## APPENDIX E5 – Floral Assessment

SCIENTIFIC TERRESTRIAL SERVICES

# Terrestrial Biodiversity Assessment

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

## Part B: Terrestrial Biodiversity Specialist Assessment Report and Plant Species Compliance Statement


**Prepared for**: NEMAI Consulting
**Author**: Dr. S. L Daniels (Pr. Sci. Nat)
**Reviewer**: C. Kock (Pr. Sci. Nat)
**Reference**: STS 24 - 2034
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Part of the SAS Environmental Group of Companies

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# DOCUMENT GUIDE

The table below provides a guide to reporting biodiversity impacts as they relate to Government Notice 1150 Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Plant Species, as published in Government Gazette 43855 dated 30 October 2020 (as amended in Government Notice 3717 of 2023).

| **Theme-Specific Requirements as per Government Notice No. 1150<br>Plant Theme – Very High and High Sensitivity Protocol followed (refer to Section 1.1)** | | |
|---|---|---|
| **No.** | **SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS** | **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 "medium sensitivity" for plant species, must submit either a Plant Species Specialist Assessment Report or a Plant Species Compliance Statement, depending on the outcome of a site inspection undertaken in accordance with paragraph 4 | A Plant Species Specialist Assessment Report was compiled. |
| 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 "low" sensitivity for plant species, must submit a Plant Species Compliance Statement. | Not applicable to this report. A Plant Species Specialist Assessment Report was compiled. |
| 1.3 | Where the nature of the activity is expected to have an impact on species of conservation concern 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 area of assessment must include the project areas of influence, as determined. | Part B: Section 1 |
| **2** | **Plant Species Specialist Assessment** | |
| 2.1 | The assessment must be prepared by a specialist registered with the South African Council for Natural Scientific Professions within a field of practice relevant to the taxonomic groups ("taxa") for which the assessment is being undertaken. | Part A: Appendix E<br>Part B: Cover Page |
| 2.2 | The assessment must be undertaken within the area of assessment. | Part A: Section 1<br>Part B: Sections 1 & 2 |
| **2.3** | **The assessment must be undertaken in accordance with the Species Environmental Assessment Guideline[1] and must:** | |
| 2.3.1 | Identify the Species of Conservation Concern which were found, observed or are likely to occur within the area of assessment; | Part B: Section 3 & Appendix C |
| 2.3.2 | Provide evidence (photographs) of each Species of Conservation Concern found or observed within the area of assessment, which must be disseminated by the specialist to a recognised online database facility[2] immediately after the site inspection has been performed (prior to preparing the report contemplated in paragraph 3); | None recorded on site. |
| 2.3.3 | Identify the distribution, location, viability[3] and detailed description of population size of the Species of Conservation Concern identified within the area of assessment; | Part B: Section 3 & Appendix C |
| 2.3.4 | Identify the nature and the extent of the potential impact of the proposed development to the population of the Species of Conservation Concern located within the area of assessment; | Part B: Section 5 |
| 2.3.5 | Determine the importance of the conservation of the population of the Species of Conservation Concern identified within the area of assessment, based on information available in national and international databases including the IUCN Red List of Threatened Species, South African Red List of Species, and/or other relevant databases; | Part B: Section 3 & Appendix C |

[1] Available at https://bgis.sanbi.org/
[2] The preferred platform is iNaturalist.org but any other national or international virtual museum.
[3] the ability to survive and reproduce in the long term.

| Theme-Specific Requirements as per Government Notice No. 1150<br>Plant Theme – Very High and High Sensitivity Protocol followed (refer to Section 1.1) | | |
|---|---|---|
| **No.** | **SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS** | **Section in report/Notes** |
| 2.3.6 | Determine the potential impact of the proposed development on the habitat of the Species of Conservation Concern located within the area of assessment; | Part B: Section 5 |
| 2.3.7 | Include a review of relevant literature on the population size of the Species of Conservation Concern, the conservation interventions as well as any national or provincial species management plans for the Species of Conservation Concern. This review must provide information on the need to conserve the Species of Conservation Concern and indicate whether the development is compliant with the applicable species management plans and if not, a motivation for the deviation; | Part B: Appendix C |
| 2.3.8 | Identify any dynamic ecological processes occurring within the broader landscape, which might be disrupted by the development and result in negative impact on the identified Species of Conservation Concern, for example, fires in fire-prone systems; | Part B: Section 3 |
| 2.3.9 | Identify any potential impact on ecological connectivity within the broader landscape, and resulting impacts on the identified Species of Conservation Concern and its long-term viability; | Part B: Section 3 |
| 2.3.10 | Determine buffer distances as per the Species Environmental Assessment Guidelines used for the population of each Species of Conservation Concern | Part B: Section 4 |
| 2.3.11 | Discuss the presence or likelihood of additional Species of Conservation Concern including threatened species not identified by the screening tool, Data Deficient or Near Threatened Species, as well as any undescribed species[4] | Part B: Section 3 & Appendix C |
| 2.3.12 | 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 B: Section 4 |
| **3.** | **The findings of the assessment must be written up in a Plant Species Specialist Assessment Report, this report must include:** | |
| 3.1.2 | A signed statement of independence by the specialist; | Part A: Appendix E<br>Part B: Cover Page |
| 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 A: Section 1<br>Part B: Sections 1 & 2 |
| 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 B: Section 2 and Appendix A |
| 3.1.5 | A description of the assumptions made and any uncertainties or gaps in knowledge or data | Part B: Section 1 |
| 3.1.6 | Details of all Species of Conservation Concern found or suspected to occur on site, ensuring sensitive species are appropriately reported; | Part B: Section 3 & Appendix C |
| 3.1.7 | The online database name, hyperlink, and record accession numbers for disseminated evidence of Species of Conservation Concern found within the area of assessment; | None recorded on site. |
| 3.1.8 | The location of areas not suitable for development and to be avoided during construction where relevant; | Part B: Section 4 |
| 3.1.9 | A discussion on the cumulative impacts; | Part B: Section 5 |
| 3.1.10 | Impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr) | |
| 3.1.11 | A reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not, of the development related to the specific | Part A: Executive Summary<br>Part B: Section 6 |

[4] Undescribed species are to be assessed as "High Sensitivity"

| Theme-Specific Requirements as per Government Notice No. 1150<br>Plant Theme – Very High and High Sensitivity Protocol followed (refer to Section 1.1) | | |
|---|---|---|
| **No.** | **SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS** | **Section in report/Notes** |
| | 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 | |
| 3.1.12 | 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" plant species sensitivity and were not considered appropriate | Part B: Section 4 |

# ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| **AIP** | Alien and Invasive Plant |
| **A&IS** | Alien and Invasive Speices |
| **BI** | Biodiversity Importance |
| **CBA** | Critical Biodiversity Area |
| **CCGT** | Combined Cycle Gas Turbine |
| **CI** | Conservation Importance |
| **CR** | Critically Endangered |
| **DFFE** | Department of Forestry, Fisheries and the Environment |
| **EA** | Environmental Authorisation |
| **ECO** | Environmental Control Officer |
| **EIA** | Environmental Impact Asessement |
| **EN** | Endangered |
| **EOO** | Extent of Occurrence |
| **ESA** | Ecological Support Area |
| **EW** | Extinct in the Wild |
| **FI** | Functional Integrity |
| **GIS** | Geographic Information System |
| **GN** | Government Notice |
| **GPS** | Global Positioning System |
| **IBA** | Important Bird Areas |
| **IEM** | Integrated Environmental Management |
| **IUCN** | International Union for Conservation of Nature |
| **km** | kilometres |
| **LC** | Least concern |
| **m** | metres |
| **MNCA** | Mpumalanga Nature Conservation Act, 1998 [Act No. 10 of 1998] |
| **MW** | Mega-Watt |
| **NCMAA** | KwaZulu-Natal Nature Conservation Management Amendment Act, 1999 (Act No. 5 of 1999) |
| **NEMA** | National Environmental Management Act, 1998 [Act No. 107 of 1998] |
| **NEMBA** | National Environmental Management: Biodiversity Act, 2004 [Act No. 10 of 2004] |
| **NFA** | National Forest Act, 1998 [Act No. 84 of 1998] |
| **NT** | Near threatened |
| **POC** | Probability of Occurrence |
| **QDS** | Quarter Degree Square |
| **RBIDZ** | Richards Bay Industrial Development Zone |
| **RDL** | Red Data Listed |
| **RLE** | Red Listed Ecosystems |
| **RR** | Receptor Resilience |
| **SACNASP** | South African Council for Natural Scientific Professions |
| **SANBI** | South African National Biodiversity Institute |
| **SAS** | Scientific Aquatic Services (Pty) Ltd |
| **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

| | |
|---|---|
| **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 (Integrated Environmental Management (IEM) Information Series: DEAT, 2004)** | Conditions that currently exist. Also called "existing conditions". |
| **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, high water yield areas, flagship free-flowing rivers, priority estuaries, focus areas for land-based protected area expansion, and focus areas for offshore protection. Marine ecosystem priority areas and coastal ecosystem priority areas have yet to be identified but will be included in future. The different categories are not mutually exclusive and, in some cases, overlap, often because a particular area or site is important for more than one reason. They should be complementary, with overlaps reinforcing the importance of an area. |
| **Biological diversity or Biodiversity (National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA))** | The variability among living organisms from all sources including, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part and also includes diversity within species, between species, and of ecosystems. |
| **Biome (Mucina and Rutherford (2006); after Low and Rebelo (1998))** | A broad ecological spatial unit representing major life zones of large natural areas – defined mainly by vegetation structure, climate, and major large-scale disturbance factors (such as fires). |
| **Bioregion (Mucina and Rutherford (2006); after Low and Rebelo (1998))** | A bioregion is a composite of spatial (vegetation) units sharing similar biotic and physio-geographical features and connected by processes operating on a regional sale. |
| **Community Characterisation** | Comparisons can be made among communities using attributes such as species richness, species diversity, and evenness.<br>➢ Species richness is simply the number of species in a community.<br>➢ Species diversity is more complex and includes a measure of the number of species in a community, and a measure of the abundance of each species.<br>➢ Species evenness is a description of the distribution of abundance across the species in a community. Species evenness is highest when all species in a sample have the same abundance. Evenness approaches zero as relative abundances vary.<br><br>Source: https://tinyurl.com/2p9yr3j8 |
| **Corridor (van Wilgen et al., 2020)** | A dispersal route or a physical connection of suitable habitats linking previously unconnected regions. |
| **Critical Biodiversity Areas (CBA) (SANBI, 2020)** | An area that must be maintained in a good ecological condition (natural or semi-natural state) in order to meet biodiversity targets. CBAs collectively meet biodiversity targets for all ecosystem types, as well as for species and ecological processes that depend on natural or semi-natural habitat that have not already been met in the protected area network. CBAs are identified through a systematic biodiversity planning process in a configuration that is complementary, efficient and avoids conflict with other land uses where possible. |
| **Critically Endangered (CR) (i.e., International Union for Conservation** | **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 |

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|---|---|
| **of Nature (IUCN) Red List category (Skowno et al., 2019))** | extinction. CR ecosystem types are at an extremely high risk of collapse. Most of the ecosystem type has been severely or moderately modified from its natural state. The ecosystem type is likely to have lost much of its natural structure and functioning, and species associated with the ecosystem may have been lost. CR species are those considered to be at extremely high risk of extinction. |
| **Degradation (Skowno et al., 2019)** | The many human-caused processes that drive the decline or loss in biodiversity, ecosystem functions or ecosystem services in any terrestrial and associated aquatic ecosystems. |
| **Development footprint (National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA))** | "*In respect of land, means any evidence of its physical transformation as a result of the undertaking of any activity*." |
| **Disturbance (van Wilgen et al., 2020)** | 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. |
| **Driver (ecological) (Lead et al., 2005)** | A driver is any natural or human-induced factor that directly or indirectly causes a change in ecosystem. A direct driver clearly influences ecosystem processes, where indirect driver influences ecosystem processes through altering one or more direct drivers. |
| **Ecological Condition (SANBI, 2017)** | "*Ecological condition*" means the extent to which the composition, structure and function of an area or biodiversity feature has been modified from a reference condition of "natural".<br>Various terminology can be used for the precision of language:<br>➢ Fair ecological condition: Areas that are moderately modified, semi-natural. An ecological condition class in which ecological function is maintained even though composition and structure have been compromised. Can apply to a site or an ecosystem.<br>➢ Good ecological condition: Areas that are natural or near-natural. An ecological condition class in which composition, structure and function are still intact or largely intact. Can apply to a site or an ecosystem.<br>➢ Poor ecological condition: Areas that are severely or irreversibly modified. An ecological condition class in which ecological function has been compromised in addition to structure and composition. Can apply to a site or an ecosystem. |
| **Ecological Support Areas (ESA) (Skowno et al., 2019)** | An ESA provides connectivity and important ecological processes between CBAs and is therefore important in terms of habitat conservation. |
| **Endangered (EN) (i.e., Red List category (Skowno et al., 2019))** | **Applied to both species/taxa and ecosystems**: A species is EN when the best available evidence indicates that it meets at least one of the five IUCN criteria for EN, indicating that the species is facing a very high risk of extinction. EN ecosystem types are at a very high risk of collapse. EN species are those considered to be at very high risk of extinction. |
| **Endemic species (SANBI, 2020)** | A species that is naturally restricted to a particular, well-defined region, i.e., species that are only found within a pre-defined area. There can therefore be sub-continental (e.g., southern Africa), national (South Africa), provincial, regional, or even within a particular mountain range. |
| **Ground·Truth** | To check the accuracy of (remotely sensed data) through in-situ observations. |
| **Habitat (NEMBA)** | A place where a species or ecological community naturally occurs. |
| **Indigenous species (synonym: native species)** | SANBI (2020) definition: Occurring naturally in a defined area (contrast with endemic) – the area must be specified and is normally taken to be the historical range of a species, notwithstanding the effects of naturally initiated range expansions/ contractions, e.g., the baobab (*Adansonia digitata*) is indigenous but not endemic to South Africa, but it is not indigenous to KwaZulu-Natal.<br><br>NEMBA definition: A species that occurs, or has historically occurred, naturally in a free state in nature within the borders of the Republic of South Africa but excludes a species that has been introduced in the Republic as a result of human activity, e.g., the bontebok (*Damaliscus pygragus pygargus*) is indigenous to only South Africa, but according to the previous definition would only be indigenous to the Western Cape. |

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| **Indigenous vegetation (NEMA) - compare with "endemic" and "native"** | Vegetation that occurs naturally within a defined area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years. |
| **Integrity (ecological)** | "An ecosystem is generally understood to have integrity when its dominant ecological characteristics (e.g., elements of composition, structure, function, and ecological processes) occur within their natural ranges of variation and can withstand and recover from most perturbations" (CBD/SBSTTA/24/3/Add.2/Rev.1, para. 18).<br>Indicators of ecosystem integrity may include the "structure, function and composition of an ecosystem relative to the preindustrial range of variation of these characteristics" (Hansen et al., 2021). |
| **Invasive species (ecological) (van Wilgen et al., 2020)** | 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. |
| **Least Concern (LC) (also referred to as Least Threatened)** | Unlikely to become extinct in the near future. A least concern species is a species that has been categorised by the IUCN as evaluated as not being a focus of species conservation. They do not qualify as threatened, near threatened (NT), or (before 2001) conservation dependent. |
| **Listed alien species** | All alien species that are regulated in South Africa under the NEMBA: Alien and Invasive Species Regulations, 2020. |
| **Native species** | A species that is within its known natural range, and occurs naturally in a given area or habitat, as opposed to an introduced species or invasive species. |
| **Quarter Degree Square (QDS) (SANBI, 2020)** | A way of dividing the longitude latitude degree square cells into smaller squares of 15' × 15' (roughly 24 × 27 kilometres (km)), forming in effect a system of geocodes. |
| **Red Data Listed (RDL) species** | According to the Red List of South African plants (http://redlist.sanbi.org/) and the IUCN, organisms that fall into the Extinct in the Wild (EW), CR, EN, Vulnerable (VU) categories of ecological status. |
| **Species of Conservation Concern (SCC)** | The term SCC in the context of this report refers to all RDL and IUCN listed threatened species as well as protected species of relevance to the project. |
| **Terrestrial Species (SANBI, 2020)** | For the purposes of the species environmental guidelines (SANBI, 2020), terrestrial species are considered to represent species that are not exclusively marine and occur on land (at least for a portion of their life cycle). This includes amphibians (frogs and toads) but excludes other freshwater aquatic species which are considered to be aquatic (e.g., fish, diatoms and aquatic macroinvertebrates). This definition is not an accurate biological definition but rather applied in this manner to align with the Protocol on Terrestrial Biodiversity. |
| **Threatened ecosystem (Skowno et al., 2019)** | An ecosystem that has been classified as CR, EN or VU, based on an analysis of ecosystem threat status. A threatened ecosystem has lost or is losing vital aspects of its structure, function, or composition. The Biodiversity Act allows the Minister of Environmental Affairs or a provincial Member of the Executive Council for Environmental Affairs to publish a list of threatened ecosystems. To date, threatened ecosystems have been listed only in the terrestrial environment. In cases where no list has yet been published by the Minister, such as for all aquatic ecosystems, the ecosystem threat status assessment in the National Biodiversity Assessment (NBA) can be used as an interim list in planning and decision making. |
| **Threatened species (Skowno et al., 2019)** | A species that has been classified as CR, EN or VU, based on a conservation assessment (Red List), using a standard set of criteria developed by the IUCN for determining the likelihood of a species becoming extinct. A threatened species faces a high risk of extinction in the near future. |
| **VU (i.e., Red List category (Skowno et al., 2019))** | Applied to both species/taxa and ecosystems: A species is VU when the best available evidence indicates that it meets at least one of the five IUCN criteria for VU, indicating that the species is facing a high risk of extinction. An ecosystem type is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for VU and is then considered to be at a high risk of collapse. |

# 1 INTRODUCTION

Scientific Terrestrial Services (Pty) Ltd (hereafter referred to as “STS”) was appointed to undertake a terrestrial biodiversity assessment as part of the Environmental Authorisation (EA) process for the proposed Mabasa 750-megawatt (MW) Combined Cycle Gas Turbine (CCGT) power plant. The project is located within the uMhlathuze Local Municipality and the King Cetshwayo District Municipality in KwaZulu-Natal Province. The defined study area (i.e., the CCGT power plant project area) for this assessment is situated within the Richards Bay Industrial Development Zone (RBIDZ), specifically Special Economic Zone Phase 1F, approximately 5 kilometres (km) east of the Nseleni Nature Reserve and 2 km north-west of central Richards Bay. The proposed development area, i.e., the **study area**, is depicted in Part A: Figures 1-3.

The study area is situated within a predominantly developed landscape, with the immediate surroundings characterised by industrial zones, nearby residential developments (approximately 1.3 km from the study area), and various service-related land uses (e.g. petrol stations).

## *1.1 Scope of Work*

This report aims to present a detailed account of the terrestrial biodiversity and plant species data (interchangeably referred to as the “floral assessment”) for the study area and to identify areas of increased ecological importance and sensitivity from a botanical perspective, as well as the mapping of such areas, and to describe the present ecological state of the study area relating to the terrestrial biodiversity theme and the plant species theme of the Department of Forestry, Fisheries, and the Environment's (DFFE) National Web-based Screening Tool (hereafter "screening tool").

The primary objective of this assessment is not to compile an exhaustive floral species list but rather to ensure that sufficient data are collected to describe all the vegetation communities present in the study area, to optimise the detection of species of conservation concern (SCC), and to assess habitat suitability for other potentially occurring SCC (SANBI, 2020).

The terrestrial biodiversity and plant species report includes the following:

- A description of the various floral habitat types, communities, and the ecological state of such communities within the study area and a ranking of each habitat type based on conservation importance and ecological sensitivity;
- Inventories of floral species as encountered within the study area;

- Maps and discussions of sensitive landscapes associated with the study area, such as indigenous forests, rocky ridges, wetlands and/or any other special features such as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs);
- An assessment of Red Data Listed (RDL) floral species, as well as an assessment of other floral SCC (such as nationally and provincially protected flora), including the potential for such species to occur within the study area;
- Delineating and mapping habitat of increased ecological importance, i.e., determining and mapping the Site Ecological Importance (SEI) of the habitats in the study area;
- To conduct a comprehensive impact assessment of how the proposed development activities may affect the floral ecology of the study area, ensuring that ecological considerations guide subsequent planning and decision-making; and
- Information and recommendations that will ensure the ongoing functioning of the ecosystem within the study area in a manner that supports local and regional conservation requirements, meets regional and national biodiversity targets, and sustains the provision of ecological services in the local area.

## *1.2 Assumptions and Limitations*

The following assumptions and limitations apply to this report:

- The results of the floral field assessment presented in this report are limited to data gathered for the study area. The immediate surroundings do not form part of this assessment but were included in the desktop analysis, of which the results are presented in **Part A: Section 3**;
- Sampling, by its nature, means that not all individuals are assessed and identified. Given the dynamic and complex nature of ecology, some aspects (some of which may be important) may have been overlooked. Nevertheless, given the experience of the specialist within the Maputaland Wooded Grassland (the reference state), the survey was deemed sufficient for drawing adequate conclusions regarding the ecological condition and sensitivity of the various habitats therein;
- The identities of some floral SCCs will not be disclosed in this report, although their potential occurrence within the study area was still evaluated. According to the best practice guideline accompanying the DFFE's screening tool and the Species Environmental Assessment Guidelines (SANBI, 2020), the names of sensitive species may not appear in any of the specialist reports that would be publicly available. Such species will be referred to as sensitive plants, with their threat status included;
- 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. As such, impacts to freshwater ecosystems 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; and

- The floral assessment took place on the 13th of June 2024 (winter season), which falls outside of the suitable period for vegetation assessments in KwaZulu-Natal and the greater savanna biome. Furthermore, this period does not coincide with the optimal flowering periods of the SCCs triggered by the screening tool (as per Table 1). As a result, particular attention was given to habitat characteristics and site conditions to assess the potential suitability of the study area to support these species, where direct detection may have been limited by seasonal factors.

