



**TERRESTRIAL BIODIVERSITY COMPLIANCE
STATEMENT FOR THE PROPOSED MINING
PERMIT APPLICATION AND STOCKPILE AREA.**

**Lekwa Local Municipality, Gert Sibande District
Municipality, Mpumalanga Province, South Africa**

22/05/2024

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Declaration

The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, Amended. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principals of science.

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1 Introduction

1.1 Background

The Biodiversity Company was appointed to undertake a terrestrial biodiversity assessment for the proposed mining permit application and stockpile area near Morgenzon in the Gert Sibande Local Municipality, Mpumalanga Province of South Africa.

The proposed development area – which includes the area where mining activities are proposed as well as the corresponding stockpile area – was allocated a 100 metre (m) buffer, and is collectively referred to as the Project Area of Influence (PAOI) from here on in. A map illustrating the regional locality of the PAOI is depicted in Figure 1-1, and a map showing the proposed layout of the PAOI can be seen in Figure 1-2.

To determine the baseline ecological state of the PAOI and to present a detailed description of the receiving environment, a desktop assessment and field survey (conducted on the 17th of April 2024) were completed in tandem. Both the desktop assessment and field survey involved the detection, identification, and description of any locally relevant sensitive receptors. The potential risks that the proposed development would have on the sensitive features was also investigated.

This assessment was conducted in accordance with the amendments to the Environmental Impact Assessment Regulations, 2014 (No. 326, 7 April 2017) of the National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998). The approach has taken cognisance of the recently published Government Notice 320 in terms of NEMA dated 20 March 2020 as well as the Government Notice 1150 in terms of NEMA dated 30 October 2020: “Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation”. The National Web based Environmental Screening Tool has characterised the terrestrial biodiversity theme for the area as ‘Very High’ sensitivity (National Environmental Screening Tool, 2024).

The purpose of conducting the specialist study is to provide relevant input into the Environmental Authorisation application process, with a focus on the proposed activities and the impacts associated with the project. This report, after taking into consideration the findings and recommendations provided by the specialist stipulated herein, should inform, and guide the Registered Environmental Assessment Practitioner (EAP) and regulatory authorities, enabling informed decision making as to the ecological viability of the proposed project.

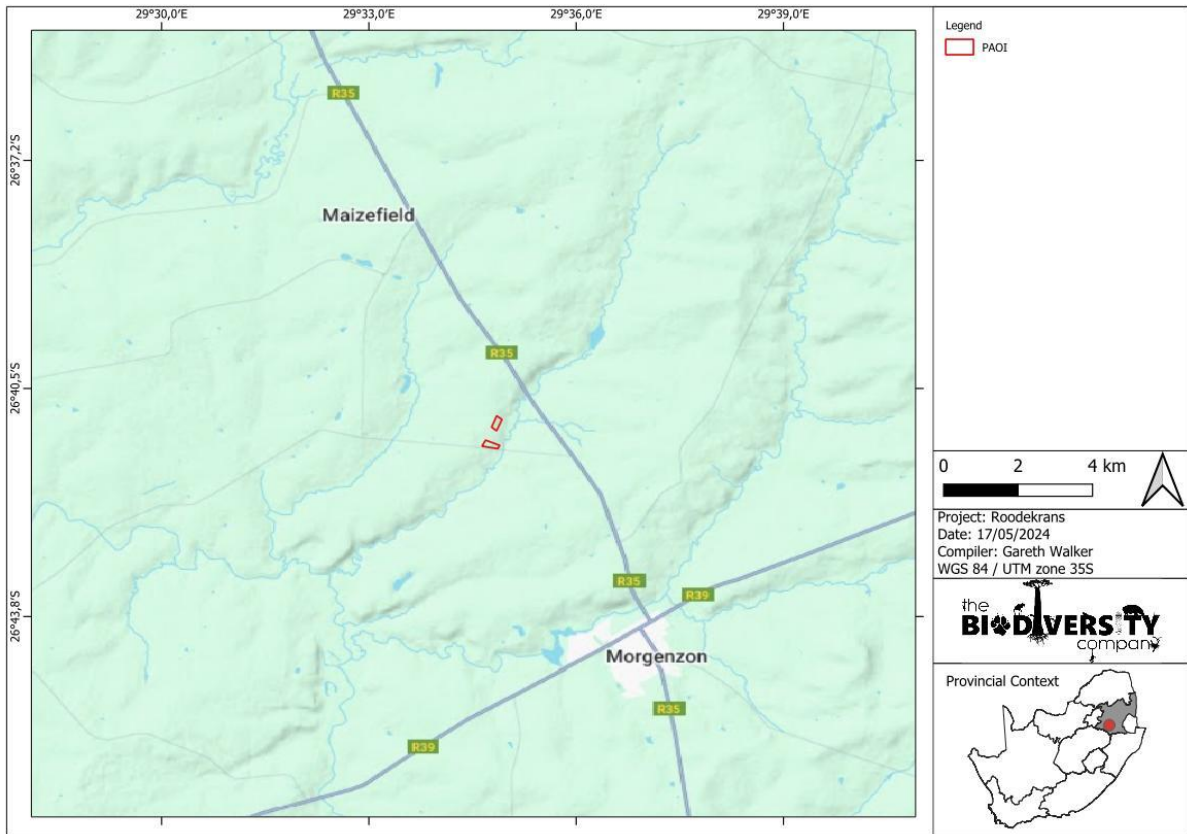


Figure 1-1 Map illustrating the regional context of the Project Area of Influence (PAOI).

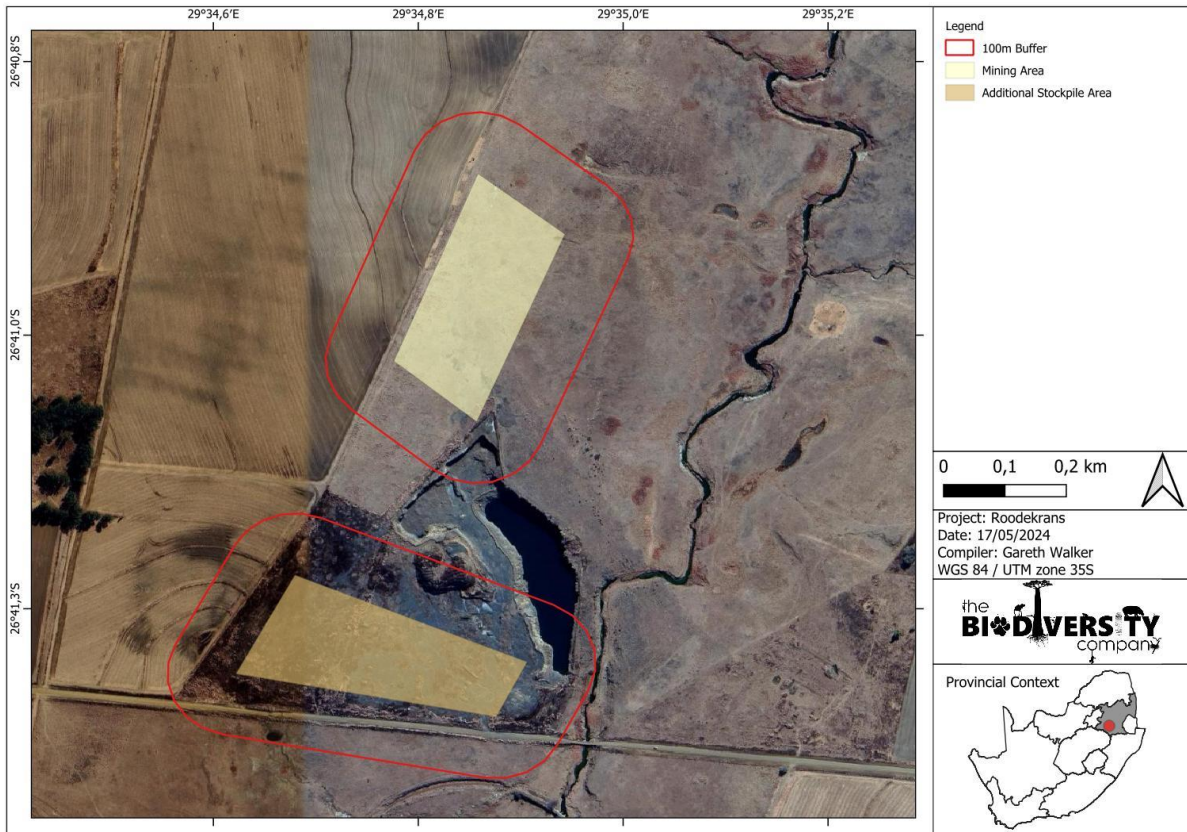


Figure 1-2 Map depicting the proposed layout of the PAOI.

