# APPENDIX E6 – Faunal Assessment



SCIENTIFIC TERRESTRIAL SERVICES

# Terrestrial Biodiversity

**AS PART OF THE ENVIRONMENTAL AUTHORISATION PROCESS FOR THE PROPOSED MABASA 750 MW COMBINED CYCLE GAS TURBINE POWER PLANT IN RICHARDS BAY, IN THE KWAZULU–NATAL PROVINCE.**

## Part C: Faunal Assessment

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Part of the SAS Environmental Group of Companies

# DOCUMENT GUIDE

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

| **Theme-Specific Requirements as per Government Notice No. 1150<br>Animal Biodiversity Theme – Very High and High Sensitivity Rating as per Screening Tool Output** | | |
|---|---|---|
| **No.** | **SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS** | **The section in report/Notes** |
| **1.** | **General Information** | |
| 1.1 | An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified by the screening tool as being of "very high" or "high" sensitivity for terrestrial animal species must submit a Terrestrial Animal Species Specialist Assessment Report. | **Part C:** Faunal Assessment |
| 1.2 | An applicant intending to undertake an activity identified in the scope of this protocol on a site identified by the screening tool as being of "medium sensitivity" for terrestrial animal species must submit either a Terrestrial Animal Species Specialist Assessment Report or a Terrestrial Animal Species Compliance Statement, depending on the outcome of a site inspection undertaken in accordance with paragraph 4. | **Part C:** Section 3 |
| 1.3 | The Terrestrial Animal Species Specialist Assessment and the Terrestrial Animal Species Compliance Statement must be undertaken within the study area. | **Part C:** Faunal Assessment |
| 1.4 | Where the nature of the activity is expected to have an impact on Species of Conservation Concern (SCC) beyond boundary of the preferred site, the project areas of influence must be determined by the specialist in accordance with Species Environmental Assessment Guideline, and the study area must include the project areas of influence, as determined. | Not Applicable |
| **2** | **Animal Species Specialist Assessment** | |
| 2.1 | The assessment must be prepared by a specialist registered with the South African Council for Natural Scientific Professions (SACNASP) within a field of practice relevant to the taxonomic groups ("taxa") for which the assessment is being undertaken. | **Part A – C:** Cover Page<br>**Part A:** Appendix E |
| **2.2** | **The assessment must be undertaken in accordance with the Species Environmental Assessment Guideline[1] and must:** | |
| 2.2.1 | Identify the SCC which were found, observed or are likely to occur within the study area; | **Part C**: Section 3<br>**Part C**: Appendix B & C |
| 2.2.2 | Provide evidence (photographs or sound recordings) of each SCC found or observed within the study area, which must be disseminated by the specialist to a recognized online database facility, immediately after the site inspection has been performed (prior to preparing the report contemplated in paragraph 3); | **Part C:** Section 3 |
| 2.2.3 | Identify the distribution, location, viability[2] and detailed description of population size of the SCC identified within the study area; | **Part C**: Section 3<br>**Part C**: Appendix B & C |
| 2.2.4 | Identify the nature and the extent of the potential impact of the proposed development on the population of the SCC located within the study area; | **Part C:** Section 5 |
| 2.2.5 | Determine the importance of the conservation of the population of the SCC identified within the study area, based on information available in national and international databases including the IUCN (International Union for Conservation of Nature and Natural Resources) Red List of Threatened Species, South African Red List of Species, and/or other relevant databases; | **Part C**: Section 3 & 5<br>**Part C**: Appendix B |

[1] Available at https://bgis.sanbi.org/
[2] the ability to survive and reproduce in the long term

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| 2.2.6 | Determine the potential impact of the proposed development on the habitat of the SCC located within the study area; | **Part C:** Section 5 |
| 2.2.7 | Include a review of relevant literature on the population size of the SCC, the conservation interventions as well as any national or provincial species management plans for the SCC. This review must provide information on the need to conserve the SCC and indicate whether the development is compliant with the applicable species management plans and if not, a motivation for the deviation; | **Part C**: Section 3<br>**Part C**: Appendix B |
| 2.2.8 | Identify any dynamic ecological processes occurring within the broader landscape, that might be disrupted by the development and result in negative impact on the identified SCC, for example, fires in fire-prone systems; | **Part C:** Section 5 |
| 2.2.9 | Identify any potential impact on ecological connectivity within the broader landscape, and resulting impacts on the identified SCC and its long term viability; | **Part C:** Section 5 |
| 2.2.10 | Determine buffer distances as per the Species Environmental Assessment Guidelines used for the population of each SCC | **Not Applicable to this report** |
| 2.2.11 | Discuss the presence or likelihood of additional SCC including threatened species not identified by the screening tool, Data Deficient or Near Threatened Species, as well as any undescribed species; or roosting and breeding or foraging areas used by migratory species where these species show significant congregations, occurring in the vicinity. | **Part C:** Section 5 |
| 2.2.12 | Identify any alternative development footprints within the preferred development site which would be of "low" sensitivity" or "medium" sensitivity as identified by the screening tool and verified through the site sensitivity verification | **Part C:** Section 4 |
| 2.3 | The findings of the assessment must be written up in a Terrestrial Animal Species Specialist Assessment Report. | **Part C:** Faunal Assessment |
| **3.** | **Animal Species Specialist Assessment Report. This report must include as a minimum the following information:** | |
| 3.1.1 | Contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the assessment including 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 C:** Section 3 |
| 3.1.4 | A description of the methodology used to undertake the site sensitivity verification and impact assessment and site inspection, including equipment and modelling used where relevant; | **Part C:** Appendix A |
| 3.1.5 | A description of the mean density of observations/number of sample sites per unit area and the site inspection observations; | Not applicable to this report |
| 3.1.6 | A description of the assumptions made and any uncertainties or gaps in knowledge or data | **Part C:** Section 1 |
| 3.1.7 | Details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported; | **Part C:** Section 3<br>**Part C:** Appendix B |
| 3.1.8 | The online database name, hyperlink and record accession numbers for disseminated evidence of SCC found within the study area | **Part C:** Section 3<br>**Part C:** Appendix B |
| 3.1.9 | The location of areas not suitable for development and to be avoided during construction where relevant; | **Part C:** Section 4 |
| 3.1.10 | A discussion on the cumulative impacts; | **Part C:** Section 5 |
| 3.1.11 | Impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr) | **Part C:** Section 5 |
| 3.1.12 | A reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not, of the development related to the specific theme considered, and if the development should receive approval or not, related to the specific theme being considered, and any conditions to which the opinion is subjected if relevant. | Executive summary<br>**Part C:** Section 6 |
| 3.1.13 | A motivation must be provided if there were any development footprints identified as per paragraph 2.3.12 above that were identified as having "low" or "medium" terrestrial animal species sensitivity and were not considered appropriate. | **Part C:** Section 1 |
| 3.2 | A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report. | **Part A**: Appendix E |
| **4** | **Medium Sensitivity Species of Conservation Concern Confirmation** | |

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| 4.1 | Medium sensitivity data represents suspected habitat for SCC based on occurrence records for these species collected prior to 2002 or is based on habitat suitability modelling. | **Part C:** Section 3 |
| 4.2 | The presence or likely presence of the SCC identified by the screening tool, must be confirmed through a site inspection by a specialist registered with the South African Council for Natural Scientific Professions in a field of practice relevant to the taxonomic group ("taxa") for which the assessment is being undertaken. | **Part C:** Section 3<br>**Part C:** Appendix B |
| 4.3 | The assessment must be undertaken within the study area. | **Part C:** Section 1 |
| 4.4 | The site inspection to determine the presence or likely presence of SCC must be undertaken in accordance with the Species Environmental Assessment Guideline. | **Part C:** Section 2 |
| 4.5 | The site inspection is to confirm the presence, likely presence or confirmed absence of a SCC within the site identified as "medium" sensitivity by the screening tool. | **Part C:** Appendix B |
| 4.6 | Where SCC are found on site or have been confirmed to be likely present, a Terrestrial Animal Species Specialist Assessment must be submitted in accordance with the requirements specified for "very high" and "high" sensitivity in this protocol. | **Part C:** Section 3<br>**Part C:** Appendix B |
| 4.7 | Conversely, where no SCC are found on site during the investigation or if the presence is confirmed to be unlikely, a Terrestrial Animal Species Compliance Statement must be submitted. | Not applicable to this report |

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# ACRONYMS

| | |
|---|---|
| **AIP** | Alien and Invasive Plant |
| **BGIS** | Biodiversity Geographic Information Systems |
| **BOP** | Balance of plant |
| **CBA** | Critical Biodiversity Area |
| **CCGT** | Combined Cycle Gas Turbine |
| **CR** | Critically Endangered |
| **DD** | Data Deficient |
| **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 |
| **EIS** | Ecological Importance and Sensitivity |
| **EN** | Endangered |
| **ESA** | Ecological Support Area |
| **GIS** | Geographic Information Systems |
| **GN** | Government Notice |
| **GPS** | Global Positioning System |
| **ha** | Hectares |
| **HRSG** | Heat Recovery Steam Generator |
| **IBA** | Important Bird and Biodiversity Area |
| **IDZ** | Industrial Development Zone |
| **IUCN** | International Union for Conservation of Nature |
| **km** | Kilometres |
| **km2** | Square kilometres |
| **kV** | Kilovolt |
| **KZN** | KwaZulu-Natal |
| **KZNNCMAA** | KwaZulu-Natal Nature Conservation and Management Amendment Act, 1997 [Act No 9 of 1997] |
| **KZNSCP** | Kwazulu-Natal Systematic Conservation Plan |
| **m2** | Square metres |
| **MW** | Megawatt |
| **NBA** | National Biodiversity Assessment |
| **NEMA** | National Environmental Management Act, 1998 [Act No. 107 of 1998] |
| **NEMBA** | National Environmental Management: Biodiversity Act, 2004 [Act No. 10 of 2004] |
| **NT** | Near Threatened |
| **NYBA** | Not yet been assessed |
| **NFA** | National Forest Act, 1998 [Act No. 84 of 1998] |
| **PES** | Present Ecological State |
| **POC** | Probability of Occurrence |
| **RDL** | Red Data listed |
| **SABAP 2** | South African Bird Atlas Project 2 |
| **SACNASP** | South African Council for Natural Scientific Professions |
| **SANBI** | South African National Biodiversity Institute |
| **SCC** | Species of Conservation Concern |
| **SEI** | Site Ecological Importance |
| **STS** | Scientific Terrestrial Services [Pty] Ltd |
| **TOPS** | Threatened or Protected Species |
| **VU** | Vulnerable |

# GLOSSARY OF TERMS

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| **Alien species (syn. exotic species; non-native species)** | A species that is present in a region outside its natural range due to human actions (intentional or accidental) that have enabled it to overcome biogeographic barriers. |
| **Baseline information (IEM Series)** | Information derived from data that:<br>• records the existing elements and trends in the environment; and<br>• records the characteristics of a given project proposal. |
| **Biological diversity or Biodiversity (as per the definition in the National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004) (NEMBA)** | The variability among living organisms from all sources including, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part and includes diversity within species, between species, and of ecosystems. |
| **Biodiversity priority areas (Skowno et al., 2019)** | Features in the landscape or seascape that are important for conserving a representative sample of ecosystems and species, for maintaining ecological processes, or for the provision of ecosystem services. They include the following categories, most of which are identified based on systematic biodiversity planning principles and methods: protected areas, Critically Endangered (CR) and Endangered (EN) ecosystems, Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA), Freshwater Ecosystem Priority Areas (FEPA), high water yield areas, flagship free-flowing rivers, priority estuaries, focus areas for land-based protected area expansion, and focus areas for offshore protection. Marine ecosystem priority areas and coastal ecosystem priority areas have yet to be identified but will be included in future. The different categories are not mutually exclusive and, in some cases, overlap, often because a particular area or site is important for more than one reason. They should be complementary, with overlaps reinforcing the importance of an area. |
| **Carrying Capacity** | The maximum population size of a biological species that can be sustained by that specific environment, given the food, habitat, water, and other resources available. |
| **Corridor** | A dispersal route or a physical connection of suitable habitats linking previously unconnected regions. |
| **Critical Biodiversity Area (CBA)** | A CBA is an area considered important for the survival of threatened species and includes valuable ecosystems such as wetlands, untransformed vegetation, and ridges. |
| **Critically Endangered (CR) (IUCN[3] Red List category)** | **Applied to both species/taxa and ecosystems**: A species is CR when the best available evidence indicates that it meets at least one of the five IUCN criteria for CR, indicating that the species is facing an extremely high risk of extinction. CR ecosystem types are at an extremely high risk of collapse. Most of the ecosystem type has been severely or moderately modified from its natural state. The ecosystem type is likely to have lost much of its natural structure and functioning, and species associated with the ecosystem may have been lost. CR species are those considered to be at extremely high risk of extinction. |
| **Development footprint (as per the NEMA definition)** | "in respect of land, means any evidence of its physical transformation as a result of the undertaking of any activity" |
| **Degradation** | 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. |
| **Disturbance** | A temporal change, either regular or irregular (uncertain), in the environmental conditions that can trigger population fluctuations and secondary succession. Disturbance is an important driver of biological invasions. |
| **Diversity** | Abundance and species richness of faunal classes |

[3] International Union for Conservation of Nature (IUCN)

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| **Driver (ecological)** | A driver is any natural or human-induced factor that directly or indirectly causes a change in ecosystem. A direct driver clearly influences ecosystem processes, where indirect driver influences ecosystem processes through altering one or more direct drivers. |
| **Ecological processes** | The functions and processes that operate to maintain and generate biodiversity. In order to include ecological processes in a biodiversity plan, their spatial components need to be identified and mapped. |
| **Ecological Support Area (ESA)** | An ESA provides connectivity and important ecological processes between CBAs and is therefore important in terms of habitat conservation. |
| **Ecoregion** | An ecoregion is a "recurring pattern of ecosystems associated with characteristic combinations of soil and landform that characterise that region." |
| **Endangered (EN) (IUCN Red List category)** | **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** | 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. |
| **Fatal flaw**<br>**(IEM Series)** | Any problem, issue or conflict (real or perceived) that could result in proposals being rejected or stopped. |
| **Faunal Class** | In biological classification, class (Latin: classis) is a taxonomic rank, as well as a taxonomic unit. Class specifically refers to major groups, namely: mammals, avifauna (birds), reptiles and invertebrates. |
| **Ground-truth** | Ground truth is a term used in various fields to refer to information provided by direct observation (i.e., empirical evidence) as opposed to information provided by inference. |
| **Habitat**<br>**(As per the definition in NEMBA)** | A place where a species or ecological community naturally occurs. |
| **Habitat loss** | Conversion of natural habitat in an ecosystem to a land use or land cover class that results in irreversible change in the composition, structure and functional characteristics of the ecosystem concerned. |
| **Impact**<br>**(IEM Series, draft Offset policy, and NEMA)** | The positive or negative effects on human well-being and/or on the environment.<br>Impact-related terminology:<br>➢ Cumulative impact: Past, current and reasonably foreseeable future impacts of an activity, considered together with the impact of the proposed activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.<br>➢ Impact Significant/significance: Significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e., intensity, duration, and likelihood). Impact significance is the value placed on the change by different affected parties (i.e., level of significance and acceptability). It is an anthropocentric concept, which makes use of value judgements and science-based criteria (i.e., biophysical, social and economic). Such judgement reflects the political reality of impact assessment in which significance is translated into public acceptability of impacts.<br>➢ Residual negative impacts: Negative impacts that remain after the proponent has made all reasonable and practicable changes to the location, siting, scale, layout, technology and design of the proposed development, in consultation with the environmental assessment practitioner and specialists (including a biodiversity specialist), in order to avoid and minimise negative impacts, and/or rehabilitate and/or restore |

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| | impacted areas within 30 years (*It is acknowledged that the time it takes for full restoration differs from ecosystem type to ecosystem type, as well as the local conditions. Given that there is no readily accessible information on the recovery times of the different ecosystem types in South Africa, a general timeframe had to be used. The 30-year general timeframe in the definition of "residual impact" reflects that the difficulty in restoring South African ecosystems once they have been disturbed. It is based on the risk-averse and cautious approach.*).<br>➢ Significant impact: An impact that may have a notable effect on one or more aspects of the environment or may result in non-compliance with accepted environmental quality standards, thresholds, or targets. |
| **Important Bird and Biodiversity Area (IBA)** | The IBA Programme identifies and works to conserve a network of sites critical for the long-term survival of bird species that: are globally threatened, have a restricted range, are restricted to specific biomes/vegetation types or sites that have significant populations. |
| **Indigenous vegetation (As per the definition in NEMA)** | Vegetation occurring naturally within a defined area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years. |
| **Integrity (ecological)** | The integrity of an ecosystem refers to its functional completeness, including its components (species) its patterns (distribution) and its processes. |
| **Invasive species** | Alien species that sustain self-replacing populations over several life cycles, produce reproductive offspring, often in very large numbers at considerable distances from the parent and/or site of introduction, and have the potential to spread over long distances. |
| **Listed invasive species** | All alien species that are regulated in South Africa under the NEMBA, Alien and Invasive Species Regulations, 2020. |
| **Least Concern (LC)** | Unlikely to become extinct in the near future. A least-concern species is a species that has been categorized by the IUCN as evaluated as not being a focus of species conservation. They do not qualify as threatened, near threatened, or (before 2001) conservation dependent. |
| **Least Threatened** | Least threatened ecosystems are still largely intact. |
| **Native species (syn. indigenous species)** | Species that are found within their natural range where they have evolved without human intervention (intentional or accidental). Also includes species that have expanded their range as a result of human modification of the environment that does not directly impact dispersal (e.g., species are still native if they increase their range as a result of watered gardens but are alien if they increase their range as a result of spread along human-created corridors linking previously separate biogeographic regions). |
| **Near Threatened (according to IUCN)** | Close to being at high risk of extinction in the near future. |
| **Niche (ecological)** | The role and position a species have in its environment; how it meets its needs for food and shelter, how it survives, and how it reproduces. A species' niche includes all of its interactions with the biotic and abiotic factors of its environment. |
| **Protected** | Species of high conservation value or national importance that require protection, according to Threatened or Protected Species (TOPS) 2007 and NEMBA. |
| **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. |
| **Refugia (ecological)** | Refugium (plural: refugia) is a location which supports an isolated or relict population of a once more widespread species. This isolation can be caused by climatic changes, geography, or human activities such as deforestation and overhunting. |

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| **Resource (ecological)** | A resource is a substance or object in the environment required by an organism for normal growth, maintenance, and reproduction. Resources can be consumed by one organism and, as a result, become unavailable to another organism. |
| **Species of Conservation Concern (SCC)** | The term SCC in the context of this report refers to all RDL and IUCN listed threatened species as well as provincially and nationally protected species of relevance to the project. |
| **Threatened 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. |
| **Trophic (ecological)** | Refers to feeding and nutrition. |
| **Vulnerable (VU)** | **Applied to both species/taxa and ecosystems**: A species is VU when the best available evidence indicates that it meets at least one of the five IUCN criteria for VU, indicating that the species is facing a high risk of extinction. An ecosystem type is VU when the best available evidence indicates that it meets any of the criteria A to E for VU and is then considered to be at a high risk of collapse. |

# 1 INTRODUCTION

Scientific Terrestrial Services (Pty) Ltd (hereafter referred to as “STS”) was appointed to conduct a biodiversity scoping assessment as part of the environmental authorisation (EA) process for the proposed Mabasa 750-megawatt (MW) Combined Cycle Gas Turbine (CCGT) power plant in the city of uMhlathuze Local Municipality and the King Cetshwayo District Municipality, KwaZulu-Natal Province (hereafter the “study area”). The project is located in the Richards Bay Industrial Development Zone (IDZ): Special Economic Zone Phase 1F, approximately 5 kilometres (km) east of the Nseleni Nature Reserve and 2 km north-west of Richards Bay central. The study area is situated 3 km north of the R34 John Ross Highway and 0.5 km southwest of the R619 regional road.