**Table 1: Table indicating the flowering times associated with triggered threatened species associated with the study area (as provided in the screening tool).**

| Species/Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sensitive species 1252 (VU) | x | x | x | x | | | | x | x | x | x | x |
| Sensitive species 89 (VU) | x | | | | | | | | | x | x | x |
| Sensitive species 649 (VU) | x | | | | | | | | | | x | x |
| Sensitive species 191 (VU) | x | x | x | x | x | x | x | x | x | x | x | x |
| *Thesium polygaloides* (VU) | x | x | x | | | | | | x | x | x | x |
| *Freesia laxa* subsp. *azurea* (VU) | | | | | | x | x | x | x | | | |
| *Fimbristylis aphylla* (VU) | x | x | x | | | | | | | x | x | x |
| *Emplectanthus cordatus* (VU) | x | x | x | | | | | | | | x | x |
| *Pachycarpus concolor* subsp. *arenicola* (VU) | x | x | x | x | | | | | | x | x | x |
| *Nidorella tongensis* (EN) | x | x | x | x | | | | | | | x | x |
| *Senecio ngoyanus* (VU) | | | | | | | | | x | x | x | x |
| *Cassipourea gummiflua var. verticillata* (VU) | x | x | x | x | | | | | | | | x |
| *Oxygonum dregeanum* subsp. *streyi* (EN) | x | x | x | x | | | | x | x | x | x | x |
| *Pavonia dregei* (VU) | x | x | x | x | x | x | | | | | | x |
| **Total** | **12** | **10** | **10** | **7** | **2** | **3** | **2** | **4** | **6** | **8** | **11** | **13** |

# 2 ASSESSMENT APPROACH

This section briefly describes the assessment method used for the floral study. Additional details about the approach can be found in Appendix A of this report.

## 2.1 Reporting Protocol

The screening tool identified the study area as having **medium sensitivity** for the Plant Species Theme and **very high sensitivity** for the Terrestrial Biodiversity Theme. Following the field-based Site Sensitivity Verification (refer to Part A: Section 4 as well as STS 24-2034 (2024a)), the medium sensitivity assigned to the Plant Species Theme was confirmed, while the very high sensitivity for the Terrestrial Biodiversity Theme was also verified.

In accordance with the Environmental Impact Assessment (EIA) Regulations (2014, as amended) and the associated protocols for specialist assessments[5], the reporting requirements were therefore as follows:

- A Plant Species Specialist Assessment Report for the Plant Species Theme (medium sensitivity); and
- A Terrestrial Biodiversity Specialist Assessment Report for the Terrestrial Biodiversity Theme (high/very high sensitivity).

This report incorporates the requirements for both the Plant Species Specialist Assessment Report and the Terrestrial Biodiversity Specialist Assessment Report, which are undertaken in accordance with the applicable protocols and guidelines.

For refined sensitivities, please refer to the SEI breakdown in Section 4 of this report.

## 2.2 General Approach

Before conducting the field assessment, a desktop study was performed to gather background information regarding the study area, including the surrounding areas (refer to **Part A**). This involved consulting maps, aerial photographs, and digital satellite images to determine broad habitats and potential sensitive areas. A literature review of the habitats, vegetation types, and distributions of floral species within and surrounding the study area was undertaken, while also considering the threat status of the ecosystem(s) in the study area. The conservation

[5] Protocols for specialist assessments:
- GN 1150 Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Plant Species as published in Government Gazette 43855 dated 30 October 2020 (as amended in GN 3717 of 2023).
- GN 320 Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity as published in Government Gazette 43110 dated 20 March 2020.

requirements and biodiversity goals, at national and provincial levels, of the biodiversity features associated with the study area were also considered.

Following the desktop assessment and literature review, a field assessment was undertaken to confirm the presence of potentially sensitive habitats and to compile floral species inventories for each habitat type identified within the study area. The developed species lists include potential floral SCC and alien floral species.

## 2.3 Sampling Effort

The floral assessment took place on the 13th of June 2024. The specialist walked several meanderings during the field assessment, surveying various plant species and recording the habitat conditions.

## 2.4 Definitions, descriptions, and taxon nomenclature

Scientific nomenclature for plant species in this report follows that of the Red List of South African Plants[6] (http://redlist.sanbi.org/index.php) and the South African National Biodiversity Institute (SANBI) Biodiversity Advisor[7] (https://biodiversityadvisor.sanbi.org/). This largely follows the nomenclature of the World Flora Online (WFO) Plant List[8] (https://wfoplantlist.org/), however, some names differ between the (WFO) and the Red List of South African Plants. For alien (or exotic) species, the definitions of Richardson et al. (2011) are used. The description of vegetation structure broadly followed the guidelines of Edwards (1983) (see **Appendix A: Figure A1**).

## 2.5 Habitat and Sensitivity Mapping

All botanical features within the study area, including vegetation units and/or habitat types, as well as notable plant species distributions (where applicable), were assessed, and areas of increased sensitivity or conservation value were delineated using a Global Positioning System (GPS). These spatial features were processed and analysed in a Geographic Information System (GIS) environment, where they were projected onto satellite imagery and used to generate habitat and sensitivity maps for the study area.

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[6] The Threatened Species Program is one of the continent's largest collaborative conservation projects to date. South Africa has become the first megadiverse country to fully assess the status of its entire flora. The Red List of South African Plants Online provides up-to-date information on the national conservation status of South Africa's indigenous plants.

[7] **Open access to South Africa's biodiversity data:** Occurrence records: 2 120 409. Animal and plant checklists: 3. Data partners: 17. Image records: 194 863. Species of plants, animals and fungi: 85 878. Planning and ecosystem assessment spatial layers: 551

[8] The standardisation and cataloguing of plant names are critical in various fields of biology, including biodiversity, biogeography, and vegetation research. The WFO Plant List is the most comprehensive and authoritative list of the world's plants, maintained by the global community of taxonomic experts as a free and open-access resource.

Habitat types were assigned SEI categories (SANBI, 2020) based on their functional integrity, conservation value, the presence of SCCs, and their resilience to disturbance. The resulting habitat sensitivities were overlaid with the proposed development footprints (where layouts are available) to identify potential conflict areas.

Maps were produced using ArcMap (ESRI, 2020), supported by additional GIS tools for various stages of analysis:

- Google Earth Pro (Google Earth Pro, 2026): used for planning and initial delineation of habitat boundaries;
- Global Mapper (Blue Marble Geographics, 2023): used for data processing and integration; and
- ArcMap (ESRI, 2020): used for visual analysis, map creation, and report-ready outputs.

## 2.6 Species of Conservation Concern (SCC) Assessment

An assessment of the presence of any floral SCCs, as well as suitable habitat to support any such species, was undertaken. As part of the SCC assessment, the following classes were considered (Box 1 - 3):

**BOX 1: THREATENED SPECIES**

In terms of Section 56(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA), threatened species are RDL species falling into the following categories of ecological status: critically endangered (CR), endangered (EN), and vulnerable (VU) in terms of the NEMBA Threatened or Protected Species (TOPS) Regulations (Government Notice (GN) R152 of 2007, as amended). Near threatened (NT) species are not considered RDL species; however, are still considered to be of increased conservation importance and are thus also included in the threatened species assessments. Removal, translocation, and/or destruction of these species require authorisation from, and consultation with, the DFFE.

**BOX 2: NATIONALLY PROTECTED SPECIES**

Protected species in terms of the NEMBA TOPS Regulations (GN R152 of 2007, as amended), i.e., species that have a least concern (LC) threat status but are still protected under the TOPS regulations. The List of Protected Tree Species (GN 1935) as published in the Government Gazette 46094 dated 25 March 2022, as it relates to the National Forest Act, 1998 (Act No. 10 of 1998) (NFA), was also considered for the SCC assessment.

**BOX 3: PROVINCIALLY PROTECTED SPECIES**

Species that are deemed important from a provincial biodiversity perspective include, for example, species listed in the KwaZulu-Natal Nature Conservation Ordinance, 1974 (Ordinance No. 15 of 1974), as amended by the KwaZulu-Natal Nature Conservation Management Amendment Act, 1999 (Act No. 5 of 1999) (NCMAA). These legislative instruments provide for the protection of certain plant and animal species within KwaZulu-Natal, for which restricted activities may not occur without the necessary permits from the relevant provincial authority (i.e. Ezemvelo KZN Wildlife)).

To compile a list of potentially occurring SCCs (both threatened and protected) for the study area—an essential step before conducting the field assessment—several methods were

utilised, including the screening tool, iNaturalist, and various national and provincial legislations as outlined in Box 1 above. A Probability of Occurrence (POC) assessment forms part of the floral assessment, and a POC score is assigned to SCCs that are located within or have the potential to be within the study area. This POC score indicates the likelihood of a species being present in the study area, and for each potential floral SCC, the POC is detailed as follows:

- "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, as many of these species lack in-depth habitat research.

# 3 RESULTS OF THE PLANT SPECIES ASSESSMENT

This section provides a description and discussion of the baseline data collected during the floral site assessment.

## *3.1 Existing Impacts*

The study area is located within the RBIDZ and has been subject to a range of historical and ongoing anthropogenic disturbances, resulting in a modified landscape characterised by a mosaic of transformed and semi-natural habitats (Figure 1). Previous land clearing and earthworks associated with industrial development have altered vegetation structure and composition, with large portions of the site now supporting disturbance-tolerant and ruderal species. Following from 2015 (Figure 1), additional clearing and construction have taken place to the west (adjacent the study area) and north of the study area. The surrounding landscape is dominated by industrial infrastructure, access roads, and service-related developments, which have contributed to habitat fragmentation, reduced ecological connectivity, and the introduction of pronounced edge effects. These edge effects, together with ongoing human activity such as vehicle movement and general operational disturbance, have further influenced habitat condition through soil compaction, vegetation degradation, and disturbance to fauna (refer to Part C).


**Figure 1: Satellite imagery illustrating land use changes within the landscape surrounding the study area (as outlined in red).**

In addition, disturbed areas within the site are susceptible to the establishment and spread of alien and invasive plant (AIP) species, which further reduce ecological integrity by outcompeting indigenous vegetation. Freshwater features and low-lying areas within the study area have also likely been influenced by altered drainage patterns and surrounding development, resulting in localised changes to hydrological processes (SAS 24-1079 (2026)). Anthropogenic surfaces such as roads, pavements, and buildings significantly alter natural surface water flow by increasing impermeable areas, which accelerates stormwater runoff, reduces groundwater infiltration, and disrupts surrounding natural drainage and flow patterns. Despite these impacts, portions of the site—particularly areas associated with grassland,

thicket vegetation, and freshwater features—retain a degree of ecological function and continue to contribute to local biodiversity (refer to Section 3.2 for further discussions). Overall, the site reflects a moderately to highly disturbed system, typical of industrial landscapes within the RBIDZ, with remnant habitat patches forming the primary areas of ecological importance identified during the scoping and site sensitivity verification assessments.

## *3.2 Vegetation Types and Fine-Scale Habitats*

The study area is located within the Indian Ocean Coastal Belt Biome and is mapped, according to SANBI (2024), as occurring within the Maputaland Wooded Grassland vegetation type. According to the 2022 Red List of Ecosystems (RLE) database (SANBI, 2022a; 2022b), this vegetation type is classified as EN. At a broad landscape scale, this vegetation type provides the reference condition against which the current vegetation communities within the study area were assessed in terms of ecological integrity and deviation from the expected natural state.

Notwithstanding this regional classification, the study area is situated within a highly modified industrial landscape, and the vegetation present reflects varying degrees of transformation, secondary succession, and disturbance. As such, fine-scale habitat delineation was undertaken based on observed differences in vegetation structure, species composition, hydrological influence, and ecological functioning. Based on the findings of the site sensitivity verification and field assessment, four broad habitat units were delineated within the study area (Figure 2), namely:

- **Transformed Habitat (0.4 ha):** This habitat unit comprises areas that have been previously disturbed through clearing, earthworks, or ongoing industrial activities. Vegetation within these areas is characterised by low structural complexity and is typically dominated by disturbance-tolerant and ruderal species[9], including a notable presence of AIP species. Grass cover is generally patchy and species-poor, and woody vegetation is either absent or present as scattered individuals. Ecological functioning within this habitat is considered to be low, with limited capacity to support SCC. This habitat unit is in a poor ecological condition[10];

[9] Ruderal species are plant species that are adapted to colonise and persist in disturbed environments. These species typically establish rapidly in areas where natural vegetation has been removed or altered, and are often characterised by fast growth rates, high reproductive output, and tolerance to environmental stress.
[10] Areas that are severely or irreversibly modified. An ecological condition class in which ecological function has been compromised in addition to structure and composition. Can apply to a site or an ecosystem.

- **Degraded Hygrophilous[11] Grassland (9.6 ha):** The Hygrophilous Grassland occurs within low-lying areas of the study area where increased soil moisture and seasonal saturation influence vegetation composition. These areas support a relatively dense herbaceous layer dominated by moisture-tolerant grass species and forbs. Vegetation structure is more intact compared to transformed areas, with improved ground cover and moderate species diversity. Despite some disturbance, this habitat unit retains ecological functionality and is considered to be in a fair ecological condition[12];
- **Thicket Habitat[13] (1.1 ha):** Patches of thicket vegetation occur within less disturbed portions of the study area and are typically associated with slightly elevated or better-drained areas. This habitat unit is characterised by a dense woody component, including shrubs and small trees, forming a multi-layered vegetation structure. The structural complexity of this habitat enhances its ecological value relative to surrounding habitats. This habitat unit is considered to be in a fair to good[14] ecological condition, depending on the level of disturbance and edge effects; and
- **Freshwater Habitat (3.0 ha):** Freshwater-associated habitats occur in the form of natural watercourse[15] features (including a Wetland Flat[16] and a Seep Wetland[17]) within the study area. These areas are characterised by hydromorphic soils[18] and the presence of hydrophilic vegetation[19], including facultative and/or obligative grass species, sedge species, and wetland-associated forb species. These habitats support key ecological processes, including hydrological regulation and nutrient cycling, and

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[11] For the purposes of this assessment, hygrophilous refers to vegetation types that are adapted to, and typically occur in, areas of increased soil moisture, seasonal saturation, or proximity to freshwater features. Such habitats are often transitional between terrestrial and aquatic systems and support plant species tolerant of wet or periodically waterlogged conditions.

[12] Areas that are semi-natural with moderate modifications. An ecological condition class where ecological function persists despite alterations in composition and structure.

[13] Thicket vegetation refers to a dense assemblage of shrubs and small trees forming a closed or semi-closed woody layer, typically lacking the height, stratification, and species composition associated with true forest systems. In contrast, forest vegetation is characterised by a well-developed, multi-layered structure with a closed canopy, taller tree species, and the presence of distinct forest-dependent species. In this context, the woody vegetation observed within the study area is considered thicket rather than forest due to its limited vertical structure, lower canopy height, and absence of key forest diagnostic species.

[14] Areas that are natural or close to natural. An ecological condition class where composition, structure, and function remain mostly intact or largely so.

[15] The National Water Act, 1998 (Act No. 36 of 1998) (NWA) define a watercourse as follows:

- A river or spring;
- A natural channel which water flows regularly or intermittently;
- A wetland, dam, or lake into which, or from which, water flows; and
- Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse;
- and a reference to a watercourse includes, where relevant, its bed and banks.

[16] **Wetlands flat** often appear as irregularly shaped wetland areas which are not linked to a stream. They are often level or near-level areas where waterlogging occurs and can be differentiated from depressions by their lack of defined margins (Ollis *et al*., 2013).

[17] **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).

[18] Hydromorphic soils are soils that show signs of prolonged or periodic saturation, typically characterised by features such as gleying, mottling, or reduced (anaerobic) conditions resulting from waterlogging.

[19] Hydrophilic vegetation refers to plant species that are adapted to grow in waterlogged or saturated conditions, i.e. “water-loving” species commonly associated with wetlands and moist environments.

provide suitable habitat for several moisture-dependent floral (and faunal) species. They are also associated with increased faunal activity relative to surrounding habitats. Although some disturbance is evident, these areas retain functional ecological characteristics and are considered to be in a fair ecological condition, with localised areas of higher sensitivity.

Overall, the vegetation within the study area reflects a disturbance-driven system, where natural vegetation patterns have been altered but not entirely lost. While transformed areas dominate, remnant hygrophilous grassland, thicket, and freshwater-associated habitats retain ecological value and contribute to the overall biodiversity of the site. These habitat units form the basis for subsequent sensitivity mapping and impact assessment.

Additional information on the ecological status and species diversity of the habitat units is provided in the sections below. In these sections, a concise overview of each vegetation type is presented, with brief references to ecological condition and vegetation structural attributes; full descriptions of these attributes are provided below.

The Vegetation Structure is based on guidelines of Edwards (1983) (as per Diagram A1) and Floral Composition for each habitat unit is presented in Appendix B.

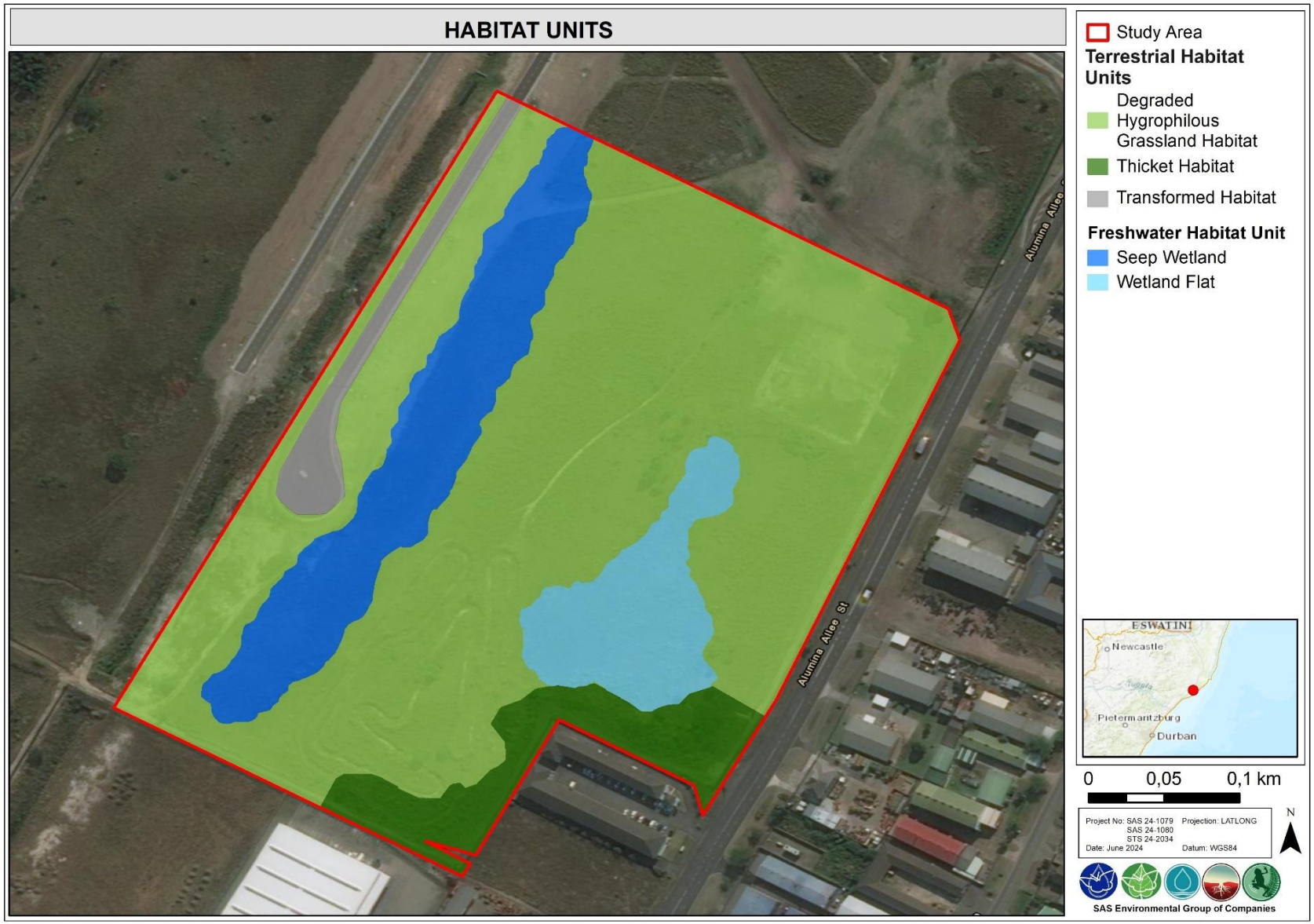


**Figure 2: Conceptual illustration of the habitat units within the study area.**

### 3.2.1 Transformed Habitat

The Transformed Habitat comprises areas that have been significantly altered through historical clearing, earthworks, and ongoing industrial activities. As a result, the vegetation structure is largely simplified, with no distinct upper canopy layer and only scattered woody elements present. Where woody species do occur, these are typically isolated individuals or small clusters of disturbance-tolerant shrubs and pioneer species (e.g., *Vachellia karroo, Trema orientalis,* and juvenile individuals of other pioneer taxa).

The understorey is poorly developed and largely dominated by ruderal and alien species, particularly in areas subjected to repeated disturbance. AIP species are locally prominent and, in some areas, may dominate the vegetation cover, reflecting the disturbed nature of the substrate and ongoing edge effects (e.g., *Bidens pilosa, Tagetes minuta, Ageratum conyzoides*). The graminoid layer is generally patchy and species-poor, consisting primarily of disturbance-tolerant grasses (e.g., *Cynodon dactylon, Eragrostis curvula* and *Panicum maximum*). In more degraded areas, ground cover may be sparse, with exposed soils or compacted surfaces limiting vegetation establishment. Where present, the herbaceous layer is dominated by opportunistic forbs that establish rapidly following disturbance but do not contribute significantly to long-term ecological stability.

Overall, the Transformed Habitat is characterised by low indigenous species richness, reduced structural complexity, and limited ecological functioning. The vegetation assemblage reflects a system that has deviated substantially from the regional reference vegetation type and does not support key ecological processes associated with more intact habitats. This habitat unit is therefore considered to be in a poor ecological condition and of low ecological importance. Indigenous vegetation[20] is largely absent, or only present as scattered remnant individuals in highly disturbed areas.

No confirmed protected plant species are expected to be strongly associated with this habitat due to the absence of suitable habitat and the high degree of transformation. The low sensitivity assigned to disturbed portions of the site is consistent with the SSVR and scoping findings, which indicate that transformed sections provide poor conditions for supporting threatened SCC. This habitat is therefore considered to be of negligible importance for threatened flora.

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

Refer to Figure 3 for photographs of the habitat associated with this unit, and Table 2 for a more detailed summary of the vegetation and species characteristics for this habitat unit.

