); and
- To outline the legal requirements that were considered for the assessment (Appendix B of this report).

1.2 Assumptions and Limitations

The following assumptions and limitations apply to this report (Part A only):

- The biodiversity desktop assessment is confined to the study area and does not include detailed results of the 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 data sources used in this report for background research do provide useful and often verifiable, high-quality data, the various databases used do not always provide an entirely accurate indication of the assessed area's actual site characteristics at the scale required to inform more intricate planning, e.g., at the scale needed for an environmental authorisation (EA). Nevertheless, this



information is useful as background information to the study and is important in legislative contextualisation of risk and impact and was used as a guideline to inform the biodiversity assessment (also refer to Parts B and C), and to focus on areas and aspects of increased conservation importance. It must, however, be noted that site assessment of key areas may potentially contradict the information contained in the relevant databases, in which case the site-verified, ground-truthed information must carry more weight in the decision-making process; and

- The DFFE's National online Web-based Environmental Screening Tool ("screening tool" hereafter) provides names of Sensitive Species likely to be present within the study area and its surroundings. Within the screening tool outcome, the names of some species are not provided; instead, these species are assigned a number, making them unidentifiable to the public (e.g., Sensitive Species 1). This procedure is followed due to the species' vulnerability to threats such as illegal harvesting and overexploitation. According to the best practice guidelines provided by the SANBI, the identity of Sensitive Species **may not appear** in the final Environmental Impact Assessment (EIA) report **nor any of the specialist reports released into the public domain**. However, the conservation threat status of such species has been provided.

1.3 Legal Requirements

The following legal requirements were considered during the assessment:

- The Constitution of the Republic of South Africa, 1996²;
- The Conservation of Agricultural Resource 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);
 - GN number 2747 (Gazette Number 47526): The revised National list of Ecosystems that are Threatened and in need of Protection, dated 18 November 2022, as it relates to the NEMBA;
 - GN number R.1020: Alien and Invasive Species Regulations, 2020, in Government Gazette 43735 dated September 2020 as it relates to the NEMBA;
 - GN number 1003: Alien and Invasive Species Lists, 2020, in Government Gazette 43726 dated 18 September 2020, as it relates to the NEMBA; and

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 nor the acts amending it are allocated act numbers.



- GN number 30568: Threatened or Protected Species (TOPS) list dated 14 December 2007, as it relates to the NEMBA.
- The National Forest Act, 1998 (Act No. 84 of 1998, as amended) (NFA);
 - GN 1935: List of Protected Tree Species as published in the Government Gazette 46094 dated 25 March 2022, as it relates to the NFA;
- The National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) (NEMPAA);
- National Water Act, 1998 (Act No. 36 of 1998), as amended (NWA);
- Government Gazette 45421 dated 10 May 2019 as it relates to the DFFE national environmental screening report required with an application for EA 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 (as amended in GN 3717 of 2023).
- The Transvaal Nature Conservation Ordinance, 1983 (Ordinance No. 12 of 1983) (TNCO).

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

The following documentation was also considered:

- The Gauteng Department of Agriculture and Rural Development (GDARD) Requirements for Biodiversity Assessments Version 3 (GDARD, 2014);
- GDARD Red listed plant guidelines 2018; and
- Revision of the Gauteng Conservation Plan (C-Plan) (v4.0 2023) Technical Report (Desmet et al., 2024).



2 ASSESSMENT APPROACH

Maps and digital satellite images were generated before the field assessment to determine broad habitats, vegetation types and potentially sensitive sites. Relevant databases and documentation that were considered during the assessment of the study area include³:

- The National Vegetation Map Project (VEGMAP), with the below vector dataset used for information on Biomes, Bioregions and Vegetation Type(s):
 - 2024 Final Vegetation Map of South Africa, Lesotho and Swaziland (SANBI, 2024).
- The 2022 Red List of Ecosystems (RLE) for terrestrial realm for South Africa (SANBI 2022a, 2022b). This database replaces the threat status as presented in the 2018 National Biodiversity Assessment (NBA) Terrestrial Assessment project (SANBI, 2018a, 2018b; Skowno et al., 2019);
- The Gauteng C-Plan V4 (2024) (Desmet 2024, GDARD 2024);
- The National Protected Areas Expansion Strategy (NPAES) – 2018 database (DEA, 2018);
- The South African Conservation Areas Database, Quarter 2 (SACAD, 2025);
- The South African Protected Areas Database, Quarter 2 (SAPAD, 2025);
- The Important Bird and Biodiversity Areas (IBA) Programme and vector dataset (BirdLife South Africa, 2014; Marnewick et al., 2015a, 2015b), in conjunction with the South African Bird Atlas Project 2 (SABAP 2);
- The 2021 Strategic Water Source Areas (SWSA) project:
 - 2021 SWSA Surface water (Lötter and Le Maitre, 2021; MTPA, 2021);
- The International Union for Conservation of Nature (IUCN) list of threatened species; and
- The screening tool (accessed 2025).

³ Datasets obtained from:

- SANBI BGIS (2024). The South African National Biodiversity Institute - Biodiversity GIS (BGIS) [online]. URL: <http://bgis.sanbi.org>; and
- E-GIS website. URL: <https://egis.environment.gov.za/>



3 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 is presented as a “dashboard” report which aims to provide concise summaries of the data on as few pages as possible to facilitate improved assimilation of results by the reader. Where necessary, further discussion and interpretation are provided.



Table 1: Summary of the biodiversity characteristics associated with the study area [Quarter Degree Squares (QDS) 2627DB]. Abbreviations used in this table are provided at the bottom of the table.

DETAILS OF THE STUDY AREA IN TERMS OF MUCINA & RUTHERFORD (2006) AND THE NATIONAL VEGETATION MAP PROJECT (SANBI, 2024) - ORIGINAL EXTENT OF MAPPED VEGETATION TYPE					
Biome(s) and Bioregion(s)	The study area is located in the Mesic Highveld Grassland Bioregion , which is situated within the Grassland Biome .				
Vegetation Type	The study area is situated within the Critically Endangered (CR) Egoli Granite Grassland (Gm10) vegetation type.				
EGOLI GRANITE GRASSLAND (DESCRIPTIONS AS PER MUCINA AND RUTHERFORD (2006))					
Distribution	Gauteng Province: Johannesburg Dome extending in the region between northern Johannesburg in the south, and from near Lanseria Airport and Centurion (south of Pretoria) to the north, westwards to about Muldersdrif and eastwards to Tembisa.				
Climate	Strongly seasonal summer-rainfall region with very dry winters.				
	MAP (mm)	MAT (°C)	MFD (days)	MAPE (mm)	MASMS (%)
	682	16.0	29	2194	75
Altitude (m)	1 280–1 660				
Conservation	Endangered (EN) . Target 24%. Only about 3% of this unit is conserved in statutory reserves (Diepsloot and Melville Koppies Nature Reserves) and a number of private conservation areas, including Motsetse and Isaac Stegmann Nature Reserves, Kingskloof Natural Heritage Site, Melrose and Beaulieu Bird Sanctuaries, as well as the Walter Sisulu National Botanical Garden. More than two-thirds of this unit has already undergone transformation, mostly by urbanisation, cultivation or the building of roads. Current rates of transformation threaten most of the remaining unconserved areas. There is no serious alien infestation in this unit, although species such as <i>Eucalyptus grandis</i> , <i>E. camaldulensis</i> and <i>E. sideroxylon</i> are commonly found. Erosion is moderate and very low.				
Geology & Soils	Archaean granite and gneiss of the Halfway House Granite at the core of the Johannesburg Dome, supporting leached, shallow, coarsely grained, sandy soil poor in nutrients of Glenrosa form. A small area is built by ultramafics.				
Vegetation & landscape features	Moderately undulating plains and low hills supporting tall, usually <i>Hyparrhenia hirta</i> -dominated grassland, with some woody species on rocky outcrops or rock sheets. The rocky habitats show a high diversity of woody species, which occur in the form of scattered shrub groups or solitary small trees.				
2018 NATIONAL BIODIVERSITY ASSESSMENT (FIGURE 4)					
The NBA lists the Egoli Granite Grassland as Poorly Protected .					
DEFINITION: Ecosystem protection level tells us whether ecosystems are adequately protected or under-protected. Ecosystem types are categorised as not protected, poorly protected, moderately protected, or well protected based on the proportion of each type that occurs within a protected area recognised in the NEMPAA.					
2022 RED LIST OF ECOSYSTEMS (FIGURE 4)					
According to the RLE database, the study area is located within the remaining extent of the CR Egoli Granite Grassland ecosystem . The vegetation type is considered CR and Endemic to South Africa. The vegetation is listed under a B(i) criterion of threatened ecosystems.					
The purpose of listing protected ecosystems is primarily to preserve witness sites of exceptionally high conservation value. The revised list (known as the RLE, 2022) is based on assessments that followed the IUCN RLE Framework (version 1.1) and covers all 456 terrestrial ecosystem types described in South Africa (Mucina and Rutherford, 2006; with updates described in Davaram					



et al., 2019). The revised list identifies 120 threatened terrestrial ecosystem types (55 CR, 51 EN and 14 Vulnerable (VU) types). Following a series of consultations with conservation authorities and the public in 2020/21 the Revised list of terrestrial ecosystems that are threatened and in need of protection was approved by the Minister for implementation in August 2022. The revised list was published in the Government Gazette (Gazette Number 47526, GN 2747) and came into effect on 18 November 2022.	
DETAIL OF THE STUDY AREA IN TERMS OF THE GAUTENG CONSERVATION PLAN (C-PLAN V4 2024)	
Critical Biodiversity Area (CBA) (Figure 5)	Almost the entire study area is located within an area considered to be of biodiversity importance, most notably an Irreplaceable CBA (also referred to as CBA 1). Triggering features of the Irreplaceable CBA include the presence of a lifezone, which is an ecologically meaningful buffer around wetlands and rivers that makes provision for species that utilise both aquatic and terrestrial habitats, habitat patches for terrestrial species, and the presence of natural vegetation and natural secondary vegetation. CBAs include natural or near-natural terrestrial and aquatic features selected based on an area's biodiversity characteristics, spatial configuration, and requirement for meeting both biodiversity pattern and ecological process targets. CBAs include irreplaceable sites (i.e., CBA Irreplaceable Areas) where no other options exist for meeting targets for biodiversity features, as well as best-design sites (i.e., CBA Important Areas) which represent an efficient configuration of sites to meet targets in an ecologically sustainable way that is least conflicting with other land uses and activities. These areas need be maintained in the appropriate condition for their category. Some CBAs are degraded or irreversibly modified but are still required for achieving specific targets, such as cultivated lands for threatened species.
Wetland and River Buffers (Figure 6)	According to the Gauteng C-Plan, there is a wetland, waterbody and river buffer associated with the study area.
River Dataset (2021) (Figure 6)	According to the Gauteng Rivers Dataset, there is a non-perennial river tributary associated with the study area.
Ridges (Figure 7)	According to the Gauteng C-Plan, there is a class 4 ridge associated with the northwestern and eastern sections of the study area. Class 4 ridges are those that have been transformed as a result of human activity by 65% or more. (Approximately 11% of ridges in Gauteng currently fall within Class 4, including the Melville Koppies and the Linksfield Ridge). Guidelines for Class 4 Ridges: ➤ Further development activities will not be supported in areas of the ridge where the remaining contiguous extent of natural habitat is 4 ha or more.