This infrastructure associated with the project (described in detail in Section 1.1) is collectively referred to as the ‘proposed Mabasa project’ in the report and is located within the study area which is illustrated in Figures 1 – 3 in relation to the surrounding environment.

## *1.1 Project Description (as provided by the proponent)*

The study area is located within a largely developed area with the immediate surrounding areas comprising predominantly industrial zones, residential developments (1.3 km from the study area), and various service industries (e.g., petrol stations). The section below was summarised from the technical document provided by the Environmental Assessment Practitioner (EAP).

### 1.1.1 Power Plant Description

The proposed Combined Cycle Power Plant (the “Plant”) will be designed to generate electricity. The scope of supply for the Plant will be based on a “2+2+1 combination” comprising of two GE Frame gas turbines (the “Combustion Turbine”) each with a dedicated Heat Recovery Steam Generator (HRSG) to generate and supply steam to a shared steam turbine (the Combustion Turbine, HRSG, and steam turbine together known as the “Power Plant”).

Generators attached to each of the Combustion Turbines and steam turbines will supply electrical power to the grid. The Combustion Turbines are capable of firing on a variety of fuels however, most commonly natural gas or light distillate oil. Specific calculations will be made based on the fuel availability for a specific Project.

The Plant will comprise of the following key equipment:

- Two (2) General Electric Frame 9 (model 9F.03) combustion turbines and generators;
- Two (2) triple pressure, 3 drum, natural circulation HRSG;
- One (1) condensing steam turbine and generator;
- One (1) de-aerating surface condenser;
- One (1) induced draft cooling tower;
- Balance of plant (BOP) equipment consisting of Pumps, Heat Exchangers, Transformers, Power Electrics, etc;
- One (1) integrated plant distribution control system; and
- 275 kilovolt (kV) Switchyard comprising of three (3) x 15 kV to 275 kV step-up transformers and one (1) station auxiliary transformer (the rating to be defined during detailed design).

The Plant will be designed for base load operations at 500 MW in Simple Cycle and 750 MW in Combined Cycle on 24 hours a day, seven days a week basis.

### 1.1.2 Project Site and Plant Arrangement

The land area required for the Project is 130,000 square metres ($m^2$) or 13 hectares (ha).

The plant arrangement is conceptual and should be finalised after i) a site visit, ii) completion of a geotechnical soil study, iii) location and direction of the transmission line / grid connection point, iv) the location of the fuel gas pipeline on site, v) utilities on site, and vi) any environmental impact study considerations.

The electrical switchgear and associated auxiliary equipment will be located within constructed buildings. The steam turbines will also be located within a building construction (the “Steam Hall”). The Steam Hall will house an office for technical staff, locker / toilet facility a workshop, a laboratory and storage area. All other major equipment will be designed for outdoor use.

Sufficient operations, administrative and support facilities are considered. A central control room provides a controlled environment to protect sensitive electrical equipment and for operators to monitor and control plant functions. A main office will accommodate Plant management and administrative staff, facilities including a kitchenette facility, toilet, first aid room, and a prayer room. All offices will have parking areas in front.

A demineralised water storage tank and system will provide boiler feed-water to the HRSG’s. The Plant will include one (1) induced draft cooling tower systems, with the source of the make-up water still to be defined.

The Plant will have a dedicated fire protection system; comprising of water storage, pumping system and a pressurized ring main complete with fire hydrants positioned along the ring main, firefighting equipment, a sprinkler system for the offices, fire extinguishers and a deluge system for the switchyard.

Site access roads will permit normal operations and lay-down areas/access adjacent to major equipment to facilitate maintenance. Roads, including ducting and open drains and ditches crossing below a road, will be designed considering axel loads and tuning circles of large trucks and mobile cranes.

The Plant will have adequate drainage to remove surface water from the site. Oily water separators positioned around the site will collect any spillage and or wash from maintenance operations on key equipment. The oily water separators will be designed to discharge grey water into the drains treated to a satisfactory cleanliness level.

Fencing will be provided around the perimeter of the switchyard and the Plant perimeter. Appropriate lighting and security system will be provided.

The proposal assumes Potable water, telecommunications, power evacuation and sewage system raw water / sanitary waste will be available at the proposed Plant site boundary.

## *1.2 Scope of Work*

The aim of this report (Part C) is to conduct a comprehensive impact assessment of how the proposed development activities may affect the faunal ecology of the study area, ensuring that ecological considerations guide subsequent planning and decision-making. This also aims to present a detailed account of the faunal baseline data for the study area and to identify areas of increased Ecological Importance and Sensitivity (EIS), as well as the mapping of such areas, and to describe the Present Ecological State (PES) of the study area with current data. The baseline data, and identified sensitivities, will highlight areas that could place constraints on planned development of activities and associated infrastructure. The primary objective of the faunal assessment is not to compile an exhaustive species list but rather to ensure that sufficient data are collected to describe all the faunal classes (mammals, avifauna, reptiles, amphibians and invertebrates) present in the study area, to optimise the detection of SCC and to assess habitat suitability for other potentially occurring SCC (SANBI, 2020).

The purpose of this report is to define the faunal ecology of the proposed development. The scope of work for this study is:

- To provide inventories of faunal species as encountered within the study area;

- To determine and describe habitat types, faunal communities and the ecological state of the sites associated with the study area and to rank each habitat type based on conservation importance and ecological sensitivity;
- To identify and consider all sensitive landscapes including rocky ridges, wetlands and/ or any other special features;
- To conduct a RDL and SCC assessment of threatened fauna, including species as listed in the NEMBA, TOPS list (Government Notice R152 in Government Gazette 29657, dated 23 February 2007, as amended), and the overall potential for such species to occur within the areas associated with the proposed development;
- To verify the Department of Forestry, Fisheries, and the Environment's (DFFE) national environmental screening report for the Animal Species Theme (Screening Tool) for the study area;
- To provide detailed information as well as relevant mitigation measures that must be implemented to guide the proposed development activities associated with the proposed study area; and
- To ensure the ongoing functioning of the ecosystem in such a way as to support local and regional conservation requirements and the provision of ecological services in the local area.

## *1.3 Assumptions and Limitations*

The following assumptions and limitations are applicable to this report:

- An EA was granted by the former Department of Environmental Affairs (DEA), now the DFFE, for the RBIDZ Phase 1F development in September 2016 (Reference No.: 14/12/16/3/3/2/665). The authorised development included the following infrastructure components: water infrastructure, sewer infrastructure, stormwater infrastructure, roads, electrical services, and the infilling of wetlands to facilitate industrial development. The access roads and associated services required for the proposed project are therefore already covered under the existing EA and do not form part of the current application. Importantly, the infilling of wetlands within the site has also been authorised under the existing EA and is excluded from the present assessment. All wetlands within the study area, will be infilled to allow for development as per the EA granted in 2016 (Ref 14/12/16/3/3/2/665). As such, impacts to freshwater ecosystems and their associated faunal assemblage are not assessed as part of this report. However, for completeness and to inform the broader ecological context of the site, baseline information relating to the freshwater habitats present within the study area has been included.

- The faunal assessment is confined to the proposed study area but the immediate surroundings were however taken into consideration in terms of faunal habitat utilisation and movement patterns. The entire study area and immediate surroundings were included in the desktop analysis of which the results are presented in **Part A: Section 3**;
- With ecology being dynamic and complex and the habits of many faunal species, some aspects (some of which may be important) may have been overlooked. It is, however, expected that most faunal communities have been accurately assessed and considered and the information provided is considered sufficient to allow informed decision making to take place and facilitate integrated environmental management;
- Due to the nature and habits of many faunal taxa, it is unlikely that all species or classes would have been observed during a field assessment. Therefore, site observations were compared with literature studies where necessary;
- Due to the locality of the study area, continuous anthropogenic activities, the cyclical nature of the life stages of many species, as well as the season of the assessment, few faunal species were observed during the site visit. As such, background data (desktop) and literature studies pertaining to the surrounding areas of the study area ((STS 22 – 2014), an assessment conducted in April 2022) were used to further infer faunal species composition and sensitivities in relation to the available habitat, and the findings of this assessment are an accurate reflection of the ecological characteristics of the study area;
- Sampling by its nature, means that not all individuals are assessed and identified. Some species and taxa within the footprint area may therefore have been missed during the assessment;
- For the faunal SCC assessment, the most recent *Regional Red Data Book of Birds of South Africa, Lesotho, and Eswatini* (Lee *et al.*, 2025) was consulted. However, as this publication is not yet reflected in the South Africa National Biodiversity Institute (SANBI) database, the precautionary principle was applied, and the highest conservation status from either source was used in this report;
- One site assessment was undertaken on the 13$^{th}$ of June 2024 (winter season). Further investigation within a more suitable season (summer or spring) is recommended to confirm the presence or absence of certain SCC, to determine the suitability of the study area, and to support and/or guide the authorisation process required in terms of NEMA. For the purpose of this report, a precautionary principle was applied to species Probability of Occurrence (POC) to account for this seasonality.

- A more comprehensive assessment would require that assessments take place across several seasons of the year. However, given the largely transformed nature of the site, multiple assessments were not deemed necessary.

## *1.4 Indemnity and Terms of use of this Report*

The findings, results, observations, conclusions, and recommendations presented in this report are based on available information and the author's best scientific and professional knowledge. The report is based on survey and assessment techniques that 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 resulting from ongoing research, or further work in this field pertaining to this investigation.

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This report must not be altered or added to or used for any other purpose other than that for which it was intended 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.