1.2 Project Description

At the time of reporting, specific details pertaining to the project had not been provided for. Such details need to be made accessible at a later stage.

1.3 Scope of Work

The aim of the biodiversity assessment was to provide information to guide the risk of the proposed development on the current state of the associated ecosystems within the PAOI. This was achieved through the following:

- Desktop assessment to identify the ecologically important terrestrial features within the PAOI;
- Desktop assessment to identify possible Species of Conservation Concern (SCC) that may occur within the PAOI;
- Field survey to identify and record flora and fauna species, (especially SCC) within the PAOI;
- Determine the Site Ecological Importance (SEI) - also commonly referred to as the sensitivity – of the PAOI; and
- The prescription of mitigation measures for identified risks associated with the proposed development.

1.4 Assumptions and Limitations

The following assumptions and limitations are applicable for this assessment:

- It is assumed that all information received from the client and landowner is accurate;
- All datasets accessed and utilised for this assessment are considered to be representative of the most recent and suitable data for the intended purposes;
- The assessment area (PAOI) was based on the footprint areas as provided for by the client, and any alterations to the area and/or missing GIS information pertaining to the assessment area would have affected the area surveyed and hence the results of this assessment;
- A single site survey – conducted on the 17th of April 2024 – was completed. Therefore, this assessment does not consider temporal/seasonal trends. However, it is the opinion of the specialist stipulated herein that both the desktop and field data collected is sufficient enough to derive a meaningful baseline;
- Whilst every effort was made to cover as much of the PAOI as possible, representative sampling was completed. Consequently, it is possible that some fauna and flora species present within the PAOI may have not been recorded during the field survey; and

The GPS used in the assessment has an accuracy of 5 m and consequently any spatial features may be offset by up to 5 m.

1.5 Legislative Framework

In line with the protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity, as per Government Notice 320 published in terms of NEMA, dated 20 March 2020: “Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation” – section 3, subsection 1:

- An applicant intending to undertake an activity identified in the scope of the protocol, on a site identified by The Screening Tool as being of a 'Very High' terrestrial biodiversity sensitivity, is required to submit a Terrestrial Biodiversity Specialist Assessment; however
- Where the information gathered from the site sensitivity verification differs from the designation of 'Very High' terrestrial biodiversity sensitivity on the screening tool and is instead found to be of a 'Low' sensitivity, then a Terrestrial Biodiversity Compliance Statement must be submitted.

The information obtained from a site sensitivity verification, which involved both a desktop assessment as well as a field survey, confirmed that the proposed PAOI is of a 'Low' sensitivity. Therefore, this report constitutes a Terrestrial Biodiversity Compliance Statement.

As per sections 2 and 3 of the protocol discussed above, a Terrestrial Biodiversity Compliance Statement must contain the information as presented in Table 1-1 below.

Table 1-1 *Terrestrial Biodiversity Compliance Statement information requirements as per the relevant protocol, including the location of the information within this report.*

Information to be Included (as per GN 320, 20 March 2020)	Report Section
Methodology used to undertake the site assessment and survey, and prepare the compliance statement, including relevant equipment and modelling used	7.1
Description of the assumptions and any uncertainties or gaps in knowledge or data	1.4
A baseline profile description of biodiversity and ecosystems of the site	3.2 & 3.3
Site sensitivity verification: Desktop Analysis using satellite imagery and available information	3.1
A statement on the duration, date, and season of the site inspection	2.1
Site sensitivity verification: Onsite inspection, including a description of current land use and vegetation found on-site	3.6
Site sensitivity verification: Photographs/evidence of environmental sensitivity	3.6
Screening tool confirmation/dispute: The assessment must verify the "Low" sensitivity of the site, in terms of plant, animal, and terrestrial biodiversity themes	3.6.2
Proposed impact management outcomes or monitoring requirements for inclusion in the EMPr	4
Indicate whether the proposed development will have any impact on the terrestrial environment, animals and/or plants	5
A signed statement of independence by the specialist	7.3
Specialist details, including a CV	7.4

A signed copy of the compliance statement must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.

2 Fieldwork

2.1 Biodiversity Field Assessment

A single season field survey was conducted on the 17th of April 2024 – constituting a late wet/early dry season survey – to delineate the various habitat types and determine their associated sensitivities, and to determine the presence of any local fauna and flora SCC within the PAOI. Every effort was made to cover all the respective habitat types within the PAOI within the limits of time, accessibility, and security. The site visit conducted by the specialist stipulated herein is considered sufficient for the proposed project (Figure 2-1).

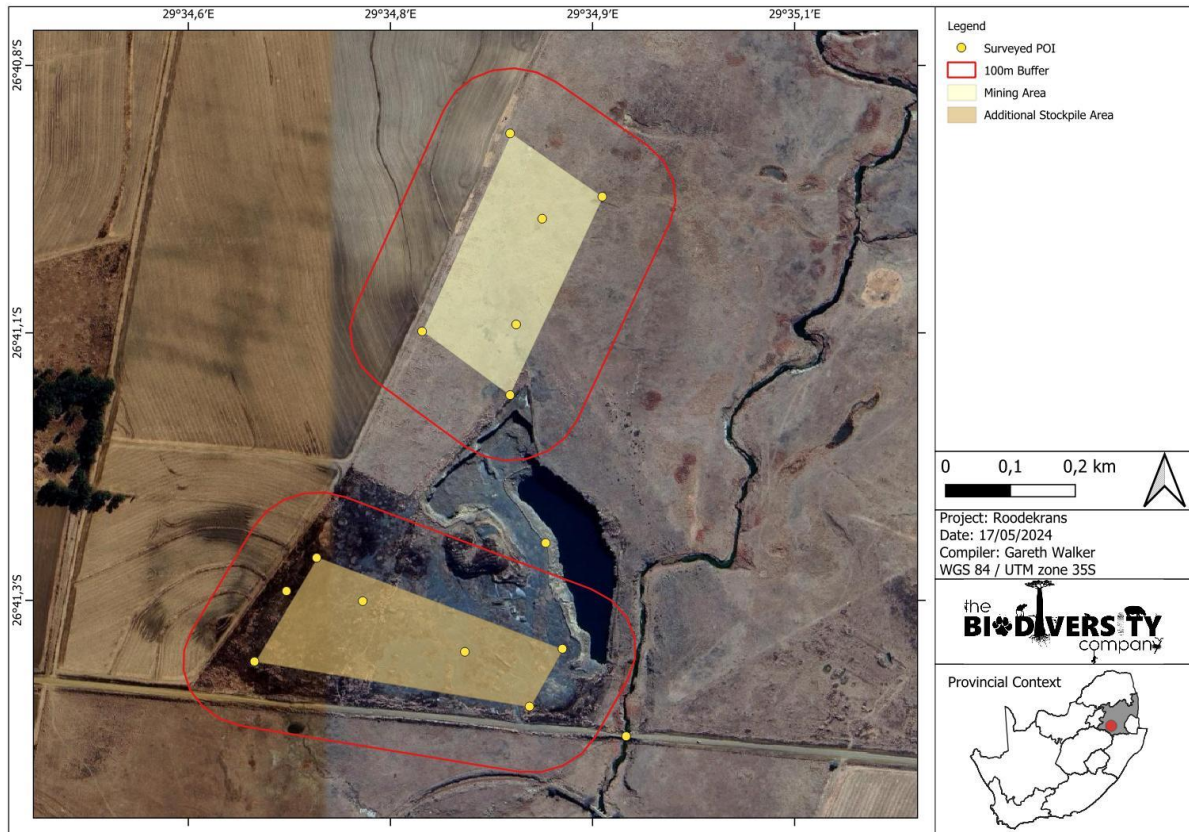


Figure 2-1 Map illustrating the surveyed Points of Interest (POI).