NATIONAL PROTECTED & CONSERVATION AREAS	
SAPAD (2025, Q2); SACAD (2025, Q2); NPAES (2018)	According to the SAPAD (2025, Q1) database ⁴ , the study area is located within approximately 2 km of the Beaulieu Bird Sanctuary and 8 km of the Glen Austin Bird Sanctuary and Diepsloot Nature Reserve . Refer to Figure 8 .
	According to the SACAD (2025, Q1) database ⁵ , the study area is not located within a 10 km radius of any conservation areas.
	According to the NPAES (2018) database , the northern portion of the study area is located within a Priority Focus Area .
IBA (2015)	The study area is not located within a 10 km radius of an IBA.
2021 STRATEGIC WATER SOURCE AREAS (SWSA)	
SWSA (2021)	The study area is not within a 10 km radius of a SWSA for surface water.
	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.

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 Area, RLE = Red List of Ecosystems, SWSA = Strategic Water Source Area, WSA = Water Source Area.

⁴ **SAPAD (2024)**: 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).

⁵ **SACAD (2024)**: 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.



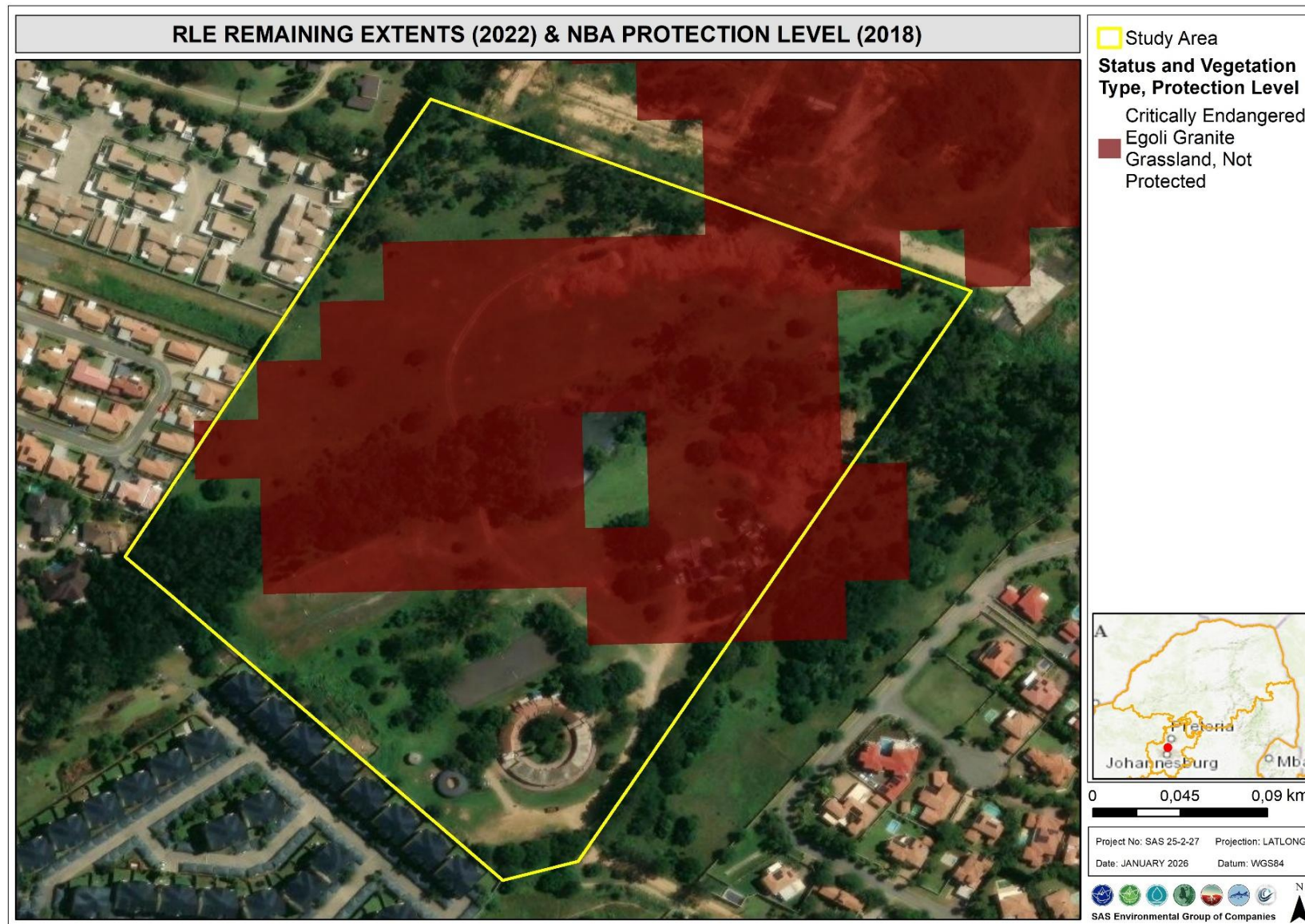


Figure 4: The remaining extent of the terrestrial ecosystems (2022 RLE database) and their protection level (2018 NBA database).



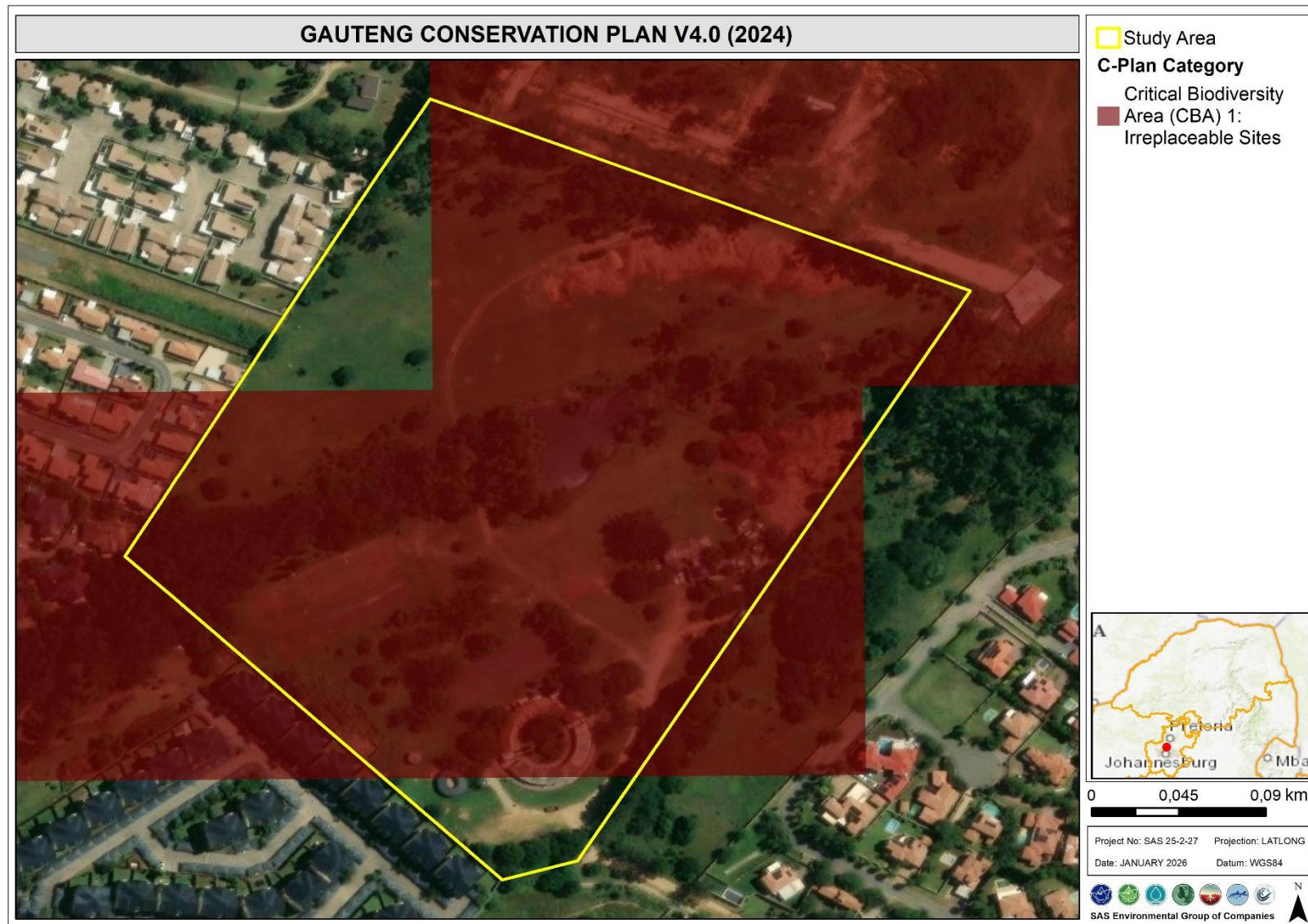


Figure 5: Important biodiversity areas relating to the study area according to the 2024 Gauteng C-Plan.