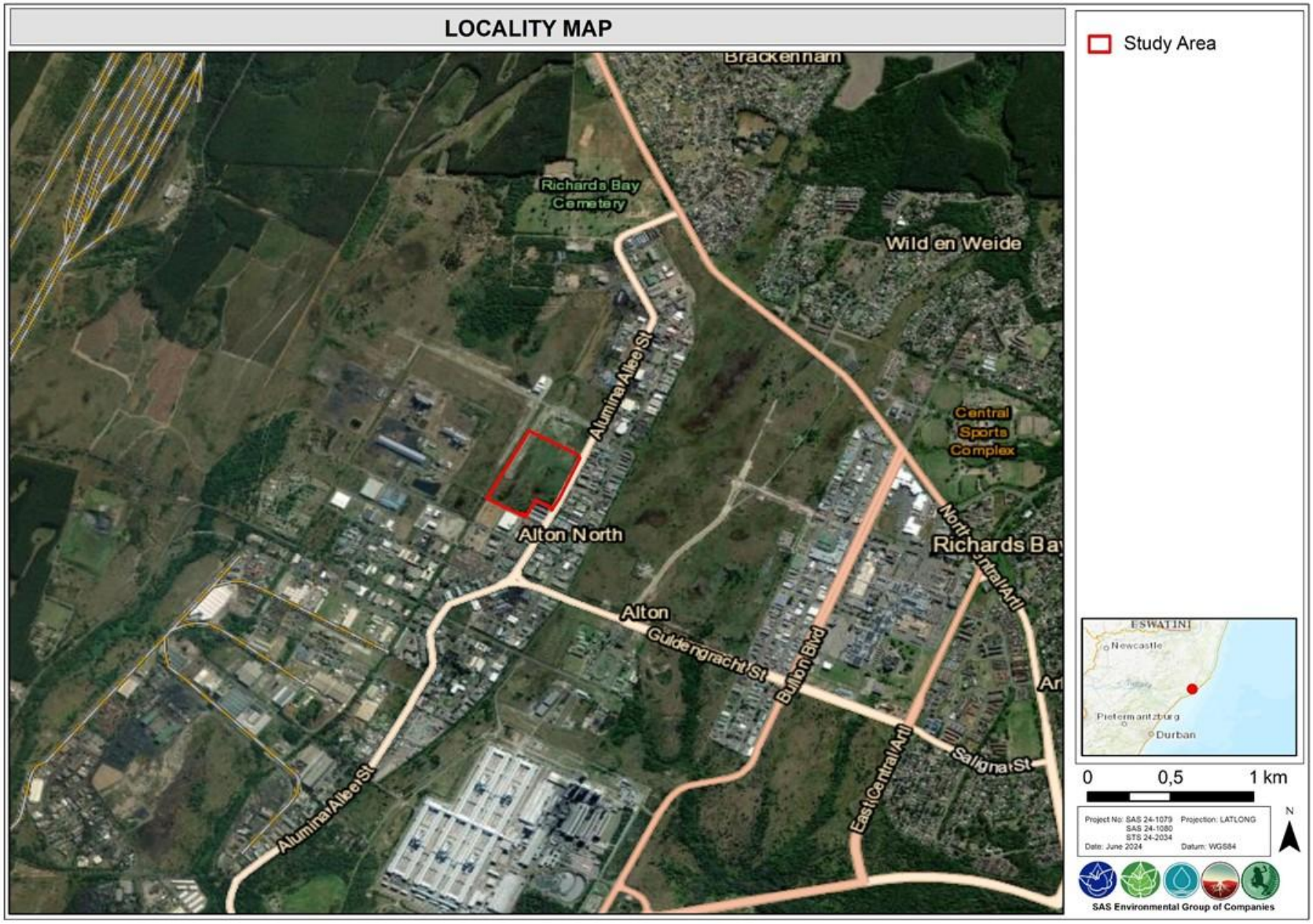



**Figure 1: Digital satellite image depicting the locality of the study area in relation to the surrounding area.**

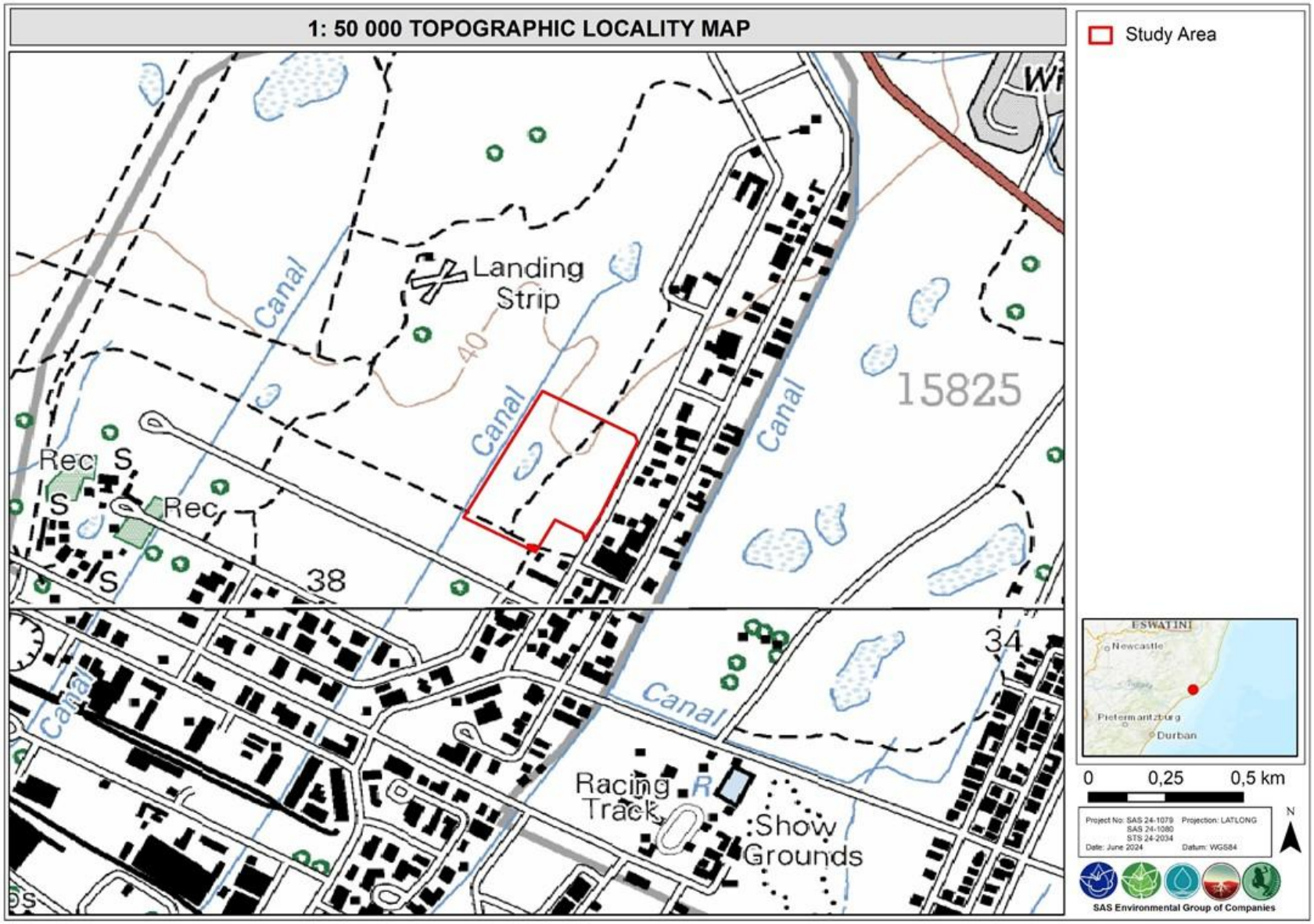



**Figure 2: The study area depicted on a topographical map in relation to the surrounding area.**

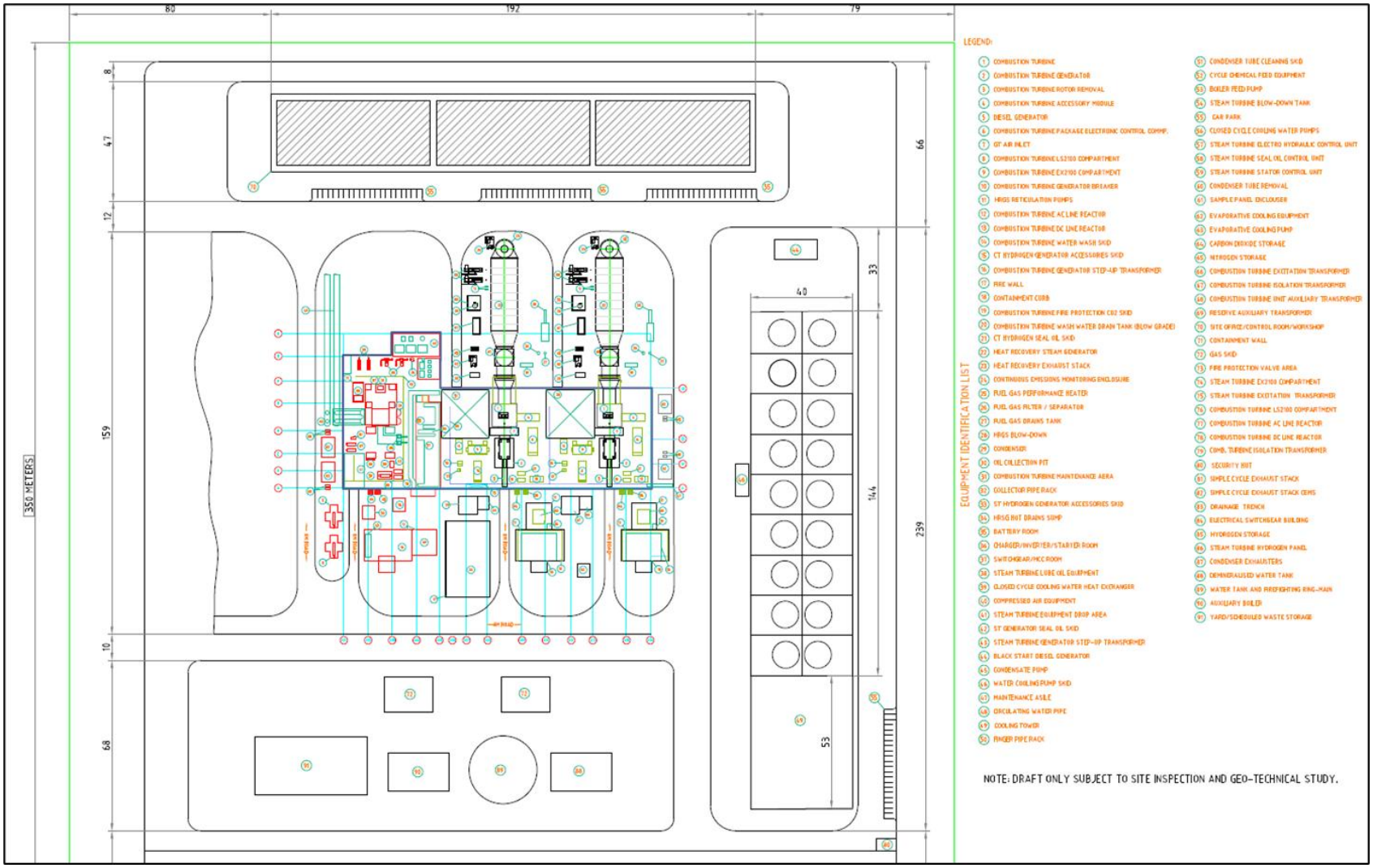



**Figure 3: Conceptual layout of the proposed Combined Cycle Power Plant.**

# 2 ASSESSMENT APPROACH

## 2.1 Reporting Protocol

The high sensitivity assigned to the Animal Species Theme by the DFFE Screening Tool was disputed for the study area, as it is considered to overstate the faunal sensitivity of the site. While faunal SCC triggered by the Screening Tool may make occasional use of the study area, particularly for foraging or movement, permanent or sustained use is considered unlikely due to the existing surrounding disturbance and broader habitat impacts in the area. The study area is therefore unlikely to function as key long-term habitat for the triggered species, and a medium sensitivity rating is considered more appropriate. The medium sensitivity assigned to the remainder of the study area was generally confirmed, except in disturbed areas where faunal sensitivity is lower. As such, the reporting protocol for the Animal Species Theme follows the protocol for the medium sensitivity theme (refer to the document guide in this report).

For refined, ground-truthed / field-verified habitat sensitivities, please refer to the site ecological importance (SEI) breakdown in Section 4 of this report.

## 2.2 General approach

Maps and digital satellite images were generated prior to the field assessment to determine broad habitats, vegetation types and potentially sensitive sites. The field assessment for the faunal specialist was undertaken on the 13th of June 2026 (winter season).

A reconnaissance ‘walkabout’ was initially undertaken to determine the general habitat types found throughout the study area. Following this, specific sites were selected that were considered representative of the habitats within the study area, with special emphasis placed on areas that may potentially support faunal SCC. Sites were investigated on foot to identify the occurrence of fauna within the study area.

A detailed explanation of the method of assessment is provided in Appendix A of this report. The faunal categories covered in this assessment are mammals, avifauna, reptiles, amphibians and invertebrates. For the methodologies relating to the impact assessment and development of the mitigation measures, please refer to Appendix C of Part A of the study.
To accurately determine the PES of the study area and capture comprehensive data with respect to faunal taxa, the following methodology were applied:

- Maps and digital satellite images were consulted prior to the field assessment to determine broad habitats, vegetation types and potentially sensitive sites. An initial visual on-site assessment of the study area was made in order to confirm the assumptions made during consultation of the digital satellite imagery;
- A literature review with respect to habitats, vegetation types and species distribution was conducted considering the larger study area. For a detailed description of the vegetation types and habitats associated with the study area, please refer to the associated Terrestrial and Plant Species Report (Part B);
- Relevant databases considered during the assessment of the study area included online verified research grade species records from iNaturalist; The Endangered Wildlife Trust Red List of Species (EWT, 2025), the SANBI South African Red List of Species (2021), Regional Red Data Book of Birds of South Africa, Lesotho, and Eswatini (Lee *et al.*, 2025), Important Bird and Biodiversity Areas (IBA, 2015), South African Bird Atlas Project 2 (SABAP2), International Union for Conservation of Nature (IUCN), the Screening Tool (2025) and the National Biodiversity Assessment (NBA, 2018);
- For the methodologies relating to the impact assessment and development of the mitigatory measures, please refer to Part A, Appendix C; and
- Specific methodologies for the assessment, in terms of field work and data analysis of faunal ecological assemblages are presented in Appendix A of this report.

## 2.3 Sensitivity Mapping

All the ecological features associated with the study area were considered and sensitive areas were delineated using a handheld Global Positioning System (GPS) unit. Geographic Information System (GIS) software was used to depict these features on satellite imagery. The various habitat types were assigned SEI categories based on their ecological integrity, conservation value, the presence of SCC and their ecosystem processes. Refer to Appendix A, of this report, for the breakdown of the methodology used to determine SEI and sensitivity.

## 2.4 Faunal Species of Conservation Concern Assessment

According to the SANBI Species Environmental Assessment Guidelines, faunal SCC are defined as any species that are threatened, range-restricted, or of particular ecological, cultural, or conservation significance, and which may be especially vulnerable to habitat loss, disturbance, or other anthropogenic pressures. SCC include taxa listed as threatened in terms of the IUCN Red List categories CR, EN, VU, NT or Data Deficient (DD), species protected under national or provincial legislation, species that are rare or locally endemic with limited

distributions, and those identified as requiring specific conservation attention due to declining populations or specialised habitat requirements.

Certain invertebrate taxa, including scorpion and spider species, as well as reptile, amphibian and mammal species, may be listed as protected under the TOPS regulations without being regarded as SCC in terms of the SANBI Species Environmental Assessment Guidelines. This distinction arises because many of these species are relatively widespread, occur across a broad range of habitats, and are not experiencing significant population declines or severe habitat fragmentation. Their protected status is therefore precautionary and largely intended to regulate collection, trade, and handling rather than to address an immediate conservation threat. While compliance with TOPS permitting requirements may be necessary if these species are encountered during development, they are not typically considered threatened; however, they remain classified as protected species and are therefore, as a precautionary principle, included in the SCC assessment.

During field assessments, it is not always feasible to identify or observe all species within an area, largely due to the secretive nature of many faunal species, possible low population numbers or varying habits of species. As such, and to specifically assess an area for faunal SCC, a POC estimation is used, considering several factors to determine the probability of faunal SCC occurrence within the study area. Species listed in Appendix B whose known distribution ranges and habitat preferences include the proposed infrastructure development sites were taken into consideration. Faunal species likely to occur within the study area are indicated and briefly discussed within each of the relevant dashboards, along with their POC.

# 3 FAUNAL ASSESSMENT RESULTS

## *3.1 Sampling Effort*

The site was surveyed on foot by means of extended transects (meanders) through the study area, where species were surveyed and habitat conditions noted; meanders were positioned within the various habitat types to ensure an adequate representation of faunal species from different classes (mammals, reptiles, amphibians, avifauna and invertebrates).

## 3.2 Existing Impacts

The study area is located within the western outskirts of the urban centre, with the adjacent land use comprising of predominantly industrial zones, residential developments, and various service industries (e.g., petrol stations). Portions of the site had previously been transformed or degraded; however, natural (untransformed) vegetation was still present. The study area has experienced several anthropogenic impacts over time, with mowing of grass and clearing of vegetation taking place in much of the study area at some point in time.

A large impermeable electrified fence on the eastern and southern portion of the study area restricts immigration and emigration for most terrestrial faunal species. Industrial development in the immediate surrounding area, as well as the existing fencing, has constrained faunal movement through the study area, resulting in increased habitat fragmentation and reduced ecological connectivity with the wider area.

Furthermore, bush encroachment within the area is likely due to the suppression of fire and the lack of herbivory, especially with low rainfall periods.

Collectively, these pressures have resulted in secondary impacts, including the proliferation of AIP species, modification of natural disturbance processes, and increased habitat fragmentation. These factors reduce habitat quality, limit resource availability, and constrain the study area's capacity to support diverse and stable faunal assemblages, particularly species sensitive to disturbance or requiring intact habitat connectivity.

## 3.3 Faunal Habitat

The habitat within the study area ranged from well-vegetated areas to transformed areas in which indigenous vegetation[4] was largely absent within the transformed sections. The study area is located within the Maputaland Wooded Grassland vegetation type and the biodiversity of the study area can be defined under four broad habitat units as described below (and mapped/depicted in Figure 8). These habitat units were distinguished based on species composition, vegetation structure, ecological function, physical nature of the environment, and habitat condition.

[4] The NEMA Listing Notice definition of indigenous vegetation: "Indigenous vegetation: refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding 10 years.

1. **Degraded Hygrophilous Grassland (Figure 4)**: This habitat unit is the largest within the study area, supporting a moderate to low species richness. It is generally characterised by a moist homogeneous herbaceous (grassy) layer, interspersed with scattered woody shrub species. This habitat unit is characterised by moderately low floral species richness, resulting in limited forage resources for herbivorous fauna. Nevertheless, it remains capable of supporting an intermediate diversity of faunal species. The habitat unit is moist and provides suitable habitat for amphibians, invertebrates and granivorous and insectivorous avifaunal species to forage within. There is limited structural diversity within this unit for fauna; and the reduced abundance of valuable niche habitat reduces the sensitivity from a faunal perspective; however, this habitat remains an important supporting unit.

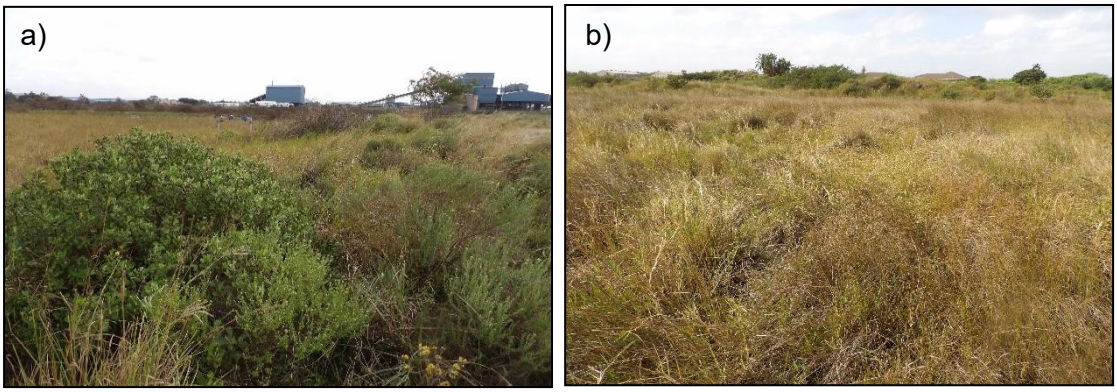



**Figure 4: Representative photographs of the Degraded Hygrophilous Grassland habitat unit associated with the study area.**

2. **Thicket habitat (Figure 5):** The habitat is in the southern part of the study area and is the third largest habitat unit. It is usually characterised by a dense layer of trees and shrubs. However, it lacks typical characteristics to qualify as a coastal forest, such as overlapping tree canopies, forest tree species, distinct tree, shrub, and herb layers, and instead has a prominent and well-developed grass layer. The present dense tree, shrub layer and graminoid layer provide valuable shelter for most fauna, however, the homogeneity of the floral community does limit the abundance of resources within the unit for herbivores. Bush encroachment within the area is likely due to the suppression of fire and the lack of herbivory. Smaller avifauna which show preference to dense thickets may find valuable habitat herein, whilst other small faunal species are likely to utilise these dense areas for refuge.

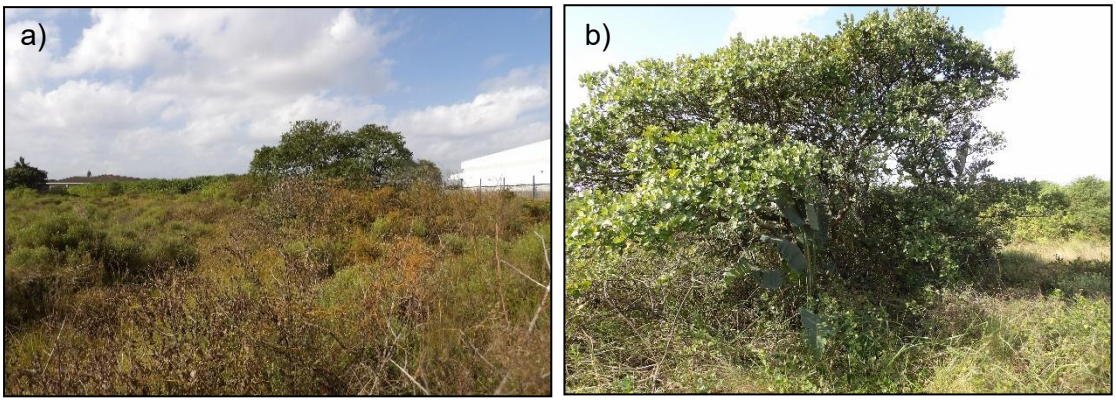



**Figure 5: Representative photographs of the Degraded Thicket habitat unit associated with the study area.**

3. **Freshwater habitat (Figure 6):** The Freshwater habitat was situated in the eastern and westerns section of the study area and two wetland types were identified within the study area (SAS 24 – 1079, 2024): Wetland flat and Seep Wetlands[5]. Floral species richness and species diversity varied between the two wetland types. The natural watercourse features provide valuable niche habitat for fauna, including potential SCC and can be particularly favoured by amphibians, avifauna and invertebrates. Although wetland types were identified during the field assessment (i.e., Seep Wetlands and Wetland Flats) and are discussed in the sections below, EA (Ref: 14/12/16/3/3/2/665) has already been granted for the infill of the Seep Wetlands and Wetland flats. As such, although these wetlands have yet to be infilled, they are only included in the habitat writeup. Given that EA has been granted for their infill, no associated impacts will thus not be discussed (refer to Section 5).