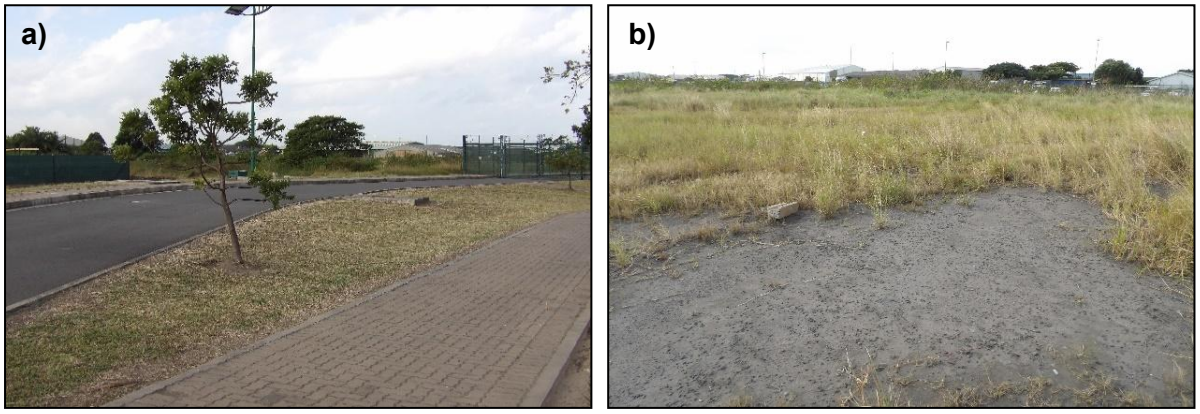


**Figure 3: Representative photographs of the Transformed habitat unit associated with the study area.**

### 3.2.2 Degraded Hygrophilous Grasslands

The Degraded Hygrophilous Grassland comprises low-lying areas associated with increased soil moisture and seasonal saturation. Vegetation within this habitat is dominated by a relatively continuous graminoid layer, supported by hydrophilic grasses and sedges such as *Paspalum dilatatum, Setaria sphacelata, Panicum maximum*, and *Cyperus spp*. The upper stratum is largely absent, with woody vegetation limited to occasional scattered individuals such as *Syzygium cordatum* and *Hibiscus tiliaceus* along slightly elevated or marginal areas. The ground layer forms the dominant structural component and is generally well-developed, with a dense grass cover interspersed with moisture-tolerant forbs such as *Persicaria senegalensis, Commelina spp*., and *Hypoxis spp*. Seasonal variation in species composition is evident, particularly following rainfall events. AIP species are present but generally less dominant than in transformed areas, although species such as *Bidens pilosa*, *Centella asiatica,* and *Cenchrus clandestineus* may occur in disturbed or edge-affected sections. The woody component of this habitat unit is represented by scattered species such as *Helichrysum krausii, Osteospermum moniliferum* subsp. *rotundatum, Diospyros galpanii*, *Eugenia capensis*, and occasional disturbance-tolerant shrubs.

The Degraded Hygrophilous Grassland exhibits a medium to tall, relatively homogeneous (moist) **short to tall, open grassland structure**, with a continuous to near-continuous graminoid layer and only scattered woody shrub element.

Overall, the Degraded Hygrophilous Grassland supports moderate native species richness and retains important ecological functions, including habitat provision for both flora and faunal species. The vegetation remains broadly representative of moisture-influenced grassland

systems within the region and is considered to be in a fair ecological condition. The Degraded Hygrophilous Grassland is still considered to be indigenous vegetation (NEMA definition).

Although no protected species were directly recorded within the habitat unit, several species have the potential of occurring within this habitat unit, i.e., several species obtained a high POC scores for this habitat unit. Refer to the outcome of the SCC assessment for this habitat unit below. No suitable habitat to support TOPS (GN R152 of 2007) species was identified within the Degraded Hygrophilous Grassland habitat unit. No Protected trees on the NFA List of Protected Tree Species (GN 1935 of 2022) were recorded, and none were expected within this habitat unit.

Specially Protected and Protected Species (NCMAA-protected):

- Orchidaceae Family (e.g., *Disa woodii, Eulophia cucullata, Eulophia speciosa, Microcoelia exilis*, POC = High, Status = LC);
- Amaryllidaceae Family (*Crinum macowanii*., POC = High, Status = LC); and
- Amaryllidaceae Family (*Boophone disticha*, POC = High, Status = LC).

Following the field assessment, no threatened floral SCC were confirmed on site; however, the broader Plant Species Theme triggered several threatened taxa for the study area. Despite this, this habitat unit is considered to provide limited suitable habitat for a single species namely *Senecio ngovanus* (POC = Medium, Status = VU). The habitat is considered more likely to support common to locally protected moisture-associated species than high-value threatened flora and is therefore considered of low to moderate importance for SCC relative to denser woody and freshwater-associated habitats.

Refer to Figure 4 for photographs of the habitat associated with this unit, and Table 3 for a more detailed summary of the vegetation and species characteristics for this habitat unit.

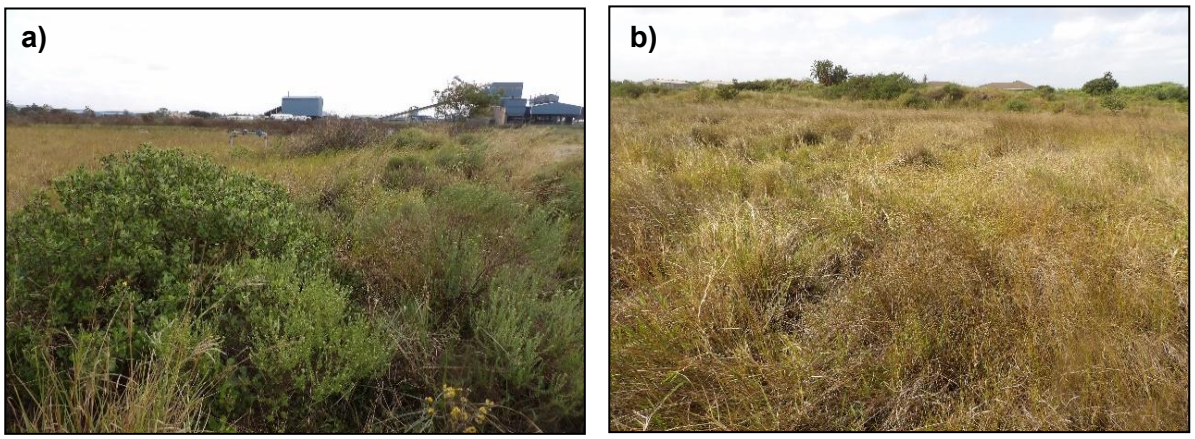


**Figure 4: Representative photographs of the Degraded Hygrophilous Grassland habitat unit associated with the study area.**

### 3.2.3 Thicket Vegetation

The Thicket Vegetation comprises areas dominated by dense woody growth, forming a semi-closed to closed shrub and small tree layer. The Thicket Vegetation exhibits a medium height, closed to semi-closed woodland structure, characterised by a dense shrub and small tree layer with a reduced but still locally evident grass component. The upper stratum is characterised by a relatively low and uneven canopy, typically comprising species such as *Diospyros lycioides, Euclea natalensis, Gymnosporia buxifolia, Carissa bispinosa*, and *Maytenus undata*. The understorey is well-developed and often includes a dense assemblage of shrubs, climbers, and lianas such as *Dalbergia armata, Rhoicissus tomentosa*, and *Asparagus densiflorus*, contributing to the structural complexity of the habitat. The graminoid layer is generally sparse due to shading, with grasses such as *Oplismenus hirtellus* occurring in patches where light penetration allows. The herbaceous layer is similarly variable and comprises shade-tolerant forbs such as *Plectranthus spp*., *Hypoestes aristata*, and *Commelina spp*. AIP species such as *Lantana camara* and *Chromolaena odorata* are present, particularly along habitat edges, although they are typically less dominant within intact thicket interiors.

Overall, the Thicket Vegetation exhibits moderate to relatively high native species richness and provides important refuge and foraging habitat for various fauna. The vegetation retains key structural and compositional characteristics of natural thicket systems and is considered to be in a fair to good ecological condition. The Thicket Vegetation is not considered true forest, but it retains a moderate affinity with structurally intact woody vegetation typical of less disturbed coastal mosaics. The Thicket Habitat is still considered to be indigenous vegetation (NEMA definition).

Although no protected species were directly recorded within the habitat unit, several species have the potential of occurring within this habitat unit, i.e., several species obtained a medium and/or high POC scores for this habitat unit. Refer to the outcome of the SCC assessment for this habitat unit below.

No suitable habitat to support TOPS species was identified within Thicket habitat unit. While no protected trees (NFA) were recorded during the site visit the Thicket Hbaitat did provide potential suitable habitat for NFA species;

- *Sclerocarya birrea* subsp. *caffra* (POC = high, Status = LC);
- *Balanites maughamii* (POC = medium, Status = LC);
- *Catha edulis* (POC = medium, Status = LC); and

- *Sideroxylon inerme* (POC = Medium, Status = LC (also protected under the NCMAA)).

Within the Thicket Habitat Specially Protected and Protected Species (NCMAA -protected) are likely to occur within the Thicket Habitat namely:

- Amaryllidaceae Family (*Crinum macowanii*, POC = High, Status = LC); and
- *Sideroxylon inerme* (POC = Medium, Status = LC (also protected under the NFA)).

The Plant Species Theme triggered several threatened taxa for the study area, and the Thicket Habitat is among the more likely terrestrial habitats to support woody or shade-associated SCC. Species such as *Cassipourea gummiflua* var. *verticillata, Emplectanthus cordatus*, and sensitive species associated with denser woody habitat may have a moderate POC where habitat quality remains sufficient. Although not confirmed during the site assessment, this habitat is considered to be of moderate importance for threatened floral SCC for the below species:

- *Cassipourea gummiflua* var. *verticillata* (Status = VU. POC = Medium);
- *Emplectanthus cordatus* (Status = VU. POC = Medium); and
- Sensitive species 1252 (Status = VU. POC = High).

Refer to Figure 5 for photographs of the habitat associated with this unit, and Table 4 for a more detailed summary of the vegetation and species characteristics for this habitat unit.

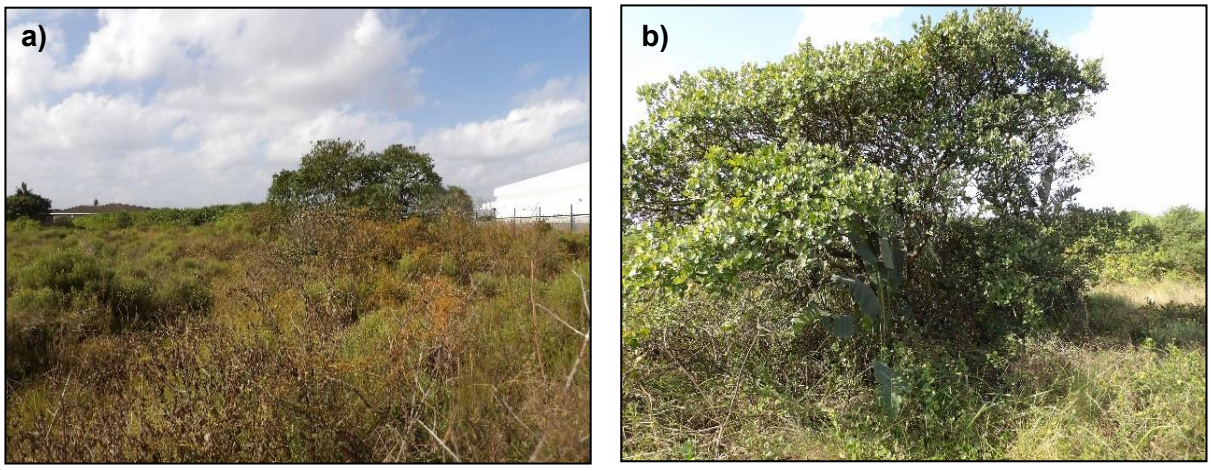


**Figure 5: Representative photographs of the Thicket habitat unit associated with the study area.**

### 3.2.4 Freshwater-Associated Habitat

The Freshwater-Associated Habitat comprises of a Seep Wetland and a Wetland Flat, which are characterised by hydromorphic soils and hydrophilic vegetation. Vegetation within this habitat is dominated by grasses, sedges, and herbaceous species adapted to saturated conditions, including *Cyperus spp*., *Juncus spp*., *Phragmites australis*, *Typha capensis*, and *Leersia hexandra*. The graminoid and sedge layers are typically dense in less disturbed areas,

forming the primary structural component of the habitat. The herbaceous layer includes species such as *Persicaria senegalensis, Ludwigia spp., Centella asiatica*, and *Ranunculus multifidus*, which are indicative of wetland conditions. Woody species are generally restricted to the margins of wetter areas and may include species such as *Syzygium cordatum*, *Salix mucronata*, and *Bridelia micrantha* in slightly drier zones. AIP species such as *Eichhornia crassipes* (where open water is present), *Cenchrus clandestineus*, and *Chromolaena odorata* may occur in disturbed sections but are typically less dominant in intact wetland areas. The Freshwater-Associated Habitat exhibits a **medium to tall moist grassland structure**, dominated by hydrophilic graminoids, sedges, and herbaceous wetland species.

Overall, the Freshwater-Associated Habitat retains important ecological processes, including hydrological regulation and nutrient cycling, and provides suitable habitat for moisture-dependent species. Despite some disturbance, the vegetation structure and function remain largely intact in places, and this habitat is considered to be in a fair ecological condition, with localised areas of higher sensitivity. This habitat unit is still considered to be indigenous vegetation (NEMA definition).

Although no protected species were directly recorded within the habitat unit, several species have the potential of occurring within this habitat unit, i.e., a single species obtained a high POC scores for this habitat unit. Refer to the outcome of the SCC assessment for this habitat unit below. No TOPS species were recorded within the habitat and no suitable habitat to support such species was identified. No NFA protected species were recorded within the habitat and no suitable habitat to support such species was identified.

Specially Protected and Protected Species (NCMAA-protected) can potentially occur in the Freshwater Habitat namely:

- Orchidaceae Family (*Disa woodii*, POC = High, Status = LC).

The Plant Species Theme triggered several wetlands and moist habitat-associated taxa for the study area. In particular, *Fimbristylis aphylla* and *Thesium polygaloides* are most plausibly associated with the freshwater habitat portions of the site. This habitat is therefore considered to be of moderate importance for threatened and protected flora below, despite no direct confirmation of threatened floral SCC during the field assessment.

- *Fimbrisylis aphylla* (POC = High, Status = VU);
- *Senecio ngoyanus* (POC = Medium, Status = VU); and
- *Thesium polygaloides* (POC = Medium, Status = VU).

Refer to Figure 6 for photographs of the habitat associated with this unit, and Table 5 for a more detailed summary of the vegetation and species characteristics for this habitat unit.

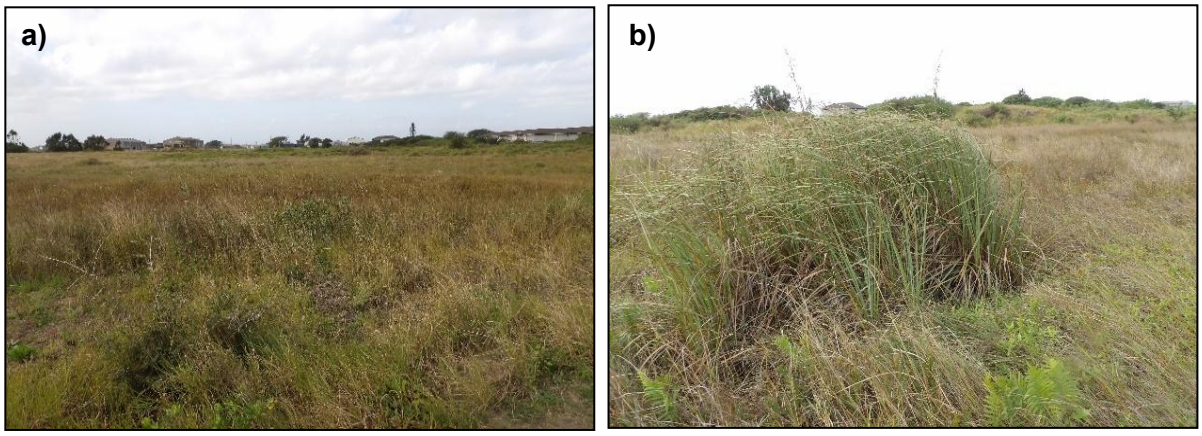


**Figure 6: Representative photographs of the Freshwater habitat unit associated with the study area.**

## *3.3 Alien and Invasive Plant (AIP) Species*

South Africa hosts hundreds of naturalised and invasive plant taxa, many of which pose significant threats to biodiversity, water resources, agricultural productivity, and ecosystem functioning (SANBI, 2022c; van Wilgen and Wilson, 2018). While numerous alien species contribute positively to sectors such as agriculture, forestry, and horticulture, a small proportion escape cultivation, establish self-sustaining populations, and become invasive.

Although only a fraction of introduced species develops invasive characteristics, those that do can transform habitats, displace indigenous flora, alter fire regimes, and reduce ecosystem service delivery. The presence and spread of invasive alien plants therefore represent a recognised environmental risk that may influence project authorisation and trigger legal management obligations.

### 3.3.1 Legal Context

The management of invasive alien species in South Africa is primarily regulated under the NEMBA and the Alien and Invasive Species Regulations (2020). Listed invasive species are categorised according to required management interventions:

- **Category 1a**: Species requiring compulsory eradication.
- **Category 1b**: Species that must be controlled and prevented from spreading.
- **Category 2**: Species permitted only under regulated conditions subject to a permit.
- **Category 3**: Species allowed to remain in certain contexts but prohibited from further propagation, with stricter controls in sensitive areas such as riparian zones.

In terms of Section 73 of NEMBA[21], landowners and project proponents have a legal duty of care to prevent the spread of listed invasive species and to implement appropriate control measures where these occur. Early detection and management are widely recognised as significantly more cost-effective than delayed intervention (van Wilgen et al., 2020).

### 3.3.2 Site Results

AIP species are present across all habitat units within the study area, with the highest abundance observed within the Transformed Habitat and along disturbance edges. Lower, but still notable, levels of invasion occur within the Hygrophilous Grassland, Thicket Vegetation, and Freshwater-Associated Habitat units. The distribution of AIPs across the site reflects underlying disturbance gradients, local hydrological conditions, and sustained propagule pressure from the surrounding industrial and urban land uses.

AIP species recorded within the study area comprise a range of growth forms, including woody shrubs and trees, herbaceous forbs, climbers, graminoids, and aquatic species. Woody invaders such as *Chromolaena odorata, Lantana camara,* and *Solanum mauritianum* are particularly prominent within disturbed and edge-affected areas, where they may form dense stands and suppress indigenous vegetation. Herbaceous invaders, including *Bidens pilosa, Tagetes minuta,* and *Ageratum conyzoides*, dominate highly disturbed areas, particularly where soil disturbance and clearing have occurred. Graminoid invasion is primarily represented by *Cenchrus clandestineus* within moisture-influenced grassland systems, while freshwater habitats are susceptible to invasion by moisture-tolerant and aquatic species such as *Xanthium strumarium* and, where open water is present, *Eichhornia crassipes*.

In total, 12 AIP species were identified within the study area, comprising predominantly herbaceous species, with fewer woody invaders and no succulent invaders recorded. Many of these species are listed under the NEMBA as Category 1b invasive species, requiring **compulsory control and removal**. These include, *Inter alia*, C*hromolaena odorata, Lantana camara, Solanum mauritianum,* and *Ageratum conyzoides*.

Several additional species, such as *Bidens pilosa* and *Tagetes minuta*, although not listed under the NEMBA Alien and Invasive Speices (A&IS) Regulations, were observed to be locally abundant, particularly along site edges and previously disturbed areas. These species

[21] Section 73(2): A person who is the owner of land on which a listed invasive species occurs must-
a) notify any relevant competent authority, in writing, of the listed invasive species occurring on that land;
b) take steps to control and eradicate the listed invasive species and to prevent it from spreading; and
c) take all the required steps to prevent or minimise harm to biodiversity.

contribute to ongoing ecological degradation through competitive exclusion of indigenous species and should be managed as part of general site rehabilitation and maintenance measures. The presence of multiple Category 1b invasive species across all habitat units necessitates active management and ongoing monitoring to prevent further degradation of the remaining indigenous vegetation associated with the surrounding threatened ecosystem.

Refer to Table 2 for a full list of recorded species and their habitat associations.

**Table 2: AIP species recorded in the study area.**

| Species | Common Name | Origin | NEMBA Category | Transformed Habitat | Hygrophilous Grassland | Thicket Vegetation | Freshwater Habitat |
|---|---|---|---|---|---|---|---|
| **Woody Species** | | | | | | | |
| *Chromolaena odorata* | Triffid weed | Central & South America | 1b | ✓✓✓ | ✓✓ | ✓✓ | ✓ |
| *Lantana camara* | Lantana | Central & South America | 1b | ✓✓✓ | ✓✓ | ✓✓✓ | ✓ |
| *Psidium guajava* | Guava | Central & South America | 1b | ✓✓ | ✓ | ✓✓✓ | ✓ |
| *Ricinus communis* | Castor oil plant | Africa (tropical) / naturalised elsewhere | 2 | ✓✓ | ✓ | ✓ | ✓ |
| *Solanum mauritianum* | Bugweed | South America | 1b | ✓✓ | ✓ | ✓✓✓ | ✓ |
| **Herbaceous Species** | | | | | | | |
| *Ageratum conyzoides* | Billy goat weed | Central & South America | 1b | ✓✓✓ | ✓✓ | ✓ | ✓ |
| *Bidens pilosa* | Blackjack | Central & South America | NL | ✓✓✓ | ✓✓ | ✓ | ✓✓ |
| *Ipomoea purpurea* | Common morning glory | Central & South America | 1b | ✓✓ | ✓ | ✓ | ✓✓ |
| *Tagetes minuta* | Khaki weed | South America | NL | ✓✓✓ | ✓✓ | ✓ | ✓ |
| *Xanthium strumarium* | Cocklebur | Americas | 1b | ✓✓ | ✓✓ | ✓ | ✓✓✓ |
| **Aquatic Species** | | | | | | | |
| *Eichhornia crassipes* | Water hyacinth | Amazon Basin (South America) | 1a | - | - | - | ✓✓✓ |
| **Graminoid Species** | | | | | | | |
| *Cenchrus clandestineus* | Kikuyu grass | East Africa | 1b | ✓✓ | ✓✓✓ | ✓ | ✓✓ |

✓ = Present (low), ✓✓ = Moderate occurrence, and ✓✓✓ = Dominant, NL= Not Listed.

