



SCIENTIFIC TERRESTRIAL SERVICES

Terrestrial Biodiversity Assessment

Part A: Background Information

AS PART OF THE ENVIRONMENTAL
AUTHORISATION PROCESS FOR THE
PROPOSED DEVELOPMENT ACTIVITIES OF
RIVERSIDE VIEW EXT 126, GAUTENG
PROVINCE.

Prepared for: Century Property Developments (Pty) Ltd
Report authors: C. Kock (Pr. Sci. Nat.)
C. Lamb (Cand. Sci. Nat.)
S. Erwee
Reviewers: S. Daniels (Pr. Sci. Nat.)
J. Potgieter (Pr. Sci. Nat.)
M. Ross (Pr. Sci. Nat.)
Reference: STS 25-2032
Date: December 2025



Part of the SAS Environmental Group of Companies

EXECUTIVE SUMMARY

Scientific Terrestrial Services (Pty) Ltd. (“STS” hereafter) was appointed to conduct a terrestrial biodiversity assessment for the proposed development of the Riverside View Ext 126 near Kyalami within the Gauteng Province. The proposed development comprises three areas (Area 1, Area 2, Area 3) which are hereafter collectively referred to as the “study area”.

The field assessment undertaken by the faunal and floral specialist occurred on the 5th of November 2025 (spring).

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 **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 the Critically Endangered (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**
 - The study area is associated with **wetland and river buffers**;
 - The Gauteng Rivers dataset (2021) indicates **1 perennial and non-perennial river** traversing the study area;
- According to the South African Protected Areas Database (SAPAD) (2025, Q2), the study area is located within $\pm 2,8$ km of the **Beaulieu Bird Sanctuary**, $\pm 3,1$ km of the **Diepsloot Nature Reserve**, and $\pm 9,2$ km from the **Crocodile River Reserve Doornrandje Nature Reserve Cluster, Crocodile River Reserve Protected Environment and Crocodile River Reserve Central Nature Reserve Cluster Protected Areas**;
- According to the South African Conservation Areas Database (SAPAD) (2025, Q2), the study area is located $\pm 6,6$ km from the **Magaliesberg Biosphere Reserve**;
- According to the National Protected Areas Expansion Strategy (NPAES) 2018 database, the study area is located within a **Priority Focus Area**;
- The Biosphere Reserves (2024) database indicates that the study area is within $\pm 6,6$ km from the transition area of the **Magaliesberg Biosphere (MB) Reserve** and ± 9 km from the **Buffer Zone**; and
- According to the Important Bird and Biodiversity Areas (IBA) 2015 database, the study area is located within $\pm 6,6$ km of the **Magaliesberg IBA**.

FLORAL ASSESSMENT RESULTS

The vegetation in the study area is modified due to a variety of direct and indirect pressures, both past and present. However, in areas where no major disturbance (which have significantly impacted the top soil) have occurred in the last 10 years ago; the majority of the study area, the current vegetation communities (where not built-up) meet the criteria for **indigenous vegetation**¹ as per the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).

The refined floral communities encountered during the site assessment are described in this report under four (4) broad habitat units. The four broad habitat units were delineated based on vegetation structure and the dominant plant groups observed within the vegetation communities, as well as on habitat integrity and the ecological processes the habitats provide or support. The delineated habitat units included:

1. Secondary Grasslands;

¹ Vegetation that occurs naturally within a defined area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.



2. **Alien Dominated Woodland;**
3. **Transformed Habitat; and**
4. **Freshwater Ecosystems:**
 - Anthropogenic dam; and
 - Eastern Valley Bottom Wetland.

Given the altered ecological drivers and the existing impacts within and surrounding the study area the vegetation of the study area, has shifted from its reference state (Egoli Granite Grassland) and no longer displays indicators of healthy mesic grasslands. Since the remaining grassland habitat is considered to have a low- moderate species diversity of which many species are weeds and very little diversity persist in the graminoid and flowering plants. The grassland is currently present as a low growing tussocked veld with a high bare ground cover. These are all signs of poor land management and sign of an unhealthy mesic grassland. The woodland and wetland vegetation has little to no communalities with the reference vegetation type (i.e., structure and species composition).

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

Two species protected under the Transvaal Nature Conservation Ordinance, 1983 (Ordinance No. 12 of 1983) (TNCO) were recorded during the site assessment, namely *Crinum graminicola* and *Scadoxus puniceus*. However, these species are unlikely to consist of large populations. Nevertheless, additional species from TNCO can possibly occur within the study area, since the TNCO include large groups of floral taxa including; *Gladiolus* spp, *Eucomis* spp and Orchidaceae spp.

FAUNAL ASSESSMENT RESULTS

From a faunal perspective, the habitat was divided into four units:

- **Alien Dominated Woodland** – This habitat reflects past and ongoing disturbance, with alien woody species encroaching into former grassland. Although degraded, it can support a variety of common faunal species that use woody vegetation for nesting and foraging. Furthermore, the rocky outcrop in this habitat provides microhabitats that can support invertebrates, reptiles, and small mammals adapted to rocky substrates. Some faunal species of conservation concern (SCC) that are more adapted to degraded and disturbed landscapes may utilise this habitat for foraging and nesting purposes. However, they are unlikely to rely on this habitat for their survival. Several protected invertebrate and reptile species on the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) Threatened or Protected Species (TOPS) list are also highly likely to occur within the rocky outcrop in this habitat;
- **Secondary Grassland** -This habitat unit consists of a short, homogenous grass layer with some AIP proliferation due to previous impacts by development and agriculture. As a result, faunal diversity and abundance are limited. Nevertheless, the homogenous grass layer and flowers from AIPs still provide a food resource for invertebrates, which in turn support small mammals and reptiles. Additionally, remnants of old structures and rock piles from dumping offer refuge and basking sites for small reptiles and rodents. Faunal SCC that are able to exploit more degraded habitats may forage within. However this habitat is unsuitable for faunal SCC more reliant on dense, tall grass for nesting and roosting;
- **Freshwater Habitat** - This habitat unit provides open water sources and elevated moisture levels that attract a diversity and abundance of fauna such as amphibians, aquatic invertebrates, and water-dependent birds. Many of which include SCC. It also offers ample foraging, roosting, and nesting opportunities. Only a small section of this habitat falls within the proposed development footprint. However, the entire habitat remains relevant due to its immediate proximity to the proposed development and the need to consider potential edge effect impacts on this habitat and its associated fauna is of utmost importance; and
- **Transformed Habitat** - These are areas that have been modified or disturbed by anthropogenic activities, including current and historic infrastructure and roads, and no longer resemble grassland. This habitat does not offer any unique habitat for fauna or areas of significant conservation value. Some faunal SCC may opportunistically forage within this habitat but it will not support any populations of faunal SCC and they are do not depend on this habitat for their survival. This habitat is not seen as important from an ecological point of view.



One faunal SCC, *Scopus umbretta* (Hamerkop, NT), was recorded within the Freshwater Habitat and is likely to use the adjacent Alien Dominated Woodland for foraging and roosting. Overall, eleven SCC have a high POC in the study area, twenty-one have a medium POC, and four TOPS species have a high POC across the Freshwater, Secondary Grassland, and Alien Dominated Woodland Habitats.

The Freshwater Habitat is the most important for SCC, supporting majority of them with a high POC. Some SCC are also likely to forage within the Secondary Grassland and Alien Dominated Woodland Habitat. However, due to the degraded nature of the Secondary Grassland and Alien Dominated Woodland, the SCC found in this habitat will be more tolerant of disturbance. Some SCC likely to forage within the Secondary Grassland habitat include *Elanus caeruleus* (Black-winged Kite, NT), *Atelerix frontalis* (Southern African Hedgehog, NT), *Falco biarmicus* (Lanner Falcon, VU), and *Falco vespertinus* (Red-footed Falcon, NT). In contrast, other grassland-dependent SCC, including *Tyto capensis* (African Grass Owl, VU), *Asio capensis* (Marsh Owl, NT), and *Eupodotis senegalensis* (White-bellied Korhaan, VU), are unlikely to nest or roost in the Secondary Grassland due to insufficient vegetation cover. They may forage opportunistically but are expected to favour more extensive, intact grasslands nearby.

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 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 habitats units.

Habitat Unit	Floral SEI	Faunal SEI
Alien Dominated Woodland	Low	Low
Rocky Areas	Low	Low
Secondary Grassland	Medium	Low
Freshwater Ecosystem: Eastern Unchanneled Valley Bottom Wetland	Medium	Medium
Anthropogenically Derived Dam	Very Low	Medium
Transformed Habitat	Very Low	Very Low

FLORAL IMPACT DISCUSSION AND REASONED OPINION:

The proposed development spans approximately 14.5 ha, of which 11.6 ha is natural habitat – Secondary Grassland (approx. 3.7 ha impacted), Freshwater Ecosystems (approx. 0.18 ha impacted), and Alien Dominated Woodland (approx. 7.6 ha impacted) – and 2.9 ha is modified habitat (i.e. Transformed Habitat). Of this 14.5 ha footprint to be impacted, no important floral communities will be lost. The proposed site location is also within an area where species diversity is moderate to moderately low, and where there was significant proportion is made up of Alien and Invasive Plant (AIP) species. As such, the resultant loss of habitat and floral species diversity is low, resulting in only localised loss of floral resources.

With adequate implementation of mitigation measures, the loss of floral habitat will be of medium-low to very low significance. These levels of habitat and species loss are acceptable and will not lead to any significant negative residual impacts on floral resources

The planned development will affect the ESA 1. The entire Area 1, the centre of Area 3 and the western extent of Area 2 coincide with ESA 1 habitat, since these areas are still considered natural and secondary in nature. Habitat loss and fragmentation, along with the associated movement and dispersal corridors, will only slightly disrupt ecological processes within the landscape. Connectivity between semi-natural and fully natural areas in the surrounding areas will remain largely intact, as the movement corridors in the northern and central parts of the study area will be minimally affected by the ESA fragmentation within the project footprint. With the proper implementation of mitigation measures, the significance of ESA habitat loss and fragmentation will be of medium-low significance, which is considered acceptable and will not cause any significant negative residual impacts on the ESA or its functions.



The proposed project activities are not expected to have a significant impact on important or sensitive floral resources. In terms of both the Plant Species Theme and Terrestrial Biodiversity Theme, the impact on flora is expected to be medium-low to very low. Consequently, the specialist believes that the project can be approved from a strictly botanical and terrestrial biodiversity standpoint.

FAUNAL IMPACT DISCUSSION AND REASONED OPINION:

The proposed layout of the project was not provided at the time of this assessment. For the impact assessment it is then assumed that the entire study area (all three assessment areas) is likely to be cleared for construction activities and that the small portion (0.26 ha) of Freshwater Habitat within the study area will not be avoided. Vegetation clearance and construction activities will lead to habitat loss for various common and widespread species, as well as potential faunal SCC. However, this loss is largely confined to already degraded habitats with very low and low SEI. As a result, post-mitigation impacts are expected to be of low to very low significance. Faunal species, including potential SCC, will be displaced into nearby, less disturbed habitats. For the more sensitive Freshwater Habitat, it is recommended that the layout be optimised to avoid or minimise development within the small portion of this habitat expected to be directly impacted by the proposed project. In the remaining adjacent Freshwater Habitat, the displacement of faunal species is likely to be temporary and they are likely to return once construction disturbance ceases if this habitat remains in its current ecological state. This can be achieved through the strict implementation of mitigation measures addressing edge effects, such as AIP proliferation, littering, and fauna persecution. As the common species and SCC that are found within the habitats affected by the proposed development are expected to persist in the surrounding landscape, impacts on SCCs are not anticipated to be significant and regional-scale effects on faunal ecology are unlikely. For slow-moving and fossorial faunal species, such as the protected arachnid species highly likely to be found within the rocky outcrop, relocation to suitable habitat outside of the direct development footprint decreases the impact on these species. No reason can be seen why the development should not be authorised provided that mitigation measures listed in this report are adhered to.

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.