3 Results & Discussion

3.1 Ecologically Important Landscape Features

Table 3-1 below has been produced from the spatial data collected and analysed as provided for by relevant sources. It presents a summative breakdown of the ecological boundaries considered and the associated relevance that each has to the region or PAOI.

Table 3-1 Summary of relevance of the proposed project to ecologically important landscape features.

Desktop Information Considered	Relevance	Reasoning
Ecosystem Threat Status	Relevant	Overlaps with a 'Least Concern (LC)' Ecosystem (RLE, 2021).
Ecosystem Protection Level	Relevant	Overlaps with a 'Not Protected (NP)' Ecosystem.
Provincial Conservation Plan	Relevant	Portions of the PAOI overlap with Critical Biodiversity Areas (CBA).
SAPAD & SACAD	Irrelevant	Does not overlap with any Protected or Conservation Areas.
National Protected Areas Expansion Strategy	Relevant	Portions of the PAOI overlap with Priority Focus Areas (NPAES, 2018).
Important Bird & Biodiversity Areas (IBA)	Irrelevant	Does not overlap with any IBAs.
South African Inventory of Inland Aquatic Ecosystems (SAIIAE)	Relevant	A small portion of the PAOI overlaps with a 'Not Protected (NP)' Inland Aquatic Ecosystem.
National Freshwater Priority Area	Irrelevant	Does not overlap with any NFEPA Wetlands or Rivers.

3.2 Fauna Species of Conservation Concern

The Screening Tool indicates that one (1) avifauna and two (2) mammalian SCC are predicted to occur within the PAOI (Table 3-2). The likelihood of each species occurring within the PAOI is low.

Table 3-2 Threatened fauna species that are expected to occur within the PAOI. EN = Endangered and VU = Vulnerable.

Group	Taxonomic Name	Common Name	IUCN	Likelihood Of Occurrence	Of
Mammalia	<i>Crocidura maquassiensis</i>	Makwassie Musk Shrew	VU	Low	
Mammalia	<i>Ourebia ourebi</i>	Oribi	EN	Low	
Aves	<i>Tyto capensis</i>	African Grass Owl	VU	Low	

3.3 Flora Species of Conservation Concern

The Screening Tool indicates that four (4) flora SCC are predicted to occur within the PAOI (Table 3-3). The likelihood of each of these species occurring within the PAOI is low. Moreover, none (0) were confirmed within the PAOI during the site survey.

Please note that the Screening Tool report includes lists of bird, mammal, reptile, amphibian, butterfly, and plant species of conservation concern known or expected to occur on the proposed development footprint. Some of these SCC are sensitive to illegal harvesting. Such species have had their names obscured and are listed as sensitive plant unique number / sensitive animal unique number. As per the best practise guideline that accompanies the protocol and screening tool, please, the **name of the sensitive species may not appear in the final EIA report nor any of the specialist reports released into the public domain**. It should be referred to as *sensitive plant* or *sensitive animal* and its threat status may be included, e.g. *critically endangered sensitive plant* or *endangered sensitive animal*.

Table 3-3 Threatened flora species expected to occur within the PAOI. VU = Vulnerable.

Family	Species	IUCN	Likelihood of Occurrence
Amaryllidaceae	<i>Sensitive species 691</i>	VU	Low

Amaryllidaceae	<i>Sensitive species 1251</i>	VU	Low
Apocynaceae	<i>Miraglossum davyi</i>	VU	Low
Apocynaceae	<i>Aspidoglossum xanthosphaerum</i>	VU	Low

3.4 Desktop Ecological Sensitivity

The following is deduced from the National Web-based Environmental Screening Tool Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended):

- Terrestrial Biodiversity Theme sensitivity is 'Very High' for the PAOI due to its presence within a CBA 2, NPAES Priority Focus Area, and within a VU ecosystem (Figure 3-1);
- Animal Species Theme sensitivity is 'Medium' for the PAOI owing to the potential occurrence of two (2) mammalian and one (1) avifauna SCC (Figure 3-2); and
- Plant Species Theme sensitivity is 'Medium' for the PAOI owing to the potential occurrence of four (4) flora SCC (Figure 3-3).

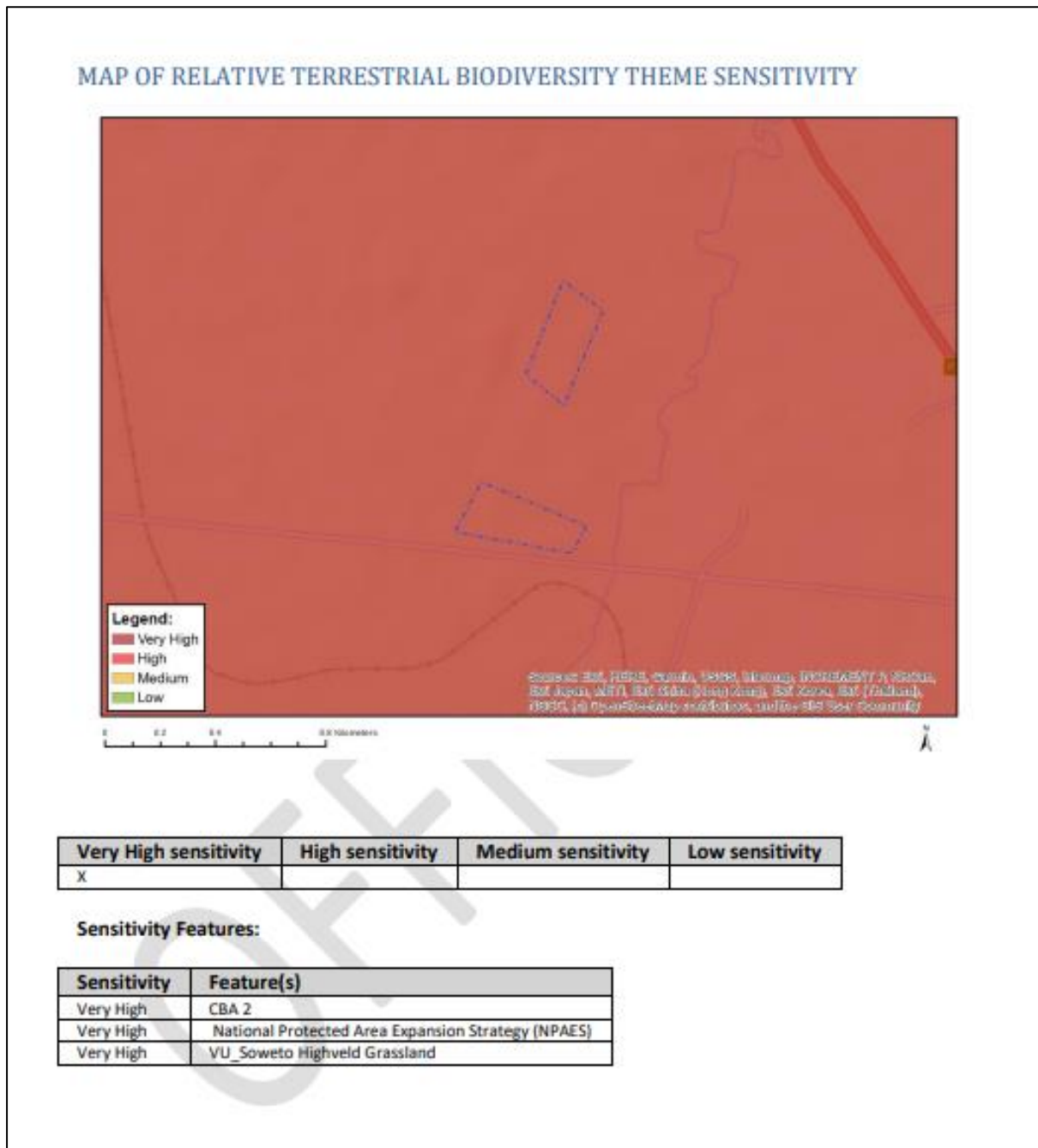
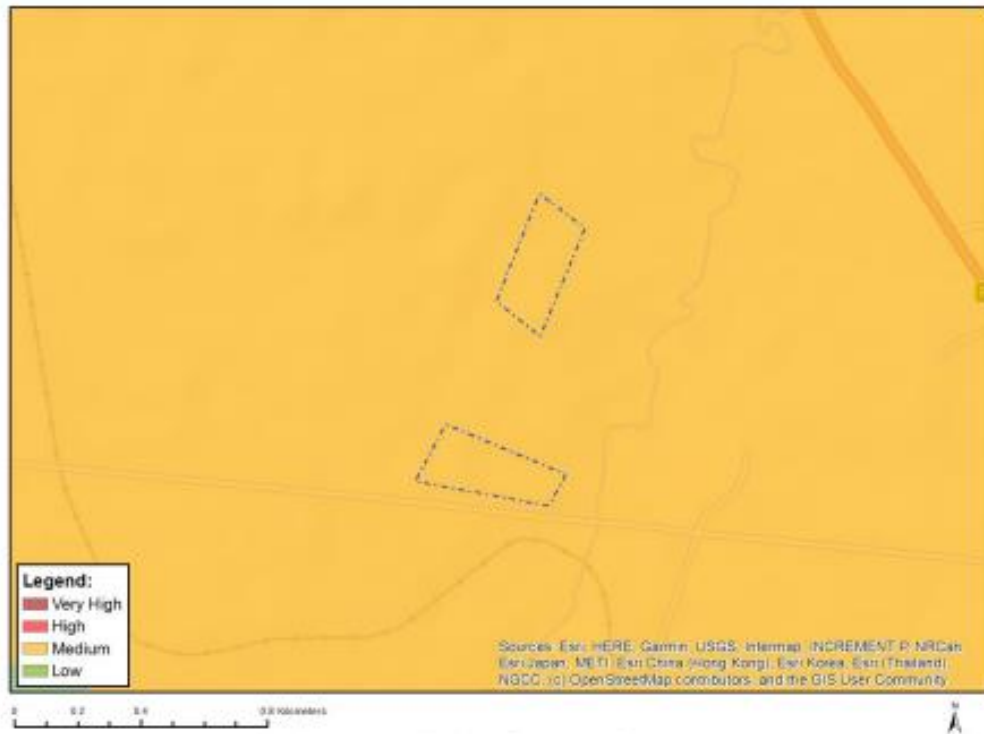