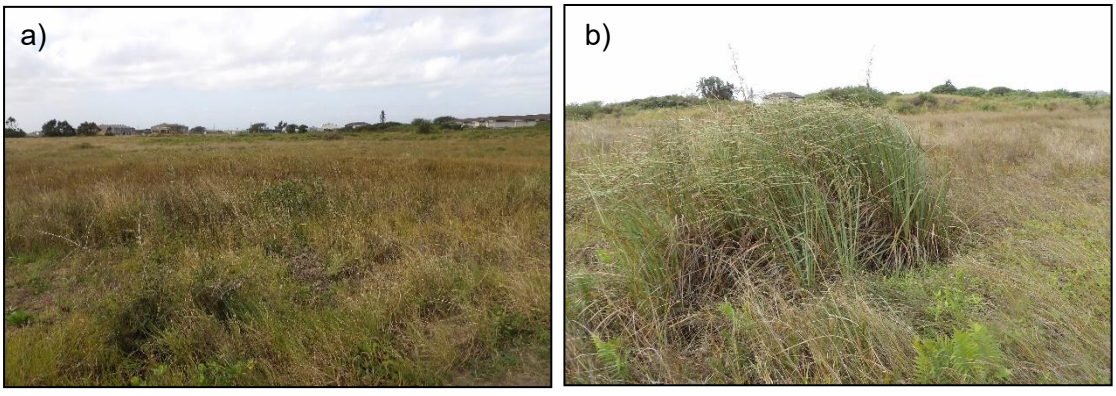



**Figure 6: Representative photographs of the Freshwater habitat unit associated with the study area.**

[5] Seep Wetlands are located on gently to steeply sloping land and dominated by the colluvial (gravity-driven), unidirectional movement of water and material down-slope. Water inputs are primarily via subsurface flows from an up-slope direction (Ollis *et al*. 2013).

4. **Transformed habitat (Figure 7):** The Transformed habitat is the smallest habitat unit within the study area, characterised by complete transformation for road and infrastructure development. This habitat is mostly concreted and barren, offering no preferred habitat for plant species or SCC. Vegetation communities are largely absent, with only a few AIP species present, albeit in low abundance. Given that faunal habitat suitability was severely reduced within this habitat, this habitat unit is not considered important or valuable for faunal species. No habitat for faunal SCC is present and the potential for the habitat to support viable populations of SCC is deemed very low.

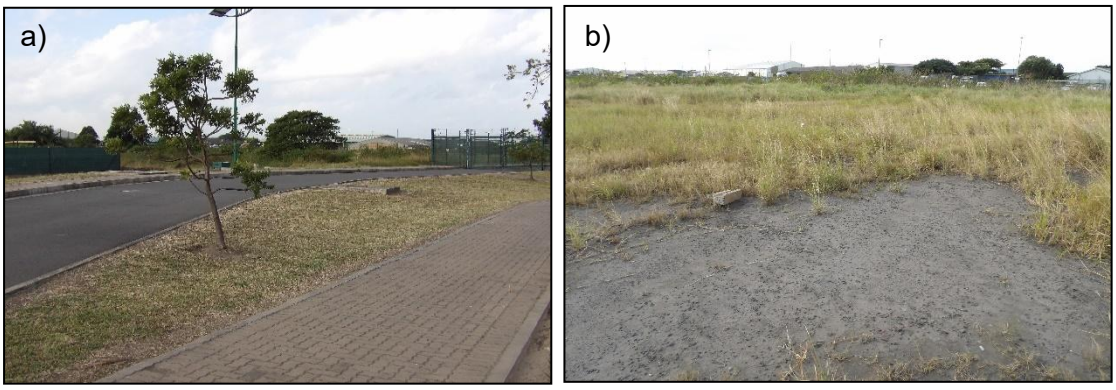



**Figure 7: Representative photographs of the Transformed habitat unit associated with the study area.**

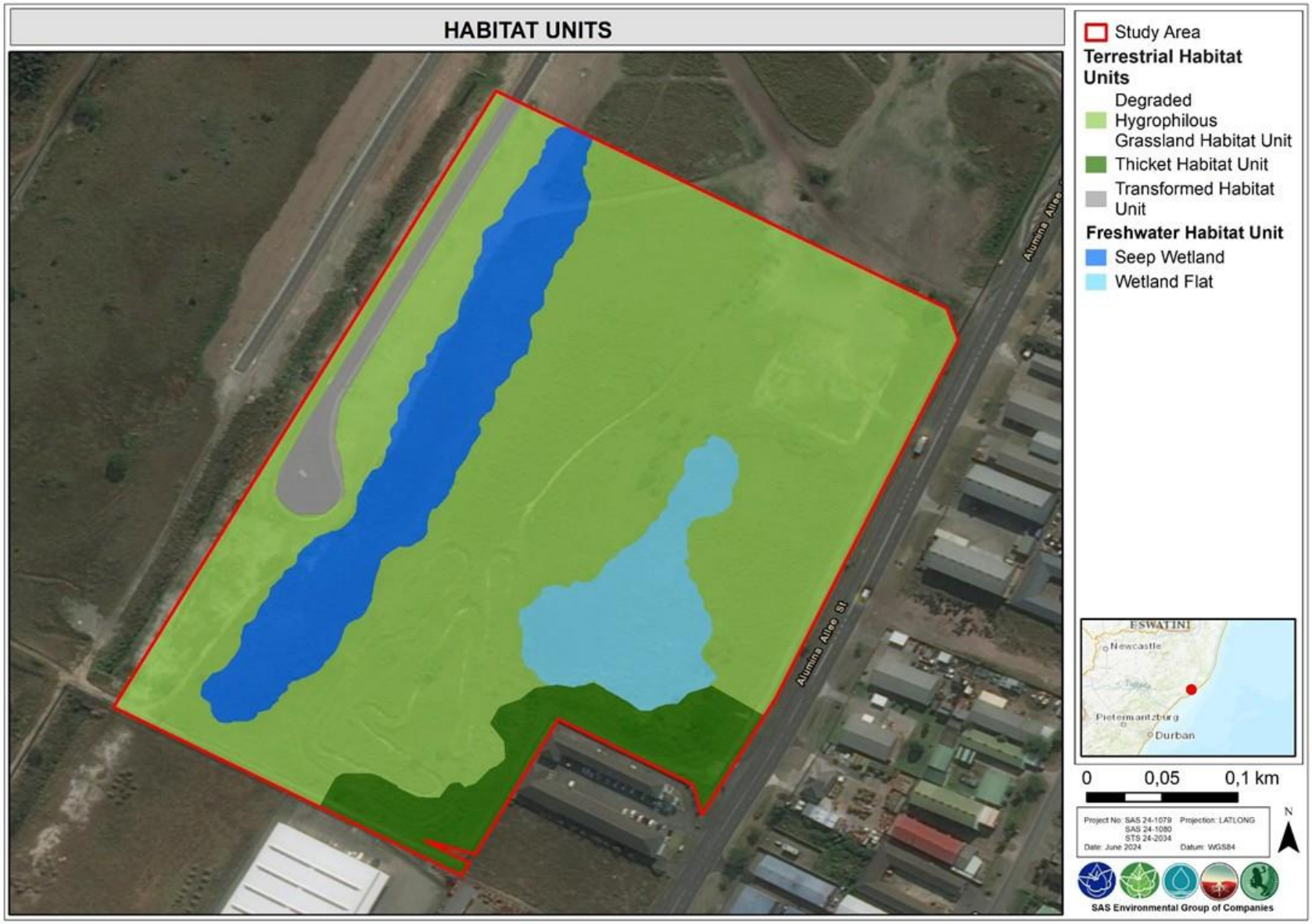



**Figure 8: Habitat units associated with the study area.**

## 3.4 Mammals

**Table 1: Field assessment results pertaining to mammal species within the study area.**

**Photographs:**




**a- c.) *Thryonomys swinderianus* (Greater Cane Rat, LC) dung observed within majority of the study area; d) the Thicket and Freshwater habitat contain adequate vegetative cover, food and water resources to sustain the low diversity of mammals expected to occur**

**Mammal SCC**

| Species | Habitat and Resources in the Sites | Status | POC |
|---|---|---|---|
| *Sensitive species 8* | This species inhabits a wide range of forested habitats. It is known to survive in degraded thicket and degraded coastal forest habitat along the urban fringe. Although suitable habitat does exist within the Thicket habitat, the electrified fence on the eastern and southern portion of the study area reduces movement corridors for this species through the study area and restricts the potential occurrence of this species. There have been no observations of the species on iNaturalist in the surrounding area. | VU | Medium |
| *Lycaon pictus* (African Wild Dog) | This species inhabits savanna, grassland, and lightly wooded ecosystems, requiring expansive, contiguous ranges to sustain viable packs. The species depends on abundant prey populations, access to water, and low levels of human disturbance. It is highly sensitive to habitat fragmentation, fencing, and road networks, which disrupt movement and hunting behaviour. Conservation of ecological corridors and maintenance of healthy predator–prey dynamics are critical to its survival, alongside mitigation of human–wildlife conflict and disease transmission from domestic animals. The online screening tool indicates that this species may occur within the study area however, this is highly unlikely due to the electric boundary fence which restricts movement and the urbanisation of the region. The lack of movement corridors has likely resulted in the absence of the species from the study area. There have been no observations of the species on iNaturalist in the surrounding area. | EN | Low |

| **Mammal Discussion** |
| --- |
| There was a reduced abundance and diversity of observed mammal assemblage and activity in the study area. The study area comprises a mosaic of habitats which, to a large degree, provide valuable habitat for mammals, however, fragmentation in the larger landscape has reduced the species diversity. The common small-bodied mammal species *Thryonomys swinderianus* (Greater Cane Rat, LC) was abundant throughout the study area with signs of dung observed across the site. Other species expected to occur include *Tragelaphus scriptus* (Bushbuck, LC), *Hystrix africaeaustralis* (Cape Porcupine, LC), *Chlorocebus pygerythrus* (Vervet Monkey, LC), and *Mungos mungo* (Banded Mongoose, LC). During the field assessments, no SCC or signs thereof were observed, however, the Sensitive species 8 has a medium POC, due to potential suitable habitat. This species is likely to utilise the site only occasionally as temporary foraging grounds. No other faunal SCC are anticipated to utilise the study area for foraging or as breeding habitat.<br><br>The tall, electrified fence is an impermeable barrier to all but the smallest of mammals, and the high degree of industrialization and settlements near the study area have diminished the local mammal diversity drastically, and now mostly common and widespread species persist within the environment. The vegetation, notably the Thicket and Freshwater habitat contain adequate vegetative cover, food and water resources to sustain the low diversity of mammals expected to occur. The Freshwater and Thicket habitat are of higher sensitivity from a mammalian perspective as they have increased forage availability and provide suitable areas for shelter and breeding. Freshwater habitats within the study area provide important resources for mammal species, particularly for drinking, foraging, and movement, although many species are equally likely to forage within adjacent grassland habitats. The homogenous nature of the Degraded Hygrophilous Grassland reduces forage availability and limits opportunities for more habitat specific species. More disturbance-tolerant mammals may also utilise Transformed habitats, such as common rodent species.<br><br>Overall, the study area is not considered to be of increased importance from a mammal perspective as a result of the low mammal diversity noted during the field assessment and the current fragmentation. |

## 3.5 Avifauna

**Table 2: Field assessment results pertaining to avifaunal species within the study area.**

**Photographs**




**a) *Corvus albus* (Pied crow, LC); b.) *Ciconia episcopus* (Woolly-necked Stork, LC); c.) *Vanellus coronatus* (Crowned Lapwing, LC); d.) *Ardea melanocephala* (Black-headed Heron, LC).**

**Avifaunal SCC**

| Species | Habitat and Resources in the Sites | Status | POC |
|---|---|---|---|
| *Circaetus fasciolatus* (Southern Banded Snake Eagle) | This species occurs within coastal lowland thicket and forest habitat interspersed with grassland habitat. Within the study area it may utilise the Thicket and the Degraded Hygrophilous Grassland habitat. During the site assessment, one unidentified raptor was observed foraging on a snake. which is an indication of at least possible suitable resources in the surrounding area. All observations of this species on iNaturalist in the surrounding area have been at the Mzingazi dam 5 km to the south-east. This species has a low recording rate on SABAP 2 in the area's pentad, and the last observation was in 2013. | CR | Medium |
| *Stephanoaetus coronatus* (Crowned Eagle) | This species utilises forests (gallery and riverine) but also occurs in woodlands and forested gorges in savannah and woodland habitat and exotic plantations. It's primary prey is mammals. There have been recordings of this species in the surrounding area on iNaturalist; and a low recording rate on SABAP 2 in the area's pentad with the last observation in 2020. The species is not expected to extensively utilise the study area for breeding however may opportunistically forage withing due to the low likelihood of its suitable mammal prey species being found in the area. The lack of forested area for this species results in a medium POC. | VU | Medium |
| *Geokichla guttata* (Spotted Ground Thrush) | The species is found in dappled and open forest understory. They tend to avoid dense thicket habitats. Within the study area, no suitable understory habitat is present for the species. There have been recordings of this species on iNaturalist in the surrounding area, however, only in the coastal forested area. There is a low recording rate of this species on SABAP 2 in the area's pentad, | EN | Low |
| *Podica senegalensis* (African Finfoot) | The African finfoot is threatened primarily by a reduction of water flow through commercial afforestation of catchment areas, damming and water extraction, as well as degradation and clearing of riverine vegetation, and increased salt and silt loads in rivers because of erosion. There have been recordings of this species on iNaturalist in the surrounding area. This species has a low recording rate on SABAP 2 in the area's pentad; and is not expected to occur on site due to the lack of a waterbody and the degraded state of the Freshwater habitat. | VU | Low |

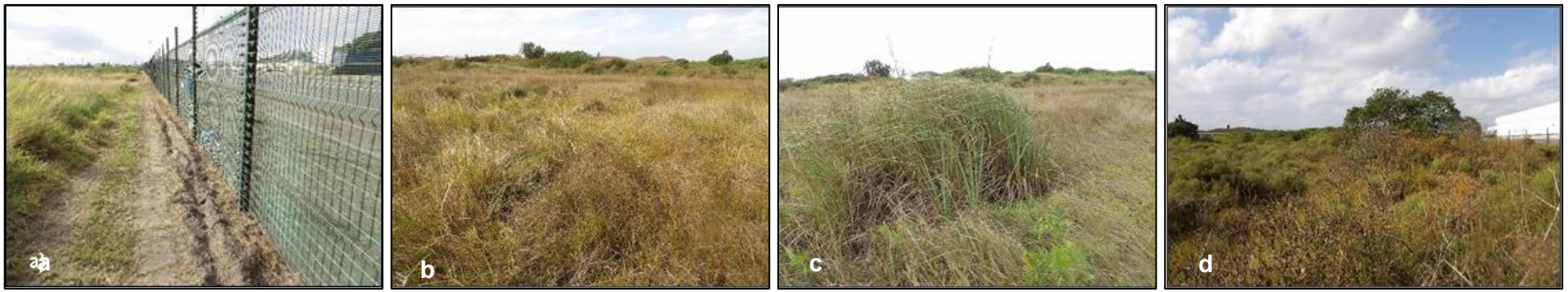
| | | | |
|---|---|---|---|
| *Circus ranivorus* (African Marsh Harrier) | This species relies on permanent wetlands, both inland and coastal, for breeding, feeding, and roosting. It also hunts over drier floodplains, grasslands, croplands, and Fynbos, primarily preying on small rodents, as well as birds, reptiles, frogs, and insects. Nests are typically situated in reedbeds over water, although breeding has also been observed in adjacent sedges, Fynbos, scrub, and agricultural fields, though such occurrences are considered rare. This species requires expansive and ecologically connected wetlands, which is not available even when combining the Degraded Hygrophilous Grassland and Freshwater habitat. This species has been observed on iNaturalist in the surrounding area. There have been no recordings of this species in the study area's pentad on SABAP 2. The distribution overlap but the lack of sufficient suitable habitat gives this species a low POC. | EN | Low |
| *Polemaetus bellicosus* (Martial Eagle) | Declines in population numbers have mostly attributed to direct persecution (shooting and trapping) by small-stock farmers, indirect persecution by poisoning, drowning in sheer-walled farm reservoirs, reduction of natural prey through habitat alteration and degradation, nest site disturbance and electrocution on electricity pylons.<br>There has been one recording of this species on iNaturalist 5 km north west at Enseleni Nature Reserve. This species has a low recording rate on SABAP 2 in the area's pentad; and with no suitable habitat within the study area, resulting in a low POC. | EN | Low |
| *Nettapus auritus* (African Pygmy Goose) | This species occupies freshwater wetlands, including pans, dams, floodplains, and slow-moving rivers, with a preference for areas rich in floating vegetation such as water lilies. The species relies on well-vegetated, shallow aquatic habitats that provide food, shelter, and nesting sites. It is sensitive to disturbance from agricultural and urban development, wetland degradation, water pollution, and hydrological changes that reduce plant cover and water quality. There have been recordings of this species in the surrounding area on iNaturalist, however not near the industrial development, much like the disturbances surrounding the study area. There have been no recordings of this species on SABAP 2. The lack of a suitable freshwater habitat and the nearby anthropogenic disturbance gives this species a low POC. | VU | Low |
| *Terathopius ecaudatus* (Bateleur) | This species inhabits open savanna, woodland, and semi-arid ecosystems, requiring extensive, undisturbed ranges for foraging. As a wide-ranging scavenger and predator, it depends on healthy populations of small vertebrates and carrion, as well as suitable nesting sites in large trees. The species is sensitive to habitat loss, declining prey availability, poisoning, and disturbance near nesting areas. The lack of suitable habitat gives this species a low POC. There have been no recordings of this species on iNaturalist and SABAP 2 in the pentads. | EN | Low |
| *Balearica regulorum* (Grey Crowned Crane) | This species occupies freshwater wetlands, moist grasslands, and floodplains, relying on a mosaic of shallow wetlands for foraging and adjacent grasslands for nesting and roosting. The species requires intact hydrological regimes, adequate water quality, and low disturbance levels, particularly during the breeding season. It is sensitive to wetland drainage, agricultural expansion, afforestation, collisions, and infrastructure development, which degrade habitat and disrupt breeding. Conservation priorities include protecting and restoring wetlands, maintaining natural water flow, and reducing human disturbance. There have been no recordings of this species on iNaturalist and SABAP 2 in the pentad.<br>The extent of disturbance and lack of suitable wetland habitat gives this species a low POC. | EN | Low |
| *Halcyon senegaloides* (Mangrove kingfisher) | This species inhabits estuarine and coastal ecosystems, particularly mangrove forests and adjacent woodland, where it relies on intact intertidal habitats for foraging. The species depends on healthy mangrove systems that support fish, crustaceans, and insects, as well as suitable nesting sites in tree cavities or termite mounds. It is sensitive to mangrove degradation, coastal development, pollution, and disturbance. There have been recordings of this species in the surrounding area on iNaturalist, however closer to the coastal area. There have been no recordings of this species on SABAP 2, and the lack of suitable habitat gives this species a low POC. | EN | Low |