TABLE OF CONTENTS

EXECUTIVE SUMMARY	ii
TABLE OF CONTENTS	vi
LIST OF FIGURES	vii
LIST OF TABLES	vii
DOCUMENT GUIDE	viii
GLOSSARY OF TERMS	xi
LIST OF ACRONYMS	xiii
1 INTRODUCTION	1
1.1 Structure of the Biodiversity Report	1
1.2 Scope of Work	2
1.3 Assumptions and Limitations	5
1.4 Legal Requirements	5
2 ASSESSMENT APPROACH	7
3 RESULTS OF THE DESKTOP ASSESSMENT	8
4 SITE SENSITIVITY VERIFICATION	21
5 REFERENCES	31
APPENDIX A: Indemnity and Terms of Use of this Report	33
APPENDIX B: Legal Requirements	34
APPENDIX C: Impact Assessment Methodology	38
APPENDIX D: Vegetation Type	44
APPENDIX E: Details, Expertise And Curriculum Vitae of Specialists	45



LIST OF FIGURES

Figure 1:	Digital satellite image depicting the study area in relation to the surrounding area.....	3
Figure 2:	The study area depicted on a topographical map in relation to the surrounding area.....	4
Figure 3:	Vegetation Types associated with the study area as per the National Vegetation Map (SANBI, 2024).....	12
Figure 4:	The study area in relation to the remaining extent of threatened ecosystems as per the RLE (SANBI, 2022a, 2022b) and the associated protection level (NBA, 2018).	13
Figure 5:	National Protected Areas that are within a 10 km radius of the study area as per SAPAD (2025, Q2).....	14
Figure 6:	National Conservation Areas that are within a 10 km radius of the study area as per SACAD (2025, Q1).....	15
Figure 7:	Priority Focus Areas (as per the NPAES 2018 database) that are associated with the study area.	16
Figure 8:	The MB Reserve in relation to the study area as per the Biosphere Reserve Zones (2024) dataset (Pool-Stanvliet and Coetzer 2020).....	17
Figure 9:	The Magaliesberg IBA in relation to the study area according to the IBA database (2015).....	18
Figure 10:	The important biodiversity areas (e.g., CBAs) in relation to the study area, according to the Gauteng C-Plan (2024).....	19
Figure 11:	Important Wetland features associated with the study area in terms of the Gauteng C-Plan (2024 dataset).	20
Figure 12:	Animal Species Theme sensitivity for the study area as obtained from the Screening Tool (accessed 2025).....	23
Figure 13:	Plant Species Theme sensitivity for the study area as obtained from the Screening Tool (accessed 2025).....	24
Figure 14:	Terrestrial Biodiversity Theme sensitivity for the study area as obtained from the Screening Tool (accessed 2025).....	25
Figure 15:	Example photographs of the Degraded Woodland Habitat including the rocky outcrops located within this habitat.	27
Figure 16:	Example photographs of the Secondary Grassland Habitat.	27
Figure 17:	Example photographs of the Freshwater Habitat.	27
Figure 18:	Example photographs of the Transformed Habitat.	28

LIST OF TABLES

Table 1:	Summary of the biodiversity characteristics associated with the study area [Quarter Degree Squares (QDS) 2528CC]. Abbreviations are provided at the bottom of the table.	9
Table 2:	Screening Tool outcomes for the study area.	21
Table 3:	Specialist comparison with the screening tool sensitivity rating and professional rating. The table further provides the specialist's recommendation for biodiversity reporting.	29



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>	Not part of the scope of this report.
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>	Not applicable. No forests associated with this project.
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

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.
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 also includes diversity within species, between species, and of ecosystems.
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.
CBA (SANBI, 2020)	An area that must be maintained in a good ecological condition (natural or semi-natural state) in order 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.
Corridor (van Wilgen et al., 2020)	A dispersal route or a physical connection of suitable habitats linking previously unconnected regions.
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.
Degradation (Skowno et al., 2019)	The many human-caused processes that drive the decline or loss in biodiversity, ecosystem functions or ecosystem services in any terrestrial and associated aquatic ecosystems.
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"
ESA (Skowno et al., 2019)	An ESA provides connectivity and important ecological processes between CBAs and is therefore important in terms of habitat conservation.
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.
Endemic species (SANBI, 2020)	A species that is naturally restricted to a particular, well-defined region, i.e., species that are only found within a pre-defined area. There can therefore be sub-continental (e.g., southern Africa), national (South Africa), provincial, regional, or even within a particular mountain range.
Ground-Truth	To check the accuracy of (remotely sensed data) by means of in-situ observations.
Habitat (NEMBA)	A place where a species or ecological community naturally occurs.
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.
Listed alien species	All alien species that are regulated in South Africa under the NEMBA, Alien and Invasive Species Regulations, 2020.
Least Threatened	Least threatened ecosystems are still largely intact.
Quarter Degree Square (QDS) (SANBI, 2020)	A way of dividing the longitude latitude degree square cells into smaller squares of 15' × 15' (roughly 24 × 27 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 protected species of relevance to the project.
Terrestrial Species (SANBI, 2020)	For the purposes of the species environmental guidelines (SANBI, 2020), terrestrial species are considered to represent species that are not exclusively marine and occur on land (at least for a portion of their life cycle). This includes amphibians (frogs and toads) but excludes other freshwater aquatic species which are considered to be aquatic (e.g., fish, diatoms and aquatic macroinvertebrates). This definition is not an accurate biological definition but rather applied in this manner to align with the Protocol on Terrestrial Biodiversity.
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 Biodiversity Act allows the Minister of Environmental Affairs or a provincial Member of the Executive Council (MEC) 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.
Threatened species	A species that has been classified as CR, EN or VU, based on a conservation assessment (Red List), using a standard set of criteria developed by the IUCN for determining the likelihood of a species becoming extinct. A threatened species faces a high risk of extinction in the near future.
VU (Red List category)	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 Vulnerable 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
CARA	Conservation of Agricultural Resource Act
CBA	Critical Biodiversity Area
C-Plan	Conservation Plan
CR	Critically Endangered
DEM	Digital Elevation Model
DFFE	Department of Forestry, Fisheries, and the Environment
E-GIS	Environmental Geographical Information Systems
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EN	Endangered
EPL	Ecosystem Protection Level
ESA	Ecological Support Area
EW	Extinct in the Wild
FEPA	Freshwater Ecosystem Priority Areas
GDARD	Gauteng Department of Agriculture and Rural Development
GIS	Geographic Information System
GN	Government Notice
Ha	Hectares
IBA	Important Bird Area
IUCN	International Union for the Conservation of Nature
km	Kilometres
km²	Square Kilometres
m	Metres
mm	Millilitres
MAP	Mean Annual Precipitation
MAPE	Mean Annual Potential for Evaporation
MASMS	Mean Annual Soil Moisture Stress
MAT	Mean Annual Temperature
MB	Magaliesberg Biosphere
MEC	Member of Executive Council
MFD	Mean Frost Days
MPRDA	Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
NBA	National Biodiversity Assessment
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act (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)
NPAES	National Protected Areas Expansion Strategy
NT	Near threatened
QDS	Quarter Degree Square (1:50,000 topographical mapping references)
RDL	Red Data List
RLE	Red List of Ecosystems
SABAP 2	Southern African Bird Atlas 2
SACAD	South Africa Conservation Areas Database
SACNASP	South African Council for Natural Scientific Professions



SANBI	South African National Biodiversity Institute
SAPAD	South Africa Protected Area Database
SCC	Species of Conservation Concern
STS	Scientific Terrestrial Services (Pty) Ltd
SWSA	Strategic Water Source Area
TOPS	Threatened Or Protected Species
TNCO	Transvaal Nature Conservation Ordinance, 1983 [Ordinance No. 12 of 1983]
UNESCO	United Nations Educational, Scientific and Cultural Organisation
VEGMAP	National Vegetation Map Project
VU	Vulnerable
WSAs	Water Source Areas



1 INTRODUCTION

Scientific Terrestrial Services (Pty) Ltd. (hereafter “STS”) was appointed to conduct a terrestrial biodiversity assessment as part of the Environmental Authorisation (EA) application process for the proposed development of the Riverside View Ext 126 near Kyalami within the Gauteng Province (Figure 1 and Figure 2).

The proposed development comprises three areas (Area 1, Area 2, Area 3) which are hereafter collectively referred to as the “study area”. Area 1 is approximately 2,32 hectares (ha) in size and is located 580 metres (m) east of the R511 roadway, 170 m north of Reddam House Helderfontein, while Area 2 is approximately 7,32 ha and is located 1,5 kilometres (km) north west of the M71 road and 1,1 km east of the R511 roadway. Area 3 is approximately 4,83 ha in size and is located 1,36 km east of the R511 roadway and 1,6 km north west of the M71 road. The surrounding landscape consists of a peri-urban area such as residential developments.

Site-specific field surveys are scheduled for the upcoming summer season to verify current ecological conditions and inform the finalisation of the impact assessment.

1.1 Structure of the Biodiversity Report

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

Part B (to follow after the summer field verification) presents the results of the floral field assessment, data analyses and discussion of the results. Part B then presents the results of the impact assessment, where the impacts on floral ecology and biodiversity are discussed.

Part C (to follow after the summer field verification) presents the results of the faunal field assessment, data analyses and discussion of the results. Part C then presents the results of the impact assessment, where the impacts on faunal ecology and biodiversity are discussed.



1.2 Scope of Work

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

- To complete 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 Geographical Information Systems (E-GIS) website (<https://egis.environment.gov.za/>). The desktop assessment aims to provide background information on the physical habitat and potential floral and faunal ecology associated with the study area;
- To state the indemnity and terms of use of this report (Appendix A) as well as to provide the details of the specialists who prepared the reports (Appendix E);
- To outline the legal requirements that were considered for the assessment (Appendix B); and
- To provide the methodologies followed relating to the impact assessment and development of the mitigation measures (Appendix C) that will be applied in the floral and faunal assessments (Part B and Part C).



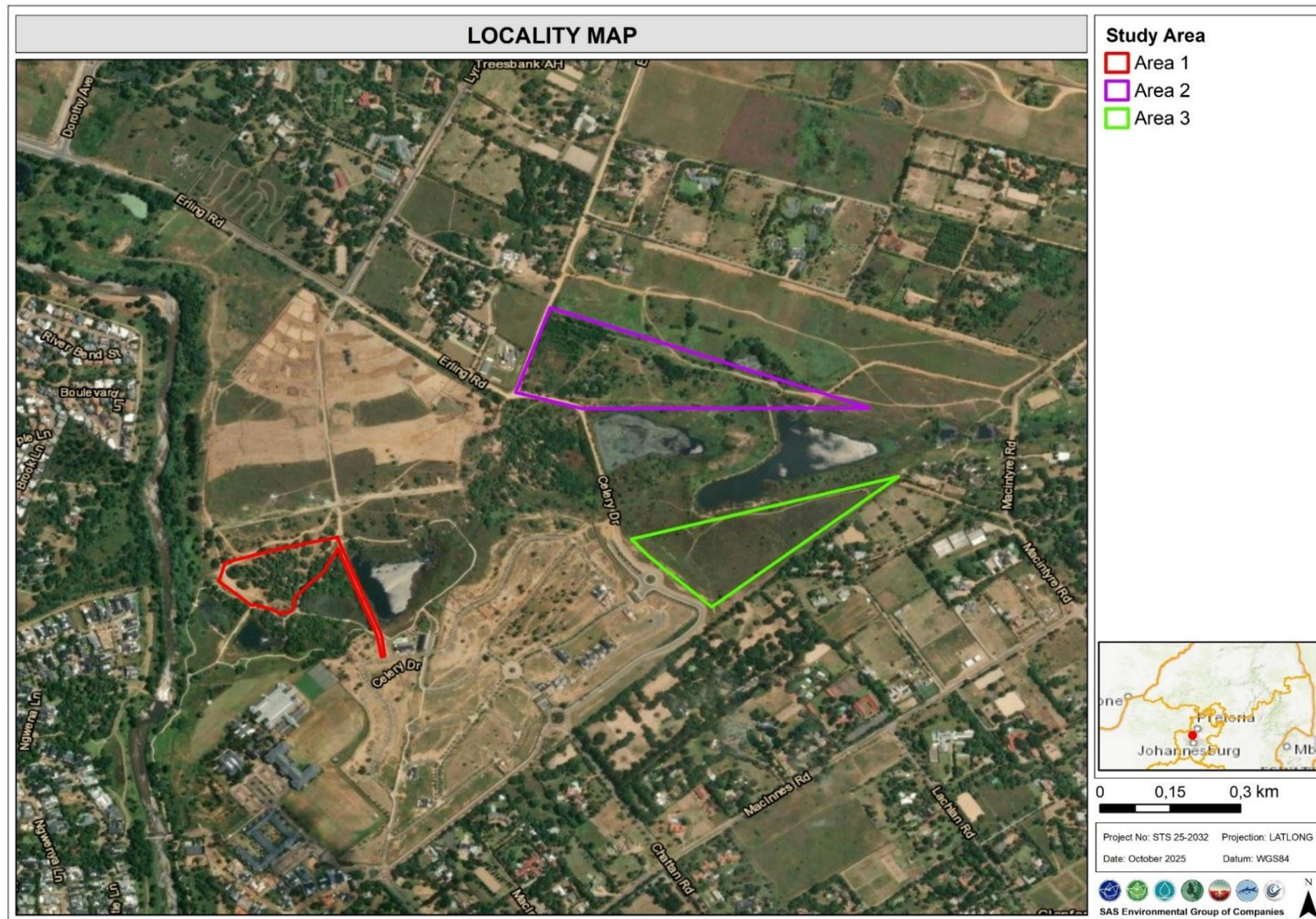


Figure 1. Digital satellite image depicting the study area in relation to the surrounding area.