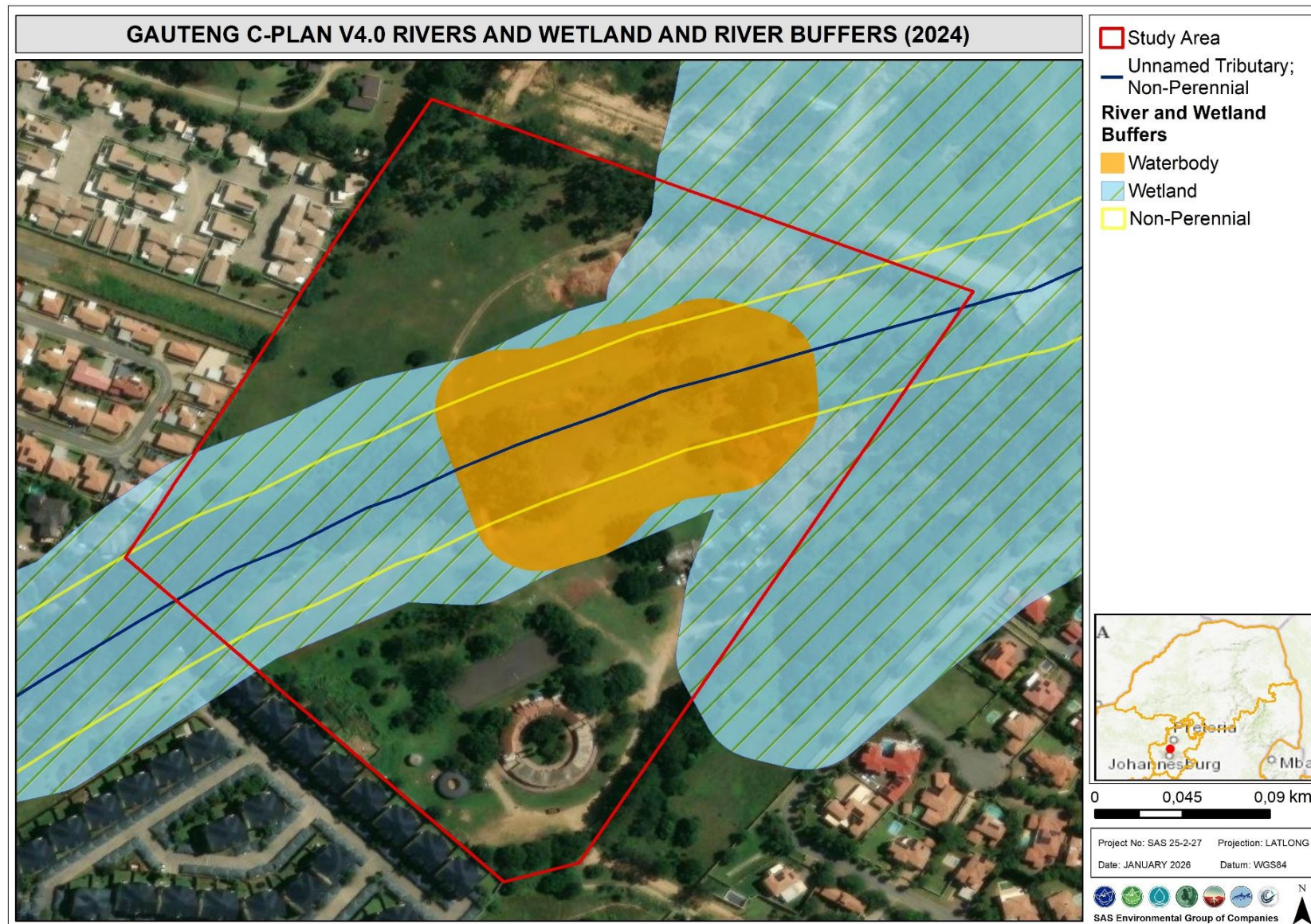


Figure 6: Rivers and river and wetland buffers associated with the study area according to the 2024 Gauteng C-Plan.



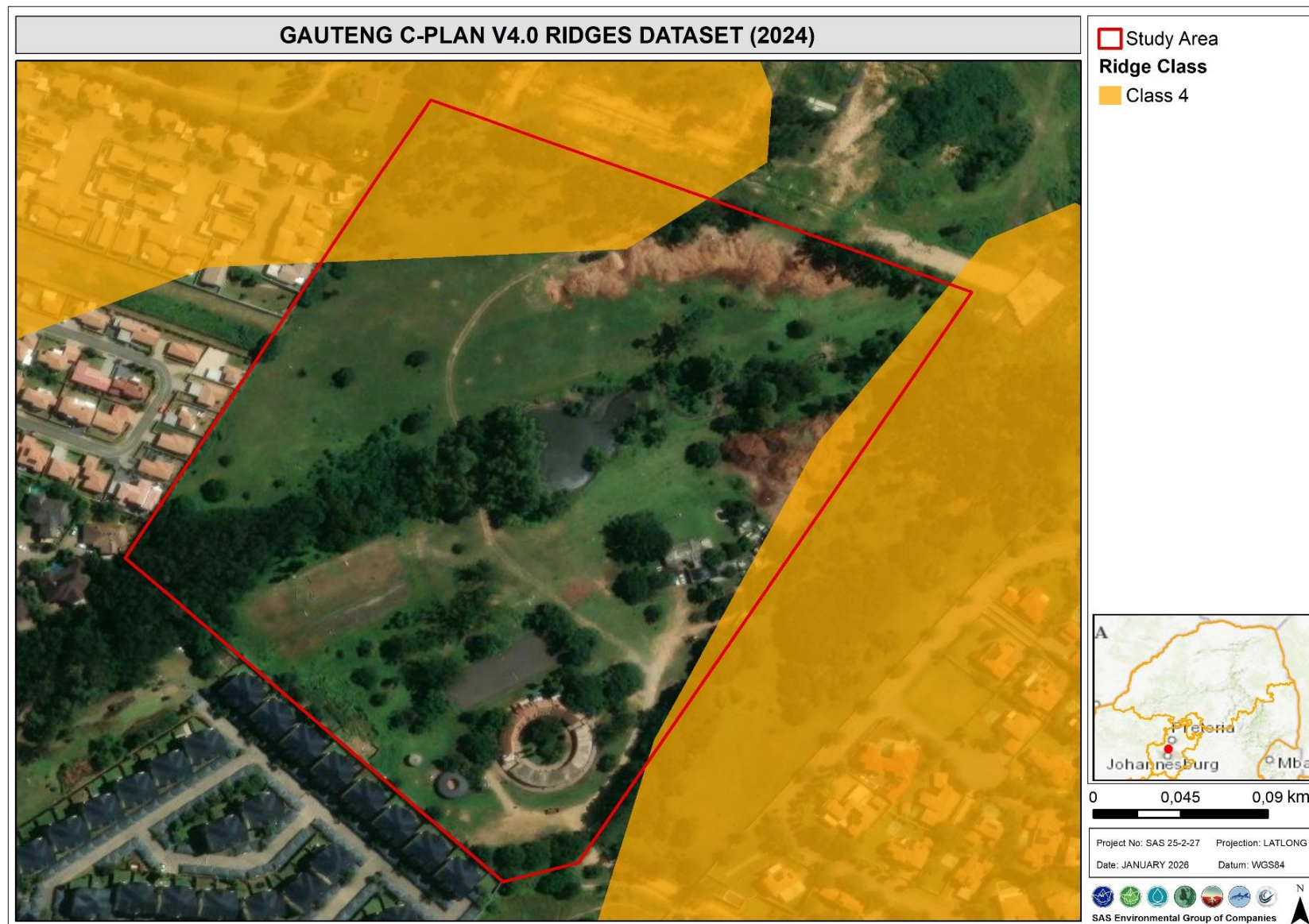


Figure 7: Ridges associated with the study area according to the 2024 Gauteng C-Plan.



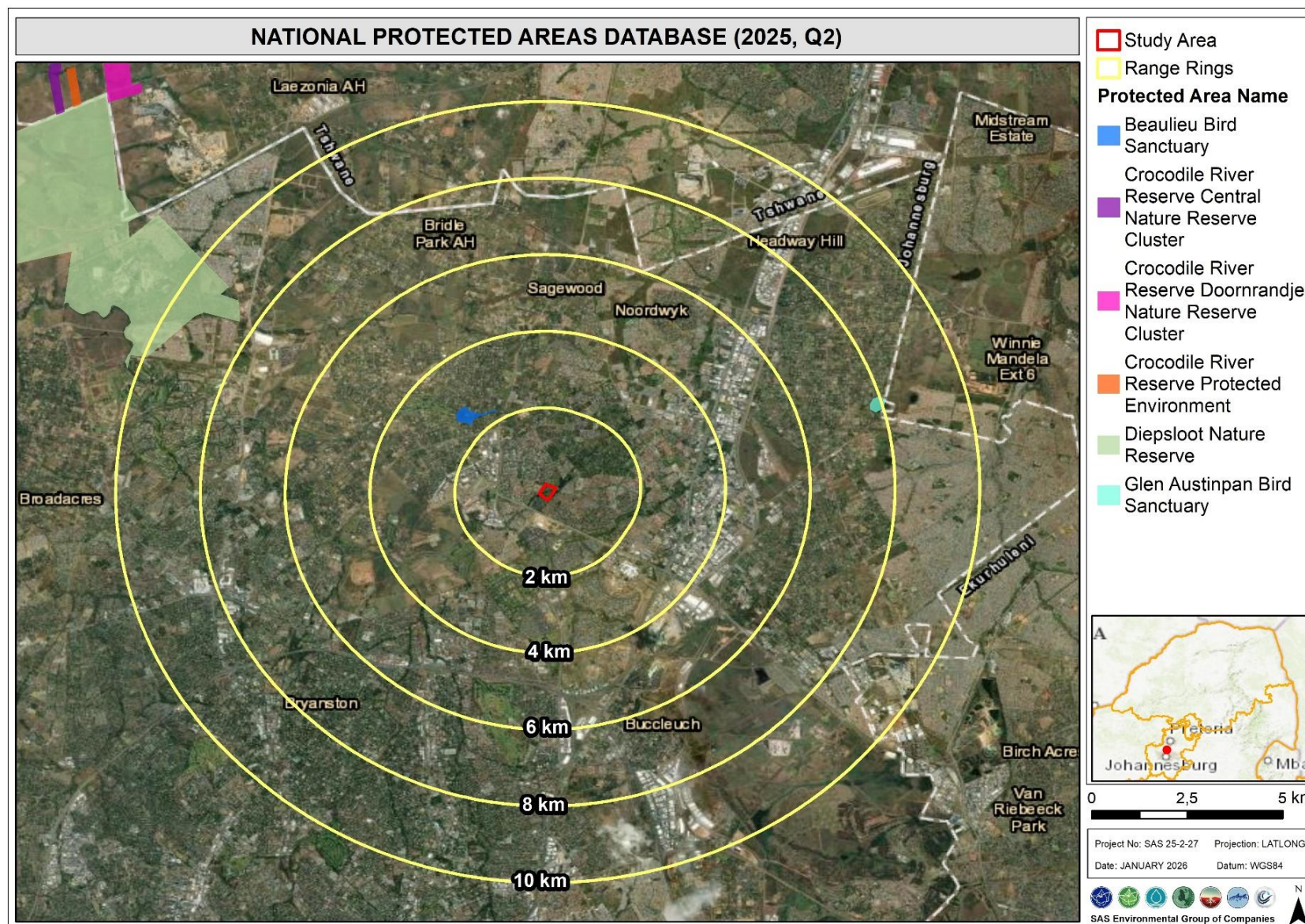


Figure 8: National protected areas within a 10 km radius of the study area according to SAPAD (2025, Q2).



4 SITE VERIFICATION REPORT

According to the “Protocols for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes (“the Protocols”) published in Government Gazette No. 43110 on 20 March 2020 and Government Gazette No. 43855 on 30 October 2020, the Environmental Assessment Practitioner (EAP) must verify the current use of the site in question and its environmental sensitivity as identified by the screening tool to determine the need for specialist inputs concerning the themes included in the Protocols. The Protocols are allowed for in terms of Sections 24(5)(a) and (h) and 44 of the NEMA. The Protocols must be complied with for every new EA application that is submitted after 9 May 2020.