Figure 3-1 Map depicting the relative terrestrial biodiversity theme sensitivity for the PAOI as generated for by the environmental screening tool.

MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY



Where only a sensitive plant unique number or sensitive animal unique number is provided in the screening report and an assessment is required, the environmental assessment practitioner (EAP) or specialist is required to email SANBI at eiadatarequests@sanbi.org.za listing all sensitive species with their unique identifiers for which information is required. The name has been withheld as the species may be prone to illegal harvesting and must be protected. SANBI will release the actual species name after the details of the EAP or specialist have been documented.

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Medium	Aves-Tyto capensis
Medium	Insecta-Lepidochrysops procera
Medium	Mammalia-Crocidura maguassiensis
Medium	Mammalia-Ourebia ourebi ourebi

Figure 3-2 Map depicting the relative animal theme sensitivity for the PAOI as generated for by the environmental screening tool.

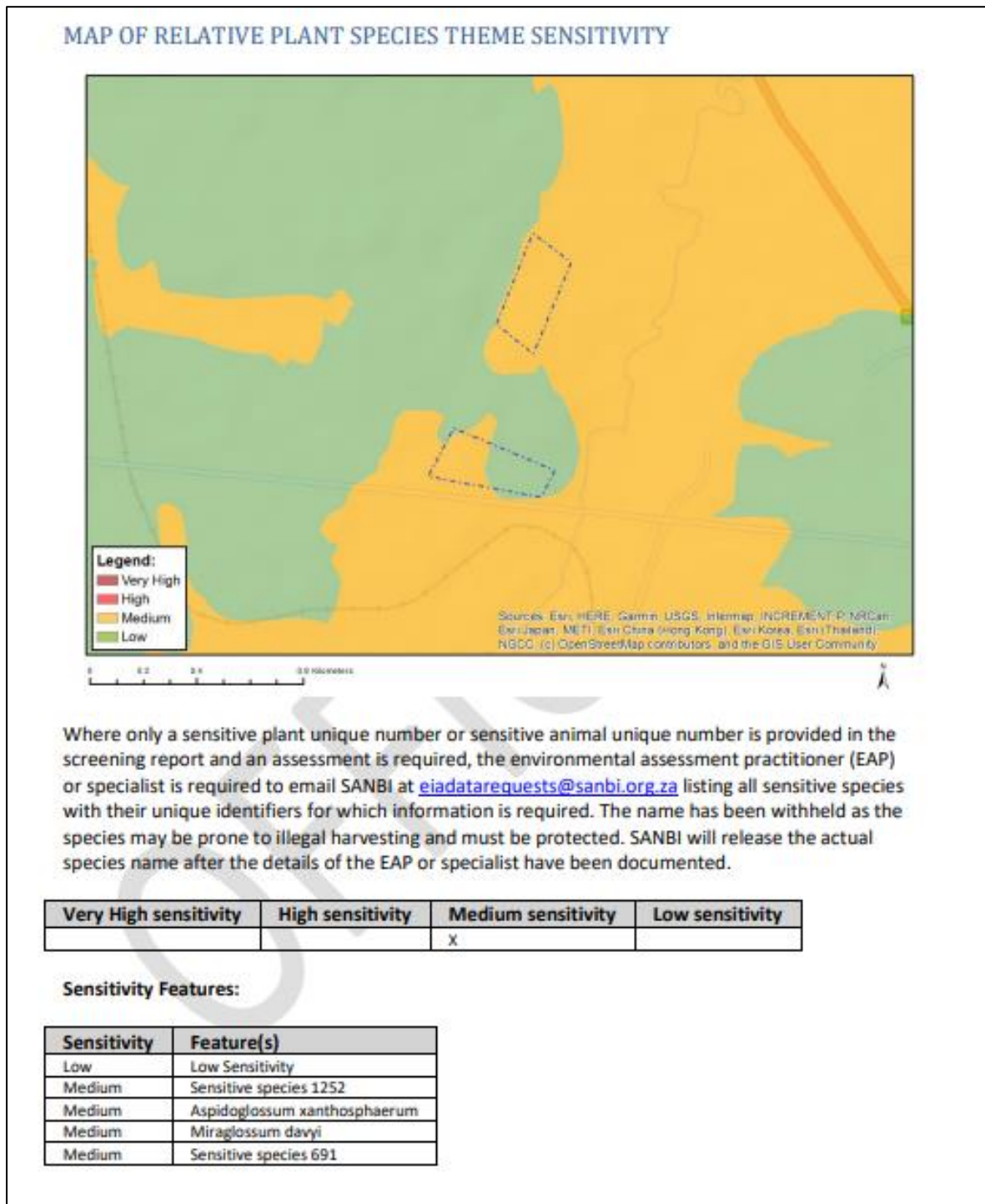




Figure 3-3 Map depicting the relative plant theme sensitivity for the PAOI as generated for by the environmental screening tool.

3.5 Biodiversity Field Survey

A summary of the terrestrial field assessment is provided in Table 3-4. The PAOI was surveyed to establish the overall ecological condition of the vegetation and to determine the likelihood of any flora and fauna SCC occurring within the area. Any potential sensitive habitat features were also assessed.