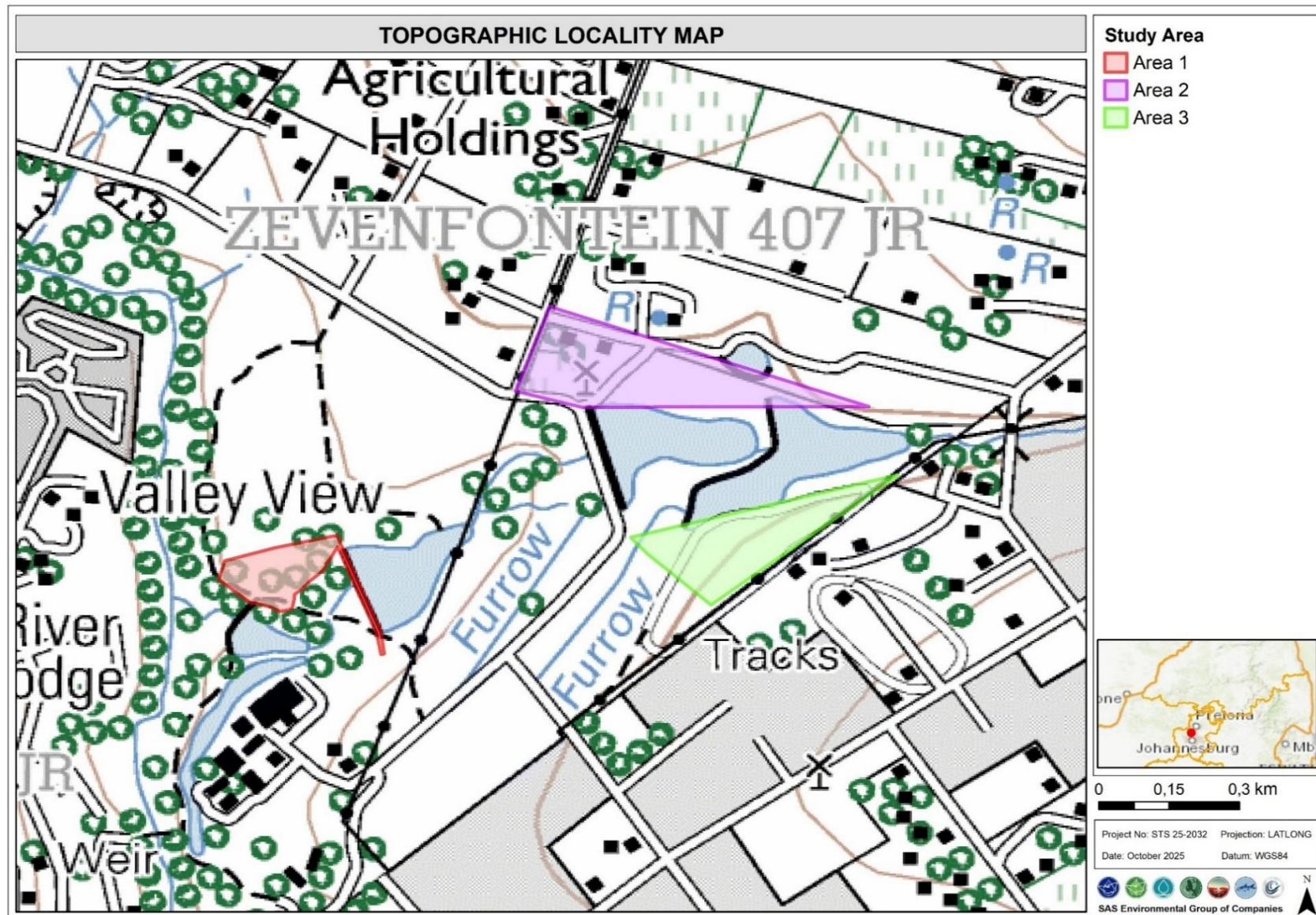


Figure 2. The study area depicted on a topographical map in relation to the surrounding area.



1.3 Assumptions and Limitations

The following assumptions and limitations apply to this report:

- 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 surrounding areas have been included on the relevant maps;
- The DFFE Screening Tool (hereafter “Screening Tool”) provides names of Sensitive Species likely to be present within the study area and its surrounds. Within the Screening Tool outcome, the names of some species are not provided. These species are rather assigned a number, keeping them unidentifiable (e.g., Sensitive Species 1). This procedure is followed because of the vulnerability of the species 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; and
- It is important to note that although all data sources used 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 EA. Nevertheless, this information is useful as background for the study and is important in the legislative contextualisation of risk and impact. It was used as a guideline to inform the biodiversity assessment (see also 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.

1.4 Legal Requirements

The following legal requirements were considered during the assessment:

- The Constitution of the Republic of South Africa, 1996²;
- The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA);
- The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA);

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.



- The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA);
 - Government Notice (GN) number 2747: The Revised National List of Ecosystems that are Threatened and in need of Protection, published in Gazette No. 47526, 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 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; and
 - 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, 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); and
- 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 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 following documentation was also considered:

- Gauteng Department of Agriculture and Rural Development (GDARD) Requirements for Biodiversity Assessments Version 3 (GDARD, 2014).

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



2 ASSESSMENT APPROACH

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

- 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 Gauteng Conservation Plan (C-Plan V4.0) (Desmet, 2024; GDARD, 2024);
- 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 the terrestrial realm for South Africa (SANBI 2022a and 2022b). This database replaces the 2018 National Biodiversity Assessment (NBA) (SANBI, 2018a & 2018b) Terrestrial Assessment, which forms one of the base databases that the RLE database is generated upon;
- The Important Bird and Biodiversity Areas (IBA) Programme and vector dataset (BirdLife South Africa, 2015; Marnewick et al., 2015a and 2015b), in conjunction with the South African Bird Atlas Project 2 (SABAP 2);
- The Biosphere Reserves Dataset (Pool-Stanvliet and Coetzer, 2020);
- From the 2021 Strategic Water Source Areas (SWSA) project:
 - 2021 SWSA **Surface water** (Lötter & Le Maitre (2021) and Mpumalanga Tourism and Parks Agency (MTPA: 2021)).
- The International Union for Conservation of Nature (IUCN) list of threatened species (IUCN, 2022a and 2022b); and
- The Screening Tool (accessed 2025).

A field assessment will be undertaken in the summer season following the first rains. The field assessment will aim to determine if any changes have taken place pertaining to the ecological status of the study area and to “ground-truth” the results of the desktop databases.

³ Datasets obtained from:

- SANBI BGIS (2023). The South African National Biodiversity Institute - Biodiversity GIS (BGIS) [online]. URL: <http://bgis.sanbi.org> as retrieved in 2023; and
- Department of Environmental Affairs (DEA) Environmental Geographical Information Systems (E-GIS) website. URL: <https://egis.environment.gov.za/>



3 RESULTS OF THE DESKTOP ASSESSMENT

The following section contains data accessed as part of the desktop assessment and are presented as a “dashboard” report below (Tables 1 and 2). The dashboard report aims to present concise summaries of the data on as few pages as possible, allowing for improved assimilation of results by the reader. Where required, further discussion and interpretation are provided.



Table 1: Summary of the biodiversity characteristics associated with the study area [Quarter Degree Squares (QDS) 2528CC]. Abbreviations 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	The study area is situated within the Grassland Biome .				
Bioregion	The study area is located within the Mesic Highveld Grassland Bioregion .				
Vegetation Type (Figure 3).	The study area is situated within the Critically Endangered (CR) Egoli Granite Grassland (Gm10) vegetation type.				
DESCRIPTION OF EGOLI GRANITE GRASSLAND VEGETATION TYPE RELEVANT TO THE STUDY AREA (MUCINA & 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 (refer also to Appendix D)	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.				
CONSERVATION DETAILS PERTAINING TO THE STUDY AREA (VARIOUS DATABASES)					
2022 RLE	According to the 2022 RLE (SANBI 2022a, 2022b), the south western portion of the study area is located within the remaining extent of the Egoli Granite Grassland threatened ecosystem (Figure 4). 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 Dayaram 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, Notice Number 2747) and came into effect on 18 November 2022.				



2018 NBA	The NBA lists the Egoli Granite Grassland as Poorly Protected. Refer to Figure 4. DEFINITION: Ecosystem Protection Level (EPL) 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 ecosystem type that occurs within a protected area recognised in the NEMPAA.
NATIONAL PROTECTED AND CONSERVATION AREAS ASSOCIATED WITH THE STUDY AREA	
The NPAES (2018)⁴, SACAD⁵ (2025, Q2), SAPAD⁶ (2025, Q2), IBA (2015), Biosphere Reserves (2024)⁷, and the SWSAs (2021) databases were checked to determine if any protected and/or conservation areas are located within 10 km of the study area.	
SAPAD (2025, Q2); SACAD (2025, Q2); NPAES (2018)	The SAPAD (2025, Q2) database indicates that the study area is located within $\pm 2,8$ km of the Beaulieu Bird Sanctuary, $\pm 3,1$ km of the Diepsloot Nature Reserve, and $\pm 9,2$ km from the Crocodile River Reserve Doornrandje Nature Reserve Cluster, Crocodile River Reserve Protected Environment and Crocodile River Reserve Central Nature Reserve Cluster Protected Areas. Refer to Figure 5. According to the SACAD (2025, Q2) database, there are no conservation areas within the study area boundary however, the study area is located $\pm 6,6$ km from the Magaliesberg Biosphere Reserve (see below) Conservation Areas. Refer to Figure 6. According to the NPAES 2018 database, the study area is located within a Priority Focus Area, especially Assessment Area 1 and 2. Refer to Figure 7.
Biosphere Reserves (2024)⁷ (Pool-Stanvliet and Coetzer 2020)	The study area is indicated to be within a $\pm 6,6$ km from the transition area of the Magaliesberg Biosphere (MB) Reserve and ± 9 km from the Buffer Zone. Refer to Figure 8. The reserve was designated in June 2015 and is 357 437 ha. The MB straddles Gauteng and North West Provinces. The rocks of the Magaliesberg bear the ripples of tides which lapped the shore more than 2 000 million years ago. The MB includes the Cradle of Humankind World Heritage Site

⁴ **Protected areas (NPAES; 2018):** are areas of land or sea that are **formally** protected by law and managed mainly for biodiversity conservation. Protected areas recognised in the NEMPAA are considered **formal protected areas** in the NPAES. It is important to differentiate protected areas from conservation areas. Conservation areas are areas of land not formally protected by law but informally protected by the current owners and users and managed at least partly for biodiversity conservation. Because there is no long-term security associated with conservation areas, they are not considered a strong form of protection. Conservation areas are not a major focus of the NPAES.

⁵ **SACAD (2025):** The types of conservation areas that are currently included in the database are the following: 1. Biosphere reserves, 2. Ramsar sites, 3. Stewardship agreements (other than nature reserves and protected environments), 4. Botanical gardens, 5. Transfrontier conservation areas, 6. Transfrontier parks, 7. Military conservation areas and 8. Conservancies.

⁶ **SAPAD (2025):** The definition of protected areas follows the definition of a protected area as defined in the NEMPAA. Chapter 2 of the NEMPAA 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 NEMPAA; 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 NFA; and 8. Mountain catchment areas declared in terms of the Mountain Catchment Areas Act, 1970 (Act No. 63 of 1970).

⁷ **Biosphere Reserves (2024):** South Africa has 10 designated United Nations Educational, Scientific and Cultural Organisation (UNESCO) Biosphere Reserves, which are areas recognised for promoting sustainable development and biodiversity conservation. These reserves are located across the country, with some overlapping with national parks and other protected areas. Biosphere reserves are 'learning places for sustainable development'. They are sites for testing interdisciplinary approaches to understanding and managing changes and interactions between social and ecological systems, including conflict prevention and management of biodiversity.



	(inscribed by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) in 1999) and the Magaliesberg Protected Environment as part of its core zone. It lies at the interface of two great African biomes – the central grassland plateaux and the sub-Saharan savannah – with remnants of a third, Afromontane Forest. The landscape accommodates species from each of these biomes, and the result is an exceptionally diverse fauna and flora that has drawn naturalists and explorers to the region for the past two centuries.
IBA (2015)	The study area is located within $\pm 6,6$ km of the Magaliesberg IBA . Refer to Figure 9.
DETAILS OF THE STUDY AREA IN TERMS OF THE GAUTENG C- PLAN (V4 2024)	
Critical Biodiversity Areas (CBA) (Figure 10)	Most of the study area, especially the entire Assessment Area 1 and 2, is located within an area considered to be of Irreplaceable critical biodiversity importance, most notably a CBA 1: Irreplaceable Site. The triggering features of the CBA 1 include the presence of wetland life zones, habitat patch vegetation, as well as natural and secondary natural vegetation. CBA1: Irreplaceable Sites are mandatory sites required to meet conservation targets where there are no other options to meet these targets (i.e., the remaining extent of the biodiversity feature is at or less than the conservation target). Typically, CBA 1 sites include CR and EN Ecosystems and known populations of threatened species.
Wetland and River Buffers (Figure 11)	According to the Gauteng C-Plan, the study area is associated with river and wetland buffers, in particular pan wetlands of good quality.
River Dataset (2021) (Figure 11)	According to the Gauteng Rivers Dataset, one perennial and non-perennial river is traversing the study area.
Ridges	According to the Gauteng Ridges Dataset, the study area is not associated with any ridges. DEFINITION: For the purposes of this document (The Ridges Guideline, 2019 update), a ridge includes hills, koppies, mountains, kloofs and gorges and/or a landscape type or topographic feature that is characterised by two or more of the following features - a crest, plateau, cliff or footslope. In addition, ridges are characterised by slopes of 5° or more (that is equivalent to slopes of > 8.8% or > 1: 11 gradient) when modelled in a GIS digital elevation model (DEM) that is based on 20 m contour intervals at a scale of 1:50 000.
SWSA FOR SURFACE WATER (Lötter and Le Maitre, 2021; MTPA, 2021)	
Surface water SWSAs are defined as areas of land that supply a disproportionate (i.e., relatively large) quantity of mean annual surface water runoff in relation to their size. They include transboundary areas that extend into Lesotho and Swaziland. The sub-national Water Source Areas (WSAs) are not nationally strategic as defined in the report but were included to provide a complete coverage.	
Name & Criteria	The study area is not within 10 km of a surface water SWSA.