## 3.4 Biodiversity Priority Areas[22]/ Conservation Significance

The biodiversity importance and conservation significance of the study area are informed by the Terrestrial Biodiversity Theme of the screening tool, together with supporting provincial and national spatial datasets reviewed in Part A and verified through the site sensitivity verification process.

At a regional and national scale, the study area is located within the Maputaland Wooded Grassland vegetation type, which is classified as EN, reflecting extensive historical transformation and ongoing pressures from land use and AIP invasion. Provincial conservation planning datasets further indicate that the broader area includes both threatened terrestrial ecosystems and vulnerable freshwater ecosystem components. In addition, the study area occurs within a landscape identified as important for conservation planning and expansion and is situated in proximity to protected areas and an Important Bird Area (IBA).

While the screening tool and associated datasets indicate that portions of the study area fall within a CBA classified as Irreplaceable, this designation is primarily associated with freshwater features, which are excluded from the current assessment due to existing authorisation for their infilling. As such, no CBA habitat is confirmed within the terrestrial components of the study area.

Despite this high conservation context at a regional scale, field verification indicates that the study area has been subject to varying degrees of historical disturbance. This is reflected in the presence of transformed areas, degraded vegetation, and the proliferation of AIP species across several habitat units. As such, while portions of the site retain limited affinity to the reference EN vegetation type, the ecological condition is variable and generally lower than that of intact examples of Maputaland Wooded Grassland.

Overall, the study area is located within a region of high conservation importance at a planning scale; however, at a site level, the terrestrial habitats are degraded and not representative of intact EN vegetation or functional CBA habitat. The conservation significance of the terrestrial

[22] 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, CR and EN ecosystems, CBAs and ESAs, Freshwater Ecosystem Priority Areas, high water yield areas, flagship free-flowing rivers, priority estuaries, study areas for land-based protected area expansion, and study areas for offshore protection.

component is therefore considered to be moderate at a local scale, driven primarily by its location within a broader sensitive landscape rather than intrinsic habitat quality.

# 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. SEI is a function of the biodiversity importance (BI) of the receptor and its resilience to impacts (receptor resilience [RR]). BI, in turn, is a function of conservation importance (CI) and the functional integrity (FI) of the receptor. For an SEI of “Very High” and “High”, avoidance mitigation is recommended. Table 3 indicates the individual SEI scoring for each habitat unit/receptor. Figure 7 illustrates the SEI for the receptors identified in the study area.

It should be noted that the SEI assigned to receptors within the study area does not, in isolation, determine whether development is permissible. Rather, SEI provides an indication of the ecological value and sensitivity of specific receptors and is used as an input into the impact assessment. The final guidance regarding development constraints is informed by the impact significance assessment, which considers the nature, extent, duration, and magnitude of impacts, as well as the effectiveness of mitigation measures. Accordingly, the presence of receptors with higher ecological importance does not preclude development; instead, feasibility is determined by the residual impact significance following the implementation of appropriate mitigation.


**Figure 7: Conceptual illustration of the floral SEIs within the study area.**

**Table 3: SEI importance for the different habitat units (i.e., receptors) in the study area. *Acronyms in the table header row include BI = biodiversity importance, CI = conservation importance, FI = functional integrity, RR = receptor resilience, and SEI = Site Ecological Importance. Note that when two values are given within the same block, the higher sensitivity is used for the final SEI calculations.**

| Habitat Unit | CI | FI | BI | RR | SEI |
|---|---|---|---|---|---|
| Transformed Habitat | **Very Low**<br>No confirmed and highly unlikely populations of SCC. No confirmed and highly unlikely populations of range-restricted species. No natural habitat remaining. | **Very Low**<br>Very small area.<br><br>No habitat connectivity except for 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 |
| Degraded Hygrophilous Grasslands | **Low**<br>No confirmed or highly likely populations of SCC. No confirmed or highly likely populations of range-restricted species. < 50% of receptor contains natural habitat with limited potential to support SCC. | **Low**<br>Several minor and major current negative ecological impacts. | Low | **Medium**<br>Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed. | Low |
| Thicket Habitat | **Medium**<br>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. Specifically, Sensitive species 1252 (Status = VU (criterion A). POC = High). | **Medium**<br>Only narrow corridors of good habitat connectivity. Mostly minor current negative ecological impacts with some major impacts and a few signs of minor past disturbance. Moderate rehabilitation potential. | Medium | **Medium**<br>Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or<br>impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed. | Medium |
| Freshwater-Associated Habitat | **High**<br>Confirmed or highly likely occurrence of IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A, namely: *Fimbristylis aphylla* (Status = VU (criterion B). POC = High). | **High**<br>Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches. Only minor current negative ecological impacts with no signs of major past disturbance and good rehabilitation potential. | High | **Very Low**<br>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 |

# 5 IMPACT ASSESSMENT

The sections below outline the significance of the perceived impacts arising from the proposed Mabasa CCGT development activities within the study area. While the site is located within a largely transformed industrial landscape, the potential presence of remnant vegetation, secondary grassland, and modified wetland features introduces ecological sensitivities that require consideration. This impact assessment will focus on the following:

- Loss of habitat and species diversity (including protected species that are not threatened);
- Loss of biodiversity features, such as habitat that has limited affinity with the threatened ecosystem;
- The potential loss of threatened flora, and the loss or degradation of habitat for threatened flora; and
- Alteration of ecological processes (e.g., hydrology, soil integrity, and disturbance regimes) affecting vegetation communities.

The proposed development entails the establishment of a gas-fired CCGT facility and associated infrastructure within an industrial development zone (Figure 8). The development footprint will be largely utilised for infrastructure placement, including turbines, cooling systems, switchyard infrastructure, access roads, and associated services. At the time of report development, no spatial layout was available, and as such, the exact placement of infrastructure within the study area could not be confirmed. However, based on the project description provided by the proponent, the CCGT and associated infrastructure will require approximately 13 ha. Given that the study area encompasses approximately 14 ha, it is anticipated that the majority of the site will be transformed for development purposes.

It is noted that the infilling of wetlands within the study area has already been authorised under a separate EA for the broader RBIDZ Phase 1F development and does not form part of the current application. As such, impacts to freshwater ecosystems are excluded from this assessment, and the focus is placed on terrestrial floral and habitat-related impacts only.

Given the nature of the proposed development and the requirement for a contiguous infrastructure footprint, avoidance of terrestrial ecological features within the study area is not considered feasible. The assessment therefore focuses on the minimisation of impacts where possible and the management of residual terrestrial impacts through appropriate mitigation measures.

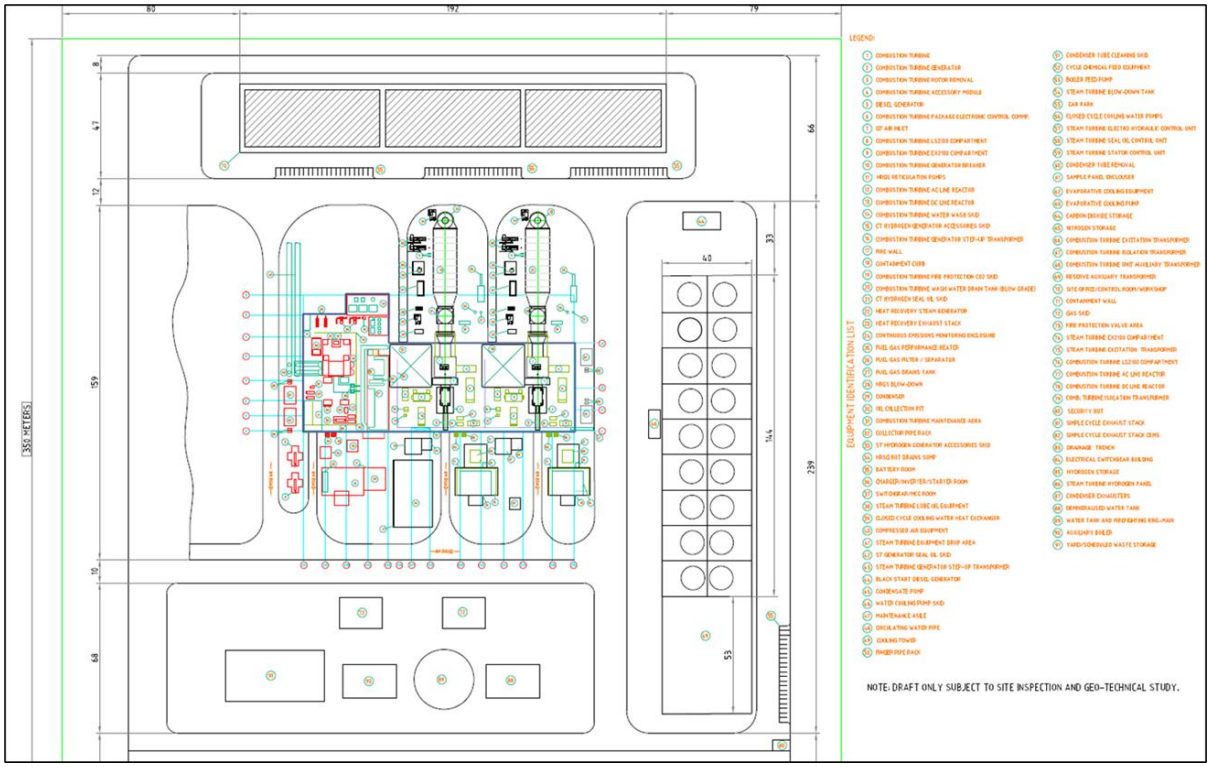


**Figure 8: Conceptual layout of the proposed CCGT Power Plant.**

Sections 5.1 and 5.2 present the assessment and discussion of potential impacts across the Pre-construction Phase[23], Construction Phase, and Operation and Maintenance Phase. All mitigation measures required to minimise these impacts are provided in Section 5.1. Table 4 outlines the perceived risks to floral species linked to the proposed developments.

**Table 4: Impact mechanisms likely to impact the floral resources of the study area.**

| PRE-CONSTRUCTION PHASE |
|---|
| **IMPACT 1: Inadequate pre-construction planning may result in non-compliance with environmental legislation, particularly in relation to the identification and management of protected flora and threatened flora prior to site clearance.** |
| ➢ Failure to undertake adequate pre-construction ecological verification may result in the unlawful destruction of protected plant species and potentially occurring threatened plant species (during optimal flowering period November to May).<br>➢ Failure to obtain the required permits under applicable legislation (e.g., provincial legislation such as the NCMAA and national legislation such as the NEMBA and NFA) may result in regulatory non-compliance.<br>➢ Failure to implement appropriate search-and-rescue or relocation measures may result in the avoidable loss of individuals of conservation concern (i.e., protected and potentially occurring threatened species).<br>➢ Inadequate demarcation of the approved development footprint may result in disturbance extending beyond the authorised area, particularly into adjacent habitats.<br>➢ Failure to integrate ecological constraints into final engineering design (particularly stormwater infrastructure) may result in avoidable impacts to vegetation and hydrological processes, both within the surrounding landscape and/or remanent habitat left within the study area (should there be any).<br>➢ Failure to plan for AIP management prior to site clearing may facilitate the establishment and spread of AIPs during and after disturbance. |

[23] No direct botanical impacts are anticipated during the pre-construction phase; however, planning decisions made during this stage influence the extent to which impacts can be avoided or minimised.

| **CONSTRUCTION PHASE** |
|---|
| **IMPACT 1: Loss and degradation of terrestrial and freshwater vegetation communities within and adjacent to the development footprint.** |
| ➢ Site clearing and vegetation removal associated with the development will result in the complete loss of natural vegetation within the development footprint, including Transformed Habitat (of very low SEI), Degraded Hygrophilous Grasslands (of low SEI), and Thicket Vegetation (of medium SEI)..<br>➢ Vegetation clearing will result in the direct loss of individuals of common plant species, as well as any SCCs (protected and potentially occurring threatened plant species) within the footprint.<br>➢ Inadequate communication of ecological constraints and permit conditions to contractors may result in non-compliance and unintentional impacts prior to or during site establishment.<br>➢ Inadequate demarcation of the approved development footprint, or failure to maintain such demarcation where damaged or removed, may result in clearing extending beyond authorised areas, leading to unnecessary loss of adjacent natural vegetation. In addition, insufficient Environmental Control Officer (ECO) oversight may result in non-compliance with demarcated boundaries.<br>➢ Construction activities, including earthworks and vehicle movement, may result in soil compaction, disturbance, and degradation of adjacent habitats, particularly along the edges of the development footprint.<br>➢ Clearing of vegetation within the development footprint will result in the loss or damage of protected plant species (including potential NFA- and/or provincially protected species).<br>➢ Failure to obtain and comply with required permits, and to properly communicate and implement search, rescue, and relocation measures, may result in the avoidable loss of protected plant species and non-compliance with environmental legislation.<br>➢ Alteration of natural drainage patterns due to earthworks and infrastructure placement may result in changes to soil moisture regimes, affecting vegetation composition.<br>➢ Inadequate stormwater management design may result in concentrated flows, erosion, and localised degradation of vegetation in downstream or adjacent areas.<br>➢ Sedimentation associated with construction activities may smother vegetation and reduce habitat quality in lower-lying areas.<br>➢ Failure to implement appropriate AIP management measures during construction may facilitate the introduction and spread of AIPs via machinery, soil movement, and disturbed substrates.<br>➢ Construction-related dust deposition may accumulate on adjacent vegetation, potentially reducing photosynthetic efficiency and plant vigour in surrounding habitats.<br>➢ Poorly managed construction activities may increase the risk of accidental fires, which may alter local disturbance regimes and facilitate further habitat degradation.<br>➢ Increased human presence during construction may result in trampling, damage to vegetation, or incidental harvesting of indigenous plant species in adjacent natural areas. |
| **IMPACT 2: Loss or degradation of threatened plant species.** |
| ➢ The clearing of vegetation within the development footprint will result in the direct loss of any potentially occurring individuals of threatened plant species, particularly in habitats associated with the Thicket Habitat.<br>➢ Failure to conduct pre-construction ecological verification may result in individuals of threatened plant species not being identified prior to site clearance.<br>➢ Failure to implement search, rescue, and relocation measures in accordance with approved methodologies and permit conditions may result in the avoidable loss of individuals of threatened plant species.<br>➢ Failure to obtain and comply with relevant permits may result in non-compliance with environmental legislation as it relates to impacts on potentially occurring individuals of threatened plant species.<br>➢ Poor communication of ecological constraints, permit conditions, and procedures for handling threatened plant species to contractors may result in unintentional damage or destruction of individuals of threatened plant species prior to or during clearing activities. |
| **IMPACT 3: Habitat fragmentation and edge effects resulting from vegetation clearing and infrastructure development.** |
| ➢ The development will contribute to localised habitat loss and increased edge effects within an already transformed industrial landscape.<br>➢ Vegetation clearing may increase exposure of adjacent habitats to wind, light, and human disturbance, potentially affecting vegetation condition.<br>➢ Construction activities may result in localised disturbance to adjacent habitats, including soil compaction, soil erosion, vegetation damage, the creation of informal access routes, and the facilitation of AIP proliferation.<br>➢ Disturbed areas along the development edge may facilitate the establishment and spread of AIP species, further altering habitat structure and composition beyond the proposed footprint.<br>➢ Poorly managed runoff and erosion during construction may lead to sedimentation and localised degradation of adjacent natural habitats. |

| |
|---|
| ➢ Given the already transformed nature of the surrounding landscape, impacts on landscape-scale connectivity are expected to be limited, with impacts largely confined to local-scale edge effects. |
| **OPERATIONAL AND MAINTENANCE PHASES** |
| **IMPACT 1: Ongoing degradation of adjacent natural vegetation due to operational activities.** |
| ➢ Ongoing human activity associated with the shopping centre may result in trampling, vegetation damage, littering, and informal access into adjacent natural areas.<br>➢ Edge effects, including altered microclimatic conditions and potential emissions-related deposition, may reduce vegetation quality along the development boundary.<br>➢ Poorly managed stormwater infrastructure may result in localised erosion, sedimentation, or changes in soil moisture regimes in adjacent areas.<br>➢ Inadequate control of access and activities may lead to progressive degradation of adjacent vegetation over time.<br>➢ Increased human presence may elevate the risk of accidental fires, further impacting adjacent natural vegetation. |
| **IMPACT 2: Establishment and spread of AIPs.** |
| ➢ Disturbed areas within and surrounding the development footprint may promote AIP establishment and colonisation.<br>➢ Infrastructure corridors and stormwater discharge areas may act as pathways for AIP spread.<br>➢ Inadequate implementation of long-term AIP management measures may result in the proliferation of invasive species and displacement of indigenous vegetation.<br>➢ Improper handling or disposal of vegetation material may further contribute to AIP spread. |
| **IMPACT 3: Alteration of stormwater runoff affecting adjacent habitats.** |
| ➢ Increased impervious surfaces may alter runoff patterns, leading to localised erosion and changes in vegetation structure.<br>➢ Concentrated stormwater flows may result in erosion features and degradation of vegetation at discharge points.<br>➢ Changes in hydrological regimes may affect soil moisture conditions, particularly in low-lying or wet areas, resulting in shifts in vegetation composition.<br>➢ Altered drainage pathways may facilitate AIP establishment and further habitat degradation. |

## *5.1 Floral Impact Assessment Results*

Tables 5 -7 present the perceived risks to the floral ecology across all phases of the proposed development. The table also presents the findings of the impact assessment undertaken on the perceived impacts before and after the implementation of mitigation measures. Key integrated mitigation measures for the proposed project are presented in the tables below and are required to effectively manage and mitigate the ecological impacts 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.

The impact assessment distinguishes between impact categories, namely **1)** impact on floral habitat and diversity (both direct and indirect impacts considered), **2)** impacts on floral SCCs and/or their associated habitat, as well as **3)** ecological connectivity and ecosystem services.

**Table 5: Pre-construction Phase impacts on the floral habitat, diversity, and significant biodiversity features from the proposed development activities. Required mitigation measures are presented at the bottom of the table.**

| | Probability | Sensitivity | Severity | Spatial Scale | Duration | Likelihood | Consequence | Significance | Probability | Sensitivity | Severity | Spatial Scale | Duration | Likelihood | Consequence | Significance |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Inadequate pre-construction planning may result in non-compliance with environmental legislation, particularly regarding the identification, permitting, and management of protected flora and species of conservation concern prior to site clearance. | 3 | 3 | 3 | 2 | 4 | **6** | **9** | **54 Medium-low** | 2 | 3 | 2 | 2 | 4 | **5** | **8** | **40 Low** |
| **Mitigation Measures for Pre-construction Phase Impacts** | | | | | | | | | | | | | | | | |
| **Site Planning and Demarcation**<br>➢ Clearly delineate and demarcate the approved development footprint on site prior to any site establishment activities to prevent disturbance beyond authorised areas.<br>➢ All construction and related activities must be strictly confined to the approved development footprint. No disturbance of areas outside of the approved footprint without prior environmental authorisation.<br>➢ Establish controlled access points, laydown areas, and stockpile areas prior to construction to prevent uncontrolled disturbance.<br>➢ Prior to site clearing, identify and prioritise areas with high densities of AIPs to prevent further spread during disturbance.<br><br>**Stormwater and Ecological Infrastructure Design**<br>➢ Stormwater infrastructure must be designed in consultation with the applicable specialists to ensure that post-development runoff does not adversely affect adjacent natural areas or nearby drainage and wetland features.<br>➢ Stormwater systems should aim to limit erosion, concentrated flow, and sedimentation, particularly at discharge points.<br>➢ Stormwater design must consider the maintenance of pre-development hydrological processes as far as practicable, recognising that hydrology is a key driver of vegetation composition and function.<br>➢ Where relevant, design measures must align with applicable legislation and municipal requirements.<br>➢ Prepare site-specific erosion and rehabilitation specifications prior to construction.<br>➢ Compile an AIP Management Plan prior to construction to guide early intervention following disturbance.<br><br>**Species Verification, Permitting, and Rescue**<br>➢ Conduct a pre-construction ecological walkdown during the appropriate season (November to May) to confirm the presence of threatened plant species, noting that protected plant species were already assessed during the site survey.<br>➢ Obtain all required permits in terms of applicable legislation (e.g., provincial conservation legislation such as provincially protected and national legislation such as NFA and NEMBA) prior to site clearance. | | | | | | | | | | | | | | | | |

- Investigate the appropriateness of a Search, Rescue and Relocation Plan for eligible protected plant species (provincially protected) and potentially occurring threatened plant species that may be impacted.
- The pre-construction ecological walkdown must be formally signed off by the appointed specialist and ECO prior to any vegetation clearing or site establishment activities.
- Identify suitable recipient sites (on-site, where feasible, or off-site) for the relocation of rescued individuals (where applicable).
- Ensure that all rescue and relocation activities are undertaken by suitably qualified specialists and in accordance with permit conditions.
- Maintain a permit register on site to ensure that all permits and associated conditions are tracked and complied with throughout the pre-construction and construction phases.

**Environmental Compliance and Site Preparation**

- Appoint an ECO or suitably qualified environmental professional to oversee compliance during site establishment and clearing.
- Ensure that all permit conditions, ecological constraints, and management measures are clearly communicated to contractors prior to construction.
- Conduct environmental induction training for all personnel prior to site establishment.
- Ensure that site clearing is supervised, particularly where protected species may occur.
- Require contractors to submit method statements for vegetation clearing, topsoil handling, and site establishment activities, which must be reviewed and approved by the ECO and/or applicable person (such as project manager, etc) prior to implementation.
- Implement a topsoil management plan, including the stripping, stockpiling, and protection of topsoil to preserve seed banks and facilitate future rehabilitation where applicable.
- Implement a compliance monitoring and reporting system to track adherence to environmental requirements, including regular ECO audits and reporting.

Implementation of the above measures is expected to substantially reduce the likelihood of avoidable botanical impacts during project finalisation; however, given that the development will result in the transformation of the entire site, residual impacts to floral resources are considered unavoidable and will require appropriate management and, where applicable, offsetting (as deemed necessary at the competent authorities discretion).