| **Avifauna Discussion** |
|---|
| Data from the SABAP2 Pentad 2840_3200 was consulted to provide insight into the bird assemblages potentially present within the study area as part of the avifaunal assessment.<br><br>Avifaunal diversity varied within the various habitats associated with the study area. Diversity was highest in the Thicket and Freshwater habitats while moderate within the Degraded Hygrophilous Grassland and low within the Transformed habitat. The mosaic of habitats provided suitable structure to support a diverse assemblage of avifauna. The integrity of the study area with regards to avifaunal species is considered intermediate as a result of the high degree of transformation encompassing the study area and the degree of human movement within the study area.<br><br>Diversity within the Degraded Hygrophilous Grassland was likely reduced due to the homogenous structure of the natural grassland and yet will provide valuable habitat for specialist grassland species. The Thicket habitat provides suitable shelter and habitat for the greatest abundance and diversity of birds. The AIP proliferation within the Thicket habitat did increase cover but likely impacts on food sustainability over longer temporal scales as AIPs outcompete indigenous flora.<br><br>Food resources are high within the study area for avifaunal species. Within the Degraded Hygrophilous Grassland and Thicket habitat grass seeds and a large abundance of invertebrates will form the staple food resources for granivorous and insectivorous species, which are likely the most abundant group. The heterogenous vegetation composition will likely enhance the year-round provisioning of food for these species, though, understandable reductions in insect abundance may occur in winter when many birds will migrate altitudinally or to other regions. During the summer months the overall food resource production of the herbaceous and woody layer will likely increase, and as such a higher abundance of avifauna can be supported. The summer months additionally see an increase in insect abundance which provides an energy rich source of food for avifaunal species. This increase is likely mimicked by small mammals as well as lizards, skinks and amphibians which are an important food resource for raptors and some smaller bird species.<br><br>Common avifaunal species such as *Pycnonotus tricolor* (Dark capped Bulbul, LC), *Cossypha caffra* (Cape Robin-Chat, LC), *Corvus albus* (Pied crow, LC), *Ciconia episcopus* (Woolly-necked Stork, LC), *Vanellus coronatus* (Crowned Lapwing, LC) and *Ardea melanocephala* (Black-headed Heron, LC) were observed during the field assessment. Other species expected to occur include *Ploceus capensis* (Cape Weaver, LC), *Anthus cinnamomeus* (African Pipit, LC), *Lonchura cucullata* (Bronze Mannikin, LC), *Dendrocygna viduata* (White-faced Whistling Duck, LC) and *Merops persicus* (Blue-cheeked Bee-eater, LC). During the field assessment no avifaunal SCC were observed. The *Circaetus fasciolatus* (Southern Banded Snake Eagle, CR) and *Stephanoaetus coronatus* (Crowned Eagle, VU) has been assigned a medium POC, due to the existence of suitable habitat but historically do not have a high recording rate.<br><br>Overall, the avifaunal sensitivity associated with the study area is considered intermediate as the potential for SCC was reduced and the observed assemblage was mostly associated with common, widely distributed species. Understandably, abundance and diversity will vary within the study area in accordance with available food resources, rainfall and seasonal changes, with some avifaunal species undertaking local migrations during the winter months. The proposed activities and associated infrastructure will result in a reduction in habitat and food resources and will likely impact on the diversity of the locality while abundance levels will decrease. Impacts to avifaunal species within the study area will result from the localised reduction in habitat, and edge effects such as noise and general human activities. Additionally, the increased movement of vehicles traveling to and from the study area as well as increased conflict with humans will likely increase the risk of persecution on avifaunal species. |

## 3.6 Herpetofauna

**Table 3: Field assessment results pertaining to herpetofaunal species within the study area.**

**Photographs:**




**a.) Electrified fence line on the eastern and southern boundary of the study area that prevents some larger herpetofaunal species from moving through the study area.; b.) The open to sparsely treed Degraded Hygrophilous Grassland habitat is likely to host mostly common and hardy reptile and amphibian species adapted to grassy habitat; The Freshwater habitat (c.) and Thicket (d.) will provide suitable breeding locations for a variety of amphibians and reptiles due to the unique moist characters and reduced exposure provided.**

**Herpetofauna SCC**

| Species | Habitat and Resources in the Sites | Status | POC |
|---|---|---|---|
| *Hyperolius pickersgilli* (Pickersgill's Reed Frog) | This species prefers densely vegetated marshy habitats in coastal bushveld and grassland. This species is endemic to coastal KwaZulu-Natal, where it occupies fragmented patches of coastal wetland and marshland dominated by dense emergent vegetation. The species depends on shallow, seasonally inundated wetlands with high humidity, clean water, and intact reed cover for breeding and shelter. It is highly sensitive to habitat loss from urban expansion, agriculture, and wetland drainage, as well as pollution and invasive vegetation. There have been observations of the species on iNaturalist in the surrounding area. This species has been observed on iNaturalist in the surrounding area. The study area could be suitable for this species during the high rainfall season when there are possible ponding water bodies. To determine the suitability of the Freshwater habitat, further investigation within a more suitable season is recommended. | EN | Medium |
| *Crocodylus niloticus* (Nile Crocodile) | The Nile Crocodile inhabits rivers, dams, lakes, and estuarine systems, requiring permanent water bodies with suitable basking sites and secure nesting areas on sandy or vegetated banks. The species depends on stable aquatic ecosystems that support adequate prey and maintain water quality. It is sensitive to habitat alteration, water pollution, bank disturbance, and fluctuating water levels that can affect nesting success. There has been one observation of the species on iNaturalist 5 km to the south at an estuary. The lack of permanent and sizeable waterbody gives this species a low POC due to the lack of suitable habitat. | VU | Low |
| *Pelusios rhodesianus* | Variable Hinged Terrapin inhabits freshwater systems including pans, dams, rivers, and marshes, favouring slow-moving or still waters with abundant aquatic vegetation and soft substrates. The species relies on stable water levels, good water quality, and access to basking and nesting sites along vegetated banks. It is | VU | Low |

| | | | |
|---|---|---|---|
| (Variable Hinged Terrapin) | sensitive to wetland degradation, pollution, and hydrological alterations that reduce habitat suitability. There have been two observations of the species on iNaturalist in the surrounding area, however, the absence of stable water levels gives this species a low POC. | | |
| *Hemisus guttatus* (Spotted Snout-Burrower) | It inhabits grassland and savanna. It breeds in seasonal pans, swampy areas, and in pools near rivers. It nests in burrows in wet soil close to temporary water, and tadpoles move to water to develop. This species has been observed on iNaturalist in the surrounding area. The study area could be suitable for this species due to the potential of the Freshwater habitat in the high rainfall season when there are possible ponding water bodies. To determine the suitability of the Freshwater habitat, further investigation within a more suitable season is recommended. | NT | High |

**Herpetofauna discussion**

Amphibians and reptiles pose a challenge in sampling due to their elusive behaviours, habitual avoidance of predators, and, in the case of amphibians, their different life stages. This and the seasonal timing of the field assessment explain the low abundance and diversity of herpetofauna observed during the site visit.

All habitat units are suitable habitat for herpetofauna to forage within as a result of their adaptable nature and feeding habits which often draw them into human dwellings. The Freshwater and Thicket habitat will provide suitable breeding locations for a variety of amphibians and reptiles due to the unique moist characters and reduced exposure provided – and therefore diversity and abundance are expected to increase closer to the suitable habitat. The Degraded Hygrophilous Grassland habitat is moist and provides suitable habitat for amphibians. The habitat unit is likely to host mostly common and hardy reptile and amphibian species adapted to grassy habitat. The Degraded Hygrophilous Grassland habitat will likely support the greatest abundance and diversity of reptiles within the study area as it provides basking opportunities for reptiles and food resources due to the likelihood of small mammals and invertebrates, which act as food resources for many herpetofauna species. The Transformed habitat is not considered valuable for herpetofauna.

Reptiles are inherently adaptable and capable of surviving in and utilising transformed and degraded habitats. Considering the adaptability of reptiles, it is improbable that reptile species associated with the study area will experience significant impact unless directly killed. Common resilient species may still be found in these areas of increased disturbance, but low abundances are expected. It is likely that snakes and some other reptiles will be able to move into and utilise areas of the study area, except the electric fence could become responsible for the electrocution of herpetofauna, and larger reptiles are likely to face levels of persecution. Habitat integrity for herpetofauna is diminished as a result of fragmentation, particularly as a result of the electrified fence which can result in high mortality of terrapins and snakes. Herpetofaunal sensitivity in the footprint is therefore deemed to be moderately high overall.

No species were observed during the field assessment, however, common reptile species are known to be present within the surroundings and will be present within the study area; such as *Philothamnus natalensis natalensis* (Eastern Natal Green Snake, LC) and *Kinixys zombensis* (Eastern Hinged-back Tortoise, LC). Common amphibian populations are likely to be present as wetland areas are present within the study area. such as *Schismaderma carens* (African Red Toad, LC), and *Hyperolius marmoratus* (Painted Reed Frog, LC), amongst others.

No reptile or amphibian SCC was observed during the site visit. The Freshwater habitat in study area could be suitable for certain species during the high rainfall season when there are possible ponding water bodies. Species with a high POC is the *Hemisus guttatus* (Spotted Snout-Burrower, NT). The study area provides suitable habitat, despite the fragmentation and the disturbed habitat, for *Hyperolius pickersgilli* (Pickersgill's Reed Frog, EN) which is given a medium POC. Due to the disturbed habitat present within the study area, the potential for other reptile and amphibian SCC to be present within the study area is low.

## 3.7 Invertebrates (Insects and Arachnids)

**Table 4: Field assessment results pertaining to invertebrate species within the study area.**

| Photographs | | | |
|---|---|---|---|
|   |   |   |   |
| ***a.)*** **An ootheca of an unidentified mantis species; b.)** ***Acanthacris ruficornis*** **(Garden Locust, Not yet been assessed (NYBA)); c.) A number of arachnids are expected to inhabit the graminoid layer of the Degraded Hygrophilous Grassland habitat; d.) There is expected to be a higher insect diversity and abundance in and around the Freshwater habitat due to the number of micro-habitats providing refuge and important nutrients.** | | | |
| **Invertebrate SCC** | | | |
| **Species** | **Habitat and Resources in the Sites** | **Status** | **POC** |
| *Arytropteris basalis* (Flat-necked Shieldback) | Flat-necked Shieldback occurs in grassland and savanna habitats, typically associated with well-vegetated areas that provide cover and foraging opportunities. This species occurs within coastal forest and thicket mosaics in the KwaZulu-Natal Province. The species depends on intact ground-layer vegetation and stable microhabitats that support its diet of plant material and small invertebrates. It is sensitive to habitat transformation through agriculture, overgrazing, and frequent burning, which reduce vegetation structure and diversity. There have been no observations of the species on iNaturalist in the surrounding area. The Thicket habitat is suitable for this species within the study area and is therefore given a medium POC. | VU | Medium |
| *Pomatonota dregii* (East Coast Katydid) | The East Coast Katydid inhabits coastal and lowland grassland and savanna systems, and Indian Ocean Coastal Belt forests, particularly in areas with dense grass and shrub cover that provide shelter and foraging resources. The species depends on intact vegetation structure and plant diversity to sustain feeding and breeding. This species resides only in a habitat type which is experiencing severe pressure by logging and cultivation with sugarcane and timber production. It is sensitive to habitat loss from urban and agricultural expansion, as well as inappropriate burning and overgrazing that reduce cover. There have been no observations of the species on iNaturalist in the surrounding area. There is suitable habitat for this species within the Degraded Hygrophilous Grassland and is therefore given a medium POC. | VU | Medium |

| | | | |
|---|---|---|---|
| *Hemicordulia Africana* (African Emerald) | The African Emerald is a widespread dragonfly species in South Africa, including KwaZulu-Natal, where it is associated with rivers, streams, and well-vegetated wetlands. It favours clean, well-oxygenated water and is often observed flying actively over water bodies, rarely perching. Larvae develop in aquatic habitats with submerged vegetation or detritus. The species is generally tolerant of moderate disturbance, although it may be sensitive to significant declines in water quality and habitat degradation. This species has been observed on iNaturalist in the surrounding area. The study area could be suitable for this species during the high rainfall season when there are possible water bodies and is therefore given a high POC. To determine the suitability of the Freshwater habitat, further investigation within a more suitable season is recommended. | VU | High |
| *Agriocnemis gratiosa* (Gracious Wisp) | This species occurs in humid tropical parts of the southern Africa region. In South Africa it is prone to having its sites shaded out by invasive alien trees, plantation forestry up to the edge of water margins resulting in habitat loss and its habitat is declining due to domestic effluent pollution. In South Africa, it also occurs at pools in natural forest clearings, swampy habitats, particularly fringes of rivers and in river floodplains. The study area could be suitable for this species during the high rainfall season when there are possible water bodies and is therefore given a high POC. To determine the suitability of the Freshwater habitat, further investigation within a more suitable season is recommended. | NT | High |
| *Parazyxomma flavicans* (Banded Duskdarter) | The Banded Duskdarter is a crepuscular dragonfly species occurring in parts of South Africa, including KwaZulu-Natal, where it is associated with still or slow-flowing freshwater habitats such as pans, dams, and marshes. It is most active at dusk, making it less frequently recorded than diurnal species. Larvae develop in aquatic environments with fine substrates and vegetation. Its reliance on intact wetland habitats means it may be sensitive to degradation, particularly from water pollution, drainage, or excessive disturbance of riparian zones; and results in a medium POC due to the Freshwater habitat not being intact. This species has been observed on iNaturalist in the surrounding area. The study area could be suitable for this species during the high rainfall season when there are possible ponding water bodies. To determine the suitability of the Freshwater habitat, further investigation within a more suitable season is recommended. | VU | Medium |
| *Agriocnemis ruberrima* (Orange Wisp) | The Orange Wisp is a small damselfly with a restricted distribution in South Africa, largely confined to the coastal plains of northern KwaZulu-Natal where it inhabits shallow, well-vegetated wetlands such as pans, marshes, and slow-flowing channels. It is closely associated with emergent grasses and sedges in intact wetland systems. The species is an SCC due to its limited range and sensitivity to habitat loss, drainage, and degradation of wetland environments; and results in a medium POC due to the Freshwater habitat not being intact. This species has been observed on iNaturalist in the surrounding area. The study area could be suitable for this species during the high rainfall season. To determine the suitability of the Freshwater habitat, further investigation within a more suitable season is recommended. | EN | Medium |
| *Urothemis luciana* (St Lucia Basker) | The St Lucia Basker is a localized dragonfly species in South Africa, largely restricted to coastal and lowland wetlands in KwaZulu-Natal. It inhabits still or slow-flowing freshwater systems such as pans, marshes, and floodplains, where it perches conspicuously on emergent vegetation. The species is typically associated with warm, well-vegetated habitats, and its larvae develop in shallow aquatic environments. Its limited distribution and dependence on intact wetland systems make it potentially vulnerable to habitat loss, drainage, and declining water quality; and results in a medium POC due to the Freshwater habitat not being intact. This species has been observed on iNaturalist in the surrounding area. The study area could be suitable for this species during the high rainfall season when there are possible ponding water bodies. To determine the suitability of the Freshwater habitat, further investigation within a more suitable season is recommended. | NT | Medium |
| *Orthetrum robustum* (Robust Skimmer) | The Robust Skimmer is a widespread dragonfly species in South Africa, commonly associated with permanent freshwater habitats such as rivers, dams, and wetlands. It is tolerant of moderate habitat disturbance and can persist in modified environments, provided adequate water quality and emergent vegetation are maintained. Adults are often observed perching near water margins, while larvae develop in aquatic substrates. This species has been observed on iNaturalist in the surrounding area. The study area could be suitable for this species during the high rainfall season when there are possible ponding water bodies and is therefore given a high POC. To determine the suitability of the Freshwater habitat, further investigation within a more suitable season is recommended. | VU | Medium |