The screening tool identifies species and ecosystem spatial triggers likely to indicate environmental sensitivity associated with a particular proposed development site, which in turn **determines the necessity and requirements for specialist studies**. The screening tool evaluates ‘environmental sensitivity’ at a **larger scale** than that of a proposed development site and frequently includes modelled data that require **field verification/ ground-truthing**. As such, the initial site sensitivity verification is required to verify the screening tool outcomes, and such verified sensitivities are used to inform the minimum reporting requirements for the Plant Species, Animal Species, and Terrestrial Biodiversity Specialist Assessment Reports. The outcome of the screening tool is presented in Table 2.

Table 2: Screening Tool outcomes for the study area.

The Screening Tool is intended to allow for the 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 of 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 square kilometres (km²) are considered Critical Habitat, as all remaining habitat is irreplaceable. Typically, these include species that qualify under CR, EN, or 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 habitats have 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 threatened species are known or expected to occur.	
Animal Species (Figure 9)	For the Animal Species theme, the study area occurs within both high- and a medium-sensitivity areas. The triggered species for the medium sensitivity are listed below: ➤ High sensitivity trigger species: ○ Aves: <i>Tyto capensis</i> (African Grass Owl, VU). ➤ Medium sensitivity trigger species: ○ Insecta: <i>Aloeides dentatis dentatis</i> (Roodepoort Copper, EN), <i>Clonia uvarovi</i> (Uvarov’s Clonia Bush Cricket, VU); ○ Mammalia: <i>Chrysopex villosus</i> (Rough-Haired Golden Mole, VU), <i>Crocidura maquassiensis</i> (Makwassie Musk Shrew, VU), <i>Dasymys robertsii</i> (Robert’s Shaggy Rat, VU), <i>Hydricus maculicollis</i> (Spotted-necked Otter, VU); and ○ Reptilia: <i>Kinixys lobatsiana</i> (Lobatse Hinged Tortoise, VU).



The Screening Tool is intended to allow for the 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 of 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 square kilometres (km²) are considered Critical Habitat, as all remaining habitat is irreplaceable. Typically, these include species that qualify under CR, EN, or 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 habitats have 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 threatened species are known or expected to occur.

Plant Species (Figure 10)	The study area for the Plant Species theme occurs partially within medium sensitivity area. The triggered species include Sensitive species 1248 ⁶ (VU) and <i>Melolobium subspicatum</i> (VU).
Terrestrial Biodiversity Sensitivity (Figure 11)	For the Terrestrial Biodiversity Sensitivity, the entire study area is of very high sensitivity . The triggered feature includes: ➤ A CBA 1 (as per Gauteng C-Plan); ➤ NPAES Priority Focus Area (as per NPAES 2018 database); and ➤ The CR Egoli Granite Grassland (as per 2022 RLE database).

⁶ The names of certain sensitive species will not be made public in this report due to the threat of harvesting or poaching of these species.



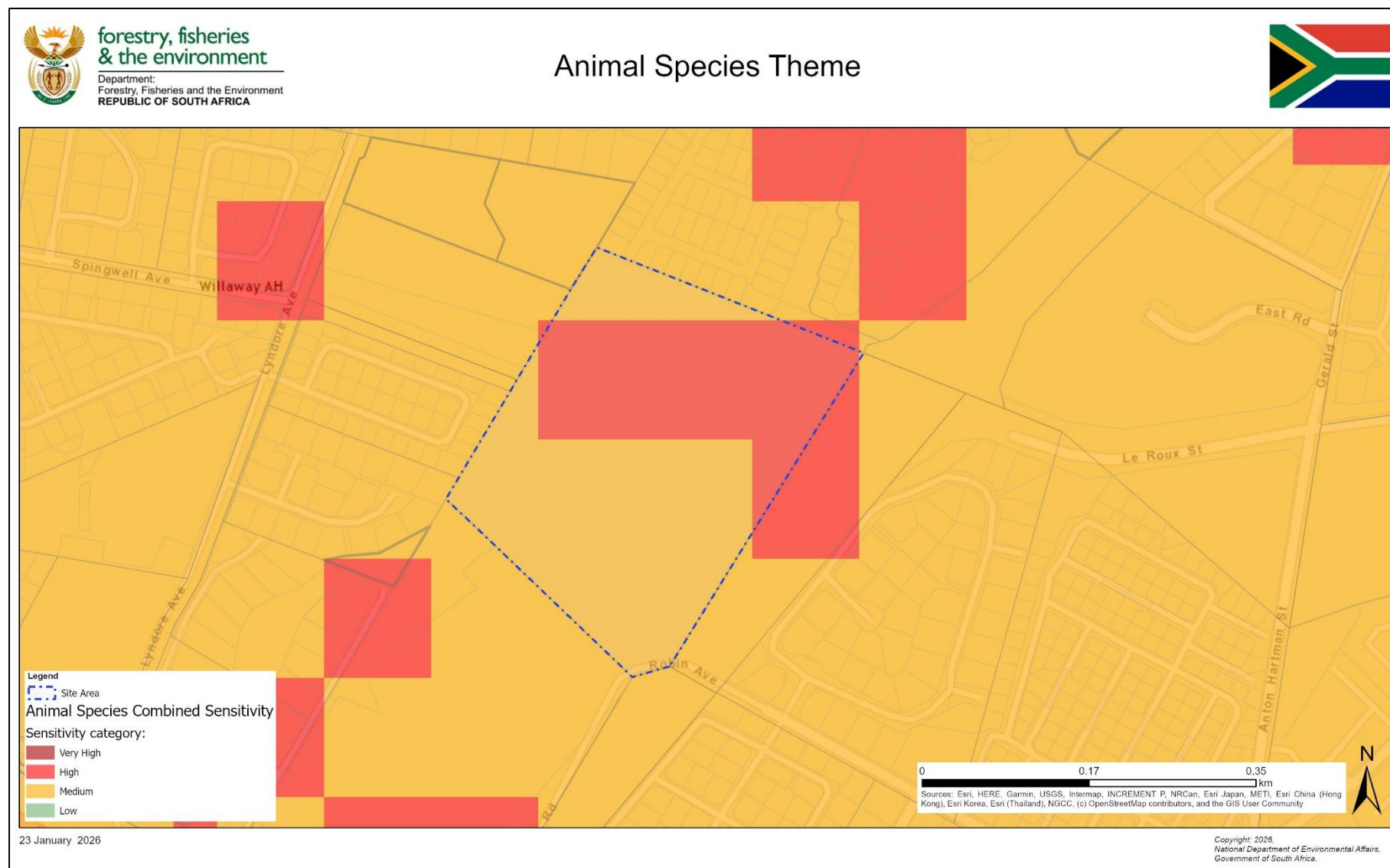


Figure 9: Animal species theme outcome as generated by the screening tool (study area depicted by the black outlined polygon).



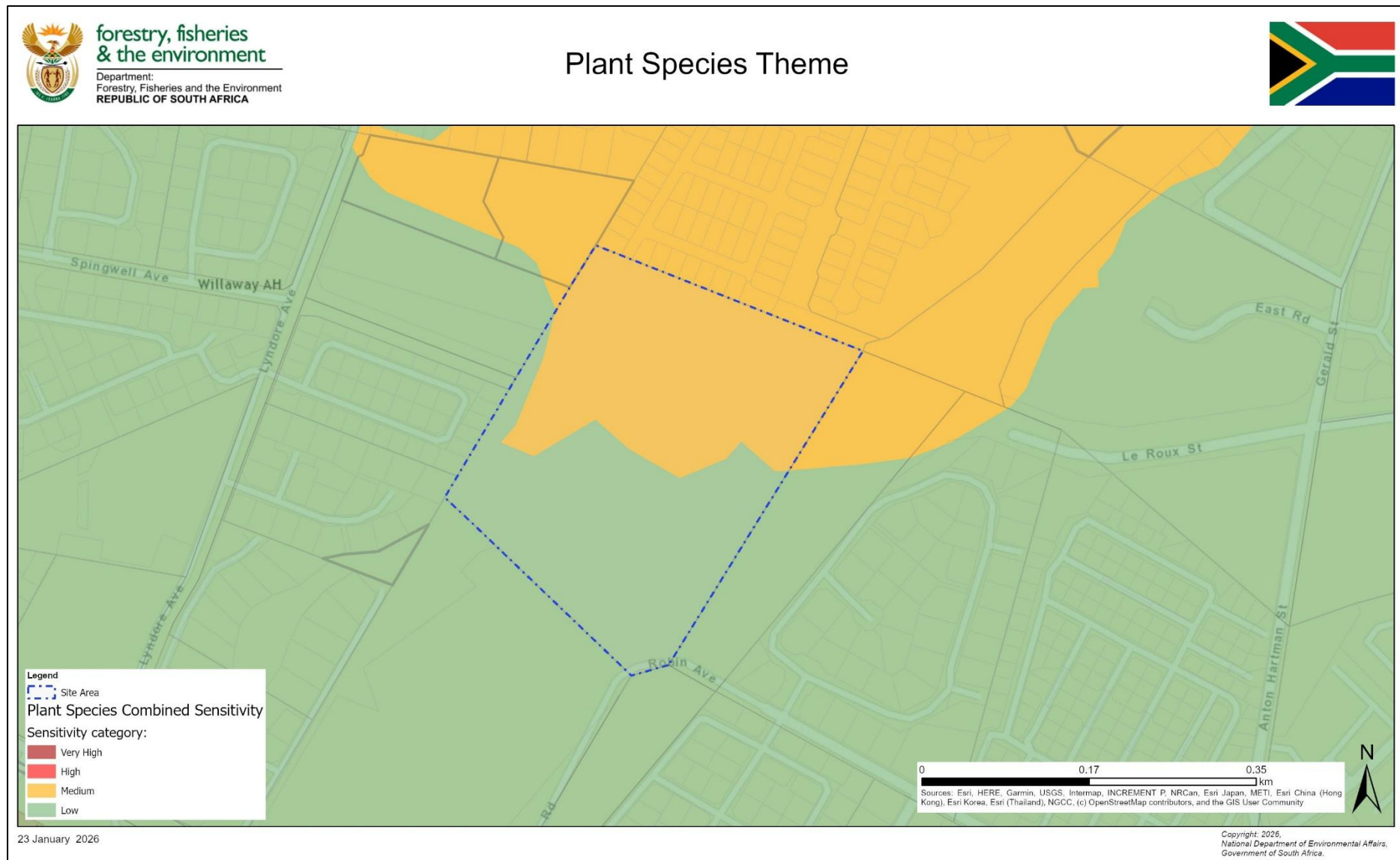


Figure 10: Plant species theme outcome as generated by the screening tool (study area depicted by the black outlined polygon).