Table 3-4 Summary of the field survey conducted within the PAOI.

Habitat	GPS co-ordinates	Description	SEI	Photographs
Transformed Grassland	26°40'58.15"S 29°34'52.69"E; 26°41'3.41"S 29°34'51.39"E	This habitat type is predominantly disturbed and has been impacted by edge effects from modified habitats, as well as impacts associated with historic and ongoing livestock grazing, vegetation clearing, agriculture and infringement. These habitats exist in a constant state of disturbance and cannot recover to a more natural state due to ongoing disturbances and impacts.	Low	
Cropland	N/A	Croplands have little to no remaining natural vegetation due to land transformation attributed to agriculture. These habitats exist in a constant state of disturbance and cannot recover to a more natural state due to ongoing disturbances and impacts.	Low	No corresponding photos of croplands were taken as these fell beyond the proposed development footprint.
Modified	26°41'19.72"S 29°34'48.83"E; 26°41'14.30"S 29°34'52.87"E	The modified areas have little to no remaining natural vegetation due to land transformation attributed to human-induced impacts such as mining and infrastructure development.	Very Low	

3.6 Site Sensitivity Verification

3.6.1 Habitats and Site Ecological Importance (SEI)

Based on the criteria provided in Appendix B of this report, all habitats within the PAOI were assigned a sensitivity category, i.e., a SEI category. Habitats within the PAOI varied in sensitivity from Very Low (i.e., modified habitats) to Low (i.e., disturbed bushveld and cropland habitats) SEI (Table 3-5 & Figure 3-4 Map depicting the Site Ecological Importance (SEI) sensitivity for the PAOI.). The findings of this assessment therefore contradict the findings set forth by the Screening Tool with regards to the combined Terrestrial Biodiversity Theme Sensitivity.

Table 3-5 Summary of habitat types and associated SEIs delineated within the PAOI.

Habitat	Description	Ecosystem Processes and Services	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Transformed Grassland	This habitat type is predominantly disturbed and has been impacted by edge effects from modified habitats, as well as impacts associated with historic and ongoing livestock grazing, vegetation clearing, agriculture and infringement. These habitats exist in a constant state of disturbance and cannot recover to a more natural state due to ongoing disturbances and impacts.	Provides limited grazing and foraging resources for indigenous fauna and livestock. Aids in the filtration of water permeating through the soil into the drainage areas. Corridor for fauna dispersion within the landscape.	Low	Low	Low	Medium	Low
Croplands	Croplands have little to no remaining natural vegetation due to land transformation attributed to agriculture. These habitats exist in a constant state of disturbance and cannot recover to a more natural state due to ongoing disturbances and impacts	Despite the lack of indigenous vegetation, croplands attract numerous insect pollinators that, in turn, attract a high diversity of avifauna species. Further, ecosystem services attributed with croplands include carbon storage, and water and nutrient retention.	Low	Low	Low	Medium	Low
Modified	The modified areas have little to no remaining natural vegetation due to land transformation attributed to (predominantly) human expansion and infrastructure development.	The ecological services provided by this habitat are limited due to the extensive cover of impermeable surfaces and the large amount of bare land. Parts of the area may be considered a movement corridor.	Very Low	Very Low	Very Low	Medium	Very Low



Figure 3-4 Map depicting the Site Ecological Importance (SEI) sensitivity for the PAOI.

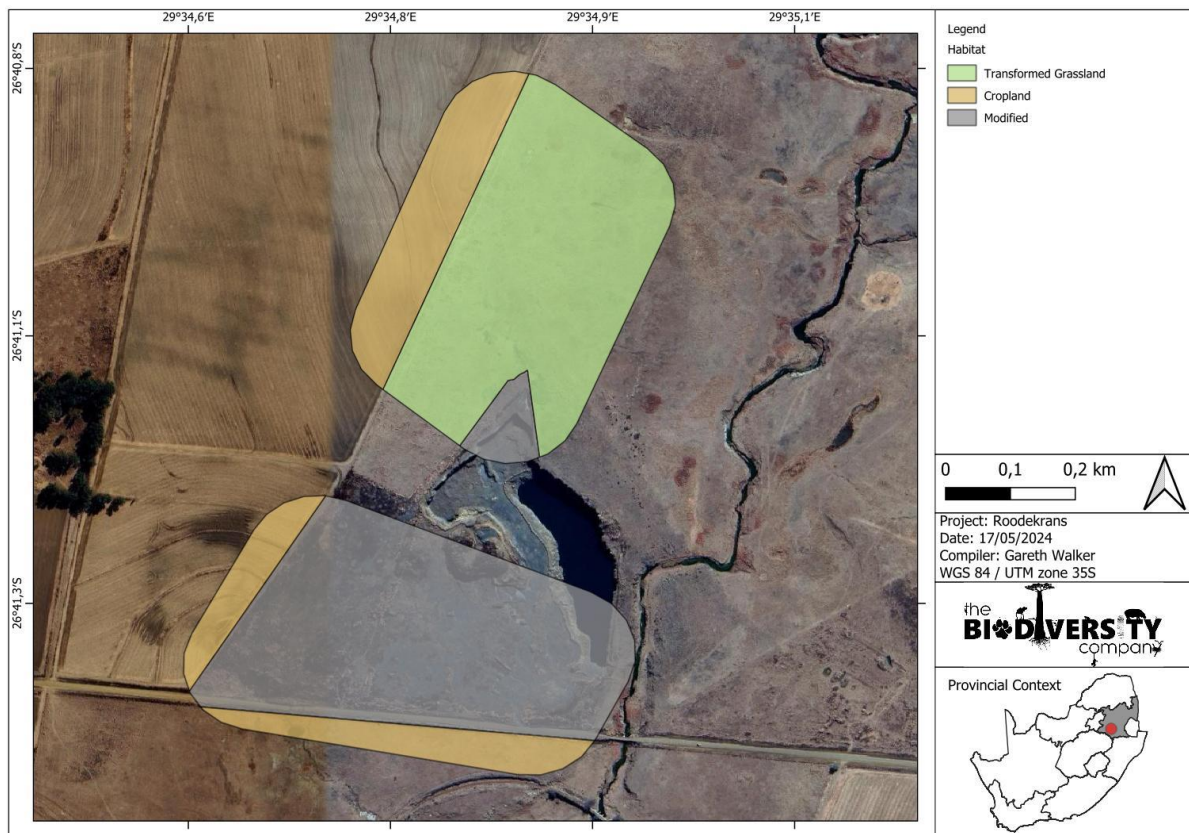


Figure 3-5 Map depicting the habitat types defined within the PAOI.

3.6.2 Screening Tool Comparison

The allocated sensitivities for each of the relevant themes are either disputed or validated in Table 3-6 below. A summative explanation for each result is provided as relevant. The specialist-assigned sensitivity ratings are based largely on the SEI process followed in the previous section, and consideration is given to any observed or likely presence of SCC or protected species.

Table 3-6 *Summary of the screening tool vs specialist assigned sensitivities.*

Screening Tool Theme	Screening Tool	Specialist	Tool Validated or Disputed by Specialist - Reasoning
Terrestrial Theme	Very High	Low	Disputed – Habitat exists in a predominantly modified state with high levels of anthropogenic disturbance that has contributed to an overall loss in ecosystem functionality. Habitat will not recover without human intervention and will continue to degrade over time without rehabilitation. Habitat no longer viable constituent of a CBA2 and VU ecosystem.
Animal Theme	Medium	Low	Disputed – Habitat exists in a modified and disturbed state with high levels of anthropogenic disturbance. No SCC were observed, and none are expected to occur within the PAOI.
Plant Theme	Low	Low	Validated – Habitat exists in a degraded state with high levels of anthropogenic disturbance. High numbers of alien and invasive plants are present. No flora SCC were observed, and none are expected to occur within the PAOI.