**Table 6: Construction Phase impacts on the floral habitat, diversity, and significant biodiversity features from the proposed development activities. Required mitigation measures are presented at the bottom of the table.**

| Affected Environment | Probability | Sensitivity | Severity | Spatial Scale | Duration | Likelihood | Consequence | Significance | Probability | Sensitivity | Severity | Spatial Scale | Duration | Likelihood | Consequence | Significance |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **IMPACT 1: Loss and degradation of terrestrial and freshwater vegetation communities within and adjacent to the development footprint** | | | | | | | | | | | | | | | | |
| **Transformed Habitat (approx. 0.4 ha)** | 5 | 1 | 1 | 2 | 5 | **6** | **8** | **48 Low** | 5 | 1 | 1 | 1 | 5 | **6** | **7** | **42 Low** |
| **Hygrophilous Grasslands (9.6 ha)** | 5 | 2 | 3 | 2 | 5 | **7** | **10** | **70 Medium-low** | 5 | 2 | 2 | 1 | 5 | **7** | **9** | **56 Medium-low** |
| **Thicket Habitat (1.1 ha)** | 5 | 3 | 3 | 2 | 5 | **8** | **10** | **80 Medium-high** | 5 | 3 | 3 | 1 | 5 | **8** | **9** | **72 Medium-low** |
| **IMPACT 2: Loss or degradation of threatened species and their habitat** | | | | | | | | | | | | | | | | |
| **Transformed Habitat (approx. 0.4 ha)** | 1 | 1 | 1 | 2 | 5 | **2** | **8** | **16 Very low** | 1 | 1 | 1 | 1 | 5 | **2** | **7** | **14 Very low** |
| **Hygrophilous Grasslands (9.6 ha)** | 2 | 2 | 2 | 2 | 5 | **4** | **9** | **36 Low** | 1 | 2 | 1 | 1 | 5 | **3** | **7** | **21 Very low** |
| **Thicket Habitat (1.1 ha)** | 4 | 3 | 3 | 2 | 5 | **7** | **9** | **63 Medium-low** | 3 | 3 | 1 | 1 | 5 | **6** | **7** | **42 Low** |
| **IMPACT 3: Habitat fragmentation and edge effects resulting from vegetation clearing and infrastructure development.** | | | | | | | | | | | | | | | | |
| **Remaining/ adjacent natural habitat** | 4 | 3 | 3 | 3 | 4 | **7** | **10** | **70 Medium-low** | 3 | 3 | 2 | 2 | 4 | **6** | **8** | **48 Medium-low** |
| **Ecological corridors** | 2 | 2 | 2 | 3 | 4 | **4** | **9** | **36 Low** | 1 | 2 | 2 | 2 | 4 | **2** | **8** | **24 Very low** |
| **Mitigation Measures for Construction Phase Impacts** | | | | | | | | | | | | | | | | |
| **IMPACT 1 Mitigation Measures:**<br>➢ Vegetation clearing must be strictly confined to the approved development footprint, and any disturbance outside this footprint must be avoided.<br>➢ The development footprint must be clearly demarcated prior to construction, and boundaries must be regularly inspected to prevent unauthorised clearing.<br>➢ All construction activities, including vehicle movement and material storage, must be restricted to designated areas within the approved footprint.<br>➢ Vehicles must be restricted to designated access routes, and the creation of informal access tracks outside the footprint must be prohibited.<br>➢ Construction materials, rubble, and cleared vegetation must be disposed of at approved facilities, and no dumping may occur in adjacent natural areas.<br>➢ Stormwater management and erosion-control measures must be implemented to prevent sedimentation, erosion, and the formation of preferential flow paths affecting adjacent habitats. | | | | | | | | | | | | | | | |

- Contractors must submit method statements for vegetation clearing, earthworks, and material storage, which must be approved by the ECO prior to implementation.
- The spread of AIPs must be actively managed, including hygiene measures for machinery and the prompt removal of emerging invasives in disturbed areas.
- Construction activities must be managed to minimise dust generation, particularly near the boundary of adjacent natural vegetation.
- Human access to surrounding natural areas must be controlled, and the collection or damage of indigenous flora by construction personnel must be prohibited.
- Appropriate spill-response measures must be in place, including spill kits and routine vehicle maintenance to prevent hydrocarbon contamination.
- No uncontrolled or unauthorised fires may be permitted during construction activities.
- A Rehabilitation Plan must be implemented for any areas disturbed outside the approved footprint.
- The ECO must verify that demarcation boundaries are correctly established, maintained, and adhered to at all times, with no unauthorised encroachment beyond the approved footprint.
- Stormwater and drainage design must ensure that runoff from the development does not result in concentrated flows or altered hydrological regimes that could degrade adjacent vegetation.
- All stockpiled material must be placed in designated areas within the approved footprint and stabilised to prevent erosion and AIP colonisation.
- It is noted that a walkdown for protected flora was undertaken as part of the site assessment; however, any additional individuals (if present) within the development footprint must be addressed in accordance with applicable legislation. All required permits must be obtained in terms of applicable legislation (including provincial (NCMM) legislation and national (NFA) legislation) prior to any clearing of protected flora. Where applicable, search, rescue, and relocation measures must be implemented for protected plant species, either on-site (if feasible) or off-site, in accordance with approved methodologies and permit conditions (overseen by the ECO).

**IMPACT 2 Mitigation Measures:**

- A pre-construction ecological walkdown should be undertaken, where practicable, to verify the presence of potentially occurring individuals of threatened plant species within the proposed development footprint.
- It is noted that the survey was not conducted during the optimal flowering period (November–May) for certain threatened plant species, and as such, detectability may have been reduced. Given the limitations on detectability associated with specific flowering periods for threatened plant species, together with the dense vegetation in the study area, it is recommended that vegetation clearing be undertaken in a phased manner, with targeted checks for potentially occurring threatened plant species immediately prior to clearing each phase. Where development commences outside of the optimal flowering period (November – May), the phased walkdowns should focus on identifiable habitat features and any recognisable individuals, with a precautionary approach adopted where suitable habitat is present.
- Where applicable, search, rescue, and relocation measures must be implemented for individuals of potentially occurring threatened plant species within the footprint, in accordance with approved methodologies and permit conditions.
- Suitable recipient sites must be identified for the relocation of eligible individuals, either on-site (if feasible) or off-site.
- All rescue and relocation activities must be overseen by a suitably qualified botanical specialist and undertaken by personnel with appropriate experience in plant handling and relocation.
- No clearing of vegetation may commence until all required permits for protected and threatened plant species have been obtained.
- The ECO must verify that, where applicable, all permit conditions for threatened plant species are implemented prior to and during site clearing.
- Relocated individuals should be monitored where required by permit conditions to assess translocation success.

**IMPACT 3 Mitigation Measures:**

- Disturbance must be strictly confined to the approved footprint to prevent unnecessary expansion of edge effects into adjacent natural habitat.
- Should disturbance occur, all disturbed boundary areas must be stabilised immediately following disturbance to prevent erosion and AIP establishment.
- Construction activities must avoid creating informal access routes or disturbance corridors into surrounding natural areas.
- Disturbed boundary areas must be stabilised and rehabilitated promptly to prevent erosion and the establishment of AIPs.

- Regular monitoring (at least monthly during peak construction) must be undertaken along development edges to identify and address emerging impacts.
- Stormwater runoff must be managed to prevent concentrated flows, erosion, and sedimentation in adjacent natural habitats.
- Regular monitoring of development edges must be undertaken during construction to identify and manage emerging impacts such as erosion, AIP establishment, or vegetation degradation.
- Garden waste and landscaping material, where applicable, and construction material must be disposed of appropriately and not deposited in natural areas.
- Measures must be implemented to minimise the spread of AIPs into adjacent natural habitat, particularly along the development boundary.

**Table 7: Operation and Maintenance Phase impacts on the floral habitat, diversity, and significant biodiversity features from the proposed development activities. Required mitigation measures are presented at the bottom of the table.**

| Affected Environment | Probability | Sensitivity | Severity | Spatial Scale | Duration | Likelihood | Consequence | Significance | Probability | Sensitivity | Severity | Spatial Scale | Duration | Likelihood | Consequence | Significance |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ongoing operational activities may result in indirect impacts to adjacent natural habitats (if present), including edge effects such as human disturbance, dust, noise, and altered microclimatic conditions along the development boundary. | 3 | 3 | 2 | 2 | 4 | **6** | **8** | **48 Low** | 2 | 4 | 2 | 1 | 4 | **5** | **6** | **30 Low** |
| Operational activities and disturbed conditions may facilitate the establishment and spread of AIPs into adjacent natural habitats. | 4 | 3 | 2 | 2 | 4 | **7** | **8** | **56 Medium-low** | 2 | 4 | 2 | 2 | 4 | **6** | **6** | **36 Low** |
| Altered stormwater runoff from increased impermeable surfaces may result in localised erosion, sedimentation, or hydrological changes in adjacent areas or downstream environments. | 4 | 3 | 2 | 2 | 4 | **7** | **8** | **56 Medium-low** | 2 | 4 | 1 | 2 | 4 | **6** | **6** | **36 Low** |
| **Mitigation Measures for Operational Impacts** | | | | | | | | | | | | | | | | |
| **IMPACT 1 Mitigation Measures:**<br>➢ No dumping of litter, general waste, or other materials may occur within adjacent natural areas.<br>➢ Access to adjacent natural areas must be controlled, and informal pathways or unauthorised access must be discouraged.<br>➢ Edge effects must be actively managed, including controlling erosion, soil compaction, dust, and disturbance along the development boundary.<br>➢ Operational activities (e.g., maintenance, landscaping, cleaning) must be undertaken in a manner that does not result in disturbance or degradation of adjacent natural vegetation.<br>➢ Stormwater infrastructure must be regularly maintained to ensure proper functioning and to prevent erosion, sedimentation, or localised degradation of adjacent habitats.<br>➢ Measures must be implemented to minimise light spill and unnecessary disturbance along the boundary with natural areas, where feasible.<br>➢ Fire risks associated with operational activities must be managed, and no uncontrolled fires may be permitted.<br>➢ Clearly define and maintain operational boundaries to prevent gradual encroachment into adjacent areas over time.<br><br>**IMPACT 2 Mitigation Measures:**<br>➢ An AIP Management Plan must be implemented throughout the operational phase.<br>➢ Landscaping, if planned, must prioritise the use of indigenous species, and the use of known invasive species must be strictly prohibited.<br>➢ Disturbed and landscaped areas must be regularly inspected for emerging AIP species, particularly along development edges and stormwater discharge areas.<br>➢ Identified AIP species must be controlled and removed promptly to prevent spread into adjacent natural habitats.<br>➢ Garden waste and landscaping material, where applicable, must be disposed of appropriately and not deposited in natural areas.<br>➢ Where necessary, implement hygiene measures to prevent the spread of AIP propagules via maintenance activities.<br>➢ Stormwater infrastructure must be monitored for AIP establishment, as these areas act as key dispersal pathways.<br>➢ Follow-up AIP monitoring and subsequent clearing must be undertaken to address regrowth and ensure long-term control effectiveness. | | | | | | | | | | | | | | | | |

**IMPACT 3 Mitigation Measures:**

- Stormwater systems must be designed and maintained to prevent concentrated flows, erosion, and sedimentation in adjacent natural habitats.
- Regular inspection and maintenance of stormwater infrastructure (e.g., drains, outlets, attenuation systems) must be undertaken to ensure continued functionality.
- Appropriate energy-dissipation measures must be implemented at discharge points to reduce the risk of erosion.
- Runoff must be managed to prevent ponding, waterlogging, or excessive drying of adjacent habitats.
- Where erosion or degradation is observed, corrective measures must be implemented promptly to stabilise affected areas.
- Stormwater design must be aligned with the freshwater specialist recommendations to ensure that downstream ecological functioning is not compromised (refer to Freshwater Ecological Assessment SAS 24-1079 (2026)).
- Monitoring of discharge points must be undertaken, particularly after major rainfall events, as per recommendations in the Freshwater Ecological Assessment.

## 5.2 Discussion and Recommendations

The sections below provide a detailed discussion of the impact assessment outcome.

### 5.2.1 Impacts on Floral Diversity and Habitat Integrity

The proposed development will result in the complete transformation of all vegetation within the study area, including terrestrial and freshwater-associated habitats. As such, the loss of floral habitat and associated biodiversity is considered unavoidable within the proposed development footprint.

The pre-construction phase does not result in direct impacts to floral habitat or species; however, it plays an important role in ensuring that regulatory compliance, species identification, permitting, and planning are appropriately undertaken prior to site clearance. With the implementation of the recommended mitigation measures, pre-construction impacts are anticipated to remain low and acceptable.

The construction phase represents the primary source of direct botanical impact. Activities associated with site clearing, earthworks, and infrastructure development will result in the permanent loss of all vegetation within the footprint, including all remaining terrestrial vegetation units. This will result in a complete loss of local plant species diversity within the site, including common species and any SCC (protected or potentially threatened) that may be present but were not detected during surveys.

In addition to direct habitat loss, construction activities may result in indirect impacts to adjacent areas (where present), including edge effects such as dust deposition, erosion, soil compaction, and the spread of AIPs. These impacts are, however, considered localised and manageable through the implementation of appropriate mitigation measures.

The operational phase is characterised by indirect and management-driven impacts rather than direct habitat loss. Potential impacts are limited to edge effects, AIP spread and altered stormwater dynamics affecting adjacent or downstream environments. With appropriate management, these impacts are expected to remain of low significance.

Overall, provided that strict mitigation measures and good environmental practices are implemented, impacts on floral diversity and habitat integrity are considered to be acceptable at a broader ecological scale, notwithstanding the complete loss of habitat within the development footprint.

### 5.2.2 Impacts on Floral SCC (threatened and protected)

The proposed development will result in the complete transformation of all habitats within the study area, and therefore the potential loss of individuals of threatened and protected plant species cannot be excluded.

Although no threatened plant species were confirmed during the site assessment, the survey was not conducted during the optimal flowering season, which may have limited detectability. Furthermore, the presence of suitable habitat, particularly within the applicable habitats, indicates a reasonable likelihood of occurrence for certain SCCs. As such, a precautionary approach has been adopted.

Pre-construction walkdowns during the appropriate season are therefore required to verify the presence of SCCs prior to site clearance. Where individuals are identified, search, rescue, and relocation measures must be implemented in accordance with applicable permit conditions. Where relocation is not feasible, destruction permits may be required.

Several protected plant species may occur within the study area, including species protected under provincial and national legislation. Given the full extent of transformation, impacts to these species are considered largely unavoidable. However, these species are not necessarily threatened, and impacts are not expected to affect their broader conservation status, provided that all permitting and mitigation requirements are adhered to.

Post-mitigation, impacts on SCCs are expected to be reduced to low significance through appropriate identification, permitting, and rescue interventions. However, it is acknowledged that residual losses may still occur where species are not detected or where relocation success is limited.

### 5.2.3 Impact on CBAs, ESAs, Threatened Vegetation and Protected Areas

From a desktop assessment, portions of the study area are mapped as falling within a CBA, primarily associated with freshwater features and broader conservation planning priorities within the Maputaland Wooded Grassland ecosystem, which is listed as EN. However, field verification indicates that the terrestrial vegetation within the study area exhibits only limited affinity to the reference condition of this ecosystem, with much of the site being degraded and subject to historical and ongoing disturbance.

Importantly, no CBA habitat has been confirmed within the terrestrial components of the study area, as the mapped CBA features are associated with freshwater habitats, which are excluded from the current assessment due to existing authorisation for their infilling. As such,

the terrestrial habitats within the study area are not considered to represent functional CBA or ESA habitat.

The proposed development will result in the complete transformation of terrestrial habitat units within the development footprint, including areas that retain limited characteristics of the EN Maputaland Wooded Grassland. However, given the disturbed nature of the site, the relatively low ecological condition of much of the vegetation, and the limited representation of intact reference habitat, the ecological importance of the affected area is considered to be reduced.

The surrounding landscape is already characterised by transformation, fragmentation, and reduced ecological connectivity. In this context, the loss of terrestrial habitat within the study area is not expected to result in meaningful disruption of ecological processes, connectivity, or functionality at a landscape scale.

Accordingly, impacts to CBAs, ESAs, and threatened vegetation are considered to be localised in extent, with significance driven primarily by the presence of degraded habitat with limited affinity to an EN ecosystem, rather than the loss of intact or high-quality conservation features.

### 5.2.4 Probable Residual Impacts

No significant negative residual impacts on terrestrial biodiversity have been identified for the proposed project. However, even with extensive mitigation, residual impacts on the receiving floral ecological environment are possible. The following points highlight the key residual impacts that have been identified:

- Permanent loss of and altered floral species diversity associated with the limited representative habitat of EN RLE Ecosystem;
- Loss of potential individuals of threatened and protected plant species that may not be detected or successfully relocated;
- Localised edge effects, including AIP proliferation and disturbance along development boundaries.

### 5.2.5 Cumulative Impacts

To assess potential cumulative impacts on vegetation and plant species associated with the proposed development, consideration was given to past, present, and reasonably foreseeable future land-use changes in the Richard’s Bay area. The region has experienced sustained urban and industrial expansion, resulting in the progressive transformation and fragmentation of natural habitats historically associated with the Maputaland Wooded Grassland ecosystem.

The study area is situated within a landscape that is already substantially modified, with surrounding land uses characterised by industrial infrastructure, road development, and transformed open areas. While some remnant habitat persists in the broader area, these are generally fragmented and occur as isolated patches with varying levels of ecological integrity. The vegetation within the study area itself reflects this broader trend, with much of the site being degraded and only partially representative of the reference ecosystem. The following cumulative considerations are relevant:

- **Incremental loss of remaining natural and semi-natural habitat**: The proposed development will contribute to the continued loss of vegetation within a landscape already undergoing transformation. However, the affected area is limited in extent and of reduced ecological condition, and therefore its contribution to cumulative habitat loss is considered to be lower;
- **Ongoing fragmentation and reduced connectivity**: While cumulative habitat fragmentation is a concern at a regional scale, the study area is already functionally disconnected from larger natural systems due to surrounding development and existing barriers. As such, the loss of this site is not expected to materially influence landscape-scale connectivity;
- **Degradation of adjacent habitats through edge effects**: Expansion of developed areas may increase edge interfaces, potentially resulting in localised disturbance to adjacent habitats (where present). However, given the already transformed nature of the surrounding environment, these effects are expected to be limited and manageable;
- **Spread of AIPs**: Disturbance associated with development may contribute to increased propagule pressure within the landscape. This represents an ongoing cumulative risk, although it is not unique to the proposed development and can be effectively managed through appropriate mitigation measures; and
- **Alteration of local hydrological processes**: Changes to surface runoff associated with increased impervious surfaces may contribute cumulatively to altered drainage patterns. However, given the scale of the development and the modified nature of surrounding systems, these impacts are expected to remain localised and unlikely to significantly affect broader ecological functioning.

Given the above, the proposed development is expected to contribute incrementally, but not significantly, to cumulative ecological pressures within the broader Richard's Bay area. The loss of habitat within the study area is localised, occurs within a disturbed and partially transformed system, and does not represent a meaningful contribution to the decline of the Maputaland Wooded Grassland ecosystem at a regional scale.

With the implementation of appropriate mitigation measures, cumulative impacts associated with the proposed development are expected to remain low to moderate and consistent with existing land-use trends. The development is therefore not anticipated to compromise the long-term persistence of the Maputaland Wooded Grassland ecosystem within the broader region.

# 6 CONCLUSION AND REASONED OPINION

The study area comprises a mosaic of degraded hygrophilous grassland, thicket, freshwater-associated habitats, and transformed areas, with portions exhibiting limited affinity to the Maputaland Wooded Grassland ecosystem (EN), albeit in a disturbed and modified state. The proposed development will result in the near-complete transformation of habitats within the development footprint. While freshwater features are present within the study area, it is noted that their infilling has been authorised under a separate EA for the broader RBIDZ Phase 1F development, and they are therefore not assessed as part of the current application.

The loss of terrestrial habitat will result in a reduction in local floral diversity and a localised decrease in ecosystem extent. However, the affected area is limited in extent and occurs within a landscape that is already substantially transformed and fragmented, where ecological connectivity and habitat integrity have already been reduced. Furthermore, the vegetation within the study area exhibits only partial affinity to the reference condition of the threatened ecosystem, thereby reducing its overall ecological importance.

Impacts on potentially occurring threatened plant species cannot be excluded, particularly within the less disturbed portions of the site. However, no threatened species were confirmed during the field assessment. This uncertainty has been addressed through a precautionary approach, including pre-construction walkdowns during the appropriate season and, where required, the implementation of search, rescue, and relocation measures in accordance with permit conditions. These measures are expected to reduce impacts on SCC to acceptable levels.

While the proposed development will contribute to the cumulative loss and degradation of natural habitat within the broader Richards Bay area, this contribution is considered incremental and of limited ecological consequence in the regional context. The terrestrial habitats affected are degraded and not representative of intact EN vegetation, and their loss is therefore unlikely to result in meaningful impacts on ecological functioning at a landscape scale.

Based on the findings of this assessment and taking into account the disturbed nature of the site, the limited extent of remaining natural habitat, and the implementation of appropriate mitigation measures, the overall significance of impacts is considered to be low. It is the opinion of the specialists that the identified risks can be reduced to acceptable levels through the application of the recommended mitigation measures and management actions.

Accordingly, the proposed development is not considered to present a fatal flaw from a botanical or terrestrial biodiversity perspective, and it is recommended that the project be considered favourably by the relevant competent authorities in terms of Environmental Authorisation.

This study provides the relevant information necessary to support Integrated Environmental Management (IEM) and to inform sustainable decision-making within the study area. The findings, results, observations, conclusions, and recommendations presented in this report are based on the best available scientific information and professional judgement at the time of assessment.

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# APPENDIX A: FLORAL METHOD OF ASSESSMENT

The methods outlined in this document are aligned with the assessment guidelines provided by the South African National Biodiversity Institute (SANBI) (SANBI, 2020). SANBI is the regulatory body within South Africa that is responsible for ensuring sustainable development through facilitating access to biodiversity data, generating information and knowledge, building capacity, providing policy advise, and showcasing and conserving biodiversity in respective botanical and zoological gardens.

As the regulatory body for biological data, SANBI provides assessment and reporting protocols. These protocols provide a minimum set of assessment and reporting criteria that must form the basis of specialist investigations required for many of the country's environmental processes. As such, the proposed methodology, as described below, is in accordance with in-country standardised field assessment methodologies.