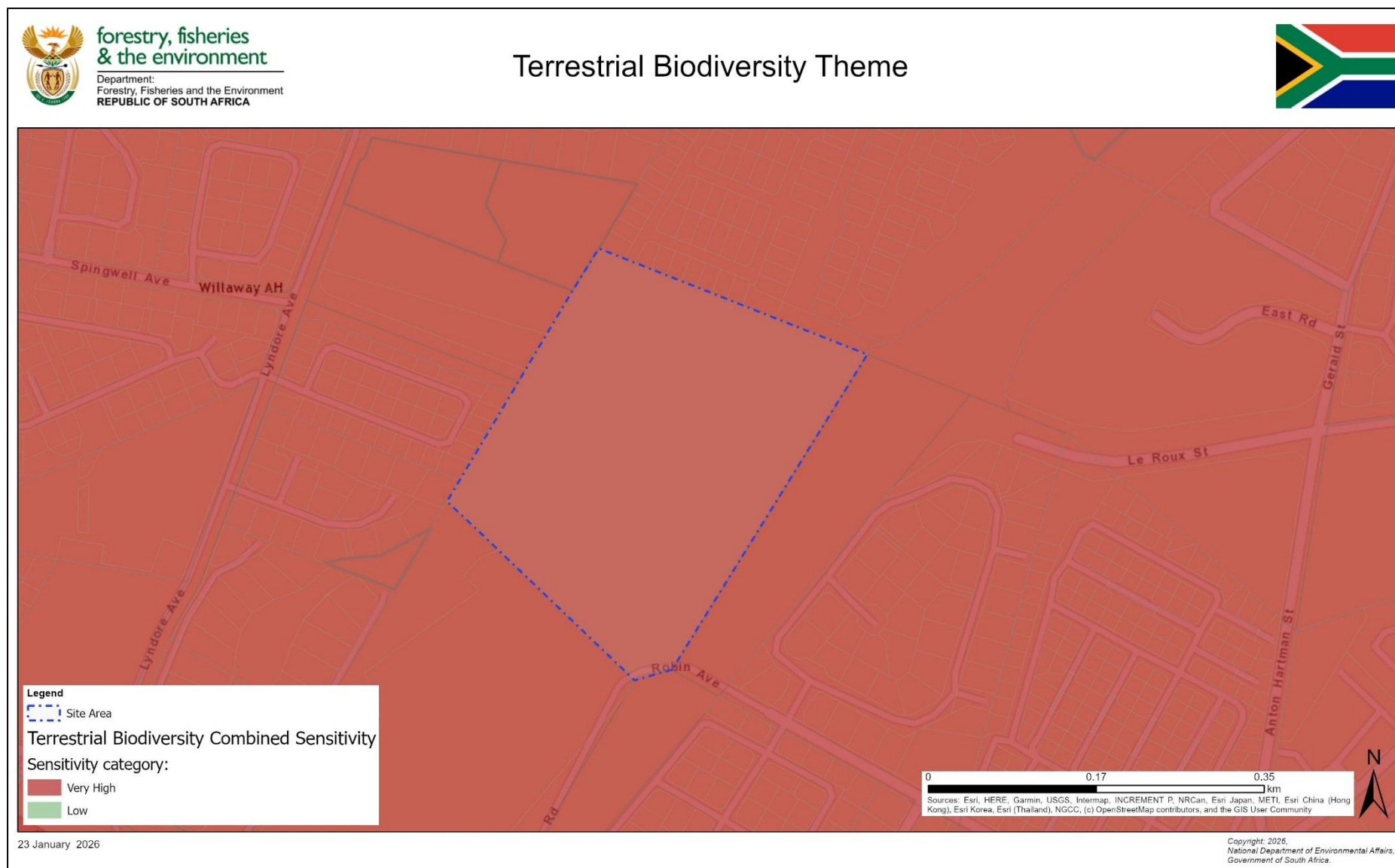


Figure 11: Terrestrial biodiversity theme outcome as generated by the screening tool (study area depicted by the black outlined polygon).



The site sensitivity verification took place on the 19th of May 2025. One floral and one faunal ecologist ground-truthed the terrestrial biodiversity aspects, and the surveys were restricted to the study area.

The study area has undergone significant transformation over time. The southern portion of the site is largely developed and associated with existing equestrian and agricultural activities and infrastructure (Figure 12), while the central section contains a freshwater system and artificial dam (Figure 14). The northern portion comprises open veld used for grazing, with grassland that is both modified and secondary in nature (Figure 13).



Figure 12: Example photographs of areas where transformation of the historic vegetation has occurred.



Figure 13: Species-poor and degraded grassland.



Figure 14: Example photographs of impacted freshwater systems.

Table 3 presents the site-verified results for the study area compared with the screening tool outcomes. It also indicates the required minimum reporting protocols.



Table 3: Specialist comparison with the screening tool sensitivity rating and professional rating. The table further provides the specialist's recommendation for biodiversity reporting.

Theme	DFFE Screening Sensitivity	Comments	Specialist Proposed Sensitivity	Proposed Assessment	Applicable Legislation
Animal Species Theme	High	No faunal SCC were observed in the study area. A high sensitivity was triggered due the highly likely presence of <i>Tyto capensis</i> (African Grass Owl, VU). Due to the degraded nature of the habitats within the study area that results in a lack of suitable roosting habitat, it was determined that <i>Tyto capensis</i> only has a medium POC as it may only occasionally forage within. Thus, the high sensitivity rating was disputed. Additionally, there is a medium POC for <i>Chrysospalax villosus</i> (Rough-Haired Golden Mole, VU), another faunal SCC triggered by the screening tool in various sections of the study area. Therefore, a medium sensitivity was confirmed in these sections due to the presence of suitable habitat and sandy soils. However, other portions of the study area were designated a low sensitivity as these highly degraded or transformed sections have a low likelihood of supporting any of the triggered faunal SCC.	Medium	Animal Species Specialist Assessment	GN 1150 Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species as published in Government Gazette 43855 dated 30 October 2020 (as amended in GN 3717 of 2023).
			Low		
Plant Species Theme	Medium	Although the study area partially overlaps with areas mapped as medium sensitivity, the likelihood of the triggered species, Sensitive species 1248 (VU) and <i>Melolobium subspicatum</i> (VU), occurring at the site is considered low given the current habitat condition and land-use history. Especially given that both species are typically associated with intact, semi-natural grassland systems that retain a high degree of ecological integrity, which is absent from the study area.	Low	Plant Species Compliance Statement	GN 1150 Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Plant Species as published in Government Gazette 43855 dated 30 October 2020 (as amended in GN 3717 of 2023).



Theme	DFFE Screening Sensitivity	Comments	Specialist Proposed Sensitivity	Proposed Assessment	Applicable Legislation
		The medium sensitivity for the Plant Species Theme is thus disputed, and a low sensitivity instead verified.			
Terrestrial Biodiversity Theme	Very High	Triggering features for the Terrestrial Biodiversity Theme include the Egoli Granite Grassland (CR). The grasslands within the study area cannot be considered primary⁷ in condition due to the current and historical disturbances, including alien vegetation proliferation, urban fragmentation, species-poor floral assemblages, and the lack of natural fire and herbivory regimes to maintain ecological functioning and integrity of the grasslands. These grasslands were thus not a good representative of the Egoli Granite Grassland, and from this perspective, the very high screening tool sensitivity is disputed. However, the 2024 Gauteng C-Plan indicates that the study area is further associated with Irreplaceable CBAs. The CBA triggers cannot be fully discounted; however, under the new C-Plan definitions, the habitat aligns with the ESA category rather than the CBA category. Regardless, the very high sensitivity is verified from this perspective.	Very High	Terrestrial Biodiversity Specialist Assessment	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

⁷ Primary grasslands are those that have not been significantly modified from their original state; even though they may no longer have their full complement of naturally-occurring species, they have not undergone significant or irreversible modification and still retain their essential ecological characteristics (SANBI, 2013).



5 REFERENCES

- BirdLife South Africa. 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).
- Constitution of the Republic of South Africa, 1996.
- Dayaram, A., Harris, L.R., Grobler, B.A., Van der Merwe, S., Rebelo, A.G., Ward Powrie, L., Vlok, J.H., Desmet, P.G., Qabaqaba, M., Hlahane, K.M. and Skowno, A.L., 2019. Vegetation map of South Africa, Lesotho and Swaziland 2018: a description of changes since 2006. *Bothalia-African Biodiversity & Conservation*, 49(1), pp.1-11.
- DEA. 2018. National Protected Areas Expansion Strategy for South Africa 2018. Department of Environmental Affairs (DEA), Pretoria, South Africa.
- Desmet, P.G., Kani, L. and Hawley, G. 2024. Revision of the Gauteng Province C-Plan (v4.0, 2023) Technical Report. Report prepared for Gauteng Department of Environment (GDEnv), Johannesburg. September 2024
- Driver A., Sink, K.J., Nel, J.N., Holness, S., Van Niekerk, L., Daniels, F., Jonas, Z., Majiedt, P.A., Harris, L. and Maze, K. 2012. National Biodiversity Assessment 2011: An assessment of South Africa's biodiversity and ecosystems. Synthesis Report. South African National Biodiversity Institute and Department of Environmental Affairs, Pretoria.
- Gauteng Department of Agriculture and Rural Development (GDARD). 2019. Guideline for Ridges in Gauteng Province. GDARD, Johannesburg. Available at: <https://www.gauteng.gov.za/>
- GDARD. 2014. GDARD Requirements for Biodiversity Assessments Version 3.
- GDARD. 2024. GIS Data – C-Plan Version 4.0.
- Government of South Africa. 2022. South African Red List of Terrestrial Ecosystems: assessment details and ecosystem descriptions. Government Notice 2747, Gazette 4526. Technical Report #7664, SANBI Pretoria, South Africa.
- Government Notice number R.1020: Alien and Invasive Species Regulations, 2020, in Government Gazette 43735 dated 25 September 2020 as it relates to the NEMBA.
- Government Notice number 1003: Alien and Invasive Species Lists, 2020, in Government Gazette 43726 dated 18 September 2020.
- Lead, C., Nelson, G.C. and Bennett, E., 2005. Drivers of change in ecosystem condition and services. *Ecosystems and human well-being: scenarios: findings of the scenarios working group*, 2, p.173.
- Lötter, M.C. & Le Maitre, D. 2021. Fine-scale delineation of Strategic Water Source Areas for surface water in South Africa using Empirical Bayesian Kriging Regression Prediction: Technical report. Prepared for the South African National Biodiversity Institute (SANBI), Pretoria. 33 pages.
- Low, A.B. and Rebelo, A.G. (eds). 1998. Vegetation of South Africa, Lesotho, and Swaziland. Department of Environmental Affairs & Tourism, Pretoria.
- 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.
- Mpumalanga Tourism and Parks Agency (MTPA). 2021. Strategic Water Source Areas for surface water [Vector] 2021. Available from the Biodiversity GIS website.
- 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).
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).
- National Web Based Environmental Screening Tool (2023). Accessible online: <https://screening.environment.gov.za/screeningtool/#/pages/welcome>.
- SABAP2, 2014. The South Africa Bird Atlas Project 2 database.
- SACAD: Department of Environmental Affairs. 2025. *South Africa Conservation Areas Database* (SACAD_OR_2025_Q2). Online available: [<http://egis.environment.gov.za>].
- SANBI. 2013. Grassland Ecosystem Guidelines: Policy and Practice for Biodiversity Conservation in South African Grasslands. SANBI, Pretoria. Available at: <https://www.sanbi.org/>
- SANBI. 2016. Lexicon of Biodiversity Planning in South Africa. Beta Version, June 2016. South African National Biodiversity Institute, Pretoria. 72 pp.