| **Invertebrate Discussion** |
|---|
| In terrestrial landscapes, insects typically represent the most abundant macro-organisms and play a critical role in ecosystem functioning. They provide essential ecosystem services, including pollination, decomposition of plant and animal material, predation on pest species, parasitism, and the removal of dung and scat from larger mammals. As such, insect abundance and diversity are often used as indicators of ecosystem health. Flowering plants, including AIP species, can provide important seasonal food resources for insects, while insects in turn contribute to pollination processes across both indigenous and non-indigenous flora. Insects also constitute a key food resource for many vertebrate species, and substantial declines in insect populations may have cascading ecological effects. Although insect communities can be relatively resilient to disturbance, this resilience is contingent on the continued availability of suitable habitat and food resources.<br><br>Insect species utilise all habitat types except for arctic tundra and ice dominated landscapes and will readily inhabit transformed and altered habitats. The survey area comprises various habitat units, which provide various niche habitat and suitable structure and resources for a diverse assemblage of species to occur. Within the study area, insect and arachnid observations were lower than expected. The field investigation took place during winter, when the life cycle of insects typically involves entering a state of dormancy or diapause, allowing them to survive the harsh conditions. Sampling earlier in the summer season would have yielded more accurate results for invertebrate abundances and diversities. To address these limitations, observational data were supplemented with available database records and findings from previous studies conducted in the broader area. The reduced observed abundance can also be attributed to historical and ongoing disturbances that have degraded habitat quality and simplified vegetation structure, thereby limiting insect diversity and activity. Arachnid abundance was similarly low in field observations; this is also likely influenced by seasonal timing and by their cryptic behaviour and predominantly nocturnal activity, which reduces detectability during standard daytime surveys, rather than indicating true absence.<br><br>The largely untransformed area comprises a mosaic of open grassland, wooded areas, and valuable Freshwater habitat, resulting in high overall habitat heterogeneity. From an invertebrate perspective, the Freshwater habitat is considered particularly important, as the varied habitat structure, aquatic features, and the presence of fallen and dead wood create numerous microhabitats for shelter, breeding, and foraging. These conditions are likely to support relatively high invertebrate abundance and diversity in and around the Freshwater habitat. Although invertebrate diversity appeared to be highest within the Thicket habitat during the survey, the Freshwater habitat is expected to support the greatest overall invertebrate diversity within the study area. The Thicket and Freshwater habitat has remained undeveloped/transformed and suitable invertebrate habitat and forage is available herein. The increased moister levels are also often an important factor in many insect life cycles. A number of arachnids are expected to inhabit the graminoid layer of the Degraded Hygrophilous Grassland habitat.<br><br>Species observed during the field assessment include a *Acanthacris ruficornis* (Garden Locust, NYBA). Other common invertebrate species that are expected to occur on site are *Zonocerus elegans* (Elegant Grasshopper, NYBA) and *Cynthia cardui* (Painted Lady, LC), amongst others. A number of invertebrate SCC have the potential distribution to occur in the surrounding areas especially the thicket mosaics surrounding the study area. The Freshwater habitat in study area could be suitable for certain species during the high rainfall season when there are possible ponding water bodies. Species with a high POC include the *Hemicordulia Africana* (African Emerald, VU) and *Agriocnemis gratiosa* (Gracious Wisp, NT). Some species only have a medium POC due to the Freshwater habitat not being intact and then possible not suitable; these species include the *Pomatonota dregii* (East Coast Katydid, VU), *Arytropteris basalis* (Flat-necked Shieldback, VU), *Parazyxomma flavicans* (Banded Duskdarter, VU), *Agriocnemis ruberrima* (Orange Wisp, EN), *Urothemis luciana* (St Lucia Basker, NT) and *Orthetrum robustum* (Robust Skimmer, VU). To determine the suitability of the Freshwater habitat, further investigation within a more suitable season is recommended. |

# 4 SITE ECOLOGICAL IMPORTANCE (SEI) AND AREAS OF CONCERN

This section aims to (1) present the sensitivity of the receptors identified within the study area (e.g., SCC, the vegetation/fauna community or habitat type present on the site), and (2) clearly define and map areas where avoidance mitigation is strongly recommended if significant, negative residual impacts are to be avoided (and to prevent potential fatal flaws).

Based on the criteria provided in Appendix A of this report, all habitats within the study area were allocated an importance category, i.e., SEI category. The SEI is a function of the biodiversity importance (BI) of the receptor and its resilience to impacts (receptor resilience [RR]). The BI, in turn, is a function of conservation importance (CI) and the functional integrity (FI) of the receptor. The criteria for SEI can be found in Appendix A.

Table 5 below indicates the individual SEI scoring for each habitat unit. Figure 9 indicates the SEI for the study area.

**Table 5: Faunal SEI importance for the different habitat units within the study area.**

| Habitat Unit | CI | FI | BI | RR | SEI | Development Constraints |
|---|---|---|---|---|---|---|
| Freshwater Habitat | **Medium** Confirmed or highly likely occurrence of populations of 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. | **High** Only minor current negative ecological impacts with no signs of major past disturbance and good rehabilitation potential. | Medium | **Very Low** Habitat that is unable to recover from major impacts, or species that are unlikely to remain at a site even when a disturbance or impact is occurring, or species that are unlikely to return to a site once the disturbance or impact has been removed. | 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. |
| Thicket Habitat | **Medium** Confirmed or highly likely occurrence of populations of 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. | **Medium** Mostly minor current negative ecological impacts with some major impacts and a few signs of minor past disturbance. Moderate rehabilitation potential. | Low | **Medium** Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor. Species in this habitat have a moderate likelihood of returning to a site once the disturbance or impact has been removed. | Medium | **Minimisation and restoration mitigation –** development activities of medium to high impact acceptable followedby appropriate restoration activities. |
| Degraded Hygrophilous Grassland | **Medium** Confirmed or highly likely occurrence of populations of 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. | **Low** Several minor and major current negative ecological impacts. | Low | **Medium** Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor. Species in this habitat have a moderate likelihood of returning to a site once the disturbance or impact has been removed. | Medium | **Minimisation and restoration mitigation –** development activities of medium to high impact acceptable followedby appropriate restoration activities. |

| Habitat Unit | CI | FI | BI | RR | SEI | Development Constraints |
|---|---|---|---|---|---|---|
| **Transformed Habitat** | **Very Low**<br>No confirmed and highly unlikely populations of SCC.<br><br>No natural habitat remaining. | **Very Low**<br>Very small (< 1 ha) area. No habitat connectivity except for flying species or flora with wind-dispersed seeds. Several major current negative ecological impacts. | **Very Low** | **Very High**<br>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 remaining at a site even when a disturbance or impact is occurring, or species that have a very high likelihood of returning to a site once the disturbance or impact has been removed. | **Very Low** | **Minimisation mitigation –** development activities of medium to high impact acceptable and restoration activitiesmay not be required. |

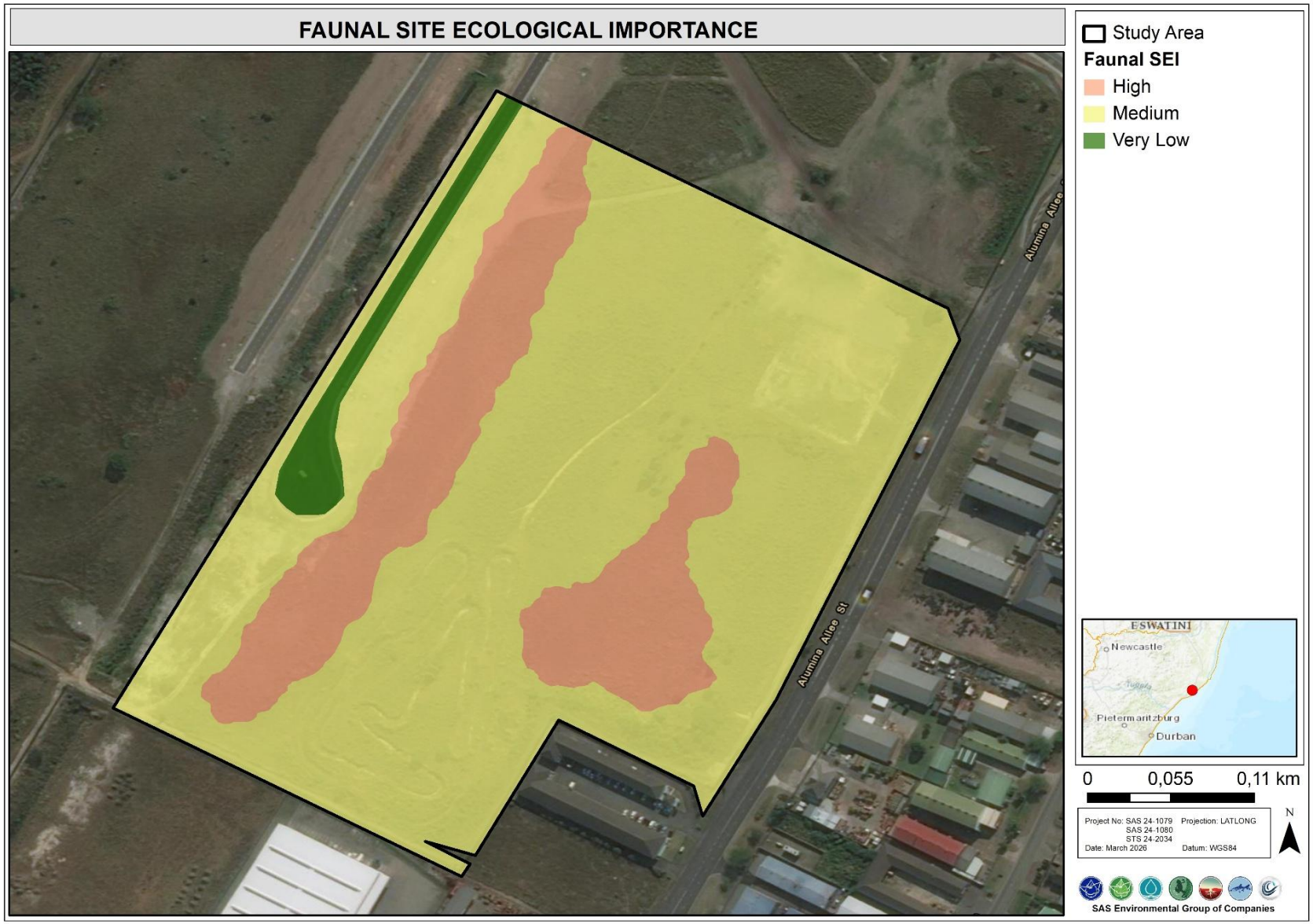



**Figure 9. Faunal habitat sensitivity map for the study area.**

# 5 IMPACT ASSESSMENT

The following sections provide the findings of the impact assessment undertaken with reference to the perceived impacts prior to the implementation of mitigation measures and following the implementation of mitigation measures. The mitigated results of the impact assessment have been calculated on the premise that all mitigation measures as stipulated in this report are adhered to and implemented. Should such actions not be adhered to, it is highly likely that post-mitigation impact scores will increase.

The authorised Phase 1F of the development includes infilling of the Wetland Flats and the Seep Wetlands within the study area (refer to Section 1.1 for further details). Thus, no impacts pertaining to these wetland types (Freshwater habitat) are presented in the impact assessment below.

An impact discussion and assessment of all potential planning, construction, and operational and maintenance phase impacts are provided in Section 5.2 and 5.3. All mitigatory measures required to minimise the perceived impacts are presented in Section 5.2.

## *5.1 Activities and Aspect Register*

The table below indicates the perceived risks to faunal communities associated with the activities pertaining to the proposed development.

**Table 6: Activities and aspects likely to impact on faunal resources.**

| ACTIVITIES AND ASPECTS REGISTER |
|---|
| **Pre-Construction Phase** |
| - Potential failure to implement the required mitigatory measures before and at the commencement of construction activities:<br>• Potential failure to obtain the necessary permits for the rescue and relocation of protected or threatened faunal species should they be needed resulting in delays to the construction activities.<br>- **Impact**: Long-term or permanent loss of potential faunal SCC listed species. |
| - Potential failure to implement an AIP Management/Control Plan before construction activities commence which is required and will subsequently aid with improved AIP management and rehabilitation in the long term for areas that will form an open space area.<br>- **Impact**: Loss of niche and foraging habitat, limiting the re-establishment potential of faunal species and of potential faunal SCC due to the proliferation of unfavourable AIPs. |
| - Potential failure to demarcate the boundaries of adjacent habitat in the study area leading to additional encroachment of development activities throughout construction and operational phases into adjacent faunal habitat.<br>- **Impact:** The unnecessary clearing of vegetation and loss of faunal habitat, leading to further displacement of faunal species, including potentially occurring SCC. |
| **Construction Phase** |
| - Site clearing and the removal of faunal habitat in the Degraded Hygrophilous Grassland and Thicket habitat due to poor planning and indiscriminate habitat destruction; |

| ACTIVITIES AND ASPECTS REGISTER |
|---|
| - **Impact:** Loss of faunal habitat whilst reducing species occupancy in the impacted areas. |
| - Proliferation of AIP species that colonise in areas of increased disturbances and that outcompete native plant species, including the further transformation of adjacent natural habitat such as open grasslands and watercourses.<br>- **Impact:** Loss of favourable faunal habitat outside of the direct development footprint, including a decrease in faunal species diversity, including potential SCC. |
| - Dumping of construction material outside of the final infrastructure footprint, thereby leading to further habitat disturbance, which will promote the establishment and spread of AIPs.<br>- **Impact:** Loss or degradation of favourable faunal habitat, diversity and potential SCC. |
| - Additional pressure on faunal habitat, diversity and abundance as a result of an increased human presence associated with the proposed development, contributing to:<br>• Potential hunting/trapping/removal/collection of faunal species or potential SCC; and<br>• Increased human activity will lead to the displacement and/or loss of potential faunal SCC.<br>- **Impact:** Loss of faunal habitat and the loss of potential faunal SCC. |
| - Potentially poorly managed edge effects:<br>• Ineffective rehabilitation of compacted areas, bare soils, or eroded areas leading to ongoing degradation of surrounding natural areas altering faunal habitat on an increased scale; and<br>• Potential compaction of soils outside of the study area due to indiscriminate movement of construction vehicles through natural vegetation.<br>- **Impact:** Loss or degradation of faunal habitat, diversity, and potential SCC within the direct footprint of the proposed development. Loss of surrounding faunal diversity and potentially occurring SCC. |
| - Possible increased fire frequency during construction.<br>- **Impact**: Loss or alteration of faunal habitat and species diversity. |
| **Operational and Maintenance Phase** |
| - Increased human presence in the area once operational, potentially leading to an increased littering and other waste impacting on faunal communities outside of the development footprint, notably in open areas where no construction is planned (i.e., remaining habitat within the study area).<br>- **Impact:** Loss of faunal habitat, potential SCC, as well as overall species diversity within the study area. |
| - Ineffective rehabilitation of exposed and impacted areas potentially leading to vegetation succession and a possible reduction of faunal diversity and occurrence of potential faunal SCC over the long-term.<br>- **Impact:** Permanent loss of faunal habitat, diversity and potential SCC, and a higher likelihood of edge effect impacts on adjacent and nearby natural faunal habitat. Further reduction of available habitat in the long-term, compounding the limiting factors to faunal assemblages. |
| - Potential inappropriate management and failure to monitor rehabilitation efforts, leading to:<br>• Increased storm water run-off;<br>• Compacted soils limiting the re-establishment of natural vegetation; and<br>• Increased risk of erosion in areas left disturbed.<br>- **Impact:** Long-term (or permanent) loss of faunal habitat, diversity and potential SCC within disturbed / impacted areas. |
| - Potentially poorly implemented and monitored AIP Management programme leading to the reintroduction and proliferation of AIP species.<br>- **Impact:** Permanent loss of surrounding faunal habitat, diversity, and potential SCC. |
| - On-going disturbance during operational phase may lead to erosion and sedimentation of surrounding faunal habitat.<br>- **Impact:** Degradation of favourable habitat and limited potential for faunal re-colonisation leading to loss of faunal habitat and diversity within the local area. |

## *5.2 Faunal Impact Assessment Results*

The below tables (Table 7 - 9) indicate the perceived risks to the faunal ecology (Habitat, Diversity and SCC) associated with all phases of the proposed activities. The table also provides the findings of the impact assessment undertaken with reference to the perceived impacts prior to the implementation of mitigation measures and following the implementation

of mitigation measures. Key integrated mitigation measures that are applicable to the proposed project are also presented in each table and are required to suitably manage, minimise and where possible, mitigate the ecological impacts that are associated with all phases of the proposed activities.

The mitigated results of the impact assessment have been calculated on the premise that all mitigation measures as stipulated in this report are adhered to and implemented. Should such actions not be adhered to, post-mitigation impact scores will likely increase.