## *Vegetation Surveys*

Various field sampling methods are available for collecting floristic data. Generally, the selection of chosen field methods is dependent on serval factors, including the size of the area to be assessed, the heterogeneity of the vegetation/habitat present, time and budget allocated for field assessments, the scale and magnitude of potential project impacts, and the scope of work to be assessed.

When planning the timing of a floristic survey, it is important to remember that the primary objective is not an exhaustive species list but rather to ensure that sufficient data are collected to describe all the vegetation communities present in the area of interest, to optimise the detection of species of conservation concern (SCC) and to assess habitat suitability for other potentially occurring SCC (SANBI, 2020). An understanding of the location and extent of vegetation types with increased sensitivity, and the location of areas of increased importance for various species of SCC, will focus efforts on the identification and marking of SCC during detailed pre-construction walkdowns.

Given the restricted time frames in which the proposed field surveys need to be conducted and the combined objective of accurately demarcating sensitive habitats within the area of interest, the method chosen needs to allow for:

I. Rapid, accurate data collection; and
II. The optimisation of time spent in habitats that are likely to sustain SCC.

Several survey methods, known as rapid biological assessments (Larsen, 2016)[24], can be employed. Examples of rapid biological assessments include plot-based assessments or transect-based assessments. SANBI (2020) recommends the use of a transect-based approach, namely timed-meander searches (TMS; Goff et al., 1982[25]). The vegetation surveys presented below are a modified version of the TMS methods (hereafter referred to as modified-meander searches (MMS)). The TMS and MMS are subjective sampling methods that employ techniques in which the specialist chooses specific sample sites within the area of interest, based on their professional experience and background research conducted prior to the site visit. This allows representative recordings of floral communities and optimal detection of SCC.

The difference between the TMS and MMS is that the MMS is not timed. The list below presents the reasons for the selection of a modified approach:

- Time, access, and safety constraints are often unpredictable and cannot be planned for prior to a site assessment, especially in remote areas and areas where local communities may not provide consent for specialists to survey their lands. As such, a timed approach may result in disproportionate efforts in some pre-defined habitats.
- Vegetation surveys are conducted at the same time as the SCC assessments, which limits the potential for timed assessments, as SCC often occur either sporadically or are difficult to detect,

[24] Larsen, T.H. ed., 2016. Core standardized methods for rapid biological field assessment. Conservation International.
[25] Goff, F.G., Dawson, G.A. and Rochow, J.J., 1982. Site examination for threatened and endangered plant species. Environmental Management, 6(4), pp.307-316.

and hence, longer surveys in certain areas are necessary (skewing the timed approach). Microhabitats where SCC are often found are often difficult to detect on digital satellite imagery. As such, timing surveys based on unverified field data will increase the risk of overlooking important SCC data or habitat integrity features.

- Subjective decisions need to be made on-site that would otherwise interfere with a times-meander approach.

The use of the presented field methods is beneficial because they allow for rapid data collection and the subjective placement (based on professional experience and prior fieldwork knowledge) of the MMSs in habitats with a higher likelihood of sustaining SCC. Furthermore, this method provides extensive coverage of the subject property, thereby increasing the probability of detecting SCC and microhabitats. Extensive coverage of the area of interest will also be advantageous when properties are large and need to be assessed.

Based on the broad habitat units delineated before going to the site and the pre-identified points of interest, which are updated based on on-site observations and access constraints, the selected sample areas are surveyed on foot, following the subjective MMT, to identify the occurrence of the dominant plant species and habitat diversities, but also to detect SCC, which tend to be sparsely distributed. Photographs are taken of each vegetation community that is representative of the typical vegetation structure of that community, as well as photos of all detected SCC (sensitive species will not be presented in the report).

Vegetation structure has been described according to the guidelines of Edwards (1983). Refer to Figure A1 below:

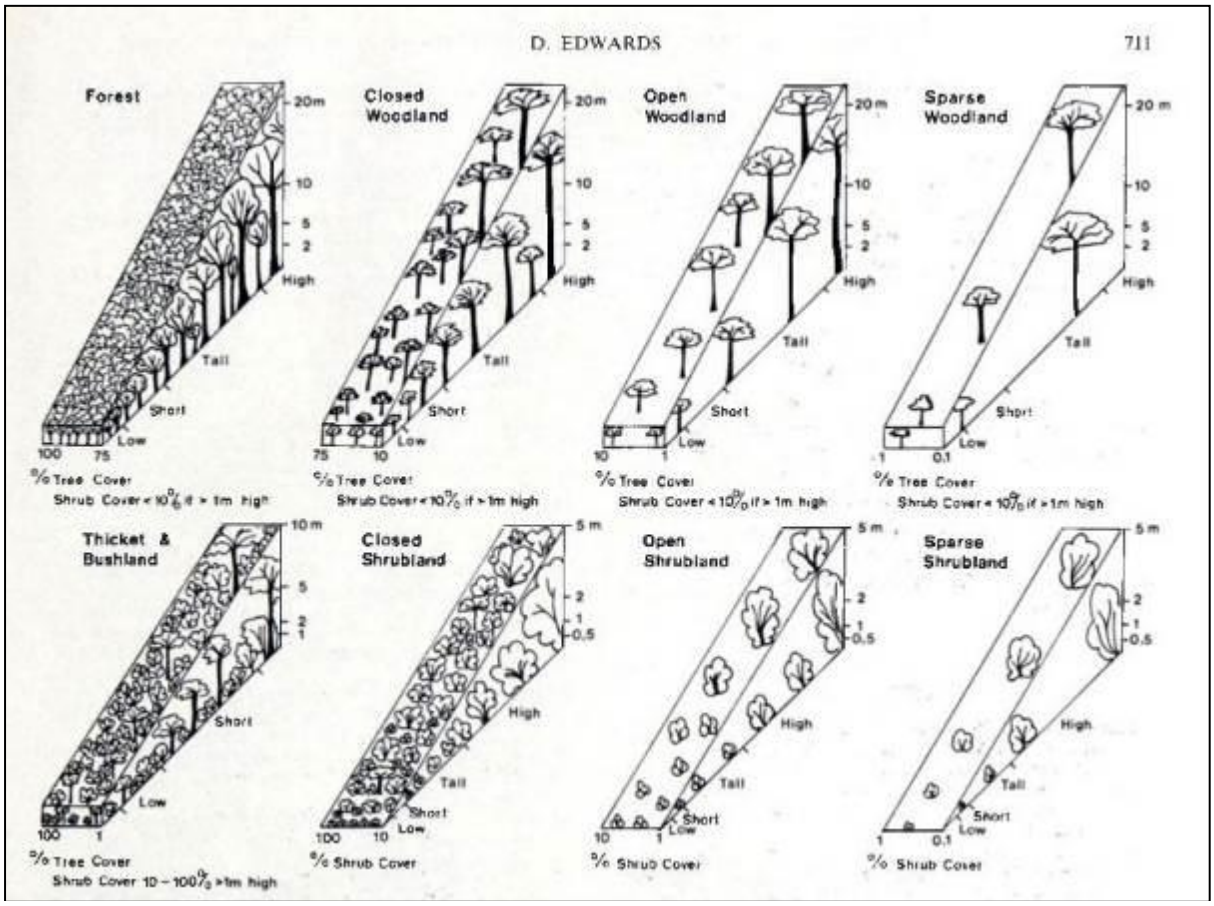



**Figure A1: Diagrammatic representation of structural groups and formation classes. Only dominant growth forms are shown.**

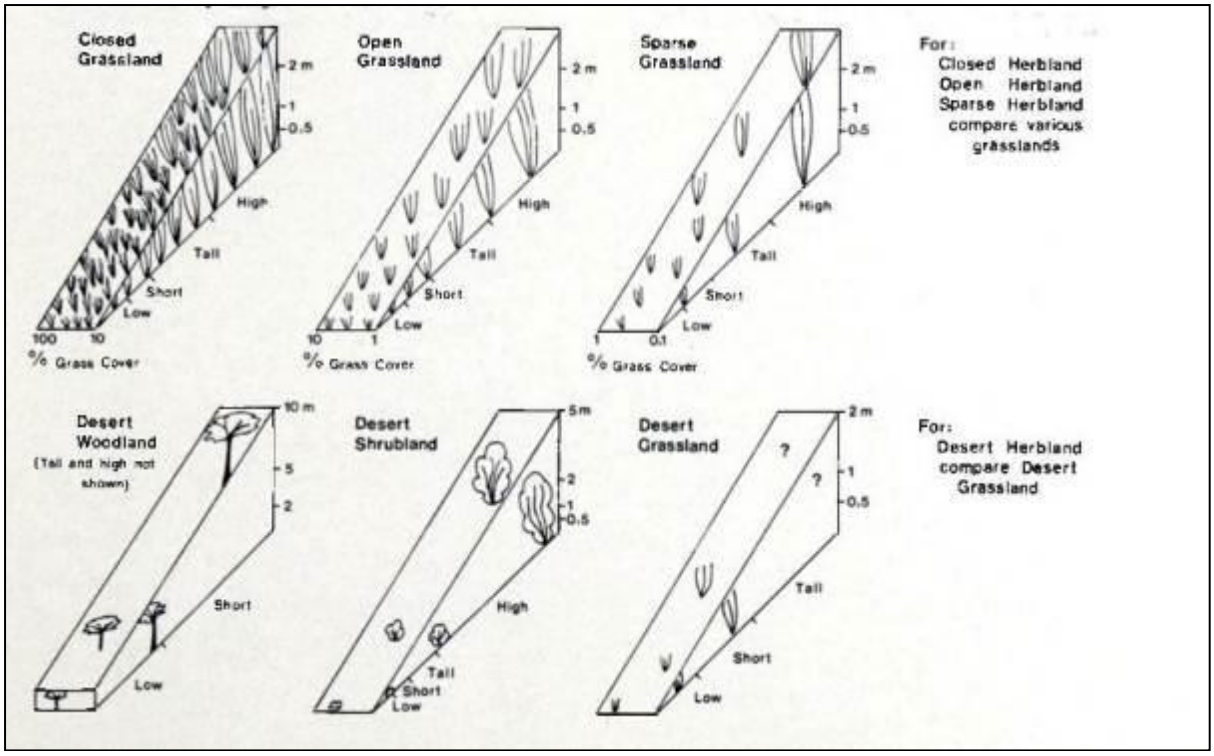



**Figure A1 (continued): Diagrammatic representation of structural groups and formation classes. Only dominant growth forms are shown.**

## *Floral Species of Conservation Concern Assessment*

Prior to the site visit, a record of floral SCC and their habitat requirements was developed for the study area, including consultation of the National Web-based Environmental Screening Tool. Because not all SCC have been included in the Screening Tool layers (e.g., near-threatened (NT) and Data Deficient (DD) taxa), it remains important for the specialist to be on the lookout for additional SCC.

### The National Web-Based Environmental Screening Tool

The Screening Tool was accessed to obtain a list of potentially occurring species of conservation concern for the study area. Each theme in the Screening Tool consists of theme-specific spatial datasets assigned a sensitivity level: "low," "medium," "high," or "very high." The four levels of sensitivity are derived and assigned in different ways: for confirmed areas of occupied habitat for SCC, a Very High and High Sensitivity are assigned; for areas of suitable habitat where SCC may occur based on spatial models only, a Medium Sensitivity is assigned. The different sensitivity ratings pertaining to the Plant [and Animal] Protocols are described below[26]:

- **Very High**: Habitat for species that are endemic to South Africa, where all the known occurrences of that species are within an area of 10 square kilometres ($km^2$) are considered Critical Habitat, as all remaining habitat is irreplaceable. Typically, these include species that qualify under Critically Endangered (CR), Endangered (EN), or Vulnerable (VU) D criteria of the IUCN or species listed as Critically/ Extremely Rare under South Africa's National Red List Criteria. For each species reliant on a Critical Habitat, all remaining suitable habitat has been manually mapped at a fine scale.

[26] More details on the use of the Screening Tool for Species of Conservation Concern can be found in the below resources:
- South African National Biodiversity Institute (SANBI). 2020. Draft Species Environmental Assessment Guideline. Guidelines for the implementation of the Terrestrial Flora (3c) & Terrestrial Fauna (3d) Species Protocols for environmental impact assessments in South Africa. South African National Biodiversity Institute, Pretoria. Version 1.0.
- The National Web based Environmental Screening Tool website: https://screening.environment.gov.za/screeningtool/#/pages/welcome

- **High**: Recent occurrence records for all threatened (CR, EN, VU) and/or rare endemic species are included in the high sensitivity level. Spatial polygons of suitable habitat have been produced for each species by intersecting recently collected occurrence records (those collected since the year 2000) that have a spatial confidence level of less than 250 metre (m) with segments of remaining natural habitat.
- **Medium**: Model-derived suitable habitat areas for threatened and/or rare species are included in the medium sensitivity level. Two types of spatial models have been included. The first is a simple rule-based habitat suitability model where habitat attributes such as vegetation type and altitude are selected for all areas where a species has been recorded to occur. The second is a species distribution model which uses species occurrence records combined with multiple environmental variables to quantify and predict areas of suitable habitat. The models provide a probability-based distribution indicating a continuous range of habitat suitability across areas that have not been previously surveyed. A probability threshold of 75 percent (%) for suitable habitat has been used to convert the modelled probability surface and reduce it into a single spatial area which defines areas that fall within the medium sensitivity level.
- **Low**: Areas where no SCC are known or expected to occur.

**IUCN RED LIST OF THREATENED SPECIES**

The IUCN Red List of Threatened Species (IUCN, 2024), the world's most comprehensive information source on the global conservation status of animal, fungi and plant species, was accessed to obtain a list of all SCCs previously recorded in the area. Using the advanced search option, a list of known SCCs for the area was generated. The IUCN Red List Categories and Criteria are intended to be an easily and widely understood system for classifying species at high risk of global extinction. It divides species into nine categories: Not Evaluated (NE), Data Deficient (DD), Least Concern (LC), Near Threatened (NT), Vulnerable (VU), Endangered (EN), Critically Endangered (CR), Extinct in the Wild (EW) and Extinct (EX).

**iNATURALIST**

iNaturalist, a crowdsourced species identification system and an organism occurrence recording tool, was utilised to determine whether any SCCs were recorded within and/or around the study area and to gauge the habitat types in which such species had previously been recorded (primarily used before the site assessment as part of field preparation).

**NEMBA TOPS SPECIES**

The National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004) (NEMBA) Threatened or Protected Species (TOPS) list (Government Gazette [GN] 29657, as amended in GN R1187 in Government Gazette 30568 of 2007.

**LIST OF PROTECTED TREE SPECIES (GOVERNMENT GAZETTE NO. 41887, NOTICE 536 OF 2018) LIST OF PROTECTED TREE SPECIES (GOVERNMENT GAZETTE NO. 41887, NOTICE 536 OF 2018) UNDER THE NATIONAL FORESTS ACT, 1998 (ACT NO. 84 OF 1998) (NFA)**

In terms of section 15(1) of the NFA, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any product derived from a protected tree, except under a licence or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated. As these species are considered important, listed trees formed part of the SCC assessment.

**SPECIALLY PROTECTED AND PROTECTED SPECIES - MPUMALANGA**

The Mpumalanga Nature Conservation Act, 1998 (Act No. 10 of 1998) (MNCA) provides a list of Protected Species (Schedule 11) (Section 69(1)(a) of the MNCA) and Specially Protected Species (Schedule 12) (Section 69(1)(b) of the MNCA) for the Mpumalanga Province. These species formed part of the SCC assessment.

### Determining the likelihood of a species occurring within the assessment area

Throughout the floral assessment, special attention was paid to identifying any of these SCC, as well as suitable habitats that could support these species.

The Probability of Occurrence (POC) for each floral 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.

| Low POC | Medium POC | High POC | Confirmed |
|---|---|---|---|

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

**Consideration and application of the precautionary approach**

The precautionary principle is defined by Tickner & Raffensperger (1999) as follows:

"*When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause-and-effect relationships are not fully established scientifically*".

Given time and resource constraints within the field, it is not always feasible to definitively state the presence or absence of particular Species of Conservation Concern (SCC) or sensitive habitats. In such instances, the precautionary principle should be applied (SANBI, 2020). By applying such principles, preventative action is taken in the face of uncertainty. Furthermore, for cryptic species that are often difficult to detect, it is not always easy to provide undeniable proof that a species occurs within a particular area within a subject property. As such, if a suitable habitat is identified within the subject property and there is potential evidence to suggest the species did or can occur within the subject property (i.e., confirmed sightings in adjacent properties), then the precautionary principle will be to assume that the species does indeed occur within the area of interest. Appropriate mitigation and management efforts would then need to follow accordingly.

## *Floral Site Ecological Importance (SEI)*

SEI is considered to be 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[27]) 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:

[27] 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.

**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. |

BI in turn is a function of conservation importance (CI) and the functional integrity (FI) of the receptor as follows:

**BI = CI + FI**

BI can be derived from a simple matrix of CI and FI as follows:

**Table A3: Matrix of CI and FI to determine BI.**

| Biodiversity importance | | Conservation importance | | | | |
|---|---|---|---|---|---|---|
| | | Very high | High | Medium | Low | Very low |
| Functional Integrity | Very high | Very high | Very high | High | Medium | Low |
| | High | Very high | High | Medium | Medium | Low |
| | Medium | High | Medium | Medium | Low | Very low |
| | Low | Medium | Medium | Low | Low | Very low |
| | Very low | Medium | Low | Very low | Very low | Very low |

**Conservation importance (CI)** is evaluated in accordance with recognised established internationally acceptable principles and criteria for the determination of biodiversity-related value, including the IUCN Red List of Species, Red List of Ecosystems and Key Biodiversity Areas (KBA; IUCN [2016]).

Conservation importance is defined here as:

*'The importance of a site for supporting biodiversity features of conservation concern present, e.g., populations of IUCN threatened and Near Threatened species (CR, EN, VU and NT), Rare species, range-restricted species, globally significant populations of congregatory species, and areas of threatened ecosystem types, through predominantly natural processes.'*

These criteria are defined as follows:

- IUCN threatened and Near Threatened species (CR, EN, VU and NT) are defined as either the global or national assessments of the risk of extinction as evaluated by a dedicated panel of

species specialists according to the criteria of the International Union for The Conservation of Nature (www.iucnredlist.org). Where the global and national assessments differ for the same taxon, the national evaluation of status[28] should be used in calculating SEI unless the global assessment is both more recent and of a more threatened category. It is important to note that the specialist is required to have a firm understanding of the IUCN Red List Categories and Criteria (IUCN 2012) in order to appropriately apply these for the evaluation of SEI. This criterion can be assessed using confirmed occurrences of species or the suitability of the habitat to support these species. Rare species are those included on South Africa's National Red List as Rare or Critically Rare or Extremely Rare. These are highly restricted species that are currently not declining. However, should any development impact on a population of these species they will immediately qualify under one of the IUCN categories of threat. y Range-restricted species – the presence of terrestrial flora, vertebrate and invertebrate fauna with a global population extent of occurrence (EOO) of 10 000 km$^2$ or less.

- Globally significant populations of congregatory species – a roughly estimated proportion (%) of the global population of a fauna species that congregate for breeding/feeding/hibernation/other reasons. y Significant areas of threatened vegetation types – this is a function of both the area (size) being considered in relation to the total extent of that vegetation type (i.e., proportion) and how threatened (CR, EN, VU) the vegetation types are.
- Natural processes – natural unmanaged areas with low levels of ecological disturbance have largely intact natural processes such as pollination, seed dispersal and migration, and thus have greater intrinsic conservation importance than those that are modified through ecological disturbance.

While most of the features that will be included in the CI will be provided by the screening tool, it is important to note that CI is evaluated at a much finer spatial scale and based on fieldwork data collection and comprehensive desktop analyses performed by the specialist during the EA process. As a minimum requirement, CI needs to be determined for each identified habitat within the project footprint, but best practice recommendation is that it should be determined for all habitats within the entire PAOI[29].

Fulfilling criteria to evaluate CI do not rely on a single specific threshold for each of the above defining characteristics but can act in combination or in isolation, providing a more robust evaluation of CI (Table A4). Furthermore, while CI is most likely to be assessed based on data collected during the fieldwork survey, it can also be an assessment of the suitability of the receptor to support populations conforming to the fulfilling criteria. As can be seen from the worked example below, each of these evaluations of the fulfilling criteria demand necessary justification.

**Table A4: Conservation importance (CI) criteria.**

| Conservation importance | Fulfilling criteria |
|---|---|
| **Very high** | - Confirmed or highly likely occurrence of CR, EN, VU or Extremely Rare[30] or Critically Rare[31] species that have a global EOO of < 10 km$^2$.<br>- Any area of natural habitat[32] of a CR ecosystem type or large area (> 0.1% of the total ecosystem type extent[33]) of natural habitat of EN ecosystem type.<br>- Globally significant populations of congregatory species (> 10% of global population). |

[28] http://speciesstatus.sanbi.org/. For mammals: https://www.ewt.org.za/wp-content/uploads/2020/04/2020-updated-2016-Red-List-of-Mammals-of-South- Africa-Lesotho-Swaziland-Summary-Listings.xlsx; for plants: http://redlist.sanbi.org.

[29] Because CI needs to be assigned to a receptor (e.g., the vegetation/fauna community or habitat type), it is customary to use the flora community delineation developed for a PAOI by a botanical specialist. However, such delineation is often too fine scaled to define fauna-specific habitats, which are generally more structural than phytosociological in nature. Where this is the case, the fauna specialist should merge two or more relevant floral communities to correlate with the specific fauna habitat type that is characteristic of a particular taxon assemblage. In certain cases, the faunal specialist will have to demarcate habitats that have not been classified by the botanical specialist; a pertinent example is the presence of cliffs, which are frequently important breeding habitat for some bird SCC.

[30] For butterflies, as per Armstrong *et al*. (2013).

[31] For plants, as per Raimondo *et al*. (2009).

[32] This excludes areas of transformed habitat within a defined ecosystem even if these are partially restored, e.g., Highveld grasslands that have been converted to maize fields and then abandoned so that some form of functional grassland is restored; this is not natural habitat as it does not and will not in the future have species composition representative of the original natural habitat.

[33] This can be calculated from the threatened ecosystem of South Africa shapefile available from the SANBI (current available version 2011: http://bgis.sanbi. org/Projects/Detail/49).