- SANBI. 2018a. Terrestrial ecosystem threat status and protection level – remaining.
- SANBI. 2018b. Terrestrial ecosystem threat status and protection level layer [Vector] 2018. URL: <http://bgis.sanbi.org> extent [Vector] 2018. URL: <http://bgis.sanbi.org>.
- SANBI. 2020. Species Environmental Assessment Guideline. Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa. South African National Biodiversity Institute, Pretoria. Version 3.1. 2022.
- SANBI. 2022a. The 2021 Red List of Ecosystems (RLE) for terrestrial realm for South Africa - Original extent [Vector] 2021. Available from the Biodiversity GIS website.
- SANBI. 2022b. The 2021 Red List of Ecosystems (RLE) for terrestrial realm for South Africa - remnants [Vector] 2021. Available from the Biodiversity GIS website.
- SANBI. 2024. The 2024 Final Vegetation Map of South Africa, Lesotho, and Swaziland (Shapefile) [Vector] 2024. Available from the Biodiversity GIS website.
- SAPAD: Department of Environmental Affairs. 2025. *South Africa Protected Areas Database* (SAPAD_OR_2025_Q2). Online available: [<http://egis.environment.gov.za>].
- Skowno, A.L., Raimondo, D.C., Poole, C.J., Fizzotti, B. & Slingsby, J.A. (eds.). 2019. South African National Biodiversity Assessment 2018 Technical Report Volume 1: Terrestrial Realm. South African National Biodiversity Institute, Pretoria. <http://hdl.handle.net/20.500.12143/6370>.
- van Wilgen, B.W., 2020. A brief, selective history of researchers and research initiatives related to biological invasions in South Africa. In *Biological Invasions in South Africa* (pp. 33-64). Springer, Cham.



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 (Pty) Ltd 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.

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APPENDIX B: Legal 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 AIP and weed species should take place throughout the construction and operation, phases in line with an approved AIP Management Plan.

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

The 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 and environmental authorisation obtained. 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 anticipated impacts.

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
- 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 unauthorized 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 minimize 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 AMENDED⁸ (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.

⁸ 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) (NFA)

According to the department of Department of Environment, Forestry and Fisheries (DEFF) (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 utilization.”

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.

NATIONAL WATER ACT, 1998 [ACT NO. 36 OF 1998], AS AMENDED (NWA)

The National Water Act, 1998 (Act No. 36 of 1998), as amended (NWA), recognises that the entire ecosystem and not just the water itself in any given water resource constitutes the resource and as such needs to be conserved. No activity may therefore take place within a watercourse unless it is authorised by the Department of Water and Sanitation (DWS). Any area within a wetland or riparian zone is therefore excluded from development unless authorisation is obtained from the DWS in terms of Section 21 (c) & (i).

THE TRANSVAAL NATURE CONSERVATION ORDINANCE (ORDINANCE NO.12 of 1983) (TNCO)

To consolidate and amend the laws relating to nature conservation and to provide matters incidental thereto and they relate to the following:

- Establishment of nature conservation division, nature conservation advisory board and nature conservation advisory committees, and appointment of officers;
- Declaration of nature reserves;
- Wild animals;
- Professional hunters and hunting-outfitters;
- Problem animals;
- Fisheries;



- Indigenous plants;
- Endangered and rare species of fauna and flora; and
- Trading in and preservation of cave-formations.

GDARD REQUIREMENTS FOR BIODIVERSITY ASSESSMENTS VERSION 3.

The biodiversity assessment must comply with the minimum requirements as stipulated by GDARD Version 3 of 2014 and must contain the following information:

- A location and description of the application site and proposed activities;
- Photographic record and description of the site characteristics and inventories of the faunal and floral species observed on site, with special mention to Red Listed species;
- Sensitivity map displaying all sensitive areas and associated buffers as listed in the Sensitivity Mapping Rules for Biodiversity Assessments section of GDARD V3 (2014); and
- A list of recommendations and mitigation measures to reduce the potential environmental impacts that the proposed development might have on the terrestrial ecology associated with the site.



APPENDIX C: Vegetation Types

Gm 10 Egoli Granite Grassland



Figure C1: Mucina and Rutherford (2006) Figure 8.45 (page 398). Gm 10 Egoli Granite Grassland: Rocky outcrop at Knoppieslaagte, west of Valhalla near Centurion (Gauteng) with *Aloe greatheadii*, *Hypoxis rigidula*, *Pygmaeothamnus zeyheri*, *Thesium magalismontanum* and *Crassula capitella* and grasses such as *Elionurus muticus*, *Tristachya leucothrix*, *Melinis repens* and *Trachypogon spicatus*.

Table C1: The table contains the important taxa associated with the Egoli Granite Grassland vegetation type. *(d) = dominant species.

Woody Layer	
Small Trees	<i>Vangueria infausta</i> .
Tall Shrubs	<i>Searsia pyroides</i> .
Low Shrubs	<i>Anthospermum hispidulum</i> , <i>Anthospermum rigidum</i> subsp. <i>pumilum</i> , <i>Lasiosiphon capitatus</i> , <i>Helichrysum kraussii</i> , <i>Ziziphus zeyheriana</i> .
Succulent Shrubs	<i>Lopholaena coriifolia</i> .
Forb layer	
Herbs	<i>Acalypha angustata</i> , <i>Acalypha peduncularis</i> , <i>Ocimum obovatum</i> (previously <i>Becium obovatum</i>), <i>Berkheya insignis</i> , <i>Crabbea hirsuta</i> , <i>Cyanotis speciosa</i> , <i>Dicoma anomala</i> , <i>Helichrysum rugulosum</i> , <i>Justicia anagalloides</i> , <i>Kohautia amatymbica</i> , <i>Nidorella hottentotica</i> , <i>Pentanisia prunelloides</i> subsp. <i>latifolia</i> , <i>Pseudognaphalium luteo-album</i> , <i>Senecio venosus</i> .
Geophytic Herbs	<i>Cheilanthes deltoidea</i> , <i>Cheilanthes hirta</i> .
Graminoid layer	
Graminoids	<i>Aristida canescens</i> (d), <i>Aristida congesta</i> (d), <i>Cynodon dactylon</i> (d), <i>Digitaria monodactyla</i> (d), <i>Eragrostis capensis</i> (d), <i>Eragrostis chloromelas</i> (d), <i>Eragrostis curvula</i> (d), <i>Eragrostis racemosa</i> (d), <i>Heteropogon contortus</i> (d), <i>Hyparrhenia hirta</i> (d), <i>Melinis repens</i> subsp. <i>repens</i> (d), <i>Monocymbium ceresiiforme</i> (d), <i>Setaria sphacelata</i> (d), <i>Themeda triandra</i> (d), <i>Tristachya leucothrix</i> (d), <i>Andropogon eucomus</i> , <i>Aristida aequiglumis</i> , <i>Aristida diffusa</i> , <i>Aristida scabrivalvis</i> subsp. <i>borumensis</i> , <i>Bewisia biflora</i> , <i>Brachiaria serrata</i> , <i>Bulbostylis burchellii</i> , <i>Cymbopogon caesius</i> , <i>Digitaria tricholaenoides</i> , <i>Diheteropogon amplexans</i> , <i>Eragrostis gummiflua</i> , <i>Eragrostis sclerantha</i> , <i>Panicum natalense</i> , <i>Schizachyrium sanguineum</i> , <i>Setaria nigrirostris</i> , <i>Tristachya rehmannii</i> , <i>Urelytrum agropyroides</i> .



Remark 1 This grassland is considered by some to be primary, though is heavily utilised, poor in species and degraded, and often resembles secondary grassland that developed on old fields.

Remark 2 So-called Witwatersrand serpentine sourveld (Reddy et al. 2001)—rocky grasslands on ultramafic rocks of a greenstone belt of uncertain origin—falls within this vegetation unit. Unlike in the Barberton region (see SVI 13 Barberton Serpentine Sourveld), the floristic composition of the Witwatersrand serpentines does not support separation of the ultramafic sourveld as a separate unit. So far, no endemic taxa have been discovered on the Witwatersrand serpentines, the floristic composition of which is similar to that of the surrounding granite grassland.



APPENDIX D: Impact Assessment Methodology

For the Environmental Assessment Practitioner (EAP) to allow for sufficient consideration of all environmental impacts, impacts must be assessed using a common, defensible method of assessing significance that will enable comparisons to be made between risks/impacts and will enable authorities, stakeholders and the client to understand the process and rationale upon which risks/impacts have been assessed. The method to be used for assessing risks/impacts is outlined in the sections below. The first stage of risk/impact assessment is the identification of environmental activities, aspects, and impacts. This is supported by the identification of receptors and resources, which allows for an understanding of the impact pathway and an assessment of the sensitivity to change. The definitions used in the impact assessment are presented below.

- An **activity** is a distinct process or task undertaken by an organisation for which a responsibility can be assigned. Activities also include facilities or infrastructure that is possessed by an organisation.
- An **environmental aspect** is an 'element of an organizations activities, products and services which can interact with the environment'⁹. The interaction of an aspect with the environment may result in an impact.
- **Environmental risks/impacts** are the consequences of these aspects on environmental resources or receptors of particular value or sensitivity, for example, disturbance due to noise and health effects due to poorer air quality. In the case where the impact is on human health or wellbeing, this should be stated. Similarly, where the receptor is not anthropogenic, then it should, where possible, be stipulated what the receptor is.
- **Receptors** can comprise, but are not limited to, people or human-made systems, such as local residents, communities and social infrastructure, as well as components of the biophysical environment such as wetlands, flora and riverine systems.
- **Resources** include components of the biophysical environment.
- **Frequency of activity** refers to how often the proposed activity will take place.
- **Frequency of impact** refers to the frequency with which a stressor (aspect) will impact on the receptor.
- **Severity** refers to the degree of change to the receptor status in terms of the reversibility of the impact; sensitivity of receptor to stressor; duration of impact (increasing or decreasing with time); controversy potential and precedent setting; threat to environmental and health standards.
- **Spatial extent** refers to the geographical scale of the impact.
- **Duration** refers to the length of time over which the stressor will cause a change in the resource or receptor.

The significance of the impact is then assessed by rating each variable numerically according to the defined criteria. Refer to the Table D1-2. The purpose of the rating is to develop a clear understanding of influences and processes associated with each impact. The severity, spatial scope and duration of the impact together comprise the consequence of the impact and when summed can obtain a maximum value of 15. The frequency of the activity and the frequency of the impact together comprise the likelihood of the impact occurring and can obtain a maximum value of 10. The values for likelihood and consequence of the impact are then read off a significance-rating matrix and are used to determine whether mitigation is necessary¹⁰.