CBA = Critical Biodiversity Areas; ESA = Ecological Support Areas; Conservation Plan (C-Plan); IBA = Important Bird Area; MAP = Mean annual precipitation; MAPE = Mean annual potential evaporation; MASMS = Mean annual soil moisture stress (% of days when evaporative demand was more than double the soil moisture supply); MAT = Mean annual temperature; MFD = Mean Frost Days; NBA = National Biodiversity Assessment; NPAES = National Protected Areas Expansion Strategy; Red List of Ecosystems (RLE); SACAD = South African Conservation Areas Database; SAPAD = South African Protected Areas Database; Strategic Water Source Areas (SWSA); Vegetation Map Project (VEGMAP); WSA = Water Source Areas;



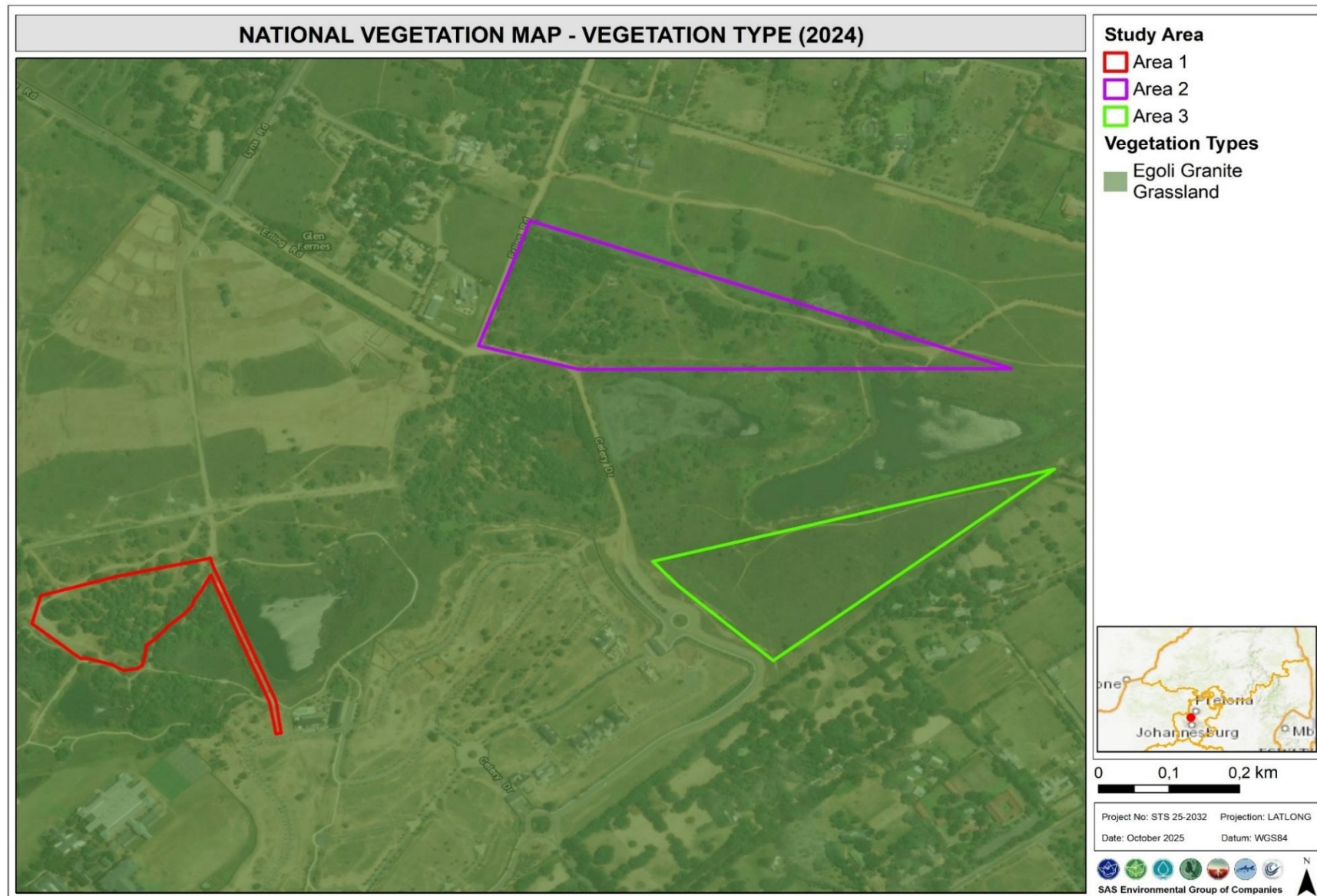


Figure 3: Vegetation Types associated with the study area as per the National Vegetation Map (SANBI, 2024).



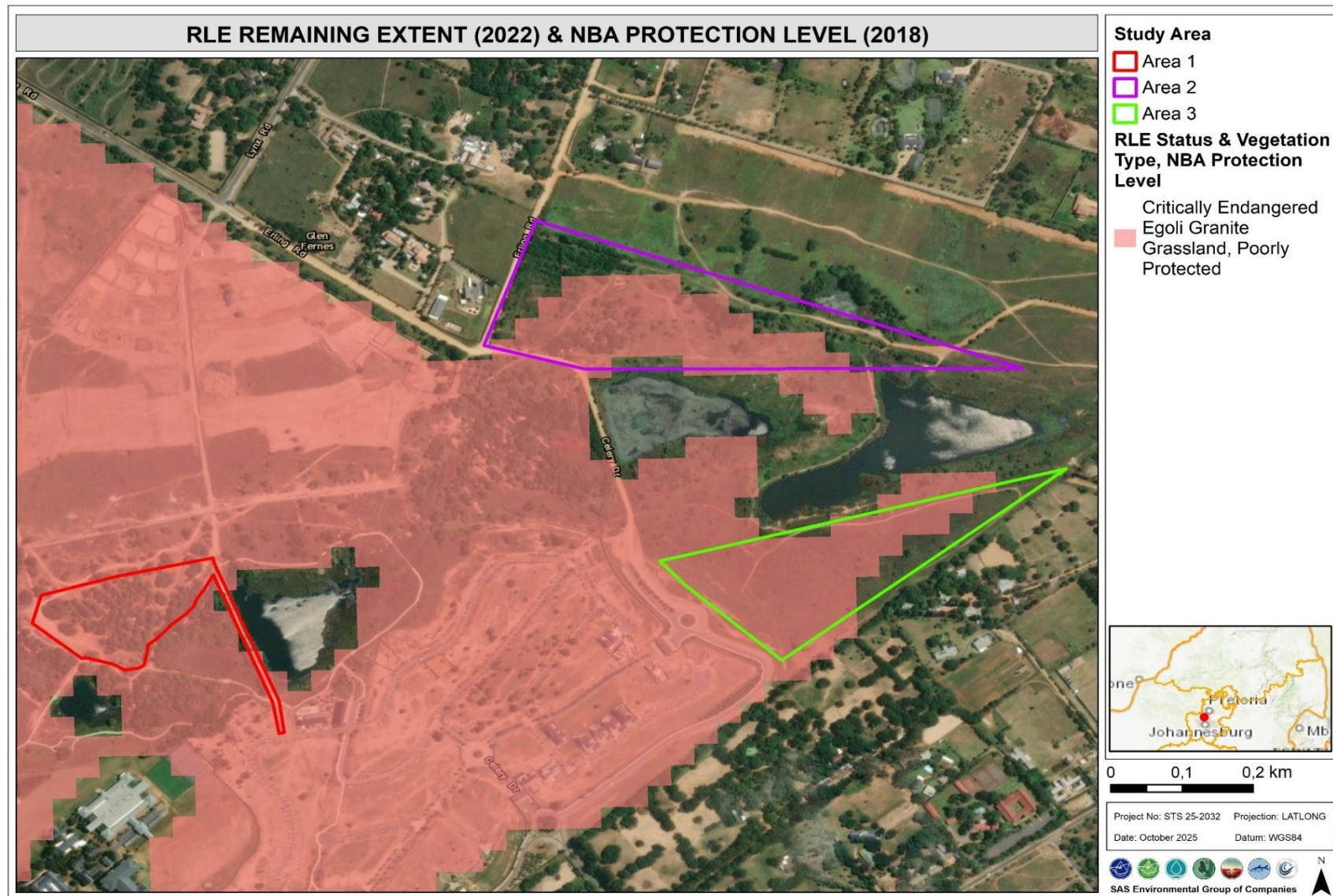


Figure 4: The study area in relation to the remaining extent of threatened ecosystems as per the RLE (SANBI, 2022a, 2022b) and the associated protection level (NBA, 2018).



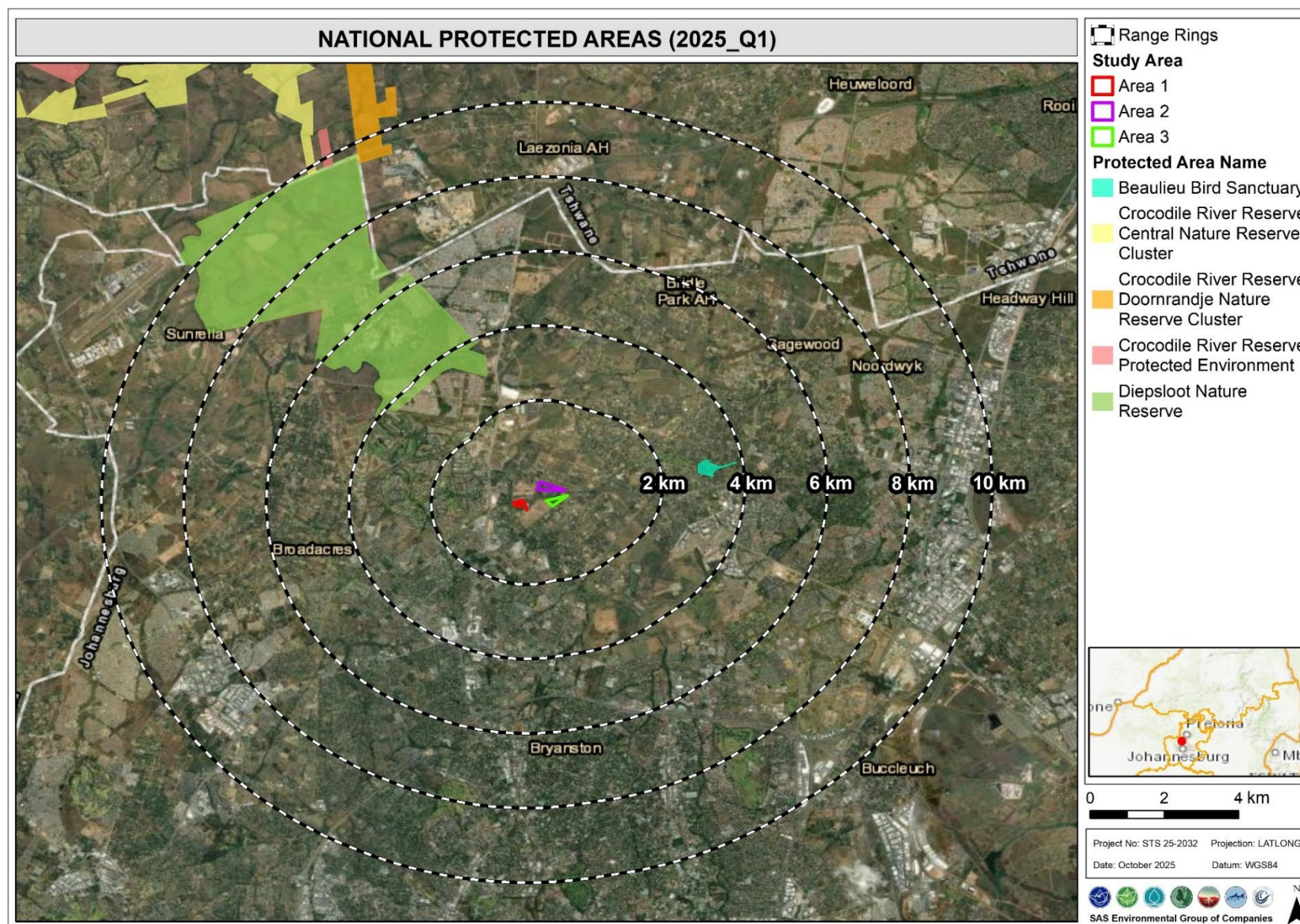


Figure 5: National Protected Areas that are within a 10 km radius of the study area as per SAPAD (2025, Q2).