**Table 7: Planning Phase impacts on faunal habitat, diversity, and SCC from the proposed development. Required mitigation measures are presented at the bottom of the table.**

| Habitat Units | UNMANAGED | | | | | | | | MANAGED | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Probability of Impact | Sensitivity | Severity | Spatial Scale | Duration of Impact | Likelihood | Consequence | Significance | Probability of Impact | Sensitivity | Severity | Spatial Scale | Duration of Impact | Likelihood | Consequence | Significance |
| **Faunal Habitat and Diversity** | | | | | | | | | | | | | | | | |
| **Degraded Hygrophilous Grassland** | 3 | 3 | 3 | 2 | 2 | **6** | **7** | **42 Low** | 2 | 3 | 2 | 1 | 2 | **5** | **5** | **25 Very Low** |
| **Thicket Habitat** | 3 | 3 | 3 | 2 | 2 | **6** | **7** | **42 Low** | 2 | 3 | 2 | 1 | 2 | **5** | **5** | **25 Very Low** |
| **Transformed Habitat** | 3 | 1 | 1 | 1 | 2 | **4** | **4** | **16 Very Low** | 2 | 1 | 1 | 1 | 2 | **3** | **4** | **12 Very Low** |
| **Faunal SCC** | | | | | | | | | | | | | | | | |
| **Degraded Hygrophilous Grassland** | 3 | 3 | 3 | 2 | 2 | **6** | **7** | **42 Low** | 2 | 3 | 2 | 1 | 2 | **5** | **5** | **25 Very Low** |
| **Thicket Habitat** | 3 | 3 | 3 | 2 | 2 | **6** | **7** | **42 Low** | 2 | 3 | 2 | 1 | 2 | **5** | **5** | **25 Very Low** |
| **Transformed Habitat** | 1 | 1 | 1 | 1 | 2 | **2** | **4** | **8 Very Low** | 1 | 1 | 1 | 1 | 2 | **2** | **4** | **8 Very Low** |
| **Mitigation Measures** | | | | | | | | | | | | | | | | |
| ➢ It must be ensured that, as far as possible, all proposed infrastructure, including temporary infrastructure, is not placed outside of the authorised footprint, especially within surrounding sensitive environment;<br>➢ The area in which construction activities are to take place must be clearly demarcated;<br>➢ Minimise loss of natural vegetation where possible through effective planning and limiting the development footprint to what is essential. The designs must further adhere to all legislation and all reasonable precautions must be taken to prevent potential spills and /or leaks;<br>➢ Appropriate rehabilitation measures and a bush encroachment control plan should be implemented to ensure control thereof;<br>➢ Where possible, and feasible, all access roads should be kept to existing roads; | | | | | | | | | | | | | | | | |

| Habitat Units | UNMANAGED | | | | | | | | MANAGED | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Probability of Impact | Sensitivity | Severity | Spatial Scale | Duration of Impact | Likelihood | Consequence | Significance | Probability of Impact | Sensitivity | Severity | Spatial Scale | Duration of Impact | Likelihood | Consequence | Significance |
| ➢ Where feasible, impacts to faunal SCC should be avoided (i.e., through adequate planning and/or rerouting/redesigning layouts (where possible)). Where this is not possible, permits will be required for the rescue/relocation of affected species;<br>➢ Permits from Ezemvelo KZN Wildlife and authorisation from the DFFE should be obtained to remove or convey any provincially or nationally protected species before any vegetation clearing (destruction of faunal habitat) may take place; and<br>➢ Pedestrian and vehicle movement in areas where no development is planned, should be restricted to prevent further disturbance to the receiving environment. | | | | | | | | | | | | | | | |

**Table 8: Construction Phase impacts on faunal habitat, diversity, and SCC from the proposed development. Required mitigation measures are presented at the bottom of the table.**

| Habitat Units | UNMANAGED | | | | | | | | MANAGED | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Probability of Impact | Sensitivity | Severity | Spatial Scale | Duration of Impact | Likelihood | Consequence | Significance | Probability of Impact | Sensitivity | Severity | Spatial Scale | Duration of Impact | Likelihood | Consequence | Significance |
| **Faunal Habitat and Diversity** | | | | | | | | | | | | | | | | |
| **Degraded Hygrophilous Grassland** | 5 | 3 | 3 | 2 | 3 | **8** | **8** | **64 Medium-Low** | 5 | 3 | 2 | 2 | 3 | **8** | **7** | **56 Medium-Low** |
| **Thicket Habitat** | 5 | 3 | 3 | 2 | 3 | **8** | **8** | **64 Medium-Low** | 5 | 3 | 2 | 2 | 3 | **8** | **7** | **56 Medium-Low** |
| **Transformed Habitat** | 4 | 1 | 1 | 1 | 3 | **5** | **5** | **25 Very Low** | 4 | 1 | 1 | 1 | 3 | **5** | **5** | **25 Very-Low** |
| **Faunal SCC** | | | | | | | | | | | | | | | | |

| Habitat Units | UNMANAGED | | | | | | | | MANAGED | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Probability of Impact | Sensitivity | Severity | Spatial Scale | Duration of Impact | Likelihood | Consequence | Significance | Probability of Impact | Sensitivity | Severity | Spatial Scale | Duration of Impact | Likelihood | Consequence | Significance |
| **Degraded Hygrophilous Grassland** | 4 | 3 | 3 | 2 | 3 | **7** | **8** | **56 Medium-Low** | 3 | 3 | 2 | 2 | 3 | **6** | **7** | **42 Low** |
| **Thicket Habitat** | 4 | 3 | 3 | 2 | 3 | **7** | **8** | **56 Medium-Low** | 3 | 3 | 2 | 2 | 3 | **6** | **7** | **42 Low** |
| **Transformed Habitat** | 1 | 1 | 1 | 1 | 3 | **2** | **5** | **10 Very Low** | 1 | 1 | 1 | 1 | 3 | **2** | **5** | **10 Very-Low** |

**Mitigation Measures**

- Vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the construction activities. Additional road construction should be limited to what is absolutely necessary, and the footprint thereof kept to a minimum;
- The development footprint should be demarcated, and it should be ensured that no construction-related activities take place outside of the demarcated footprint;
- Vegetation clearing should be conducted in a phased manner to allow fauna enough time to escape to areas ahead of the clearance activities;
- In the event that reptiles are encountered during construction activities, harmless species should be carefully relocated by a suitably trained construction personnel member. For larger venomous snakes, a suitably trained professional or trained site personnel should be contacted to assist in the relocation of individuals, should it not move off on its own. No reptiles are to be killed or harmed;
- If any herpetofauna SCC are encountered or unearthed, they should be safely relocated to similar habitat outside of the footprint area. Should species be encountered/unearthed, the relevant provincial authorities must be duly notified;
- Edge effects stemming from construction activities, which may affect adjacent areas, need to be strictly managed;
- No construction rubble or cleared alien invasive species are to be disposed of outside of demarcated areas, and should be taken to a registered waste disposal facility;
- All soils compacted, outside of the footprint areas, as a result of construction activities should be ripped, profiled, and reseeded using indigenous vegetation;
- No informal fires by construction personnel are to be allowed;
- If any spills occur, they should be immediately cleaned up to avoid soil contamination that can hinder faunal rehabilitation later down the line. Spill kits should be kept on site within workshops. in the event of a breakdown, maintenance of vehicles must take place with care and spillage preventative measures implemented;
- No hunting/trapping or persecution of fauna must be allowed;
- As far as possible vegetation clearance activities should be undertaken in the winter months, as faunal species will not be breeding;
- Ensure that no unnatural preferential flow paths are created during construction, i.e., implement appropriate stormwater management;
- Outside lighting should be designed to minimise impacts on fauna, especially invertebrates. Use of fluorescent, LED and mercury vapour lighting should be avoided and sodium vapour (yellow) lights should be used wherever possible for outside lighting; and
- Should any faunal SCC be encountered, construction should be halted, and a suitably qualified specialist consulted to help ascertain the best way forward.

**Table 9: Operation and Maintenance Phase impacts on faunal habitat, diversity, and SCC from the proposed development. Required mitigation measures are presented at the bottom of the table.**

| Habitat Units | UNMANAGED | | | | | | | | MANAGED | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Probability of Impact | Sensitivity | Severity | Spatial Scale | Duration of Impact | Likelihood | Consequence | Significance | Probability of Impact | Sensitivity | Severity | Spatial Scale | Duration of Impact | Likelihood | Consequence | Significance |
| **Faunal Habitat and Diversity** | | | | | | | | | | | | | | | | |
| **Degraded Hygrophilous Grassland** | 4 | 3 | 3 | 2 | 5 | **7** | **10** | **70 Medium-Low** | 4 | 3 | 2 | 1 | 5 | **7** | **8** | **56 Medium-Low** |
| **Thicket Habitat** | 4 | 3 | 2 | 2 | 5 | **7** | **9** | **63 Medium-Low** | 4 | 3 | 1 | 1 | 5 | **7** | **7** | **49 Low** |
| **Transformed Habitat** | 3 | 1 | 1 | 1 | 5 | **4** | **7** | **28 Low** | 3 | 1 | 1 | 1 | 5 | **4** | **7** | **28 Low** |
| **Faunal SCC** | | | | | | | | | | | | | | | | |
| **Degraded Hygrophilous Grassland** | 4 | 3 | 2 | 2 | 5 | **7** | **9** | **63 Medium-Low** | 3 | 3 | 1 | 1 | 5 | **6** | **7** | **42 Low** |
| **Thicket Habitat** | 4 | 3 | 2 | 2 | 5 | **7** | **8** | **56 Medium-Low** | 4 | 3 | 1 | 1 | 5 | **7** | **7** | **49 Low** |
| **Transformed Habitat** | 1 | 1 | 1 | 1 | 5 | **2** | **7** | **10 Very Low** | 1 | 1 | 1 | 1 | 5 | **2** | **7** | **10 Very Low** |
| **Mitigation Measures** | | | | | | | | | | | | | | | | |
| ➢ Edge effects arising from the proposed development, such as erosion and alien plant species proliferation, which may affect adjacent natural areas, need to be strictly managed;<br>➢ Where bare soils are left exposed post construction activities, they should be immediately rehabilitated. Rehabilitation efforts should be monitored continuously during the operational phase until natural processes restore ecological functioning and biodiversity in the surrounding and open space areas;<br>➢ No dumping of litter or waste must be allowed on-site or in the adjacent surrounding habitats;<br>➢ Staff need to be educated and informed about local wildlife and fauna in the surrounding areas.<br>o No hunting/trapping or persecution of fauna must be allowed in the open space and surrounding areas; and<br>➢ In the event that reptiles or arachnids are encountered, harmless species should be carefully relocated to the open space areas by a suitably trained community member. For larger venomous snakes, a suitably trained professional should be contacted to assist in the relocation of the species. No reptiles or arachnids are to be killed or harmed. | | | | | | | | | | | | | | | |

## 5.3 Impact Discussion

Following the field assessment and subsequent data analyses, it was determined that the Degraded Hygrophilous Grassland and Thicket habitat may provide suitable foraging habitat for common faunal species and several potential faunal SCC resulting in a **medium faunal SEI**. The Transformed habitat provided suitable habitat for common faunal species and no potential SCC and resulted in a **very low faunal SEI**.

Where SEI scores are higher, the impact from the proposed activities will be more significant and greater residual, negative impacts may be experienced. The required mitigation and management measures also differ depending on the SEI scores. The potential for regional impacts is considered unlikely if recommended mitigation measures are adhered to. Therefore, the impact significance (prior to mitigation) on faunal habitat diversity and SCC ranges from **Medium-Low** to **Very Low**. After mitigation measures are implemented, impacts can be suitably reduced, notably the potential impact extents. The potential for large-scale impacts on faunal ecology is unlikely if recommended mitigatory measures as stipulated in Section 5.2 are adhered to. The below sections provide a discussion of the impact assessment outcome in more detail.

### 5.3.1 Impacts on Faunal Habitat and Diversity

The proposed development activities will result in the extensive clearance of vegetation, which will lead to a loss of faunal habitat, important supporting habitat, and diversity within the study area. Impacts associated with the faunal communities is not anticipated to be high provided that mitigation measures are undertaken. The proposed development activities within the Thicket habitat will result in the loss of forage and sheltering areas for several fauna. Although this unit is encroached and degraded in nature it does provide habitat of valuable structure for invertebrates, reptiles and avifauna. The loss of this unit is however not anticipated to lead to highly significant impacts on faunal diversity at a regional level. The Transformed habitat is already considered developed and thus impacts are anticipated to be low.

Negative impacts likely to be associated with the faunal ecology within study area includes increased urbanisation and industrialisation and placement of infrastructure within natural habitat. There is also likely going to be a reduction in faunal movement corridors in the general area. AIP proliferation, bush encroachment, and erosion in disturbed areas have a high potential to degrade the remaining faunal habitat. Increased human movement, will likely lead to greater pressure on faunal communities and increasing the potential for human wildlife conflict.

Vegetation clearing and habitat transformation (i.e., direct impacts) to 1) faunal habitat and species diversity and 2) SCC will both be greatest during the operation phase in the Degraded Hygrophilous Grassland. Post-mitigation, impacts will likely result in a **Medium-Low** and **Low** impact respectively. Significance on faunal ecology and can be largely restricted to the footprint areas in the construction and operation phase.

### 5.3.2 Impacts on Faunal SCC

The online screening tool Animal Species Theme indicated that the study area is of High and Medium sensitivity.

The high sensitivity is triggered by *Circaetus fasciolatus* (Southern Banded Snake Eagle, CR), *Circus ranivorus* (African Marsh Harrier, EN), *Geokichla guttata* (Spotted Ground Thrush, EN), *Podica senegalensis* (African Finfoot, VU), *Polemaetus bellicosus* (Martial Eagle, EN), and *Stephanoaetus coronatus* (Crowned Eagle, VU).

The medium sensitivity is triggered by *Arytropteris basalis* (Flat-necked Shieldback, VU), *Balearica regulorum* (Grey Crowned Crane, EN), *Crocodylus niloticus* (Nile Crocodile, VU), *Halcyon senegaloides* (Mangrove kingfisher, EN), *Hyperolius pickersgilli* (Pickersgill's Reed Frog, EN), *Lycaon pictus* (African Wild Dog, EN), *Nettapus auratus* (African Pygmy Goose, VU), *Pelusios rhodesianus* (Variable Hinged Terrapin, VU), *Pomatonota dregii* (East Coast Katydid, VU), *Terathopius ecaudatus* (Bateleur, EN) and Sensitive species 8 (VU).

Sensitive species 8 (VU), *Circaetus fasciolatus* (Southern Banded Snake Eagle, CR), *Stephanoaetus coronatus* (Crowned Eagle, VU), *Hyperolius pickersgilli* (Pickersgill's Reed Frog, EN), *Arytropteris basalis* (Flat-necked Shieldback, VU) and *Pomatonota dregii* (East Coast Katydid, VU) have a verified medium POC as they may be found in the study area but are unlikely to permanently depend on it due to historic and current anthropogenic impacts. In the study area the high sensitivity is disputed and a medium sensitivity designation is deemed more appropriate. The medium sensitivity in the remaining areas is verified.

No faunal SCC listed under the Online National Web Based Environmental Screening Tool and IUCN were confirmed within the study area though the study area does provide suitable habitat for potential faunal SCC known to occur in the greater area, though habitat fragmentation and anthropogenic activities are likely to have impacted on these species' potential occurrence/use of the study area.

Three (3) other SCC have a high POC for the study area; *Hemisus guttatus* (Spotted Snout-Burrower, NT), *Hemicordulia Africana* (African Emerald, VU) and *Agriocnemis gratiosa* (Gracious Wisp, NT) (Sections 3.4 – 3.7), whilst four (4) other faunal SCCs have a medium

POC - which may potentially be encountered within the study area. It is noted that these species are not likely dependent on the study area for survival, and the area may only be a part of their larger home ranges or foraging areas. If all mitigation measures are put into effect, the potential impacts on faunal SCC are expected to be limited and not detrimental to the SCC on a local to regional scale.

### 5.3.3 Probable Residual Impacts

Even with extensive mitigation, residual impacts on the receiving faunal ecological environment will still persist. The following points highlight the key residual impacts that have been identified:

- Altered faunal species diversity and abundance in and immediately adjacent the development footprint areas;
- Edge effects such as further habitat fragmentation and AIP proliferation;
- Potential loss of faunal SCC including suitable habitat for such species; and
- Disturbed areas not rehabilitated to an ecologically functioning state with resulting significant loss of faunal habitat, species diversity, and SCC likely to be permanent; and
- Edge effects such as further habitat fragmentation and AIP proliferation.

### 5.3.4 Cumulative Impacts

Cumulative impacts are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

The study area has experienced several anthropogenic impacts over time, with mowing of grass and clearing of vegetation taking place in much of the study area at some point in time; and fragmentation, through extensive fencing and edge effects, have occurred within and surrounding the study area due to its close proximity to human settlements and industry. These activities have degraded the habitat. As a result, common faunal classes, that are more resilient to disturbance, are anticipated to occur within the study area in intermediate abundances.

In the context of the largely disturbed surrounding environment, these fragmented habitats have become important refugia for faunal diversity. Any further loss or fragmentation of the remaining habitat and connected natural vegetation will reduce habitat continuity and further weaken ecological linkages across the landscape. Cumulatively, this will result in increasingly

isolated natural areas that are no longer connected by functional corridors, with consequent declines in ecosystem functioning and the delivery of ecosystem services.

The development will lead to common faunal species being displaced from the proposed footprint areas into adjacent habitats. This will lead to increased competition for space and food resources within the study area and adjacent habitat units. Edge effects and AIP proliferation are more concerning over the long-term. AIP proliferation will ultimately lead to loss of viable habitat, on a potentially increased scale, in the surrounding areas, displacing faunal species further as indigenous floral species (faunal habitat and food resources) are displaced and lost. An additional cumulative impact that could increase substantially over the life of the development, if not mitigated, is littering and dumping of other waste material in sensitive areas or outside designated areas, which may negatively impact faunal habitat on an increased scale over time.