The assessment of significance is undertaken twice. Initial, significance is based on only natural and existing mitigation measures (including built-in engineering designs). The subsequent assessment considers the recommended management measures required to mitigate the impacts. Measures such as demolishing infrastructure, and reinstatement and rehabilitation of land, are considered post-mitigation.

The model outcome of the impacts was then assessed in terms of impact certainty and consideration of available information. The Precautionary Principle is applied in line with South Africa's National Environmental Management Act, 1998 (Act No. 107 of 1998) in instances of uncertainty or lack of

⁹ The definition has been aligned with that used in the ISO 14001 Standard.

¹⁰ Some risks/impacts that have low significance will however still require mitigation.



information, by increasing assigned ratings or adjusting final model outcomes. In certain instances, where a variable or outcome requires rational adjustment due to model limitations, the model outcomes have been adjusted.

Table D1: Criteria for assessing significance of impacts.

LIKELIHOOD DESCRIPTORS

Probability of impact	RATING
Highly unlikely	1
Possible	2
Likely	3
Highly likely	4
Definite	5
Sensitivity of receiving environment	RATING
Ecology not sensitive/important	1
Ecology with limited sensitivity/importance	2
Ecology moderately sensitive/important	3
Ecology highly sensitive /important	4
Ecology critically sensitive /important	5

CONSEQUENCE DESCRIPTORS

Severity of impact	RATING
Insignificant / ecosystem structure and function unchanged	1
Small / ecosystem structure and function largely unchanged	2
Significant / ecosystem structure and function moderately altered	3
Great / harmful/ ecosystem structure and function largely altered	4
Disastrous / ecosystem structure and function seriously to critically altered	5
Spatial scope of impact	RATING
Activity specific/ < 5 ha impacted / Linear developments affected < 100m	1
Development specific/ within the site boundary / < 100ha impacted / Linear developments affected < 100m	2
Local area/ within 1 km of the site boundary / < 500ha impacted / Linear developments affected > 100m	3
Regional within 5 km of the site boundary / < 2000ha impacted / Linear developments affected < 3000m	4
Entire habitat unit / Entire system/ > 2000ha impacted / Linear developments affected > 3000m	5
Duration of impact	RATING
One day to one month	1
One month to one year	2
One year to five years	3
Life of operation or less than 20 years	4
Permanent	5



Table D2: Significance Rating Matrix.

LIKELIHOOD (Frequency of activity + Frequency of impact)	CONSEQUENCE (Severity + Spatial Scope + Duration)														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105
	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150

Table D3: Positive/Negative Mitigation Ratings.

Significance Rating	Value	Negative Impact Recommendation	Positive Impact Recommendation
Very high	126-150	Critically consider the viability of proposed projects Improve current management of existing projects significantly and immediately	Maintain current management
High	101-125	Comprehensively consider the viability of proposed projects Improve current management of existing projects significantly	Maintain current management
Medium-high	76-100	Consider the viability of proposed projects. Improve current management of existing projects	Maintain current management
Medium-low	51-75	Actively seek mechanisms to minimise impacts in line with the mitigation hierarchy	Maintain current management and/or proposed project criteria and strive for continuous improvement
Low	26-50	Where deemed necessary seek mechanisms to minimise impacts in line with the mitigation hierarchy	Maintain current management and/or proposed project criteria and strive for continuous improvement
Very low	1-25	Maintain current management and/or proposed project criteria and strive for continuous improvement	Maintain current management and/or proposed project criteria and strive for continuous improvement

The following points were considered when undertaking the assessment:

- Risks and impacts were analysed in the context of the *project's area of influence* encompassing:
 - Primary project site and related facilities that the client and its contractors develop or controls;
 - Areas potentially impacted by cumulative impacts for any existing project or condition and other project-related developments; and
 - Areas potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location.
- Risks/Impacts were assessed for all stages of the project cycle including:
 - Construction; and
 - Operation.
- If applicable, transboundary, or global effects were assessed.
- Individuals or groups who may be differentially or disproportionately affected by the project because of their *disadvantaged* or *vulnerable* status were assessed.
- Particular attention was paid to describing any residual impacts that will occur after rehabilitation.



Mitigation measure development

According to the DEA *et al.*, (2013) “Rich biodiversity underpins the diverse ecosystems that deliver ecosystem services that are of benefit to people, including the provision of basic services and goods such as clean air, water, food, medicine, and fibre; as well as more complex services that regulate and mitigate our climate, protect people and other life forms from natural disaster and provide people with a rich heritage of nature-based cultural traditions. Intact ecological infrastructure contributes significant savings through, for example, the regulation of natural hazards such as storm surges and flooding which is attenuated by wetlands”.

According to the DEA *et al.*, (2013) ecosystem services can be divided into 4 main categories:

- Provisioning services are the harvestable goods or products obtained from ecosystems such as food, timber, fibre, medicine, and fresh water;
- Cultural services are the non-material benefits such as heritage landscapes and seascapes, recreation, ecotourism, spiritual values and aesthetic enjoyment;
- Regulating services are the benefits obtained from an ecosystem’s control of natural processes, such as climate, disease, erosion, water flows, and pollination, as well as protection from natural hazards; and
- Supporting services are the natural processes such as nutrient cycling, soil formation and primary production that maintain the other services.

Loss of biodiversity puts aspects of the economy, wellbeing, and quality of life at risk, and reduces socio-economic options for future generations. This is of particular concern for the poor in rural areas who have limited assets and are more dependent on common property resources for their livelihoods. The importance of maintaining biodiversity and intact ecosystems for ensuring on-going provision of ecosystem services, and the consequences of ecosystem change for human well-being, were detailed in a global assessment entitled the Millennium Ecosystem Assessment (MEA, 2005), which established a scientific basis for the need for action to enhance management and conservation of biodiversity.

Sustainable development is enshrined in South Africa’s Constitution and laws. The need to sustain biodiversity is directly or indirectly referred to in several Acts, not least the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (hereafter referred to as the Biodiversity Act) and is fundamental to the notion of sustainable development. In addition, international guidelines, and commitments as well as national policies and strategies are important in creating a shared vision for sustainable development in South Africa (DEA *et al.*, 2013).

The primary environmental objective of the Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) is to give effect to the environmental right contained in the South African Constitution. Furthermore, Section 37(2) of the MPRDA states that “any prospecting or mining operation must be conducted in accordance with generally accepted principles of sustainable development by integrating social, economic and environmental factors into the planning and implementation of prospecting and mining projects in order to ensure that exploitation of mineral resources serves present and future generations”.

Pressures on biodiversity are numerous and increasing. According to the DEA *et al.*, (2013) Loss of natural habitat is the single biggest cause of biodiversity loss in South Africa and much of the world. The most severe transformation of habitat arises from the direct conversion of natural habitat for human requirements, including¹¹:

- Cultivation and grazing activities;
- Rural and urban development;
- Industrial and mining activities, and
- Infrastructure development.

Impacts on biodiversity can largely take place in four ways (DEA *et al.*, 2013):

- **Direct impacts:** are impacts directly related to the project including project aspects such as site clearing, water abstraction and discharge of water from riverine resources;

¹¹ Limpopo Province Environment Outlook. A Report on the State of the Environment, 2002. Chapter 4.



- **Indirect impacts:** are impacts associated with a project that may occur within the zone of influence in a project such as surrounding terrestrial areas and downstream areas on water courses;
- **Induced impacts:** are impacts directly attributable to the project but are expected to occur due to the activities of the project. Factors included here are urban sprawl and the development of associated industries; and
- **Cumulative impacts:** can be defined as the sum of the impact of a project as well as the impacts from past, existing, and reasonably foreseeable future projects that would affect the same biodiversity resources. Examples include numerous mining operations within the same drainage catchment or numerous residential developments within the same habitat for faunal or floral species.

Given the limited resources available for biodiversity management and conservation, as well as the need for development, efforts to conserve biodiversity need to be strategic, focused, and supportive of sustainable development. This is a fundamental principle underpinning South Africa's approach to the management and conservation of its biodiversity and has resulted the definition of a clear mitigation strategy for biodiversity impacts.

'Mitigation' is a broad term that covers all components of the 'mitigation hierarchy' defined hereunder. It involves selecting and implementing measures – amongst others – to conserve biodiversity and to protect the users of biodiversity and other affected stakeholders from potentially adverse impacts because of mining or any other land use. The aim is to prevent adverse impacts from occurring or, where this is unavoidable, to limit their significance to an acceptable level. Offsetting of impacts is the last option in the mitigation hierarchy for any project.

The mitigation hierarchy in general consists of the following in order of which impacts should be mitigated (DEA *et al.*, 2013):

- **Avoid/prevent impact:** can be done through utilising alternative sites, technology, and scale of projects to prevent impacts. In some cases, if impacts are expected to be too high the "no project" option should also be considered, especially where it is expected that the lower levels of mitigation will not be adequate to limit environmental damage and eco-service provision to suitable levels;
- **Minimise impact:** can be done through utilisation of alternatives that will ensure that impacts on biodiversity and ecoservices provision are reduced. Impact minimisation is considered an essential part of any development project;
- **Rehabilitate impact:** is applicable to areas where impact avoidance and minimisation are unavoidable where an attempt to re-instate impacted areas and return them to conditions which are ecologically similar to the pre-project condition or an agreed post project land use, for example arable land. Rehabilitation can however not be considered as the primary mitigation tool as even with significant resources and effort rehabilitation usually does not lead to adequate replication of the diversity and complexity of the natural system. Rehabilitation often only restores ecological function to some degree to avoid ongoing negative impacts and to minimise aesthetic damage to the setting of a project. Practical rehabilitation should consist of the following phases in best practice:
 - **Structural rehabilitation** which includes physical rehabilitation of areas by means of earthworks, potential stabilisation of areas as well as any other activities required to develop a long terms sustainable ecological structure;
 - **Functional rehabilitation** which focuses on ensuring that the ecological functionality of the ecological resources on the focus area supports the intended post closure land use. In this regard special mention is made of the need to ensure the continued functioning and integrity of wetland and riverine areas throughout and after the rehabilitation phase;
 - **Biodiversity reinstatement** which focuses on ensuring that a reasonable level of biodiversity is re-instated to a level that supports the local post closure land uses. In this regard special mention is made of re-instating vegetation to levels which will allow the natural climax vegetation community or community suitable for supporting the intended post closure land use; and
 - **Species reinstatement** which focuses on the re-introduction of any ecologically important species which may be important for socio-cultural reasons, ecosystem functioning reasons



and for conservation reasons. Species re-instatement need only occur if deemed necessary.