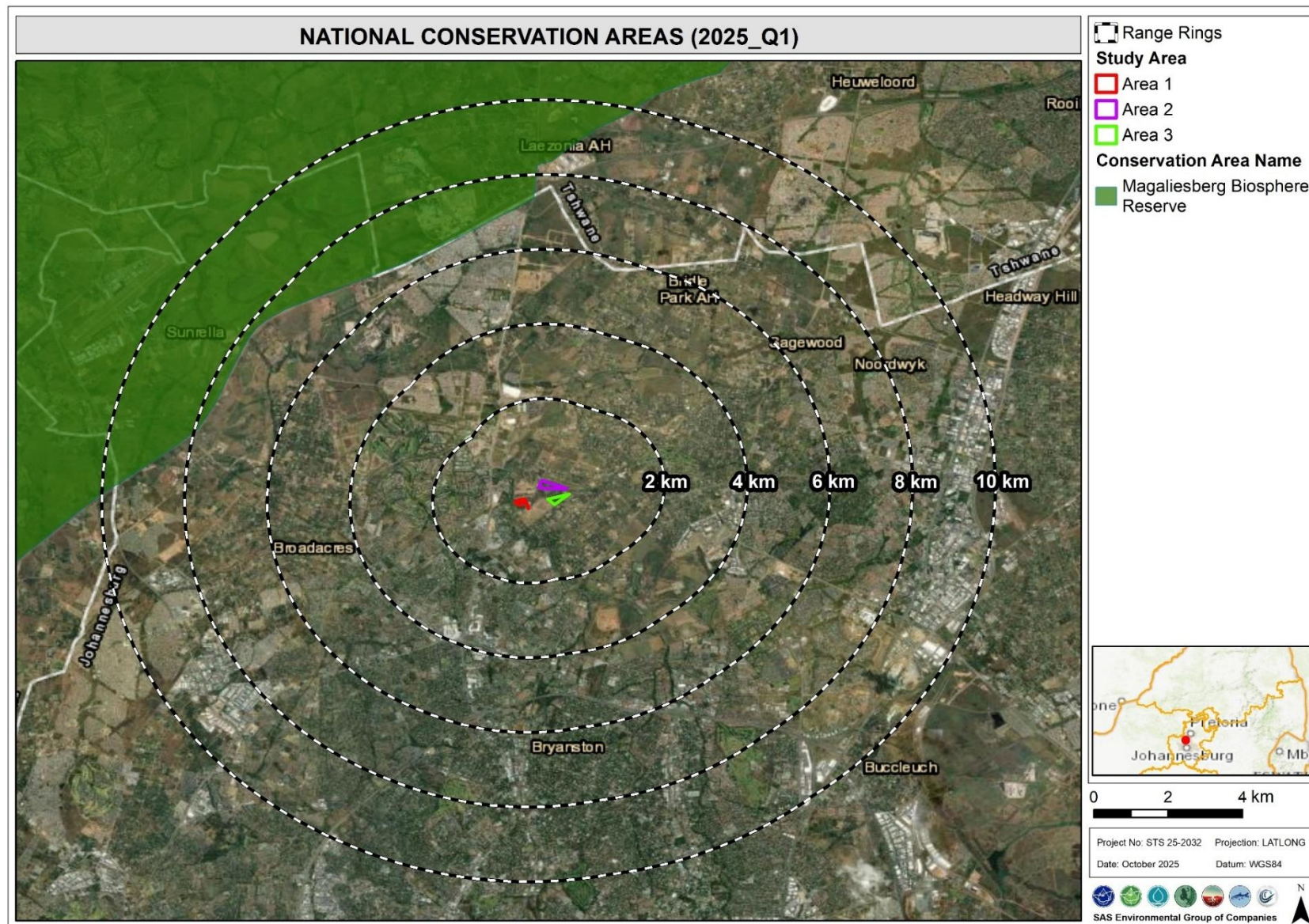


Figure 6: National Conservation Areas that are within a 10 km radius of the study area as per SACAD (2025, Q1).



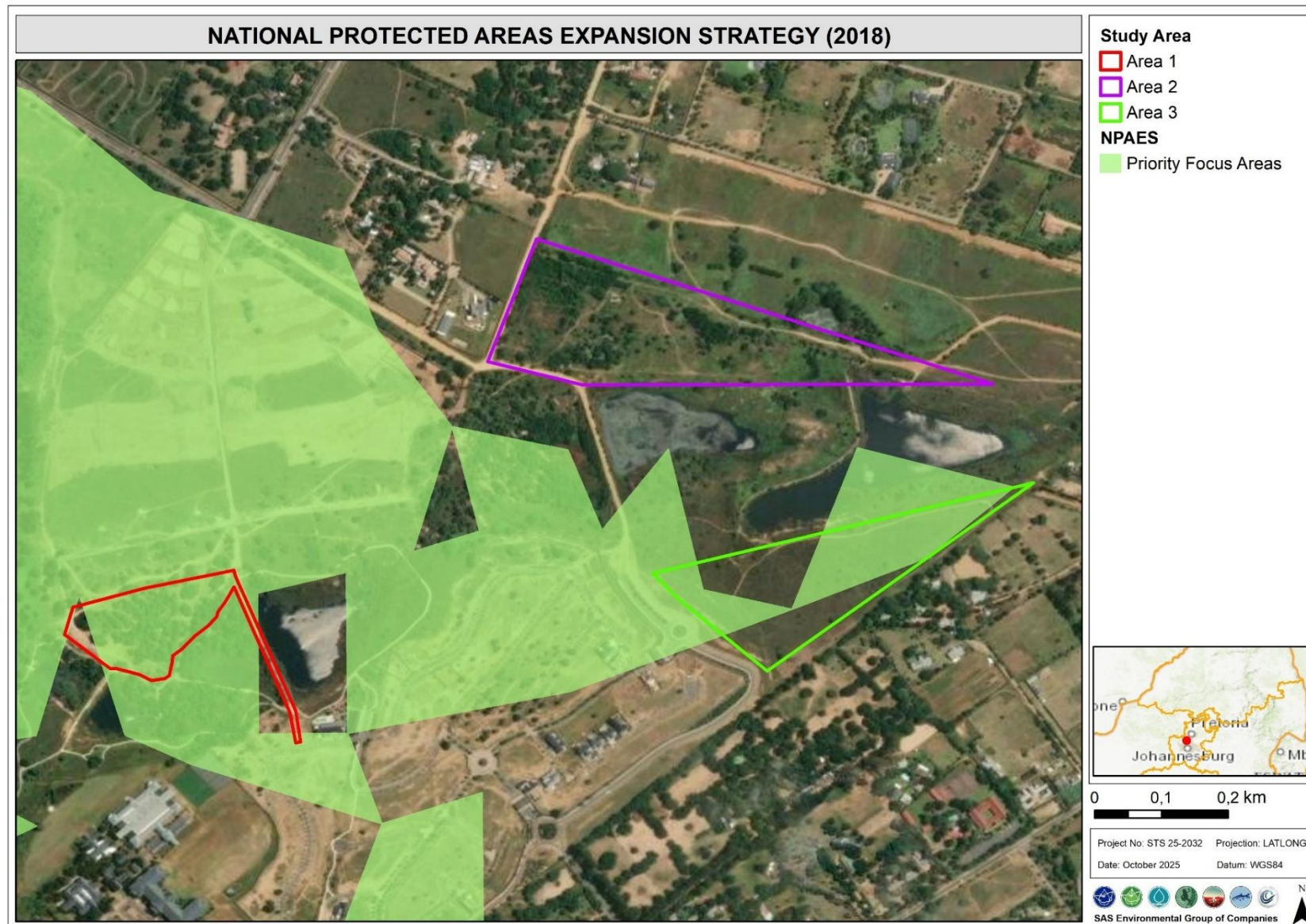


Figure 7: Priority Focus Areas (as per the NPAES 2018 database) that are associated with the study area.



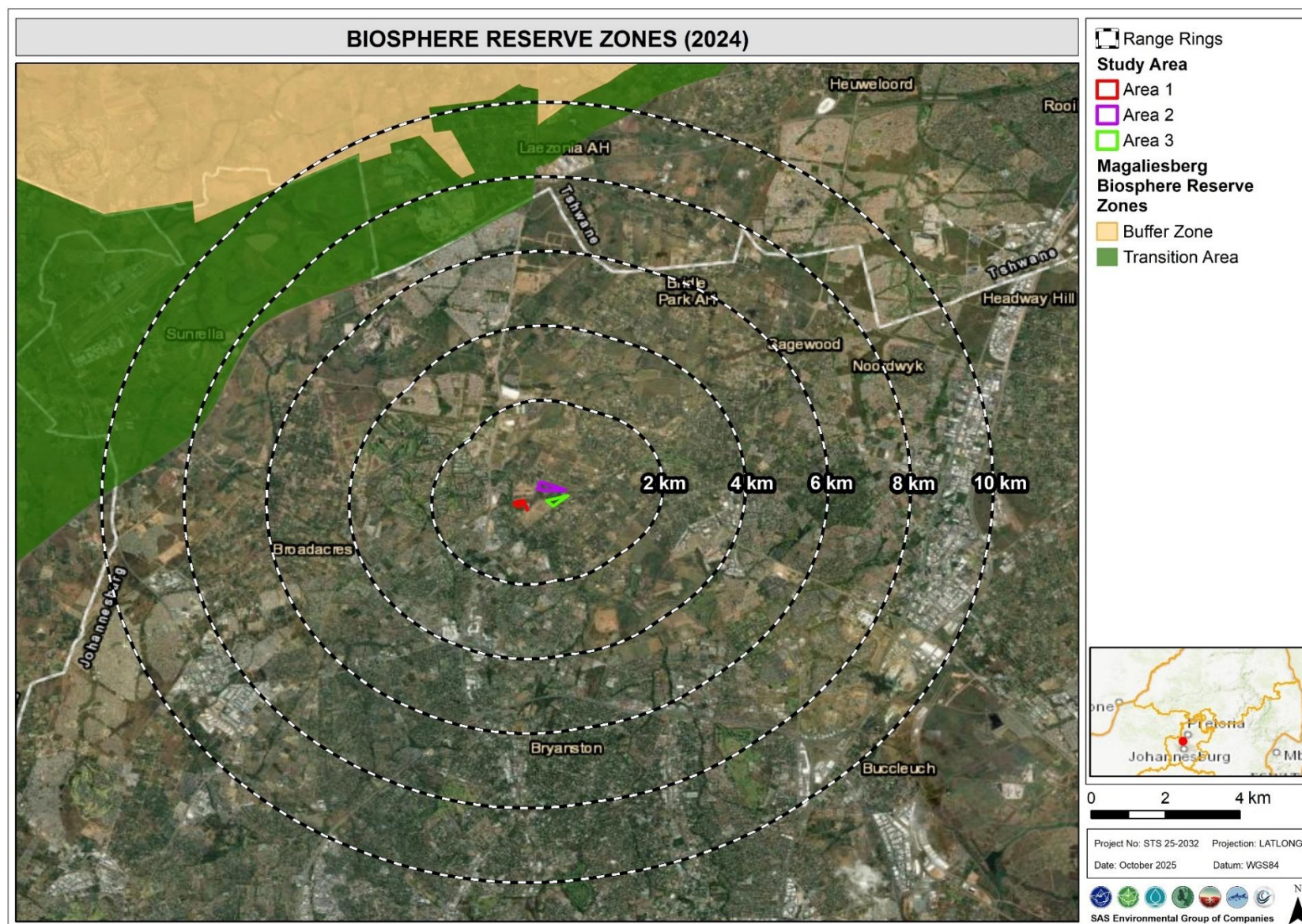


Figure 8: The MB Reserve in relation to the study area as per the Biosphere Reserve Zones (2024) dataset (Pool-Stanvliet and Coetzer 2020).