4 Impact Management and Mitigation Plan

The aim of the management outcomes is to present mitigation actions in such a way that they can be incorporated into the Environmental Management Programme (EMPr), and possible biodiversity management programme, for the project, which should in turn allow for a more successful implementation and auditing of the mitigations and monitoring guidelines. **Error! Reference source not found.** presents the recommended mitigation measures and the respective time frames, targets, and performance indicators relative to the terrestrial assessment.

The focus of mitigation measures is to reduce the significance of the likely impacts associated with the development, and thereby:

- Prevent the further loss and fragmentation of indigenous vegetation communities within the ecosystem within and around the PAOI;
- Reduce the negative fragmentation effects of the development and facilitate the safe movement of fauna species;
- Prevent the direct and indirect loss and disturbance of flora and fauna species and communities; and
- Adequately follow the guidelines for interpreting the SEI ratings assigned to the PAOI.

Table 4-1 Project specific mitigation measures including requirements for timeframes, roles, and responsibilities.

Management outcome: Vegetation and Habitats				
Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. It is recommended that areas to be developed be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon	Life of operation	Project manager, Environmental Officer	Areas of indigenous vegetation (High and Very High SEI Areas)	Ongoing
All laydown areas, chemical toilets etc. should be restricted to Low SEI areas. No materials may be stored for extended periods of time and must be removed from the PAOI once the construction/closure phase has been concluded.	Construction/Operational Phase	Environmental Officer & Design Engineer	Laydown areas and material storage & placement.	Ongoing
Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion. This will also reduce the likelihood of encroachment by alien invasive plant species.	Closure Phase/Rehabilitation phase	Environmental Officer & Contractor	Assess the state of rehabilitation and encroachment of alien vegetation	Quarterly for up to two years after the closure
All footprints to be rehabilitated after construction is complete. Rehabilitation of the disturbed areas existing in the PAOI must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type.	Operational Phase	Environmental Officer & Contractor	Footprint rehabilitation	Quarterly monitoring
A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment on site unless necessary. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers	Life of operation	Environmental Officer & Contractor	Spill events, Vehicles dripping.	Ongoing
Leaking equipment and vehicles must be repaired immediately or be removed from PAOI to facilitate repair	Life of operation	Environmental Officer & Contractor	Leaks and spills	Ongoing
It should be made an offence for any staff to /take bring any plant species into/out of any portion of the PAOI without permission. The only exception to this involves the removal of exotic or invasive species from the PAOI, and the introduction of indigenous species for rehabilitation of the PAOI post development. Introductions and removals, however, must be closely monitored to ensure that the correct species are being removed/reintroduced.	Life of operation	Project manager, Environmental Officer	Any instances	Ongoing
Management outcome: Fauna				
Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited.	Life of operation	Health and Safety Officer	Compliance to the training.	Ongoing
Management outcome: Alien Vegetation				

Roodekrans

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
An Alien Invasive Plant (AIP) Management Plan must be compiled and implemented. This should regularly be updated to reflect the annual changed in AIP composition.	Life of operation	Project manager, Environmental Officer & Contractor	Manage and assess presence and encroachment of alien vegetation	Twice a year
The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Footprints of the roads must be kept to prescribed widths.	Construction/Operational Phase	Project manager, Environmental Officer & Contractor	Footprint Area	Life of operation
Management outcome: Environmental awareness training				
Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the PAOI.	Life of operation	Health and Safety Officer	Compliance to the training.	Ongoing

5 Conclusion

The PAOI exists in a predominantly modified state, having been subjected to various anthropogenic impacts such as mining, infrastructure development, pollution, unregulated livestock grazing, agriculture and edge effects associated with the nearby activities. This habitat is unlikely to fully recover without human intervention and will continue to degrade without further active rehabilitation.

The completion of this terrestrial biodiversity assessment led to a dispute of the 'Very High' Terrestrial Biodiversity Theme Sensitivity as set out in the National Environmental Screening Tool. Instead, the PAOI is assigned an overall 'Low' Terrestrial Theme Sensitivity.

5.1 Impact Statement

The location, state and size of the ecosystem suggests that it is unlikely that any functional habitat will be lost because of the impacts arising from the proposed activities. However, these assumptions pertain exclusively to the terrestrial habitat.

5.2 Specialist Opinion

It is the opinion of the specialist stipulated herein that the proposed development is favourable only if all mitigation measures provided in this and other specialist reports are implemented.

6 References

Bates, M.F., Branch, W.R., Bauer, A.M., Burger, M., Marais, J., Alexander, G.J & de Villiers, M.S. (Eds). 2014. Atlas and Red List of Reptiles of South Africa, Lesotho and Swaziland. Suricata 1. South African Biodiversity Institute, Pretoria.

Department of Forestry, Fisheries and the Environment (DFFE). 2023. SACAD (South Africa Conservation Areas Database) and SAPAD (South Africa Protected Areas Database). <http://egis.environment.gov.za>.

Department of Forestry, Fisheries and the Environment (DFFE). 2022. National Protected Areas Expansion Strategy <http://egis.environment.gov.za>.

Du Preez, L.H. & Carruthers, V. 2009. A Complete Guide to the Frogs of Southern Africa. Struik Nature, Cape Town.

Fish, L., Mashau, A.C., Moeaha, M.J. & Nembudani, M.T. 2015. Identification Guide to Southern African Grasses: An Identification Manual with Keys, Descriptions, and Distributions. SANBI, Pretoria.

Mucina, L. & Rutherford, M.C. (Eds.). 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria, South African.

Mucina, L., Rutherford, M.C. & Powrie, L.W. (Eds.). 2007. Vegetation map of South Africa, Lesotho and Swaziland. 1:1 000 000 scale sheet maps. 2nd ed. South African National Biodiversity Institute, Pretoria.

Mucina, L., Scott-Shaw, CR., Rutherford, MC., Camp., KGT., Matthews, WS., Powrie, LW and Hoare, DB. Indian Ocean Coastal Belt. IN Mucina, L. & Rutherford, M.C. (Eds.). 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria, South African.

National Biodiversity Assessment spatial data. 2018. <http://bgis.sanbi.org/>. Accessed January 2024.

Nel JL, Murray KM, Maherry AM, Petersen CP, Roux DJ, Driver A, Hill L, Van Deventer H, Funke N, Swartz ER, Smith-Adao LB, Mbona N, Downsborough L and Nienaber S. 2011. Technical Report for the National Freshwater Ecosystem Priority Areas project. WRC Report No. K5/1801.

NEMBA. 2014. Government Gazette, Volume 584. No 37320. www.gpwonline.co.za. Accessed January 2024.

Raimondo, D., von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C., Kamundi, D.A. and Manyama, P.A. 2009. Red List of South African Plants. Strelitzia 25. South African National Biodiversity Institute, Pretoria.

SANBI. 2022. Red List of South African Plants version 2020. redlist.sanbi.org (Accessed: May 2023)

SANBI-BGIS. 2017. Technical guidelines for CBA Maps: Guidelines for developing a map of Critical Biodiversity Areas & Ecological Support Areas using systematic biodiversity planning.

SAPAD (South Africa Protected Areas Database) and SACAD (South Africa Conservation Areas Database) (2023). <http://egis.environment.gov.za>

Skinner, J.D. & Chimimba, C.T. 2005. The Mammals of the Southern African Sub-region. Cambridge University Press, Cape Town.

Skowno, A.L. & Monyeki, M.S. 2021. South Africa's Red List of Terrestrial Ecosystems (RLEs). Land, 10, 1048, 1-14.

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.

Taylor A, Cowell C, Drouilly M, Schulze E, Avenant N, Birss C, Child MF. 2016. A conservation assessment of *Pelea capreolus*. In Child MF, Roxburgh L, Do Linh San E, Raimondo D, Davies-Mostert HT, editors. The Red List of Mammals of South Africa, Swaziland and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

Van Deventer H, Smith-Adao L, Collins NB, Grenfell M, Grundling A, Grundling P-L, Impson D, Job N, Lötter M, Ollis D, Petersen C, Scherman P, Sieben E, Snaddon K, Tererai F. and Van der Colff D. 2019. *South African National Biodiversity Assessment 2018: Technical Report. Volume 2b: Inland Aquatic (Freshwater) Realm*. CSIR report number CSIR/NRE/ECOS/IR/2019/0004/A. South African National Biodiversity Institute, Pretoria. <http://hdl.handle.net/20.500.12143/6230>.