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

**Functional integrity (FI)** of the receptor (e.g., the vegetation/fauna community or habitat type) is defined here as the receptors' current ability to maintain the structure and functions that define it, compared to its known or predicted state under ideal conditions. Simply stated, FI is:

*'A measure of the ecological condition of the impact receptor as determined by its remaining intact and functional area, its connectivity to other natural areas and the degree of current persistent ecological impacts.'*

These criteria can be defined as:

- Connectivity to other natural areas – connectivity, which can also be measured conversely as the degree of habitat fragmentation, refers to how connected habitat patches are to each other, which has a significant influence on numerous ecological processes, such as migration and dispersal opportunities of biota and therefore genetic exchange between populations. Connectivity to other similar habitats becomes more important as the remaining intact and functional area of a habitat decreases, mainly because population sizes decrease and are therefore at greater risk from ecological perturbations and inbreeding effects. The degree of connectivity between habitat patches varies greatly with the dispersal ability of the taxon or taxon group (e.g., fossorial reptiles) in question.
- Degree of current persistent negative ecological impacts – persistent negative impacts such as uncontrolled spread of alien and invasive flora effectively decreases both the remaining intact area and ecosystem functioning of a particular habitat. Persistent ecological disruptors must not include components that landowners are legally obliged to address or that should be addressed as norm for best practice. Wilful neglect of these legal obligations or the presence of invasive alien species that can practically be controlled through management actions should not negatively influence the FI score to a major extent.
- Remaining intact and functional area – the proportion of the receptor that supports natural habitat with intact ecological processes – small areas are less likely to withstand ecological degradation compared to large areas, and the latter are therefore better able to maintain structure and function allowing for intact ecological processes.

Ecological processes can be considered to be mostly intact and functional if the receptor area has low levels of current ecological disruptors, has good connectivity to other areas and is a relatively large area. As for CI, the fulfilling criteria to evaluate FI do not rely on a single specific threshold for each of the above defining characteristics but can act in combination or in isolation (Table A5) and will require justification by the specialist.

**Table A5: Functional integrity (FI) criteria.**

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

Ecological processes can be considered to be mostly intact and functional if the receptor area has low levels of current ecological disruptors, has good connectivity to other areas and is a relatively large area. As for CI, the fulfilling criteria to evaluate FI do not rely on a single specific threshold for each of the above defining characteristics but can act in combination or in isolation (Table A2) and will require justification by the specialist (see worked example below).

**Receptor resilience (RR)** is defined here as:

*'The intrinsic capacity of the receptor to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention.'*

The fulfilling criteria to evaluate RR are based on the estimated recovery time required to restore an appreciable portion of functionality to the receptor (Table A4) and will require justification by the specialist. The specialist needs to bear in mind that resilience will often be linked to a particular disturbance or impact, or even time of year, and needs to be described in relation to these factors. For example, large birds of prey have different levels of resilience to noise disturbance depending on whether they are breeding or not; these species would have low resilience to noise disturbance such as construction of a road adjacent to a nest site during the breeding season but a higher resilience to lodge construction in an area with limited breeding habitat outside of the breeding season.

Receptor resilience needs to be evaluated by the specialist and justification for each evaluation must be provided in the report (see worked example below). Finally, after the successful evaluation of both BI and RR as described above, it is possible to evaluate SEI from the final matrix as follows:

SEI should be described in the above manner for each impact receptor within the area of influence and clearly mapped in relation to the proposed development activities and infrastructure. Interpretation of SEI in the context of the proposed development activities (Table A1) must be provided by the specialist.

**It is very important to note that SEI is specific to the proposed development activities and cannot be meaningfully compared between different proposed projects with different associated activities on the same spatial location. However, SEI for the same proposed development with multiple alternative layouts and/or locations may be compared within the same study.**

**Table A6: Resilience criteria.**

| Resilience | Fulfilling criteria |
|---|---|
| Very high | Habitat that can recover rapidly (~ less than 5 years) to restore > 75%[28] 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. |
| High | Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a high likelihood of returning to a site once the disturbance or impact has been removed. |
| Medium | Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed. |
| Low | Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~ less than 50% of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed. |
| Very low | Habitat that is unable to recover from major impacts, or species that are unlikely to 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. |

# APPENDIX B: FLORAL SPECIES LIST

**Table B1: Floral species encountered during the field assessment. Alien species observed during the field assessment are indicated with an asterisk (*). Protected And/or Threatened species are emboldened.**

| Scientific Name | Degraded Hygrophilous Grasslands | Thicket habitat | Freshwater Habitat |
|---|---|---|---|
| **Woody Species** | | | |
| **Eucalyptus camaldulensis* | x | x | x |
| **Lantana camara* | x | x | x |
| **Melia azadarach* | x | x | x |
| **Psidium guajava* | x | x | |
| **Solanum mauritianum* | x | x | |
| *Albizia adianthifolia* | | | |
| *Bauhinia galapanii* | | x | |
| *Brachylaena discolor* subsp. *discolor* | | x | |
| *Bridelia cf. cathartica* | | | |
| *Celtis africana* | | | |
| *Combretum molle* | | x | |
| *Cussonia zuluensis* | | | |
| *Dalbergia armata* | | x | |
| *Dichrostachys cinerea* | | x | |
| *Diospyros galpanii* | x | | |
| *Dombeya rotundifolia* | | x | |
| *Dracaena aletriformis* | | | |
| *Erythrina lysistemon* | | x | |
| *Euclea natalensis* | | x | |
| *Eugenia capensis* | x | | |
| *Gymnosporia senegalensis* | | x | |
| *Harpephyllum caffrum* | | | |
| *Helichrysum krausii* | x | | |
| *Hippobromus pauciflorus* | | x | |
| *Hyphaene coriacea* | | x | |
| *Lantana rugosa* | x | | |
| *Phoenix reclinata* | | | |
| *Rhoicissus tomentosa* | | x | |
| *Sclerocarya birrea* subsp. *caffra* | | x | |
| *Scutia myrtina* | | x | |
| *Searsia lancea* | | x | x |
| *Strelitzia Nicolai* | | x | |
| *Strychnos spinosa* | | x | |
| *Syzygium cordatum* | | x | x |
| *Trema orientalis* | | | |
| *Vabguaria infausta* | | x | |
| *Vachellia karoo* | | x | |
| *Vachellia zanthoploea* | | x | |
| *Ziziphus mucronata* | | x | |
| **Herbaceous Species** | | | |
| *Asystasia gangetica* | | | |
| *Chamaecrista mimosoides* | x | x | |
| *Dipcadi marlothii* | x | | |

| Scientific Name | Degraded Hygrophilous Grasslands | Thicket habitat | Freshwater Habitat |
|---|---|---|---|
| *Disa woodii* | x | | x |
| *Drimiopsis maculata* | | x | |
| *Freesia laxa* | | | |
| *Gloriosa superba* | | x | |
| *Hypoxis rigidula* | x | x | |
| *Imperata cylindrica* | x | | |
| *Justica betonica* | x | | x |
| *Laportea peduncularis* | | | |
| *Lasiosiphon capitatus* | x | x | |
| *Leonotis leonurus* | | x | |
| *Lobelia flaccida,* | x | x | |
| *Microsorum scolopendria* | | | |
| *Nymphaea nouchali* | | | x |
| *Stachys natalensis* | | | |
| *Stenochlaena tenuifolia* | | | |
| *Tephrosia purpurea* | x | | |
| *Thunbergia natalensis* | x | | |
| *Xysmalobium cf. undulatum* | | x | |
| **Succulent Species** | | | |
| *Aloe marlothii* | x | x | |
| *Aloe umfoloziensis* | | x | |
| **Graminoid Species** | | | |
| *Aristida stipitata* | x | | |
| *Cymbopogon validus* | x | x | |
| *Cynodon dactylon* | x | | x |
| *Cyperus albostriatus* | | | |
| *Cyperus denudatus* | | | x |
| *Cyperus fastigatus* | | | x |
| *Cyperus latifolious* | | | x |
| *Digitaria eriantha* | x | x | |
| *Eleocharis acutangular* | | | x |
| *Hyparrhenia hirta* | x | x | |
| *Imperata cylindrica* | x | | x |
| *Ischaemum fasciculatum* | x | | x |
| *Isolepis cernua* | | | x |
| *Melinis repens* | x | x | |
| *Phragmites australis* | | | x |
| *Setaria sphacelata* var. *sphacelata* | | x | |
| *Themeda triandra* | x | | |
| *Typha capensis* | | | x |

# APPENDIX C: FLORAL SCC

South Africa uses the internationally endorsed IUCN Red List Categories and Criteria in the Red List of South African plants. This scientific system is designed to measure species' risk of extinction. The purpose of this system is to highlight those species that are most urgently in need of conservation action. Due to its strong focus on determining risk of extinction, the IUCN system does not highlight species that are at low risk of extinction but may nonetheless be of high conservation importance. Because the Red List of South African plants is used widely in South African conservation practices such as systematic conservation planning or protected area expansion, we use an amended system of categories designed to highlight those species that are at low risk of extinction but of conservation concern.

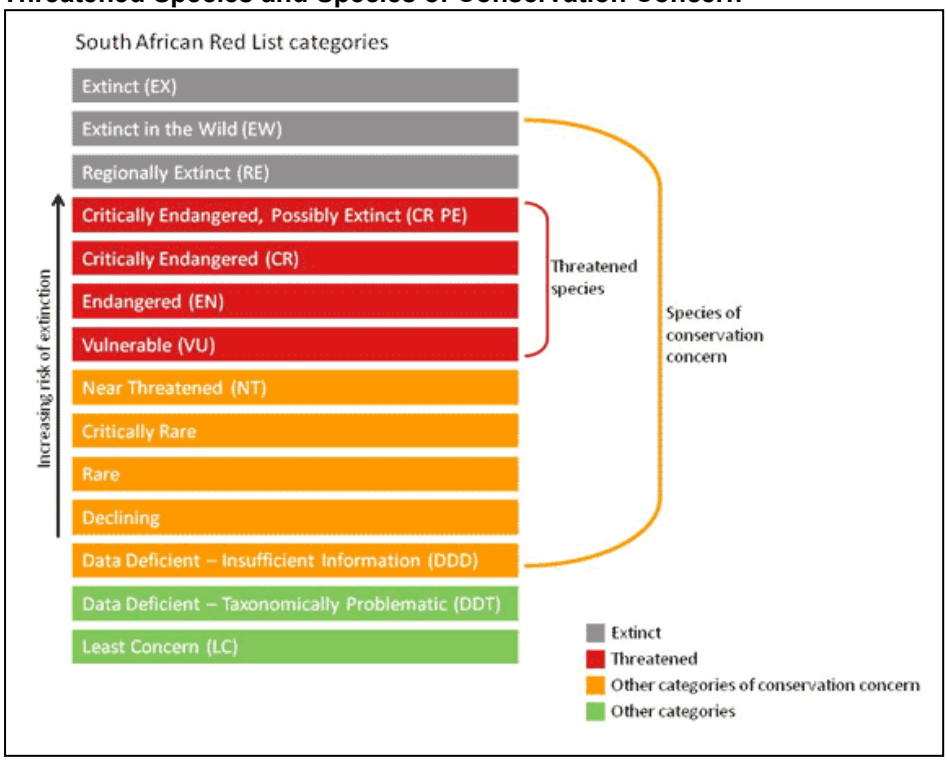
**Definitions of the national Red List categories**

Categories marked with $^{N}$ are non-IUCN, national Red List categories for species not in danger of extinction but considered of conservation concern. The IUCN equivalent of these categories is Least Concern (LC).

- **Extinct** A species is Extinct when there is no reasonable doubt that the last individual has died. Species should be classified as Extinct only once exhaustive surveys throughout the species' known range have failed to record an individual.
- **Extinct in the Wild (EW)** A species is Extinct in the Wild when it is known to survive only in cultivation or as a naturalized population (or populations) well outside the past range.
- **Regionally Extinct** A species is Regionally Extinct when it is extinct within the region assessed (in this case South Africa), but wild populations can still be found in areas outside the region.
- **Critically Endangered, Possibly Extinct** Possibly Extinct is a special tag associated with the category Critically Endangered, indicating species that are highly likely to be extinct, but the exhaustive surveys required for classifying the species as Extinct has not yet been completed. A small chance remains that such species may still be rediscovered.
- **Critically Endangered (CR)** A species is Critically Endangered when the best available evidence indicates that it meets at least one of the five IUCN criteria for Critically Endangered, indicating that the species is facing an extremely high risk of extinction.
- **Endangered (EN)** A species is Endangered when the best available evidence indicates that it meets at least one of the five IUCN criteria for Endangered, indicating that the species is facing a very high risk of extinction.
- **Vulnerable (VU)** A species is Vulnerable when the best available evidence indicates that it meets at least one of the five IUCN criteria for Vulnerable, indicating that the species is facing a high risk of extinction.
- **Near Threatened (NT)** A species is Near Threatened when available evidence indicates that it nearly meets any of the IUCN criteria for Vulnerable and is therefore likely to become at risk of extinction in the near future.
- $^{N}$**Critically Rare** A species is Critically Rare when it is known to occur at a single site but is not exposed to any direct or plausible potential threat and does not otherwise qualify for a category of threat according to one of the five IUCN criteria.
- $^{N}$**Rare** A species is Rare when it meets at least one of four South African criteria for rarity but is not exposed to any direct or plausible potential threat and does not qualify for a category of threat according to one of the five IUCN criteria. The four criteria are as follows:
  - Restricted range: Extent of Occurrence (EOO) <500 km$^2$, OR
  - Habitat specialist: Species is restricted to a specialised microhabitat so that it has a very small Area of Occupancy (AOO), typically smaller than 20 km$^2$, OR
  - Low densities of individuals: Species always occurs as single individuals or very small subpopulations (typically fewer than 50 mature individuals) scattered over a wide area, OR
  - Small global population: Less than 10 000 mature individuals.
- **Least Concern (LC)** A species is Least Concern when it has been evaluated against the IUCN criteria and does not qualify for any of the above categories. Species classified as Least Concern are considered at low risk of extinction. Widespread and abundant species are typically classified in this category.

- **Data Deficient - Insufficient Information (DDD)** A species is DDD when there is inadequate information to make an assessment of its risk of extinction, but the species is well defined. Listing of species in this category indicates that more information is required, and that future research could show that a threatened classification is appropriate.
- **Data Deficient - Taxonomically Problematic (DDT)** A species is DDT when taxonomic problems hinder the distribution range and habitat from being well defined, so that an assessment of risk of extinction is not possible.
- **Not Evaluated** A species is Not Evaluated when it has not been evaluated against the criteria. The national Red List of South African plants is a comprehensive assessment of all South African indigenous plants, and therefore all species are assessed and given a national Red List status. However, some species included in Plants of southern Africa: an online checklist are species that do not qualify for national listing because they are naturalized exotics, hybrids (natural or cultivated), or synonyms. These species are given the status Not Evaluated and the reasons why they have not been assessed are included in the assessment justification.

**Threatened Species and Species of Conservation Concern**




# SCREENING TOOL SPECIES

A Probability of Occurrence (POC) assessment was undertaken for Red Data Listed (RDL) species identified through the South African National Biodiversity Institute (SANBI) Biodiversity Advisor and the National Web-Based Environmental Screening Tool. Supplementary distribution records were reviewed using iNaturalist and the Global Biodiversity Information Facility (GBIF), where relevant. Species distribution, habitat requirements, and conservation status information were sourced from the Red List of South African Plants, the SANBI Biodiversity Advisor, relevant hardcopy literature, and peer-reviewed scientific databases, as necessary.

**Table C1: POC assessment outcomes for RDL species identified for the study area, including threat status, habitat requirements, and assigned POC scores.**

POC = Probability of Occurrence.

| Triggered Species | SANBI Status | Habitat and Description | POC | Reason |
|---|---|---|---|---|
| *Platycoryne mediocris* | **EN (B; C; D)** | **Family**: Orchidaceae. **Endemism**: Not endemic to South Africa. **Provincial distribution**: Mpumalanga. **Range**: Nelspruit and widespread in tropical Africa. **Major system:** Terrestrial. **Major habitats:** Legogote Sour Bushveld, Crocodile Gorge Mountain Bushveld.<br><br>**Description**: Mixed deciduous woodland, in shallow peaty soils over granite sheet rock, growing in a seasonally wet drainage line. Elsewhere it occurs in poorly drained grassland, 700-1750 m. | High | Limited areas of shallow, peaty soils over granite sheet rock are present within the study area. Although not extensive, these microhabitats are sufficient to support the species, which has been recorded in close proximity to the site historically. |
| *Woodia singularis* | **Rare** | **Family**: Apocynaceae. **Endemism**: Not endemic to South Africa. **Provincial distribution**: Limpopo, Mpumalanga. **Range**: Swaziland, Barberton and Punda Maria. **Major system**: Terrestrial. **Major habitats**: Legogote Sour Bushveld, Makuleke Sandy Bushveld.<br><br>**Description**: Various habitats in bushveld and grasslands. | Low | Although this species is associated with the Legogote Sour Bushveld, the reference vegetation type in the study area, the site is outside of the known distribution rage. |
| Sensitive species 136 | **EN (B; C)** | **Family**. Asphodelaceae. **Endemism**: South African endemic. **Provincial distribution:** Mpumalanga. **Range**: This species is endemic to a small area in the transition area between the Mpumalanga Lowveld and Escarpment, where it occurs from Sabie southwards to White River and around Nelspruit. **Major system:** Terrestrial. **Major habitats:** Legogote Sour Bushveld, Long Tom Pass Montane Grassland, Northern Escarpment Quartzite Sourveld, Northern Escarpment Dolomite Grassland.<br><br>**Description**: It occurs along drainage lines and in wetlands in open woodland and grassland, 600-1100 m. | Medium | The site exhibits limited suitable habitat, primarily lacking drainage lines and wetlands within open woodland areas. Most of the site, instead, consists of densely closed woodland vegetation, with no watercourses identified by the freshwater ecologist. |
| Sensitive species 575 | **CR (A)** | **Family**. Zingiberaceae. **Endemism**: Not endemic to South Africa. **Provincial distribution:** KwaZulu-Natal, Limpopo, Mpumalanga. **Range**: This species has gone extinct in KwaZulu-Natal and occurs sporadically from the Letaba catchment in the Limpopo Lowveld to Swaziland. It also occurs in Zimbabwe, Malawi, Zambia, Mozambique, Ethiopia, Benin, Niger, Nigeria, Tanzania and northern Ghana. **Major system:** Terrestrial. **Major habitats:** Granite Lowveld, Crocodile Gorge Mountain Bushveld, Pretoriuskop Sour Bushveld, Tzaneen Sour Bushveld, Legogote Sour Bushveld.<br><br>**Description**: It grows in tall open or closed woodland, wooded grassland or bushveld. | High | Locality records indicate the presence of the species near Mbombela. Given that the species is unaffected by open or closed woodlands, the site offers appropriate conditions. However, this species was not observed at the site. |

# NEMBA TOPS LIST FOR SOUTH AFRICA[34]

Plant species listed under the National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004) (NEMBA) Threatened or Protected Species (TOPS) Regulations were reviewed to determine potential occurrence within the study area.

**Table C2: Plant species listed under the NEMBA TOPS Regulations applicable to South Africa, and their assessed POC within the study area.**

| NEMBA TOPS LIST (PLANT SPECIES) | | | | |
|---|---|---|---|---|
| **Scientific Name** | **Common Name** | **POC** | **Provincial Distribution** | **Status** |
| *Adenia wilmsii* | No common name | Low | Provincial distribution: Mpumalanga<br>Range: Lydenburg to Waterval Boven<br>Description: Dolerite outcrops or red loam soil, in open woodland, 1300-1500 m. | EN; P |
| *Adenium swazicum* | Swaziland Impala Lily | Low | Range: Kruger National Park to Swaziland along the Lebombo Mountains and adjacent areas in south-western Mozambique. | VU |
| *Adenium swazicum* | Swaziland Impala Lily | Low | Provincial distribution: Mpumalanga | VU |
| *Aloe albida* | Grass Aloe | Low | Provincial distribution: Mpumalanga<br>Range: Aloe albida has a restricted range in the mountains south of Barberton, Mpumalanga, extending to Malolotja in north-western Swaziland. | NT |
| *Aloe pillansii* (now *Aloidendron pillansii*) | False Quiver Tree | Low | Provincial distribution: Northern Cape<br>Range: Richtersveld and southern Namibia. | EN |
| *Clivia mirabilis* | "Oorlogskloof 'Bush Lily | Low | Provincial distribution: Northern Cape, Western Cape | VU; P |
| *Diaphananthe millarii* | Tree Orchid | Low | Provincial distribution: Eastern Cape, KwaZulu-Natal<br>Range: East London and Durban. | VU |
| *Disa macrostachya* | No common name | Low | Provincial distribution: Northern Cape | EN; P |
| *Disa nubigena* | No common name | Low | Provincial distribution: Western Cape | Rare; P |
| *Disa physodes* | No common name | Low | Provincial distribution: Western Cape | CR; P |
| *Disa procera* | No common name | Low | Provincial distribution: Western Cape | EN; P |
| *Disa sabulosa* | No common name | Low | Provincial distribution: Western Cape | EN; P |
| *Encephalartos aemulans* | Ngotshe Cycad | Low | Provincial distribution: KwaZulu-Natal | CR |
| *Encephalartos altensteinii* | Bread Palm | Low | Provincial distribution: Eastern Cape, KwaZulu-Natal | VU; P |
| *Encephalartos arenarius* | Dune Cycad | Low | Provincial distribution: Eastern Cape | EN |
| *Encephalartos brevifoliolatus* | Escarpment Cycad | Low | Provincial distribution: Limpopo | EW |
| *Encephalartos caffer* | Breadfruit Tree | Low | Provincial distribution: Eastern Cape, KwaZulu-Natal | NT; P |
| *Encephalartos cerinus* | Waxen Cycad | Low | Provincial distribution: KwaZulu-Natal | CR |
| *Encephalartos cupidus* | Blyde River Cycad | Low | Provincial distribution: Limpopo, Mpumalanga<br>Description: Grassland, on steep, rocky slopes, or cliffs and sometimes near seepage areas bordering gallery forests. | CR |

[34] National Environmental Management: Biodiversity Act 10 of 2004 - Threatened or Protected Species Regulations, 2007. Government Notice R152 in Government Gazette 29657 dated 23 February 2007. Commencement date: 1 June 2007 [GN R150, Gazette no. 29657], as amended.