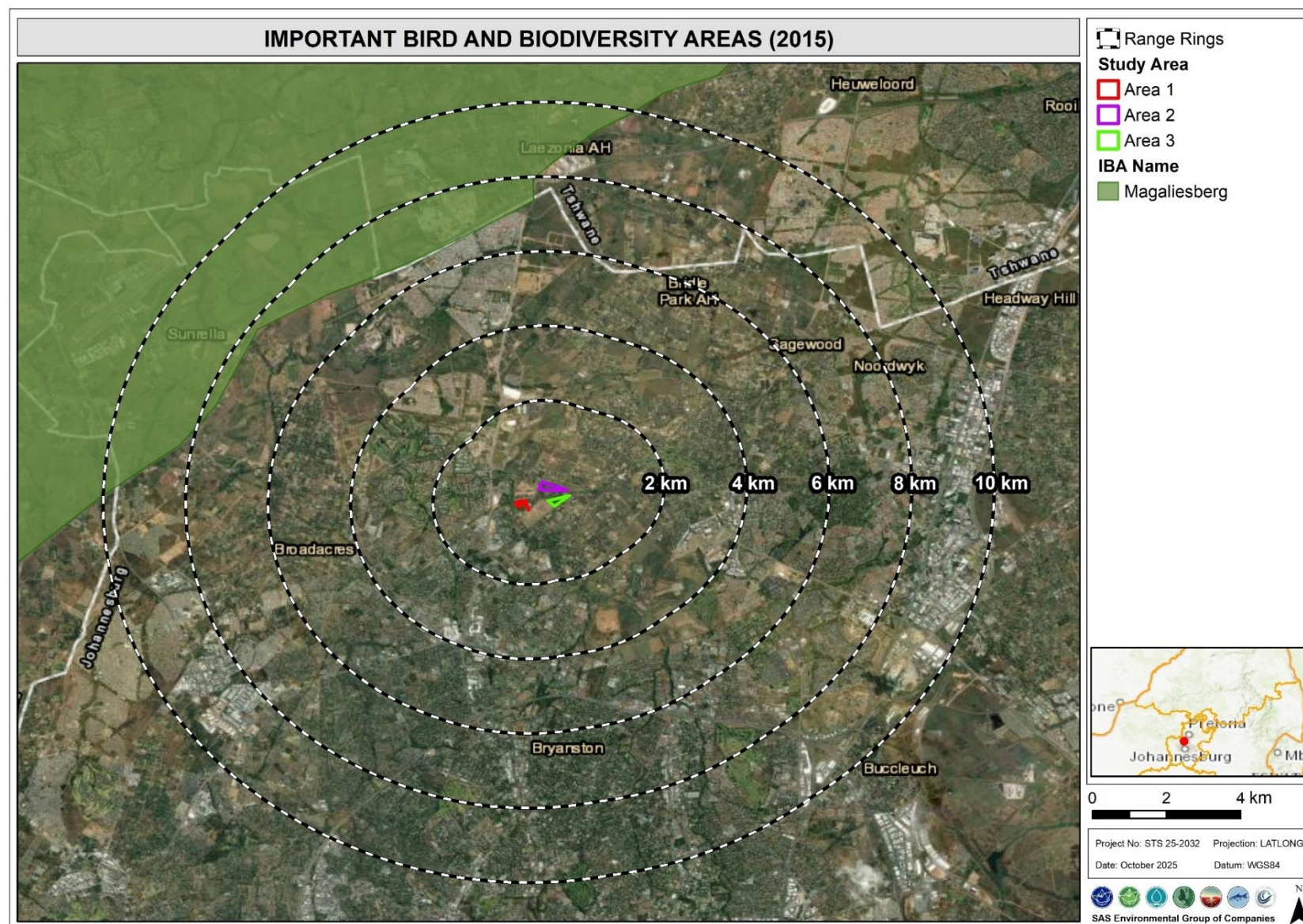


Figure 9: The Magaliesberg IBA in relation to the study area according to the IBA database (2015).



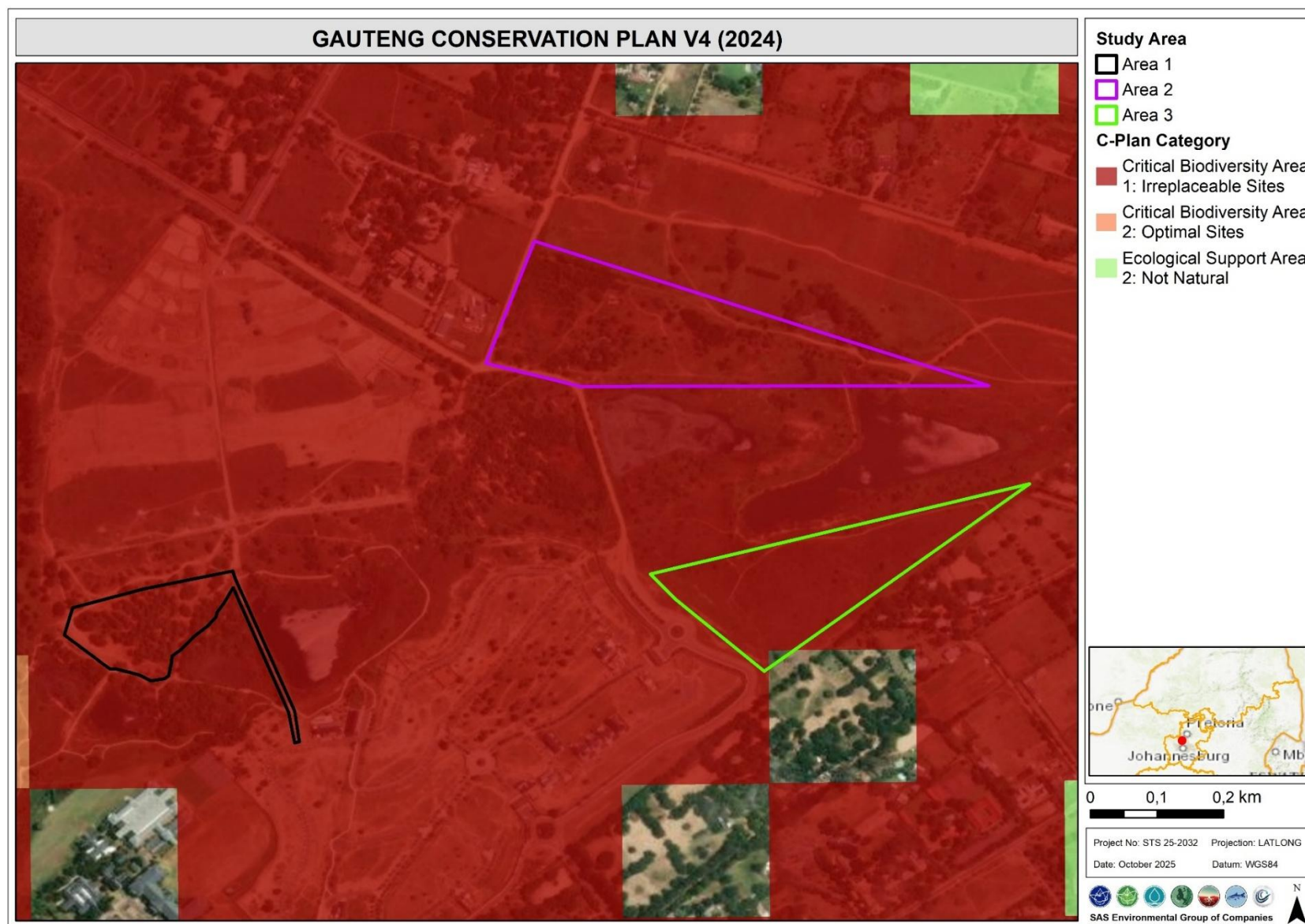


Figure 10: The important biodiversity areas (e.g., CBAs) in relation to the study area, according to the Gauteng C-Plan (2024).



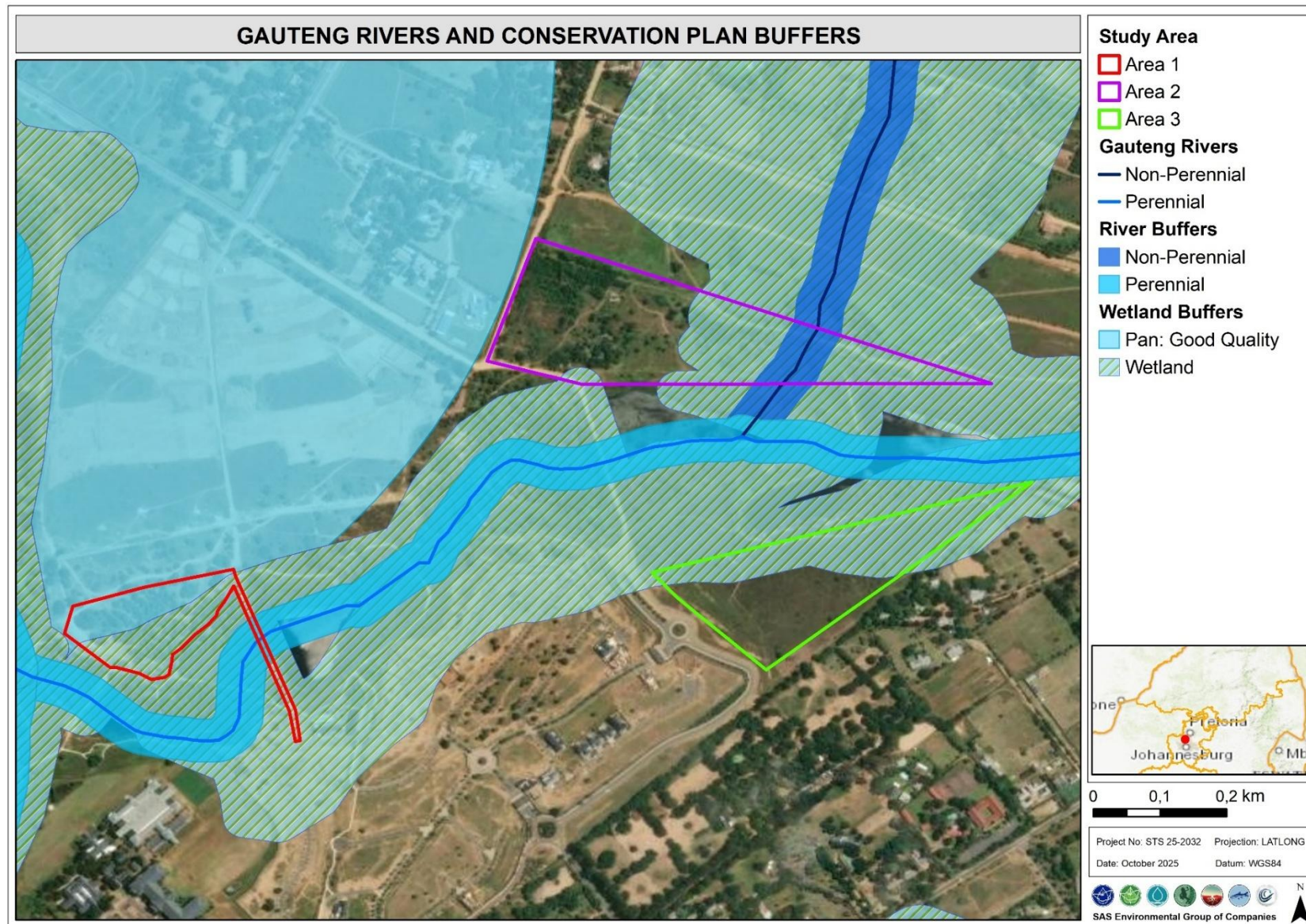


Figure 11: Important Wetland features associated with the study area in terms of the Gauteng C-Plan (2024 dataset).



4 SITE SENSITIVITY VERIFICATION

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: ➤ <u>Very High</u>: 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. ➤ <u>High</u>: Recent occurrence records for all threatened (CR, EN, VU) and/or rare endemic species are included in the high sensitivity level. ➤ <u>Medium</u>: Model-derived suitable habitat areas for threatened and/or rare species are included in the medium sensitivity level. ➤ <u>Low</u>: Areas where no threatened species are known or expected to occur.	
Animal Species Theme (Figure 12)	According to the Animal Species Theme, the study area is located in areas identified with an overall high sensitivity, with the majority of the study area indicated to be of medium sensitivity. Triggering species for the assigned high sensitivities are: ➤ <u>Aves</u>: <i>Tyto capensis</i> (African Grass Owl, VU). Triggering species for the assigned medium sensitivities are: ➤ <u>Aves</u>: <i>Eupodotis senegalensis</i> (White-bellied Korhaan, VU); <i>Hydroprogne caspia</i> (Caspian Tern, VU); ➤ <u>Insecta</u>: <i>Aloeides dentatis dentatis</i> (Roodepoort Copper, EN); ➤ <u>Invertebrate</u>: <i>Clonia uvarovi</i> (Uvarov’s Clonia, 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.	
	➤ Mammalia: <i>Crocidura maquassiensis</i> (Makwassie Musk Shrew, VU), <i>Dasymys robertsii</i> (Robert's Shaggy Rat, VU), <i>Hydrictis maculicollis</i> (Spotted-necked Otter, VU); and ➤ Reptilia: <i>Kinixys lobatsiana</i> (Lobatse Hinge-back Tortoise, VU).
Plant Species Theme (Figure 13)	For the Plant Species Theme, the overall sensitivity of the study area is medium sensitivity, with sections in the north and east located within areas of low sensitivity. The triggering features for the medium sensitivity are: ➤ <i>Melolobium subspicatum</i> (VU); and Sensitive species 1248 (VU) ⁸.
Terrestrial Biodiversity Theme (Figure 14)	According to the Terrestrial Biodiversity Theme, the entire study area is identified as being located within an area of very high sensitivity. The triggered features include: ➤ Being within a CBA1 (Corresponds to the Gauteng C-Plan); ➤ Being with a NPAES; and ➤ The CR Egoli Granite Grassland ecosystem.

⁸ 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.