7 Appendix Items

7.1 Appendix A: Methods

7.1.1 Desktop Dataset Assessment

7.1.1.1 Ecologically Important Landscape Features

Existing ecologically relevant data layers were incorporated into a GIS to establish how the proposed development might interact with any ecologically important entities. Emphasis was placed around the following spatial datasets:

- National Biodiversity Assessment 2018 (Skowno et al, 2019) - The purpose of the National Biodiversity Assessment (NBA) is to assess the state of South Africa's biodiversity based on best available science, with a view to understanding trends over time and informing policy and decision-making across a range of sectors. The NBA deals with all three components of biodiversity: genes, species and ecosystems; and assesses biodiversity and ecosystems across terrestrial, freshwater, estuarine and marine environments. The two headline indicators assessed in the NBA are:
 - Ecosystem Threat Status – indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition. Red List of Ecosystems (RLE) 2021 – The list was first published in 2011 and has since been substantially revised by authors Dr Andrew Skowno and Mrs Maphale Monyeki (SANBI, 2022). This list is based on assessments that followed the International Union for Conservation of Nature (IUCN) Red List of Ecosystems Framework (version 1.1) and covers all 456 terrestrial ecosystem types described in South Africa by Mucina and Rutherford (2006). A total of 120 of the 456 terrestrial ecosystem types assessed are categorised as threatened and together make up approximately 10% of the remaining natural habitat in the country. Of these 120 ecosystem types, 55 are Critically Endangered (CR), 51 Endangered (EN) and 14 are Vulnerable (VU). The remainder are categorised as Least Concern (LC) (SANBI, 2022; Skowno & Monyeki, 2021).
 - Ecosystem Protection Level – indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. Not Protected, Poorly Protected or Moderately Protected ecosystem types are collectively referred to as under-protected ecosystems.
- Protected areas:
 - South Africa Protected Areas Database (SAPAD) and South Africa Conservation Areas Database (SACAD) (DFFE, 2023a) – The South African Protected Areas Database (SAPAD) and South Africa Conservation Areas Database (SACAD) contains spatial data for the conservation of South Africa. It includes spatial and attribute information for both formally protected areas and areas that have less formal protection. The database is updated on a continuous basis and forms the basis for the Register of Protected Areas which is a legislative requirement under the National Environmental Management: Protected Areas Act, Act 57 of 2003.

- National Protected Areas Expansion Strategy (NPAES) (DFFE, 2022b) – The National Protected Area Expansion Strategy (NPAES) provides spatial information on areas that are suitable for terrestrial ecosystem protection. These focus areas are large, intact and unfragmented and are therefore, of high importance for biodiversity, climate resilience and freshwater protection.
- Conservation/Biodiversity Sector Plans:
 - The Mpumalanga Critical Biodiversity Areas (CBA) map accounts for terrestrial fauna and flora only. The inclusion of the aquatic component was limited to the Freshwater Ecosystem Priority Areas (FEPA) catchments (included in the cost layer and for the identification of Ecological Support Areas (ESAs)) and wetland clusters (included in the ESAs only). The areas are subdivided as Critical Biodiversity Areas (CBA1), CBA2, Degraded, ESA1, ESA2, Other and Protected:
 - Critical Biodiversity Areas (CBAs) –Areas considered critical for meeting biodiversity targets and thresholds, and which are required to ensure the persistence of viable populations of species and the functionality of ecosystems.
 - Ecological Support Areas (ESAs) - Areas are required to support and sustain the ecological functioning of Critical Biodiversity Areas (CBAs). For terrestrial and aquatic environments, these areas are functional but are not necessarily pristine natural areas. They are however required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within the CBAs, and which also contributes significantly to the maintenance of Ecological Infrastructure.
- Important Bird and Biodiversity Areas (BirdLife South Africa, 2015) – Important Bird and Biodiversity Areas (IBAs) constitute a global network of over 13 500 sites, of which 112 sites are found in South Africa. IBAs are sites of global significance for bird conservation, identified through multi-stakeholder processes using globally standardised, quantitative, and scientifically agreed criteria; and
- Freshwater Ecology:
 - Strategic Water Source Areas (SWSAs) (Le Maitre et al, 2018) – SWSAs are defined as areas of land that supply a quantity of mean annual surface water runoff in relation to their size and therefore, contribute considerably to the overall water supply of the country. These are key ecological infrastructure assets and the effective protection of surface water SWSAs areas is vital for national security because a lack of water security will compromise national security and human wellbeing.
 - South African Inventory of Inland Aquatic Ecosystems (SAIIAE) (Van Deventer et al, 2018) – A South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was established during the National Biodiversity Assessment of 2018. It is a collection of data layers that represent the extent of river and inland wetland ecosystem types as well as pressures on these systems.
 - National Freshwater Ecosystem Priority Area (NFPEPA) (Nel et al., 2011) – The NFPEPA database provides strategic spatial priorities for conserving the country’s freshwater ecosystems and associated biodiversity as well as supporting sustainable use of water resources.

7.2 Appendix B: Terrestrial Site Ecological Importance

The different habitat types within the PAOI were delineated and identified based on observations made during the field survey, and information from available satellite imagery. These habitat types were assigned Ecological Importance (EI) categories based on their ecological integrity, conservation value, the presence of SCC and their ecosystem processes.

Site Ecological Importance (SEI) is a function of the Biodiversity Importance (BI) of the receptor (e.g., SCC, the vegetation/fauna community or habitat type present in the Project Area) and Receptor Resilience (RR) (its resilience to impacts).

BI is a function of Conservation Importance (CI) and the Functional Integrity (FI) of the receptor. The criteria for the CI and FI ratings are provided in Table 7-1 and Table 7-2 respectively.

Table 7-1 Summary of Conservation Importance (CI) criteria.

Conservation Importance	Fulfilling Criteria
Very High	Confirmed or highly likely occurrence of Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Extremely Rare or CR species that have a global extent of occurrence (EEO) of < 10 km ² . Any area of natural habitat of a CR ecosystem type or large area (> 0.1% of the total ecosystem type extent) of natural habitat of an EN ecosystem type. Globally significant populations of congregatory species (> 10% of global population).
High	Confirmed or highly likely occurrence of CR, EN, VU species that have a global EEO of > 10 km ² . IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A. If listed as threatened only under Criterion A, include if there are less than 10 locations or < 10 000 mature individuals remaining. Small area (> 0.01% but < 0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type or large area (> 0.1%) of natural habitat of VU ecosystem type. Presence of Rare species. Globally significant populations of congregatory species (> 1% but < 10% of global population).
Medium	Confirmed or highly likely occurrence of populations of Near Threatened (NT) species, threatened species (CR, EN, VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals. Any area of natural habitat of threatened ecosystem type with status of VU. Presence of range-restricted species. > 50% of receptor contains natural habitat with potential to support SCC.
Low	No confirmed or highly likely populations of SCC. No confirmed or highly likely populations of range-restricted species. < 50% of receptor contains natural habitat with limited potential to support SCC.
Very Low	No confirmed and highly unlikely populations of SCC. No confirmed and highly unlikely populations of range-restricted species. No natural habitat remaining.

Table 7-2 Summary of Functional Integrity (FI) criteria.