| NEMBA TOPS LIST (PLANT SPECIES) | | | | |
|---|---|---|---|---|
| **Scientific Name** | **Common Name** | **POC** | **Provincial Distribution** | **Status** |
| *Encephalartos dolomiticus* | Wolkberg Cycad | Low | Provincial distribution: Limpopo | CR |
| *Encephalartos dyerianus* | Lowveld Cycad | Low | Provincial distribution: Limpopo | CR; P |
| *Encephalartos eugene-maraisii* | Waterberg Cycad | Low | Provincial distribution: Limpopo | EN |
| *Encephalartos friderici-guilielmi* | No common name | Low | Provincial distribution: Eastern Cape, KwaZulu-Natal | NT; P |
| *Encephalartos ghellinckii* | No common name | Low | Provincial distribution: Eastern Cape, KwaZulu-Natal | VU; P |
| *Encephalartos heenanii* | Woolly Cycad | Low | Provincial distribution: Mpumalanga Description: Open areas of montane grasslands amidst scarp forest in deep valleys and ravines. | CR |
| *Encephalartos hirsutus* | Venda Cycad | Low | Provincial distribution: Limpopo | CR |
| *Encephalartos horridus* | Eastern Cape Blue Cycad | Low | Provincial distribution: Eastern Cape | EN |
| *Encephalartos humilis* | No common name | Low | Provincial distribution: Mpumalanga Description: Montane and mistbelt grassland, rocky sandstone slopes. | VU; P |
| *Encephalartos inopinus* | Lydenburg Cycad | Low | Provincial distribution: Limpopo | CR |
| *Encephalartos laevifolius* | Kaapsehoop Cycad | Low | Provincial distribution: Eastern Cape, KwaZulu-Natal, Limpopo, Mpumalanga. Description: Steep, rocky slopes in mistbelt grassland, 1300-1500 m. | CR |
| *Encephalartos lanatus* | No common name | Low | Provincial distribution: Gauteng and western Mpumalanga Description: Sheltered, wooded ravines in sandstone ridges, 1200-1500 m. | NT; P |
| *Encephalartos latifrons* | Albany Cycad | Low | Provincial distribution: Eastern Cape | CR |
| *Encephalartos lebomboensis* | Lebombo Cycad | Low | Provincial distribution: KwaZulu-Natal, Mpumalanga Description: Cliffs and rocky ravines in the savanna and the grassland. | EN |
| *Encephalartos lehmannii* | No common name | Low | Provincial distribution: Eastern Cape | NT; P |
| *Encephalartos longifolius* | No common name | Low | Provincial distribution: Eastern Cape | NT; P |
| *Encephalartos middelburgensis* | Middelburg Cycad | Low | Provincial distribution: Gauteng, Mpumalanga Description: Open grasslands and in sheltered valleys. | CR |
| *Encephalartos msinganus* | Msinga, Cycad | Low | Provincial distribution: KwaZulu-Natal | CR |
| *Encephalartos natalensis* | Natal Giant Cycad | Low | Provincial distribution: Eastern Cape, KwaZulu-Natal | NT; P |
| *Encephalartos ngoyanus* | Ngoye Dwarf Cycad | Low | Provincial distribution: KwaZulu-Natal | VU |
| *Encephalartos nubimontanus* | Blue Cycad | Low | Provincial distribution: Limpopo | EW |
| *Encephalartos paucidentatus* | No common name | Low | Provincial distribution: Mpumalanga Description: Forest, occurs on steep rocky slopes and alongside streams in deep gorges. | VU; P |
| *Encephalartos princeps* | No common name | Low | Provincial distribution: Eastern Cape | VU; P |
| *Encephalartos senticosus* | No common name | Low | Provincial distribution: KwaZulu-Natal | VU; P |
| *Encephalartos transvenosus* | Modjadje Cycad | Low | Provincial distribution: Limpopo | LC; P |
| *Encephalartos trispinosus* | No common name | Low | Provincial distribution: Eastern Cape | VU; P |
| *Encephalartos woodii* | Wood's Cycad | Low | Provincial distribution: KwaZulu-Natal | EW |
| *Euphorbia clivicola* | No common name | Low | Provincial distribution: Limpopo | CR; P |

| NEMBA TOPS LIST (PLANT SPECIES) | | | | |
|---|---|---|---|---|
| **Scientific Name** | **Common Name** | **POC** | **Provincial Distribution** | **Status** |
| *Euphorbia meloformis* | No common name | Low | Provincial distribution: Eastern Cape | NT; P |
| *Euphorbia obesa* | No common name | Low | Provincial distribution: Eastern Cape | EN; P |
| *Harpagophytum procumbens* | Devil's Claw | Low | Provincial distribution: Free State, Limpopo, Northern Cape, North West | LC; P |
| *Harpagophytum zeyherii* | Devil's Claw | Low | Provincial distribution: Gauteng, Limpopo, Mpumalanga, North West | LC; P |
| *Hoodia currorii* | Ghaap | Low | Provincial distribution: Limpopo | P |
| *Hoodia gordonii* | Ghaap | Low | Provincial distribution: Free State, Northern Cape, Western Cape | DDD; P |
| *Jubaeopsis caffra* | Pondoland Coconut | Low | Provincial distribution: Eastern Cape | EN |
| *Merwilla plumbea* | Blue Squill | Low | Provincial distribution: KwaZulu-Natal, Mpumalanga<br>Major habitats: Grassland<br>Description: Montane mistbelt and Ngongoni grassland, rocky areas on steep, well drained slopes. 300-2500 m. | NT |
| *Newtonia hildebrandtii* var. *hildebrandtii* | Lebombo Wattle | Low | Provincial distribution: KwaZulu-Natal | Now LC |
| *Protea odorata* | Swartland Sugarbush | Low | Provincial distribution: Western Cape | CR; P |
| *Stangeria eriopus* | No common name | Low | Provincial distribution: Eastern Cape, KwaZulu-Natal | VU; P |
| *Warburgia salutaris* | Pepper-bark Tree | Low | Provincial distribution: KwaZulu-Natal, Limpopo, Mpumalanga<br>Range: North-eastern KwaZulu-Natal, Mpumalanga, and Limpopo Province. Also occurs in Swaziland, Mozambique, Zimbabwe, and Malawi.<br>Description: Variable, including coastal, riverine, dune and montane forest as well as open woodland and thickets. | EN |
| *Zantedeschia jucunda* | Yellow Arum Lilly | Low | Provincial distribution: Limpopo | VU |
| **Sensitive species 136** | N/A | Medum | Provincial distribution: Mpumalanga<br>Range: This species is endemic to a small area in the transition area between the Mpumalanga Lowveld and Escarpment, where it occurs from Sabie southwards to White River and around Nelspruit.<br>Description: It occurs along drainage lines and in wetlands in open woodland and grassland, 600-1100 m. | EN; P |
| **Sensitive species 575** | N/A | High | Provincial distribution: KwaZulu-Natal, Limpopo, Mpumalanga<br>Range: Sporadically from the Letaba catchment in the Limpopo Lowveld to Swaziland. Extinct in KwaZulu-Natal. Widespread elsewhere in Africa.<br>Description: Tall open or closed woodland, wooded grassland, or bushveld. | CR |

**CR = Critically Endangered, EN = Endangered, EW = Extinct in the Wild, NT = Near Threatened, VU = Vulnerable, P = Protected, POC = Probability of Occurrence.**

# PROVINCIALLY PROTECTED FLORA – MPUMALANGA

In accordance with the Mpumalanga Nature Conservation Act, 1998 (Act No. 10 of 1998) (MNCA), provincially protected plant species were considered as part of the floral assessment. The table below lists the relevant species included under Schedule 11 of the Act.

**Table C3: Schedule 11 - Protected Plants (Section 69 (1) (a)) of the Mpumalanga Nature Conservation Act, 1998 (Act No. 10 of 1998) (MNCA).**

| SCHEDULE 11 - PROTECTED PLANTS | | |
|---|---|---|
| **Common Name** | **Scientific Name** | **POC** |
| All species of trees ferns, excluding the bracken fern | All species of the Genus: *Cyathea capensis* and *Cyathea dregei* (now *Alsophila dregei*) | Low |
| All species of Cycads in Republic of South Africa and the seedling of the species of *Cycads* referred to in schedule 12 | All species of the family Zamiaceae occurring in the Republic of South Africa and the seedlings of the species of *Encephalartos* referred to in Schedule 12 | Low |
| All species of yellow wood | *Podocarpus* spp. | Low |
| All species of arum lilies | *Zantedeschia* spp. | Low |
| "Volstruiskom" | *Schizobasis intricata* (now *Drimia intricata*) | Low |
| | Sensitive species 1248 | Low |
| All species of red-hot pokers | *Kniphofia* spp. | Low |
| All species of *Aloes*, excluding:<br>(a) All species not occurring in Mpumalanga and<br>(b) The following species:<br>all species of haworthias<br>all species of *Agapanthus*<br>all species of squill | Aloe spp., excluding:<br>(a) All species not occurring in Mpumalanga<br>(b) The following species:<br>*Haworthia* spp.<br>*Agapanthus* spp.<br>*Scilla* spp. | Confirmed |
| All species of pineapple flower | *Eucomis* spp. | Medium |
| All species of *dracaena* | *Dracaena* spp. | Low |
| All species of paint brush | *Haemanthus* spp. and *Scadoxus* spp. | High |
| Cape poison bulb | *Boophone disticha* | Low |
| All species of *Clivia* | *Clivia* spp. | Low |
| All species of *Brunsvigia* | *Brunsvigia* spp. | Low |
| All species of *Crinum* | *Crinum* spp. | Low |
| Ground lily | *Ammocharis coranica* | Low |
| All species of fire lily | *Cyrtanthus* spp. | Low |
| River lily | *Hesperantha coccinea* | Low |
| All species of *Watsonia* | *Watsonia* spp. | Low |
| all species of gladioli | *Gladiolus* spp. | Confirmed |
| N/A | Sensitive species 575 | High |
| All species of orchids | All species of the family Orchidaceae. | High |
| All species of the family Proteaceae | All species of the family Proteaceae | High |
| All species of black stinkwood | *Ocotea* spp. | Low |
| Kiaat | *Pterocarpus angolensis* | Confirmed |
| Tamboti | *Spirostachys africana* | Low |
| The following species of *Euphorbias*: *Euphorbia bernardii* and *Euphorbia grandialata* | The following species of euphorbias: *Euphorbia bernardii and Euphorbia grandialata* | Low |
| Common bersama | *Bersama tysoniana* | Low |
| Red ivory | *Berchemia zeyheri* – now *Phyllogeiton zeyheri* | Confirmed |
| | Sensitive species 738 | Low |
| All species of *Adenia* | *Adenia* spp. | High |
| Bastard onion wood | *Cassipourea gerrardii* | Low |
| Assegai tree | *Curtisia dentata* | Low |

| SCHEDULE 11 - PROTECTED PLANTS | | |
|---|---|---|
| **Common Name** | **Scientific Name** | **POC** |
| All species of olive trees | All species of the Genus Olea | **High** |
| All species of impala lilies | All species of the Genus Adenium | **Low** |
| Kudu lily | *Pachypodium saundersii* | **Low** |
| All species of *Brachystelma* | *Brachystelma* spp. | **High** |
| All species of *Ceropegia* | *Ceropegia* spp. | **Confirmed** |
| All species of *Huerniopsis* and *Huernia* | *Huernipsis* and *Huernia* spp. | **High** |
| All species of *Duvalia* | *Duvalia* spp. | **Low** |
| All species of *Stapeliads* | *Stapelia spp.* | **Low** |
| All species of *Orbeanthus* | *Orbeanthus* spp. | **Low** |
| All species of *Orbeas* | *Orbea* spp. | **High** |
| All species of *Orbeopsis* | *Orbeopsis* spp.. | **Low** |

In accordance with the MNCA, provincially protected plant species were considered as part of the floral assessment. The table below lists the relevant species included under Schedule 12 of the Act.

**Table C4: Schedule 12 - Specially Protected Plants (Section 69 (1) (b)) of the Mpumalanga Nature Conservation Act, 1998 (Act No. 10 of 1998) (MNCA).**

| SCHEDULE 12 - SPECIALLY PROTECTED PLANTS | | |
|---|---|---|
| **Common Name** | **Scientific Name** | **POC** |
| (a) All plants, excluding seedlings, of the following species of cycads within the genus *Encephalartos*: *dolomiticus, dyer, middleburg, eugene marais, heenan, inopinus, laevifolius, lanatus, lebombo, ngoyanus, paucidentatus, modjadje and villosus*;<br>(b) All plants of the following. species of cycad within the *Encephalartos genus: cupidus* and *humilus;* and<br>(c) all species of cycads in their natural habitat. | (a) All plants, excluding seedlings, of the following species of the Genus *Encephalartos: E. dolomiticus, E. dyerianus, E. middleburgensis, E. eugene maraissii, E. heenanii, E. inopinus, E. laevifolius, E. lanatus, E. transvenosus and E. villosus and* many species derived from the above species;<br>*(b)* All plants of the following species of the Genus *Encephalartos: E. cupids and E. humilus;* and<br>(c) All plants of the Genus *Encephalartos* in their natural habitat. | **Low** |

# NFA-PROTECTED TREES

Tree species listed as protected under the National Forests Act, 1998 (Act No. 84 of 1998) (NFA) were reviewed in accordance with Government Gazette No. 41887, Notice 536 of 2018. In terms of the NFA, no person may cut, disturb, damage, or remove a protected tree without a valid licence issued by the relevant authority.

**Table C5: POC assessment results for tree species listed as protected under the National Forests Act, 1998 (Act No. 84 of 1998), as published in Government Gazette No. 41887, Notice 536 of 2018.**

| Species Name | Status | Description | POC |
|---|---|---|---|
| *Afzelia quanzensis* | LC; P | **Family:** Fabaceae<br>**Common names:** pod mahogany, lucky bean tree (Eng.); peulmahonie (Afr.); iNkehli (Zulu); Mambakofi (Swahili)<br>**SA Tree No**: 207<br><br>Widespread. It grows in low altitude woodland and dry forests, usually in deep sand. Its distribution stretches from northern KwaZulu-Natal, through to Limpopo, Zimbabwe and other neighbouring countries. It is also found in Somalia. | **Low** |
| *BBalanites maughamii* subsp. *maughamii* | DD; P | **Family**: Zygophyllaceae<br>**Common names:** torchwood (Eng.); groendoring (Afr.); umnunu (Sotho); nulu (Tswana)<br>**SA Tree No**: 251<br><br>The plants can be found in small colonies in the bushveld, sand forest, on sandstone outcrops, along riverbanks, near springs and around pans. | **Low** |
| *Boscia albitrunca* | LC; P | **Family**: Brassicaceae<br>**Common names**: shepherd's tree (Eng.); witgat (Afr.); siPhiso (Sw), Mohlôpi (Northern Sotho); Xukutsi (Tswana); Muthobi (Venda)<br>**SA Tree No**: 122<br><br>This species is found in the drier parts of southern Africa, in areas of low rainfall. The vast distribution range covers Botswana, Limpopo, Gauteng, North-West, Swaziland, the Free State, Northern Cape and KwaZulu-Natal. It also extends into Zambia, Zimbabwe and Mozambique. | **Low** |
| *Breonadia salicina* | LC; P | **Family:** Rubiaceae<br>**Common names:** matumi, African teak, wild-oleander, Transvaal teak (Eng.); mingerhout, watermatoemie, waterboekenhout, basterkiaat (Afr.); mohlomê (Northern Sotho); mutulume (Tshivenda); umfula, umfomfo (isiZulu)<br>**SA Tree No**: 684<br><br>Found in riverine fringe forest, along or in water of permanent streams and rivers, occurring at low altitude, in tropical and subtropical regions. It is widely distributed in the northeast of South Africa, from KwaZulu-Natal, Mpumalanga and Limpopo, mostly in the Lebombo Mountains, to the neighboring countries, Swaziland, Zimbabwe and Mozambique, and in parts of Malawi and extends further north in Africa to Ethiopia, Yemen and Saudi Arabia, and in Madagascar. | **Low** |
| *Catha edulis* | LC; P | **Family:** Celastraceae<br>**Common names:** Bushman's tea (Eng.); Boesmanstee (Afr.); umhlwazi (Zulu); iqgwaka (Xhosa); khat (Arabic)<br>**SA Tree No**: 404 | **Medium** |

| Species Name | Status | Description | POC |
|---|---|---|---|
| | | Found in woodlands and on rocky outcrops. It is scattered in KwaZulu-Natal and Eastern Cape, mostly from the mistbelt, moving inland. | |
| *Curtisia dentata* | NT; P | **Family:** Cornaceae<br>**Common names**: assegai (Eng.); assegaai (Afr.); uSirayi, umGxina (Xhosa); umLahleni (Xhosa, Zulu); uMagunda, uMaginda, umBese, umPhephelelangeni (Zulu); iliNcayi, isiNwati (Sw); modula-tshwene (Northern Sotho); musangwe, mufhefhera (Venda)<br>**SA Tree No**: 570<br><br>The assegai grows in most of the forests in southern Africa and Swaziland, from sea level to 1 800 m. It ranges from the Cape Peninsula through the forest patches of the eastern Western Cape to the forests of the Knysna region, the Eastern Cape, KwaZulu-Natal, Mpumalanga, Limpopo and Swaziland. In the forest it is usually found in climax forest and grows into a tall tree with a clean, unbuttressed bole. It also grows on grassy mountain slopes and in coastal scrub forest where it is a small bushy tree. | **Low** |
| *Elaeodendron transvaalense* | NT; P | **Family:** Celastraceae<br>**Common names:** bushveld saffron (Eng.); bosveldsaffraan, lepelhout (Afr.); iNgwavuma, uMgugudo (Zulu); shimapana (Tsonga); monamane (Northern Sotho)<br>**SA Tree No**: 416<br><br>Bushveld saffron is widespread but not common. It grows from KwaZulu-Natal, Swaziland, Mpumalanga and through the northern parts of South Africa into Mozambique, Zimbabwe and Zambia; it also extends westwards to Botswana, Angola and Namibia. It favours soils rich in lime, grows in various soils and is found in forests, bushveld, scrub, thornveld and woodland, along streams and often on termite mounds. | **Low** |
| *Ocotea bullata* | EN; P | **Family:** Lauraceae<br>**Common names**: stinkwood, black stinkwood, Cape laurel, (Eng), stinkhout, swartstinkhout, laurelhout (Afr), umnukani (Zulu), umhlungulu (Xhosa)<br>**SA Tree No**: 118<br><br>Occurs naturally in most of the high forests of South Africa, from the kloofs of Table Mountain to the mountain forests of Limpopo, and it is at its best in the Knysna forests. | **Low** |
| *Phyllogeiton zeyheri* | LC; P | **Family:** Rhamnaceae<br>**Common names**: red ivorywood, purple ivory, pink ivory (Eng.); rooi-ivoor, rooihout (Afr.); monee (Sesothosa Leboa); umNeyi (siSwati); xiniyani (Xitsonga); moye (Setswana); munia-niane, muniane (Tshivenda); umNini (isiXhosa); umNcaka, umNini (isiZulu)<br>**SA Tree No**: 450<br><br>Red ivorywood occurs naturally from Zimbabwe in the north to the Eastern Cape in the south. The tree grows plentifully at Niyani (which means place of berchemias), in Limpopo. The tree grows in woodland, bushveld, rocky areas, along rivers, streams and on old termite mounds. It is also found on south- and east-facing slopes of mountains. | **Confirmed** |

| Species Name | Status | Description | POC |
|---|---|---|---|
| *Pittosporum viridiflorum* | LC; P | **Family**: Pittosporaceae<br>**Common names**: Cheesewood, White Cape Beech (E), Kasuur, Witboekenhout (A), umVusamvu, Umkhwenkwe, Umphushamvu, Umphushane (Z), Kgalagangwe (NS), Mosetlela (SS), Mpustinya-poqo, Nkasur (TS), Mulondwane, Mutanzwakhamelo (V), Umgqwengqwe (X)<br>**SA Tree No**: 139<br><br>Widespread, absent in drier western parts of EC, woodland, scrub, thicket, forest, riverine fringe; Indigenous Forests, Sub-Escarpment Grassland, Sub-Escarpment Savanna, Indian Ocean Coastal Belt, Eastern Fynbos-Renosterveld, Albany Thicket.<br>It grows over a wide range of altitudes and varies in form from one location to another. *Pittosporum viridiflorum* grows in tall forest and in scrub on the forest margin, kloofs and along stream banks. | **Low** |
| *Prunus africana* | VU; P | **Family**: Rosaceae<br>**Common names**: red stinkwood, African almond ( Eng. ); rooistinkhout, Afrika-amandel, Wilde-kersieboom (Afr.); Inyazangoma-elimnyama, Inkokhokho, Ngubozinyeweni, Umdumezulu, Umlalume (Zulu); uMkakase, Inyazangoma, Itywina-elikhul, Umdumizulu, Umkhakhase (Xhosa), Mogohloro (Northern Sotho), Mulala-maanga (Venda)<br><br>Confined to evergreen forests from near the coast to the mist belt and montane forests in KwaZulu-Natal, Eastern Cape, Swaziland, Mpumalanga, Zimbabwe and tropical Africa. This It is a moderately fast-growing tree which is sensitive to heavy frost, preferring areas where there is regular rain; it will tolerate moderate frosts. | **Low** |
| *Pterocarpus angolensis* | LC; P | **Family:** Fabaceae<br>**Common names:** kiaat, bloodwood, paddle-wood, sealing-wax tree, wild teak, Transvaal teak (Eng.); kiaat, bloedhout, dolfhout, greinhout, kajatenhout, lakhout, wilde-kiaat (Afr.); morôtô (North Sotho); mokwa, morotômadi (Tswana); umvangazi, umbilo (Zulu)<br>**SA Tree No**: 236<br><br>Grows in the warm, frost-free areas in the northeast of the country, extending into Zimbabwe, northern Botswana, Mozambique and Namibia and northwards into other parts of Africa. It grows in bushveld and woodland where the rainfall is above 500 mm per year, and it favours rocky slopes or well-drained, deep, sandy soil. | **Confirmed** |
| *Sclerocarya birrea* subsp. *afra* | LC; P | **Family**: Anacardiaceae<br>**Common names**: marula (Eng.); morula (Northern Sotho); mufula (Tshivenda); ukanyi (Tsonga)<br>**SA Tree No**: 360<br><br>Bushveld and woodland.<br>The marula is widespread in Africa from Ethiopia in the north to KwaZulu-Natal in the south. In South Africa it is more dominant in the Baphalaborwa area in Limpopo. It occurs naturally in various types of woodland, on sandy soil or occasionally sandy loam. | **Confirmed** |