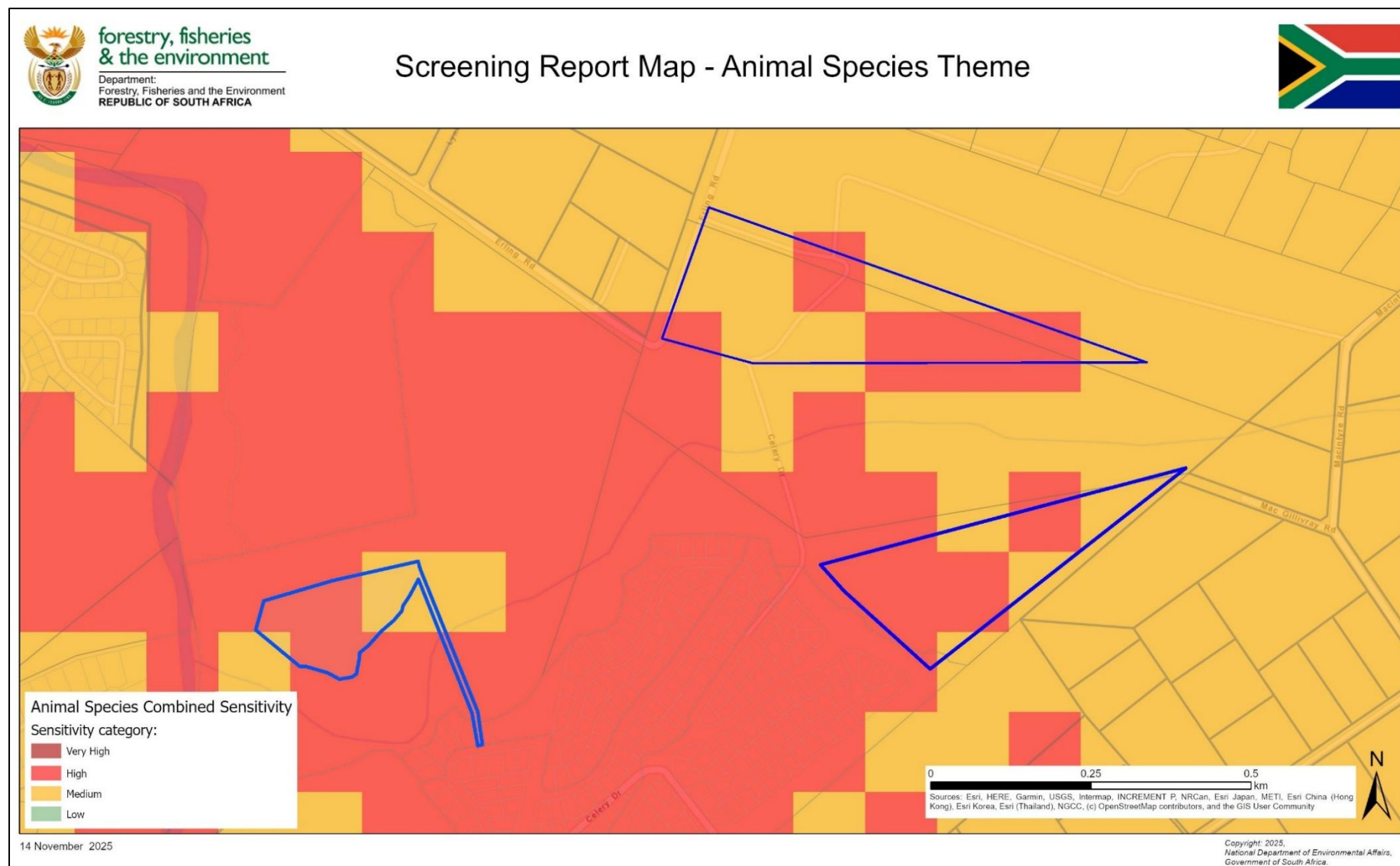


Figure 12: Animal Species Theme sensitivity for the study area as obtained from the Screening Tool (accessed 2025).



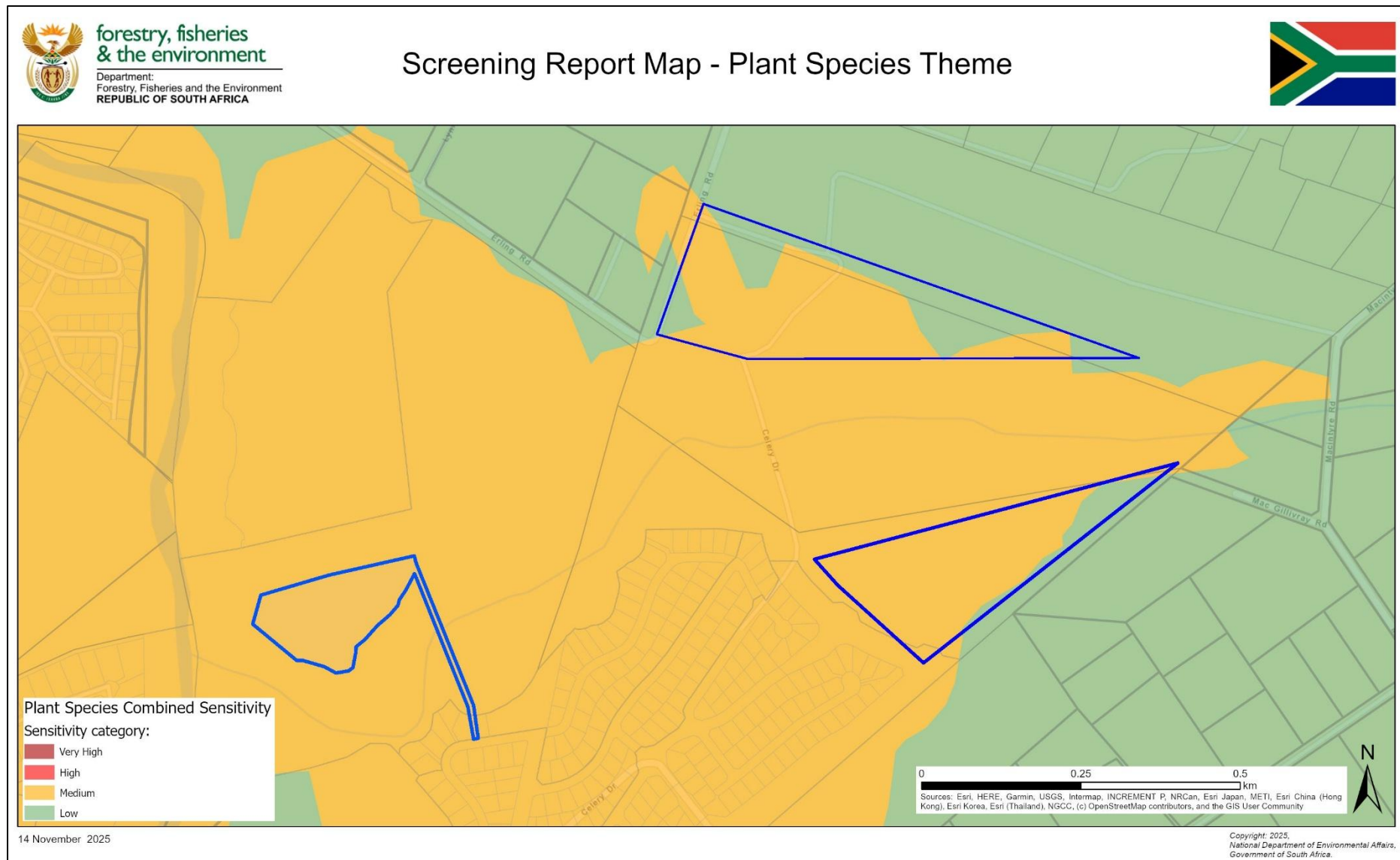


Figure 13: Plant Species Theme sensitivity for the study area as obtained from the Screening Tool (accessed 2025).



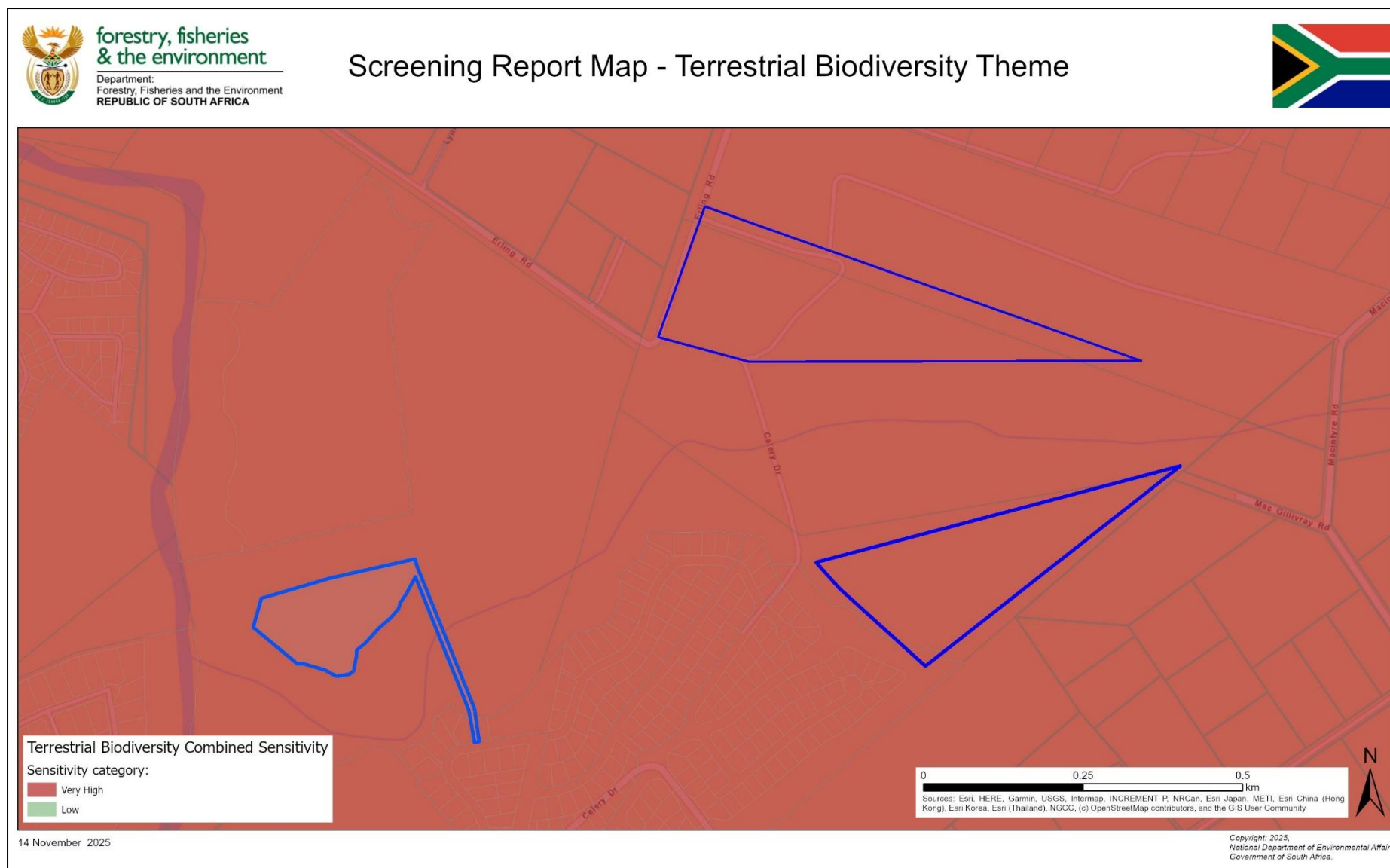


Figure 14: Terrestrial Biodiversity Theme sensitivity for the study area as obtained from the Screening Tool (accessed 2025).



The site sensitivity verification took place on the 5th of November 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 comprised various habitats that have undergone degradation through historic and current anthropogenic activities. The Alien Dominated Woodland Habitat is characterised by alien tree encroachment due to past disturbance (Figure 15, left). This habitat also includes a rocky outcrop (Figure 15, right) that creates a microhabitat for fauna and flora adapted to rockier substrate. The Secondary Grassland Habitat is characteristic of a short, patchy, homogenous layer of grass with some AIP proliferation (Figure 16). More common faunal and floral species occur within this habitat due to its degraded nature. The Freshwater Habitat comprises of anthropogenically derived dams and a valley bottom wetland associated with a tributary of the Jukskei River (Figure 17). The elevated moisture levels in the Freshwater Habitat will attract fauna more dependent on such (e.g., amphibians and water dependent birds and invertebrates). Many of these faunal species may also occasionally forage within the adjacent Secondary Grassland and Alien Dominated Woodland Habitat. Only a small section of the Freshwater Habitat (Valley Bottom Wetland) is located within the study area. However, the broader Freshwater Habitat was still included in the assessment due to its immediate proximity to the proposed development, as potential edge effects on floral and faunal assemblages in this habitat need to be considered. The Transformed Habitat is characterised by current anthropogenic structures such as old buildings and roads (Figure 18). Although these structures provide basking and refuge opportunities for small mammals, reptiles and invertebrates, this habitat has no significant conservation value for fauna.

One faunal SCC, *Scopus umbretta* (Hamerkop, NT), was observed during the site verification within the Freshwater Habitat. An additional eleven SCC have a high POC within the study area, while twenty-one species have a medium POC, only some of which were triggered by the screening tool. Additionally, four TOPS species are considered to have a high POC within the Freshwater, Secondary Grassland, and Alien Dominated Woodland habitats.