# 6 CONCLUSION AND RECOMMENDATIONS

The impact assessment was undertaken on all aspects of faunal ecology deemed likely to be affected. 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. Further investigation within a more suitable season is recommended to confirm the presence or absence of certain SCC to support and/or guide the authorisation process required in terms of NEMA. The proposed development will result in the loss of faunal habitat. Direct impacts resulting from this development are expected to affect potential SCC and common faunal species. Impacts on potential SCC in the study area are not expected to be significant if all mitigation measures outlined in this report are followed. Indirect impacts on surrounding natural habitats need to be strictly mitigated to avoid significant impacts on these areas. Thus, development is not expected to have a significant impact on the faunal assemblages, only clears vegetation where necessary and carries out all the relevant mitigation measures stipulated within this report. Given the findings of the study, it is the reasoned opinion that the proposed development can be authorised provided that mitigation measures listed in this report are adhered to.

It is the opinion of the ecologists that this study provides the relevant information required to implement Integrated Environmental Management (IEM) and to ensure that the best long-term use of the ecological resources in the study area will be made in support of the principle of sustainable development.

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# APPENDIX A: Faunal Method of Assessment

It is important to note that due to the nature and habits of fauna, varied stages of life cycles, seasonal and temporal fluctuations along with other external factors, it is unlikely that all faunal species will have been recorded during the site assessment. The presence of anthropogenic activities associated with the study area may have an impact on faunal behaviour and in turn the rate of observations.

### *Mammals*

Mammal species were recorded during the field assessment with the use of visual identification by actively searching/listening for individuals or the presence of spoor, calls and dung. Specific attention was given to mammal SCC listed on a regional and national level, as well as those identified by the Screening Tool. Desktop analysis of the study area was used to determine areas of higher value to mammal species and focus was placed within these areas during the field survey. Transects were walked throughout the study area to cover maximum ground within the given timeframe. Camera traps and sherman trap were also deployed in field to further increase observation rates, notably of nocturnal and reclusive species.

### *Avifauna*

The Southern African Bird Atlas Project 2 database (http://sabap2.adu.org.za/) was compared with the recent field survey of avifaunal species identified in the study area. Field surveys were undertaken utilising direct observation and bird call identification techniques to accurately identify avifaunal species. Specific attention was given to avifaunal SCC listed on a regional and national level, as well as those identified by the Screening Tool.

### *Reptiles*

Reptiles were identified during the field survey. Suitable applicable habitat areas (rocky outcrops and fallen dead trees) were inspected, and all reptiles encountered were identified. The data gathered during the assessment along with the habitat analysis provided an accurate indication of which reptile species are likely to occur in the study area. Specific attention was given to reptile SCC listed on a regional and national level, as well as those identified by the Screening Tool.

### *Amphibians*

Identifying amphibian species is done by the use of direct visual identification along with call identification techniques. Amphibian species flourish in and around wetland, riparian, and moist grassland areas. It is unlikely that all amphibian species will have been recorded during the site assessment, due to their cryptic nature and habits, varied stages of life cycles and seasonal and temporal fluctuations within the environment. The data gathered during the assessment along with the habitat analysis provided an accurate indication of which amphibian species are likely to occur within the study area as well as the surrounding area. Specific attention was given to amphibian SCC listed on a regional and national level, as well as those identified by the Screening Tool.

### *Invertebrates*

Whilst conducting transects through the study area, all insect species visually observed were identified, and where possible photographs were taken.

It must be noted however that due to the cryptic nature and habits of insects, varied stages of life cycles and seasonal and temporal fluctuations within the environment, it is unlikely that all insect species will have been recorded during the site assessment period. Nevertheless, the data gathered during the assessment along with the habitat analysis provided an accurate indication of which species are likely to occur in the study area at the time of the survey. Specific attention was given to insect SCC listed on a regional and national level, as well as those identified by the Screening Tool.

Suitable applicable habitat areas (rocky outcrops, sandy areas and fallen dead trees) where spiders and scorpions are likely to reside were searched. Rocks were overturned and inspected for signs of these species. Specific attention was paid to searching for Mygalomorphae arachnids (Trapdoor and Baboon spiders) as well as potential SCC scorpions within the study area.

## Faunal Species of Conservation Concern Assessment

The POC for each faunal SCC was determined using the following four parameters:

- Species distribution;
- Habitat availability;
- Food availability; and
- Habitat disturbance.

The POC for each faunal SCC is described:

- "**Confirmed'**: if observed during the survey;
- "**High**": if within the species' known distribution range and suitable habitat is available;
- "**Medium**": if either within the known distribution range of the species or if suitable habitat is present; or
- "**Low**": if the habitat is not suitable and falls outside the distribution range of the species.

The accuracy of the POC is based on the available knowledge about the species in question, with many of the species lacking in-depth habitat research.

## Faunal Site Ecological Importance (SEI)

SEI is a function of the biodiversity importance (BI) of the receptor (e.g., species of conservation concern, the vegetation/fauna community or habitat type present on the site[6]) and its resilience to impacts (receptor resilience [RR]) as follows:

**SEI = BI + RR**

SEI can be derived from a simple matrix of BI and RR as follows:

**Table A1: Matrix of CI and FI to determine BI.**

| Site Ecological Importance (SEI) | | 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 development is provided below.

**Table A2: Guidelines for interpreting SEI in the context of the proposed development 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. |

[6] Note that the habitat type may be independent of the vegetation community and that it may even be artificial, e.g., excavated rock quarries that provide crucial breeding habitat for cliff-nesting species such as Bald Ibis.

# APPENDIX B: Faunal SCC

**Table B1: NEMBA: TOPS list (2007) of all faunal SCC.**

| Scientific Name | Common Name |
|---|---|
| **CRITICALLY ENDANGERED SPECIES** | |
| **REPTILIA** | |
| *Caretta caretta* | Loggerhead Sea Turtle |
| *Dermochelys coriacea* | Leatherback Sea Turtle |
| *Eretmochelys imbricate* | Hawksbill Sea Turtle |
| **AVES** | |
| *Grus carunculatus* | Wattled Crane |
| *Hirundo atrocaerulea* | Blue Swallow |
| *Neophron percnopterus* | Egyptian Vulture |
| *Poicephalus robustus* | Cape Parrot |
| **MAMMALIA** | |
| *Bunolagus monticularis* | Riverine Rabbit |
| *Chrysospalax* | Rough-haired Golden Mole |
| **ENDANGERED SPECIES** | |
| **REPTILIA** | |
| *Chelonia mydas* | Green Turtle |
| *Cordylus giganteus* | Giant Girdled Lizard |
| *Lepidochelys olivacea* | Olive Ridley Turtle |
| *Psammobates geometricus* | Geometric Tortoise |
| **AVIFAUNA** | |
| *Anthropoides paradiseus* | Blue Crane |
| *Balearica regulorum* | Grey Crowned Crane |
| *Ephippiorhynchus senegalensis* | Saddle-billed Stork |
| *Gypaetus barbatus* | Bearded Vulture |
| *Gyps africanus* | White-backed Vulture |
| *Gyps coprotheres* | Cape Vulture |
| *Necrosyrtes* | Hooded Vulture |
| *Pelecanus rufescens* | Pink-backed Pelican |
| *Scotopelia peli* | Pel's Fishing Owl |
| *Torgos tracheliotus* | Lappet-faced Vulture |
| **MAMMALIA** | |
| *Amblysomus robustus* | Robust Golden Mole |
| *Damaliscus tunatus* | Tsessebe |
| *Diceros bicornis* | Black Rhinoceros |
| *Equus zebra* | Mountain Zebra |
| *Lycaon pictus* | African Wild Dog |
| *Neamblysomus gunningi* | Gunning's Golden Mole |
| *Ourebia ourebi ourebi* | Oribi |
| *Paraxerus palliatus* | Red Squirrel |
| *Petrodromus tetradactylus* | Four-toed Elephant-shrew |
| **INVERTEBRATA** | |
| *Colophon spp - species* | Stag Beetles |
| **VULNERABLE SPECIES** | |
| **AVES** | |
| *Trigonoceps occipitalis* | White-headed Vulture |
| *Aquila rapax* | Tawny Eagle |
| *Ardeotis kori* | Kori Bustard |
| *Ciconia nigra* | Black Stork |
| *Circaetus fasciolatus* | Southern Banded Snake Eagle |
| *Eupodotis caerulescens* | Blue Korhaan |

| Scientific Name | Common Name |
|---|---|
| *Falco fasciinucha* | Falcon |
| *Falco naumanni* | Lesser Kestrel |
| *Falco peregrinus* | Peregrine Falcon |
| *Geronticus calvus* | Bald Ibis |
| *Neotis ludwidii* | Ludwig's Bustard |
| *Polemaetus bellicosus* | Martial Eagle |
| *Terathopius ecaudatus* | Bateleur |
| *Tyto capensis* | Grass Owl |
| **MAMMALIA** | |
| *Acinonyx jubatus* | Cheetah |
| *Chrysospalax trevelyani* | Giant Golden Mole |
| *Cricetomys gambianus* | Giant Rat |
| *Damaliscus pyrgorgus pygargus* | Bontebok |
| *Dendrohyrax arboreus* | Tree Hyrax |
| *Hippotragus equinus* | Roan Antelope |
| *Pholidota temminckii* | Pangolin |
| *Neamblysomus julianae* | Juliana's Golden Mole |
| *Neotragus moschatus* | Suni |
| *Panthera leo* | Lion |
| *Panthera pardus* | Leopard |
| *Philantomba monticola* | Blue Duiker |
| **INVERTEBRATA** | |
| *Peripatopsis alba* | White Cave Velvet Worm |
| ***PROTECTED SPECIES*** | |
| **AMPHIBIA** | |
| *Pyxicephalus adspersus* | Giant Bullfrog |
| *Pyxicephalus edulis* | Afiican Bullfrog |
| **REPTILIA** | |
| *Bitis gabonica* | Gaboon Adder |
| *Bitis schneideri* | Namaqua Dwarf Adder |
| *Bradypodion taeniabronchum* | Smith's Dwarf Chameleon |
| *Cordylus cataphractus* | Girdled Lizard |
| *Crocodylus niloticus* | Nile crocodile |
| *Python natalensis* | African Rock Python |
| **AVES** | |
| *Bucowus leadeateri* | Southern Ground-Hornbill |
| *Circus ranivorus* | African Marsh Harrier |
| *Neotis denhami* | Denham's Bustard |
| *Spheniscus* | Jackass Penguin |
| **MAMMALIA** | |
| *Atelerix frontalis* | South African Hedgehog |
| *Ceratotherium simum* | White Rhinoceros |
| *Connochaetes* | Black Wildebeest |
| *Crocuta crocuta* | Spotted Hyaena |
| *Felis nigripes* | Black-footed Cat |
| *Parahyaena brunnea* | Brown Hyaena |
| *Leptailurus serval* | Serval |
| *Loxodonta africana* | African elephant |
| *Lutra maculicollis* | Spotted-necked Otter |
| *Millivora capensis* | Honey Badger |
| *Raphicerus sharpei* | Sharpe's Grysbok |
| *Redunca* | Reedbuck |
| *Vulpes chama* | Cape Fox |
| **INVERTEBRATA** | |

| Scientific Name | Common Name |
|---|---|
| *Aloeides clarki* | Coega Copper Butterfly |
| *Ceratogyrus spp - All species* | Horned Baboon Spiders |
| *Echinodiscus bisperforatus* | Pansy Shell |
| *Dromica spp - All species* | Tiger Beetles |
| *Graphipterus assimilis* | Velvet Ground Beetle |
| *Hadogenes spp -species* | Flat Rock Scorpions |
| *Haliotis midae* | South African Abalone |
| *Harpactira spp - All species* | Common Baboon Spiders |
| *Ichnestoma - Aspecies* | Fruit Chafer Beetles |
| *Manticora spp - Aspecies* | Monster Tiger Beetles |
| *Megacephala asperata* | Tiger Beetle |
| *Megacephala regalis* | Tiger Beetle |
| *Nigidius auriculatus* | Stag beetle |
| *Oonotus adspersus* | Stag Beetle |
| *Oonotus interioris* | Stag Beetle |
| *Oonotus rex* | Stag Beetle |
| *Oonotus sericeus* | Stag Beetle |
| *Opisthacanthus spp - All species* | Creeping Scorpions |
| *Opistophthalmus spp - All species* | Burrowing Scorpions |
| *Platychile pallida* | Tiger Beetle |
| *Prosopocoilus petitclerci* | Stag Beetle |
| *Prothyma guttipennis* | Tiger Beetle |
| *Pterinochilus spp - All species* | Golden Baboon Spiders |

**NL= Not Listed; EN= Endangered; CR= Critically Endangered; VU= Vulnerable; P = Protected (TOPS 2007); NT = Near Threatened**

**Table B2: Faunal SCC that may occur in the study area according to the DFFE screening tool**

| Scientific Name | Common Name | Status | Sensitivity | POC |
|---|---|---|---|---|
| *Lycaon pictus* | African Wild Dog | EN | Medium | Low |
| | Sensitive species 8 | VU | Medium | Medium |
| *Balearica regulorum* | Grey Crowned Crane | EN | Medium | Low |
| *Circus ranivorus* | African Marsh Harrier | EN | High | Low |
| *Podica senegalensis* | African Finfoot | VU | High | Low |
| *Polemaetus bellicosus* | Martial Eagle | EN | High | Low |
| *Stephanoaetus coronatus* | Crowned Eagle | VU | High | Low |
| *Halcyon senegaloides* | Mangrove kingfisher | EN | Medium | Low |
| *Nettapus auratus* | African Pygmy Goose | VU | Medium | Low |
| *Geokichla guttata* | Spotted Ground Thrush | EN | High | Low |
| *Terathopius ecaudatus* | Bateleur | EN | Medium | Low |
| *Circaetus fasciolatus* | Southern Banded Snake Eagle | CR | High | Medium |
| *Crocodylus niloticus* | Nile Crocodile | VU | Medium | Low |
| *Pelusios rhodesianus* | Variable Hinged Terrapin | VU | Medium | Low |
| *Hyperolius pickersgilli* | Pickersgill's Reed Frog | EN | Medium | Medium |
| *Arytropteris basalis* | Flat-necked Shieldback | VU | Medium | Medium |
| *Pomatonota dregii* | East Coast Katydid | VU | Medium | Medium |

**VU = Vulnerable**

**Table B3: Avifaunal Species for the pentad encompassing the study area.**

| Pentads | Link to pentad summary on the South African Bird Atlas Project 2 web page |
|---|---|
| 2840_3200 | https://sabap2.birdmap.africa/coverage/pentad/2840_3200 |

# APPENDIX C: Faunal Species List

**Table C1: Mammal species or signs recorded during the field assessment. Species expected to be on site, due to historic observations, are marked with a ***

| Scientific Name | Common Name | National Red List Status |
|---|---|---|
| *Thryonomys swinderianus* | Greater Cane Rat | LC |
| **Tragelaphus scriptus* | Bushbuck | LC |
| **Hystrix africaeaustralis* | Cape Porcupine | LC |
| **Chlorocebus pygerythrus* | Vervet Monkey | LC |
| **Mungos mungo* | Banded Mongoose | LC |

**LC = Least concerned.**

**Table C2: Avifaunal species recorded during the field assessment. For a more comprehensive list of all potentially occurring bird species in the vicinity of the study area, please refer to the SABAP 2 pentad link. Species expected to be on site, due to historic observations, are marked with a ***

| Scientific Name | Common Name | National Red List Status |
|---|---|---|
| *Pycnonotus tricolor* | Dark capped Bulbul | LC |
| *Vanellus coronatus* | Crowned Lapwing | LC |
| *Cossypha caffra* | Cape Robin-Chat | LC |
| *Corvus albus* | Pied crow | LC |
| *Ardea melanocephala* | Black-headed Heron | LC |
| *Ciconia episcopus* | Woolly-necked Stork | LC |
| **Ploceus capensis* | Cape Weaver | LC |
| **Anthus cinnamomeus* | African Pipit | LC |
| **Lonchura cucullata* | Bronze Mannikin | LC |
| **Dendrocygna viduata* | White-faced Whistling Duck | LC |
| **Merops persicus* | Blue-cheeked Bee-eater | LC |

**LC = Least concerned**

**Table C3. Reptile species expected to be on site, due to historic observations, are marked with a *.**

| Scientific name | Common name | National Red List Status |
|---|---|---|
| **Philothamnus natalensis natalensis* | Eastern Natal Green Snake | LC |
| **Kinixys zombensis* | Eastern Hinged-back Tortoise | LC |

**LC = Least Concern**

**Table C4. Amphibians expected to be on site, due to historic observations, marked with a *.**

| Scientific Name | Common Name | National Red List Status |
|---|---|---|
| * *Schismaderma carens* | African Red Toad | LC |
| **Hyperolius marmoratus* | Painted Reed Frog | LC |

**LC = Least Concern**

**Table C5: Invertebrates recorded during the field assessment. Species expected to be on site, due to historic observations, are marked with a ***

| Scientific Name | Common Name | National Red List Status |
|---|---|---|
| *Acanthacris ruficornis* | Garden Locust | NYBA |
| **Zonocerus elegans* | Elegant Grasshopper | NYBA |
| **Cynthia cardui* | Painted Lady | LC |

**LC = Least Concern; NYBA = Not Yet Been Assessed**