- **Offset impact:** refers to compensating for residual or unavoidable negative impacts on biodiversity. Offsetting should take place to address any impacts deemed to be unacceptable which cannot be mitigated through the other mechanisms in the mitigation hierarchy. The objective of biodiversity offsets should be to ensure no net loss of biodiversity. Biodiversity offsets can be a last resort to compensate for residual negative impacts on biodiversity.

The significance of residual impacts should be identified on a regional as well as national scale when considering biodiversity conservation initiatives. If the residual impacts lead to irreversible loss or irreplaceable biodiversity the residual impacts should be of *very high significance* and when residual impacts are of *very high significance*, offset initiatives are not considered an appropriate way to deal with the magnitude and/or significance of the biodiversity loss. In the case of residual impacts determined to have *medium to high significance*, an offset initiative may be investigated. If the residual biodiversity impacts are considered of low significance no biodiversity offset is required.¹²

Considering the above discussion, the following points present the key concepts considered in the development of mitigation measures for the proposed project:

- Mitigation and performance improvement measures and actions that address the risks and impacts¹³ are identified and described in as much detail as possible;
- Measures and actions to address negative impacts will favour avoidance and prevention over minimisation, mitigation, or compensation where possible; 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, with estimates of the resources (including human resource and training requirements) and responsibilities for implementation wherever possible.

Recommendations

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

¹² Provincial Guideline on Biodiversity Offsets, Western Cape, 2007.

¹³ Mitigation measures should address both positive and negative impacts.



APPENDIX E: Details, Expertise and Curriculum Vitae of Specialists

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

Candice Lamb	MSc Zoology (University of Pretoria)
Christien Steyn	MSc Plant Science (University of Pretoria)
Jandre Potgieter	BSc (Hons) Entomology (University of Pretoria)
Mathew Ross	PhD Aquatic Health (University of Johannesburg)
Samantha-Leigh Daniels	PhD Plant Science (University of Pretoria)

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

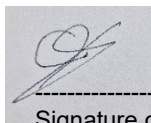
Company of Specialists	Scientific Terrestrial Services (Pty) Ltd.
Name / Contact person:	Candice Lamb
E-mail:	candice@sasenvgroup.co.za
Qualifications	MSc Zoology (University of Pretoria) BSc (Hons) Zoology (University of Pretoria)
Registration / Associations	Awaiting registration finalisation as a candidate member of the South African Council for Natural Scientific Professions (SACNASP)
Name / Contact person:	Christien Steyn
E-mail:	christien@sasenvgroup.co.za
Qualifications	MSc (Plant Science) (University of Pretoria) BSc (Hons) Plant Science (University of Pretoria) BSc (Environmental Sciences) (University of Pretoria)
Registration / Associations	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)
Name / Contact person:	Mathew Ross
E-mail:	mathew@sasenvgroup.co.za
Qualifications	PhD Aquatic Health (University of Johannesburg) MSc Aquatic Health (University of Johannesburg) BSc (Hons) Zoology (Aquatic Ecology) (University of Johannesburg) BSc Biological Sciences (Zoology & Botany) (University of Johannesburg)
Registration / Associations	Registered Professional Scientist with the South African Council for Natural Scientific Professions (SACNASP): Ecological Sciences & Aquatic Sciences Accredited River Health Practitioner by the South African River Health Program (RHP) Member of the Gauteng Wetland Forum
Name / Contact person:	Jandre Potgieter
E-mail:	jandre@sasenvgroup.co.za
Qualifications	BSc (Hons) Entomology (University of Pretoria) BSc Entomology (University of Pretoria)
Registration / Associations	Registered Professional Scientist at South African Council for Natural Scientific Professions (SACNASP)
Name / Contact person:	Samantha-Leigh Daniels
E-mail:	samantha@sasenvgroup.co.za
Qualifications	PhD (Plant Science) (University of Pretoria) MSc (Plant Science) (University of Pretoria) BSc (Hons) Zoology & Entomology (University of Pretoria) BSc Zoology & Entomology (University of Pretoria)
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 Botanical Society of South Africa (BotSoc) Member of the Land Rehabilitation Society of Southern Africa (LARSSA)



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

I, Candice Lamb, declare that -

- I act as the **independent GIS and faunal 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.

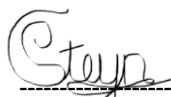


Signature of the Specialist

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

I, Christien Steyn, declare that -

- I act as the **independent botanical 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

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

I, Mathew James Ross, 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



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

I, Jandre Potgieter, declare that -

- I act as the **independent faunal 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.

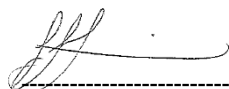


Signature of the Specialist

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

I, Samantha-Leigh Daniels, declare that -

- I act as the **independent botanical 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 CANDICE LAMB

PERSONAL DETAILS

Position in Company	Faunal Ecologist
Joined SAS Environmental Group of Companies	January 2024

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Registered as a candidate scientist of the South African Council for Natural Scientific Professions (SACNASP – Reg No. 167209)

EDUCATION

Qualifications

MSc Zoology (University of Pretoria)	2022
BSc (Hons) Zoology (University of Pretoria)	2018
BSc Environmental Science (University of Pretoria)	2017

AREAS OF WORK EXPERIENCE

South Africa – Gauteng, Mpumalanga, Limpopo, Northern Cape, KwaZulu-Natal, Eastern Cape, North West
Africa – Lesotho

KEY SPECIALIST DISCIPLINES

Biodiversity Assessments

- Avifaunal Assessments
- Faunal Assessments
- Desktop Studies, Mapping, and Background Information Research

Freshwater Assessments

- Desktop Studies, Mapping, and Background Information Research
- Desktop Freshwater Delineation
- Freshwater (wetland/riparian) Delineation and Assessment

GIS

- Mapping and GIS for various sectors and various disciplines (biodiversity, freshwater, aquatic, soil, and land capability).





SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF CHRISTIEN STEYN

PERSONAL DETAILS

Position in Company	Senior Floral Ecologist and Discipline Lead
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: Species Environmental Assessment Guidelines 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 – Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, Northern Cape, North West.

Africa – Lesotho, Sierra Leone.

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

Freshwater Assessments

- Desktop Freshwater Ecosystem Delineation
- Freshwater Ecosystem Plant Species Plans





SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF DR MATHEW JAMES ROSS

PERSONAL DETAILS

Position in Company	Discipline Lead, Principal Aquatic Ecologist, General Ecologist
Joined SAS Environmental Group of Companies	2024

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Registered Professional Scientist with the South African Council for Natural Scientific Professions (SACNASP):
Ecological Sciences & Aquatic Sciences
Accredited River Health Practitioner by the South African River Health Program (RHP)
Member of the Gauteng Wetland Forum

EDUCATION

Qualifications

PhD Aquatic Health (University of Johannesburg)	2015
MSc Aquatic Health (University of Johannesburg)	2005
BSc (Hons) Zoology (Aquatic Ecology) (University of Johannesburg)	2001
BSc Biological Sciences (Zoology & Botany) (University of Johannesburg)	2000

Short Courses

Algal toxicity testing workshop – Environmentek, CSIR.	2003
Grass identification course – Witwatersrand Botanical Gardens	2003
Venomous snake handling and first aid	2003
First Aid – Level 3 – Netcare 911	2004
Advanced 4x4 driving	2001
Soil Classification course with emphasis on wetland delineations (TerraSoil Science)	2009
Advanced grass identification course (Africa Land Use Training)	2010
Qualified as an Advanced Scuba Diver.	2004
Internationally accredited protection dog trainer and trials assailant.	2005

AREAS OF WORK EXPERIENCE

South Africa – All Provinces
Southern Africa – Botswana, Mozambique, Zimbabwe, Zambia, Namibia, Swaziland
Eastern Africa – Tanzania, Uganda, Malawi
West Africa – Ghana, Senegal, Angola, Cameroon, Mali, Burkina Fasso, Sierra Leone
Central Africa – Democratic Republic of the Congo

DEVELOPMENT SECTORS OF EXPERIENCE

1. Renewable energy: Hydropower (run-of-river, pumped storage & dams), solar.
2. Fish migrations assessments and Fishpass/fishway design & construction
3. Instream infrastructure: Gauging weirs, abstraction weirs.
4. Ecological Water requirements: DRIFT Modelling experience.
5. Linear developments (energy transmission, telecommunication, pipelines, roads)
6. Water resources sector (wastewater treatment works & water treatment works).
7. Mining sector (various).
8. Industrial, commercial & residential developments.

KEY SPECIALIST DISCIPLINES



Freshwater Assessments

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

Aquatic Ecological Assessment and Water Quality Studies

- Fish migrations analysis
- Fishpass/fishway design and development (2D and 3D design modelling)
- Fishway integration and hydraulic modelling
- Habitat Assessment Indices (IHAS, HCR, IHI & RHAM)
- Aquatic Macro-Invertebrates (SASS5 & MIRAI)
- Fish Response Assessment Index (FRAI)
- Fish Health Assessments
- Riparian Vegetation Integrity (VEGRAI)
- Toxicological analysis
- Water quality monitoring
- Screening Test
- Riverine Rehabilitation Plans
- Floral Assessments

Biodiversity Assessments

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

Modelling & Design

- Proficient in GIS modelling and analysis
- Proficient in AutoCAD design and modelling
- Proficient in hydraulic analysis of fishways and other instream infrastructure





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)	2013
BSc Entomology (University of Pretoria)	2012

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Professional member of the South African Council for Natural Scientific Professions (SACNASP – Reg No. 170165/24)

AREAS OF WORK EXPERIENCE

South Africa – Gauteng, Eastern Cape, Limpopo, Western Cape, Mpumalanga, Northern Cape, Free State, North West and KZN

Africa – Angola, Malawi, and the Democratic Republic of the Congo (DRC)

KEY SPECIALIST DISCIPLINES

Biodiversity Assessments

- Faunal Assessments





SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF DR SAMANTHA-LEIGH DANIELS

PERSONAL DETAILS

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

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Professional member of the South African Council for Natural Scientific Professions (SACNASP)
 Member of the South African Association of Botanists (SAAB)
 Member of the Botanical Society of South Africa (BotSoc)
 Member of the Land Rehabilitation Society of Southern Africa (LARSSA)

EDUCATION

Qualifications

PhD (Plant Science) (University of Pretoria)	2023
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, Northern Cape, Western Cape

Africa – Lesotho, Democratic Republic of Congo (DRC)

KEY SPECIALIST DISCIPLINES

Biodiversity Assessments

- Desktop Studies, Mapping and Background Information Research
- Terrestrial Ecological and Biodiversity Scoping Assessments
- Terrestrial Ecological and Biodiversity Screening Assessments
- Floral Assessments
- Alien and Invasive Plant Control Plans (AIPCPs)
- Terrestrial Monitoring
- Species Rescue and Relocation Plans
- Rehabilitation and Management Plans
- Strategic Net Positive Impact (NPI) Accounting

Offsets

- Biodiversity Offsets
- Wetland Offsets

Training

- Plant species identification
- Herbarium usage and protocols