Figure 15: Example photographs of the Degraded Woodland Habitat including the rocky outcrops located within this habitat.



Figure 16: Example photographs of the Secondary Grassland Habitat.



Figure 17: Example photographs of the Freshwater Habitat.



Figure 18: Example photographs of the Transformed Habitat.

The table below 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	The triggered high sensitivity for <i>Tyto capensis</i> (African Grass Owl, VU) was disputed and a medium sensitivity was designated instead as this species was assigned a medium probability of occurrence (POC). The triggered medium sensitivity was confirmed in some areas due to the medium POC of various triggered faunal SCC such as <i>Eupodotis senegalensis</i> (White-bellied Korhaan, VU), <i>Crocidura maquassiensis</i> (Makwassie Musk Shrew, VU), <i>Kinixys lobatsiana</i> (Lobatse Hinge-back Tortoise, VU), and <i>Clonia uvarovi</i> (Uvarov's clonia, VU).	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).
	Medium	The medium and high sensitivity in some sections are disputed and a low is designated instead due to the low POC of triggered <i>Aloeides dentatis dentatis</i> (the Roodepoort copper, EN), <i>Dasymys robertsii</i> (Robert's Shaggy Rat, VU), <i>Hydriclis maculicollis</i> (Spotted-necked Otter, VU), and <i>Hydroprogne caspia</i> (Caspian Tern, VU) and portions that are too degraded to support any faunal SCC.	Low		



Theme	DFFE Screening Sensitivity	Comments	Specialist Proposed Sensitivity	Proposed Assessment	Applicable Legislation
Plant Species Theme	Medium	The triggered species, namely Sensitive species 1248 (VU) and <i>Melolobium subspicatum</i> (VU), were not present within the study area. These species are also not anticipated to occur within the study area as the vegetation and habitat conditions are not considered suitable. The medium sensitivity for the Plant Species Theme is thus disputed and a low sensitivity instead verified.	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).
Terrestrial Biodiversity Theme	Very High	Triggering features for the Terrestrial Biodiversity Theme include the Egoli Granite Grassland (CR). The natural vegetation within the study area cannot be considered primary in condition, as several sections were cultivated historically, but also due to 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 and ESAs. The triggers for the CBA may be more indicative of ESA habitat rather than CBA. Regardless, the very high sensitivity is verified.	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



5 REFERENCES

- BirdLife South Africa. 2015. Important Bird Areas 2015 [vector geospatial dataset] 2015. Available from the Biodiversity GIS website.
- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA)
- Constitution of the Republic of South Africa, 1996
- Dayaram et al. 2019. The Contribution of wetland flora to regional floristic diversity across a wide range of climatic conditions in southern Africa.
- Department of Environmental Affairs. 2018. National Protected Areas Expansion Strategy for South Africa 2018. Department of Environmental Affairs, 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.
- GDARD. 2014. GDARD Requirements for Biodiversity Assessments Version 3.
- GDARD. 2024. GIS Data – C-Plan Version 4.0.
- 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.
- International Union for Conservation of Nature (IUCN) 2022a. The IUCN Red List of Threatened Species. Version 2021-3. <https://www.iucnredlist.org/>
- IUCN.2022b. The IUCN Red List of South African Plants. <http://redlist.sanbi.org/species.php?species=2785-1>
- Lee ATK, Rose S, Banda S, Bezeng SB, Maphalala MI, Maphisa DH, Smit-Robinson HA (eds), The 2025 Red Data Book of Birds of South Africa, Lesotho and Eswatini. Johannesburg, South Africa: BirdLife South Africa.
- 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., 1998. Vegetation of South Africa, Lesotho, and Swaziland: A companion to the vegetation map of South Africa, Lesotho, and Swaziland.
- 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. 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) (NEMA).
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA).
- National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) (NEMPAA).
- National Forests Act, 1998 (Act No. 84 of 1998) (NFA).
- National Web-Based Environmental Screening Tool. 2025. Accessible online: <https://screening.environment.gov.za/screeningtool/#/pages/welcome>
- Pool-Stanvliet R, Coetzer K. 2020. The scientific value of UNESCO biosphere reserves. S Afr J Sci. 116(1/2), Art. #7432, 4 pages. <https://doi.org/10.17159/sajs.2020/7432>
- SABAP2 2015. 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. 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. 2019. National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity. Synthesis Report. South African National Biodiversity Institute, an entity of the Department of Environment, Forestry and Fisheries, Pretoria. pp. 1–214.



- 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 2022 Red List of Ecosystems (RLE) for terrestrial realm for South Africa - Original extent [Vector] 2021. Available from the Biodiversity GIS website.
- SANBI. 2022b. The 2022 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., Measey, J., Richardson, D.M., Wilson, J.R. and Zengeya, T.A., 2020. Biological Invasions in South Africa (p. 975). Springer Nature.



APPENDIX A: Indemnity and Terms of Use of this Report

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

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

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



APPENDIX B: 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 NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) (NEMA)

The National Environmental Management Act, 1998 (Act No.107 of 1998) (NEMA) and the associated Environmental Impact Assessment (EIA) Regulations (GN R326 as amended in 2017 and well as listing notices 1, 2 and 3 (GN R327, R325 and R324 of 2017), state that prior to any development taking place which triggers any activity as listed within the abovementioned regulations, an environmental authorisation process needs to be followed 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 diversity;
- The use of indigenous biological resources in a sustainable manner;
- The fair and equitable sharing among stakeholders of the benefits arising from bio prospecting involving indigenous biological resources;
- To give effect to ratify international agreements relating to biodiversity which are binding to the Republic;
- To provide for cooperative governance in biodiversity management and conservation; and
- To provide for a South African National Biodiversity Institute to assist in achieving the objectives of this Act.

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

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

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



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

NEMBA is administered by the Department of Environmental Affairs and aims to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA. In terms of alien and invasive species. This act in terms of alien and invasive species aims to:

- Prevent the 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 AMENDED⁹ (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.

⁹ 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 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 FOREST ACT, 1998 (ACT NO. 10 OF 1998), AS AMENDED IN SEPTEMBER 2011 (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 utilisation.”

Applicable sections of the NFA pertaining to the proposed project include the below:

Section 12:

Declaration of trees as protected

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

Section 15(1):

No person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a licence granted by the Minister or in terms of an exemption from the provisions of this subsection published by the Minister in the Gazette.

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

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 (GDARD, 2014A).

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 (2014b); 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: Impact Assessment Methodology

Ecological Impact Assessment Method

For the Environmental Assessment Practitioner (EAP) to allow for sufficient consideration of all environmental impacts, impacts were 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 applicant to understand the process and rationale upon which risks/impacts have been assessed. The method 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'¹⁰. 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 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 C1. 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 the level of mitigation that may be necessary¹¹.

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 takes into account the recommended management measures required to mitigate the impacts.

¹⁰ The definition has been aligned with that used in the ISO 14001 Standard.

¹¹ Some risks/impacts that have low significance will however still require mitigation.



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 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 C1: 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 < 1000m	3
Regional within 5 km of the site boundary / < 2000ha impacted / Linear developments affected < 2000m	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 C2: 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 C3: Positive/Negative Mitigation Ratings.

Significance Rating	Value	Negative Impact Management Recommendation	Positive Impact Management 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 proponent and their contractors develops 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:
 - Pre-construction;
 - Construction;
 - Operation; and
 - Closure and decommissioning.
- 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; and



- Particular attention was paid to describing any residual impacts that will occur after rehabilitation.

Mitigation measure development

According to the DEA *et al.*, (2013¹²) “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 a number of 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, including¹³:

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

¹² Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, and South African National Biodiversity Institute. 2013. Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector. Pretoria. 100 pages.

¹³ Limpopo Province Environment Outlook. A Report on the State of the Environment, 2002. Chapter 4.



- 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;
- **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 as a result 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 considered to be 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 considered to 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 considered to be of *very high significance* and when residual impacts are considered to be 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.¹⁴

In light of 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 impacts¹⁵ 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 projects. These recommendations also include general management measures which apply to the proposed projects as a whole. Mitigation measures have been developed to address issues in all phases throughout the life of the projects from planning, through to construction and operation.

¹⁴ Provincial Guideline on Biodiversity Offsets, Western Cape, 2007.

¹⁵ Mitigation measures should address both positive and negative impacts



APPENDIX D: Vegetation Type

Egoli Granite Grassland (Gm10)



Figure D1: 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*. Image by D.B. Hoare, page 398 (Mucina & Rutherford, 2006).

Table D1: Floristic species of The Egoli Granite Grassland (Mucina & Rutherford, 2006¹⁶).

Plant Community	Species
Woody Layer	
Trees	Small Tree: <i>Vangueria infausta</i>
Shrubs	Tall Shrub: <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 Shrub: <i>Lopholaena coriifolia</i> .
Forb layer	
Herbs	<i>Acalypha angustata</i> , <i>Acalypha peduncularis</i> , <i>Ocimum 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>Laphangium luteoalbum</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 amplexens</i> , <i>Eragrostis gummiiflua</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> .

*(d) = dominant

¹⁶ 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*.



APPENDIX E: Details, Expertise And Curriculum Vitae of Specialists

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

Charne Kock	MSc Plant Science (University of Pretoria)
Sanja Erwee	BSc Zoology (University of Pretoria)
Candice Lamb	MSc Zoology (University of Pretoria)
Jandre Potgieter	BSc (Hons) Entomology (University of Pretoria)
Mathew Ross	PhD Aquatic Health (University of Johannesburg)

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.
Postal address:	PO. Box 751779, Gardenview
Postal code:	2047
Telephone:	011 616 7893
Name / Contact person:	Charne Kock
E-mail:	charne@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	SANAP (South African National Antarctic Programme) Golden Key Honorary Society Member of the Botanical Society of South Africa (BotSoc) Member of the Land Rehabilitation Society of Southern Africa (LARSSA) Member of the South African Association of Botanists (SAAB) Registered Professional Scientist at South African Council for Natural Scientific Professions (SACNASP – Reg No. 169998)
Name / Contact person:	Sanja Erwee
E-mail:	sanja@sasenvgroup.co.za
Qualifications	BSc (Zoology) (University of Pretoria)
Name / Contact person:	Candice Lamb
E-mail:	candice@sasenvgroup.co.za
Qualifications	MSc (Zoology) (University of Pretoria) BSc (Hons) Zoology (University of Pretoria) BSc Environmental Sciences (University of Pretoria)
Registration / Associations	Registered Candidate Scientist at the South African Council for Natural Scientific Professions (SACNASP)
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:	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



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

I, Charne Kock, declare that -

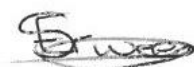
- I act as the **independent specialist (reviewer)** in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct.



Signature of the Specialist

I, Sanja Erwee, declare that -

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

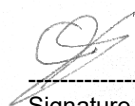


Signature of the Specialist



I, Candice Lamb, declare that -

- I act as the **independent 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

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

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



**SAS ENVIRONMENTAL GROUP OF COMPANIES –
SPECIALIST CONSULTANT INFORMATION**

CURRICULUM VITAE OF CHARNE KOCK

PERSONAL DETAILS

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

MEMBERSHIP IN PROFESSIONAL SOCIETIES

SANAP (South African National Antarctic Programme)
 Golden Key Honorary Society
 Member of the Botanical Society of South Africa (BotSoc)
 Professional member of the South African Council for Natural Scientific Professions (SACNASP – Reg No. 169998)
 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)	2021
BSc (Hons) Plant Science (University of Pretoria)	2018
BSc Environmental Science (University of Pretoria)	2017

Short courses and Training

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

AREAS OF WORK EXPERIENCE

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

KEY SPECIALIST DISCIPLINES

Biodiversity Assessments

- Terrestrial Ecological and Biodiversity Scoping Assessments
- Floral Assessments
- Floral walkdowns
- Alien and Invasive Plant Control Plan (AIPCP)
- Alien control monitoring
- Desktop Studies, Mapping and Background Information Research
- Plant permits





SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF **SANJA ERWEE**

PERSONAL DETAILS

Position in Company	GIS Technician and Visual Specialist
Joined SAS Environmental Group of Companies	2014

EDUCATION

Qualifications

BSC Zoology (University of Pretoria)	2013
--------------------------------------	------

Short Courses

Global Mapper	2015
SANBI BGIS Course	2017
Global Mapper Lidar Course	2017
ESRI MOOC ARCGIS Cartography	2018

AREAS OF WORK EXPERIENCE

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

KEY SPECIALIST DISCIPLINES

Freshwater Assessments

- Desktop Freshwater Delineation
- Plant species and Landscape Plan

Visual Impact Assessment

- Visual Baseline and Impact Assessments
- Visual Impact Peer Review Assessments
- View Shed Analyses
- Visual Modelling

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 **CANDICE LAMB**

PERSONAL DETAILS

Position in Company	Junior 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 Sciences	2017

AREAS OF WORK EXPERIENCE

South Africa – Gauteng, Mpumalanga, Limpopo, KwaZulu-Natal, Northern Cape, 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 Freshwater Delineation

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 **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, Namibia, Malawi and 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 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