Functional Integrity	Fulfilling Criteria
Very High	Very large (> 100 ha) intact area for any conservation status of ecosystem type or > 5 ha for CR ecosystem types. High habitat connectivity serving as functional ecological corridors, limited road network between intact habitat patches. No or minimal current negative ecological impacts, with no signs of major past disturbance.
High	Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type or > 10 ha for EN ecosystem types. Good habitat connectivity, with potentially functional ecological corridors and a regularly used road network between intact habitat patches. Only minor current negative ecological impacts, with no signs of major past disturbance and good rehabilitation potential.
Medium	Medium (> 5 ha but < 20 ha) semi-intact area for any conservation status of ecosystem type or > 20 ha for VU ecosystem types. Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches. Mostly minor current negative ecological impacts, with some major impacts and a few signs of minor past disturbance. Moderate rehabilitation potential.
Low	Small (> 1 ha but < 5 ha) area. Almost no habitat connectivity but migrations still possible across some modified or degraded natural habitat and a very busy used road network surrounds the area. Low rehabilitation potential. Several minor and major current negative ecological impacts.
Very Low	Very small (< 1 ha) area. No habitat connectivity except for flying species or flora with wind-dispersed seeds. Several major current negative ecological impacts.

BI can be derived from a simple matrix of CI and FI as provided in Table 7-3.

Table 7-3 Matrix used to derive Biodiversity Importance (BI) from Functional Integrity (FI) and Conservation Importance (CI).

Biodiversity Importance		Conservation Importance				
		Very High	High	Medium	Low	Very Low
Functional Integrity	Very High	Very High	Very High	High	Medium	Low
	High	Very High	High	Medium	Medium	Low
	Medium	High	Medium	Medium	Low	Very Low
	Low	Medium	Medium	Low	Low	Very Low
	Very Low	Medium	Low	Very Low	Very Low	Very Low

The fulfilling criteria to evaluate RR are based on the estimated recovery time required to restore an appreciable portion of functionality to the receptor, as summarised in Table 7-4.

Table 7-4 Summary of Receptor Resilience (RR) criteria.

Resilience	Fulfilling Criteria
Very High	Habitat that can recover rapidly (~ less than 5 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a very high likelihood of: (i) remaining at a site even when a disturbance or impact is occurring, or (ii) returning to a site once the disturbance or impact has been removed.
High	Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of: (i) remaining at a site even when a disturbance or impact is occurring, or (ii) returning to a site once the disturbance or impact has been removed.
Medium	Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of: (i) remaining at a site even when a disturbance or impact is occurring, or (ii) returning to a site once the disturbance or impact has been removed.
Low	Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~ less than 50% of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of: (i) remaining at a site even when a disturbance or impact is occurring, or (ii) returning to a site once the disturbance or impact has been removed.
Very Low	Habitat that is unable to recover from major impacts, or species that are unlikely to: (i) remain at a site even when a disturbance or impact is occurring, or (ii) return to a site once the disturbance or impact has been removed.

After the determination of BI and RR, the SEI can be ascertained using the matrix as provided in Table 7-5.

Table 7-5 Matrix used to derive Site Ecological Importance from Receptor Resilience (RR) and Biodiversity Importance (BI).

Site Ecological Importance		Biodiversity Importance				
		Very High	High	Medium	Low	Very Low
Receptor Resilience	Very Low	Very High	Very High	High	Medium	Low
	Low	Very High	Very High	High	Medium	Very Low
	Medium	Very High	High	Medium	Low	Very Low
	High	High	Medium	Low	Very Low	Very Low
	Very High	Medium	Low	Very Low	Very Low	Very Low

Interpretation of the SEI in the context of the proposed project is provided in Table 7-6.

Table 7-6 *Guideline for interpreting Site Ecological Importance in the context of proposed activities.*

Site Ecological Importance	Interpretation in relation to proposed development activities
Very High	Avoidance mitigation – no destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e., last remaining populations of species, last remaining good condition patches of ecosystems/unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains.
High	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted, limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Medium	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Low	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.
Very Low	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

The SEI evaluated for each taxon can be combined into a single multi-taxon evaluation of SEI for the assessment area. Either a combination of the maximum SEI for each receptor should be applied, or the SEI may be evaluated only once per receptor but for all necessary taxa simultaneously. For the latter, justification of the SEI for each receptor is based on the criteria that conforms to the highest CI and FI, and the lowest RR across all taxa.

7.3 Appendix C – Specialist Declaration of Independence

I, Gareth Walker, declare that:

I act as the independent specialist in this application;

I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;

I declare that there are no circumstances that may compromise my objectivity in performing such work;

I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;

I will comply with the Act, regulations and all other applicable legislation;

I have no, 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; and

I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.



Gareth Walker

Biodiversity Specialist

The Biodiversity Company

May 2024

I, Andrew Husted, declare that:

I act as the independent specialist in this application;

I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;

I declare that there are no circumstances that may compromise my objectivity in performing such work;

I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;

I will comply with the Act, regulations and all other applicable legislation;

I have no, 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; and

I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.



Andrew Husted

Ecologist

The Biodiversity Company

May 2024

7.4 Appendix D – Specialist CVs

Gareth Walker

BSC, MSc, PhD

Cell: +27 83 572 5371

Email: gareth@thebiodiversitycompany.com

Identity Number: 9111095050080

Date of birth: 09 November 1991



Profile Summary

Work experience throughout South Africa and Angola.

Extensive experience working in Limpopo and Mpumalanga assessing the various ecological drivers of terrestrial ungulates.

Experience with wildlife management and ecological monitoring in the Kruger National Park and surrounding private reserves.

Areas of Interest

Zoology, Ecology, Biodiversity, Conservation and Invasion Ecology.

Key Experience

- Terrestrial Ecological Assessments
- Monitoring programmes
- Field work and research
- Species distribution modelling

Country Experience

South Africa, Angola

Nationality

South African

Languages

English – Proficient

Afrikaans – Conversational

Zulu – Basic

Qualifications

- PhD Zoology, Rhodes University
- MSc Botany Invasion Ecology, Stellenbosch University
- BSc (Hons) Conservation Ecology, Stellenbosch University
- SANASP (Application Pending)

Andrew Husted

M.Sc Aquatic Health (*Pr Sci Nat*)

Cell: +27 81 319 1225

Email: andrew@thebiodiversitycompany.com

Identity Number: 7904195054081

Date of birth: 19 April 1979



Profile Summary

Working experience throughout South Africa, West and Central Africa and also Armenia & Serbia.

Specialist experience in exploration, mining, engineering, hydropower, private sector and renewable energy.

Experience with project management for national and international multi-disciplinary projects.

Specialist guidance, support and facilitation for the compliance with legislative processes, for in-country requirements, and international lenders.

Specialist expertise include Instream Flow and Ecological Water Requirements, Freshwater Ecology, Terrestrial Ecology and also Ecosystem Services.

Areas of Interest

Sustainability and Conservation.

Instream Flow and Ecological Water Requirements.

Publication of scientific journals and articles.

Key Experience

- World Bank, Equator Principles and the International Finance Corporation requirements
- Environmental, Social and Health Impact Assessments (ESHIA)
- Environmental Management Programmes (EMP)
- Ecological Water Requirement determination experience
- Wetland delineations and ecological assessments
- Rehabilitation Plans and Monitoring
- Fish population structure assessments
- The use of macroinvertebrates to determine water quality.
- Aquatic Ecological Assessments
- Aquaculture

Country Experience

Angola, Botswana, Cameroon

Democratic Republic of Congo

Ghana, Ivory Coast, Lesotho

Liberia, Mali, Mauritius, Mozambique

Nigeria, Republic of Armenia,

Senegal, Serbia, Sierra Leone, South Africa

Tanzania

Nationality

South African

Languages

English – Proficient

Afrikaans – Conversational

German - Basic

Qualifications

- MSc (University of Johannesburg) – Aquatic Health.
- BSc Honours (Rand Afrikaans University) – Aquatic Health
- BSc Natural Science
- Pr Sci Nat (400213/11)
- Certificate of Competence: Mondi Wetland Assessments
- Certificate of Competence: Wetland WET-Management
- SASS 5 (Expired) – Department of Water Affairs and Forestry for the River Health Programme
- EcoStatus application for rivers and streams

Signed:



Andrew Husted