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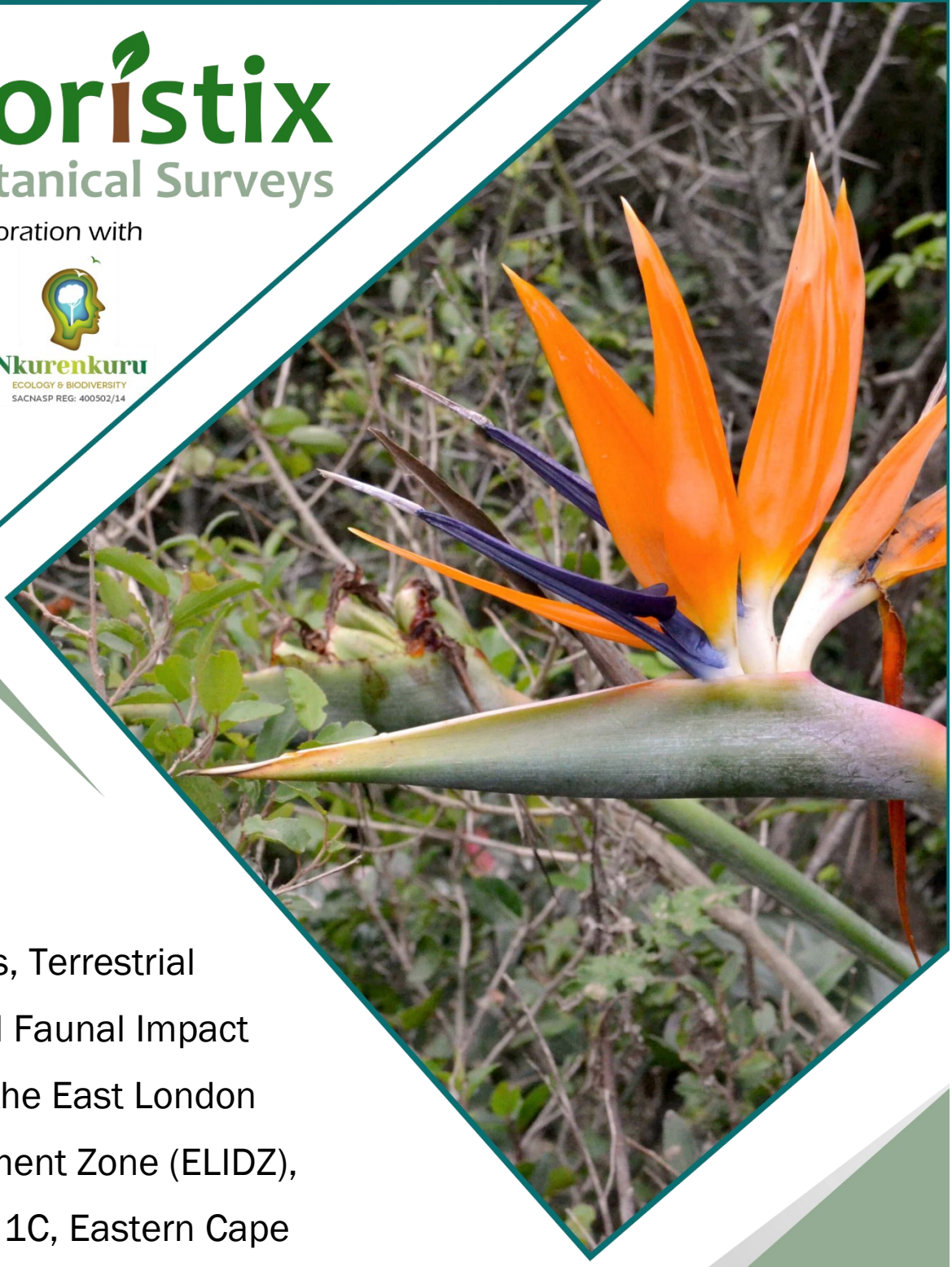

Plant Species, Terrestrial Biodiversity, and Faunal Impact Assessment for the East London Industrial Development Zone (ELIDZ), Zones 1A, 1B, and 1C, Eastern Cape

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Executive Summary

This ecological assessment report details the findings of a botanical, faunal, and terrestrial biodiversity survey and evaluation conducted on 19 – 23 May and 08 – 12 September 2025, for the East London Industrial Development Zone (ELIDZ). The surveys aimed to characterize the habitats and vegetation patterns, as well as faunal communities and important landscape features, within the ELIDZ, specifically identifying sensitive species and assessing potential ecological impacts.

The ELIDZ supports a complex ecological mosaic comprising nine distinct plant community types and six faunal habitat types. While parts of the ELIDZ are heavily degraded by invasive alien plants species (IAPs), the area functions as a critical, isolated biodiversity refuge.

The ELIDZ's overall Medium to High Site Ecological Importance (SEI) is driven by the confirmed presence of Species of Conservation Concern (SCC), as well as other sensitive features. Specifically, a breeding pair of the African Marsh Harrier (*Circus ranivorus*; EN) was confirmed in the Depression Wetlands near the southeastern border of Zone 1A. Furthermore, the confirmed presence of *Erica orientalis* (DDT) at a single locality, along with 29 protected plant species (including two Nationally Protected Trees) contributes to elevating the ELIDZ' SEI.

Overall, the ELIDZ is very rich in plant and animals species due to the various habitats occurring on-site. Specifically, a total of 211 plant species and 215 animal species were recorded, highlighting the site's regional conservation value. Unfortunately, IAPs are also a large problem within the ELIDZ, with 24 NEM:BA A&IS Regulations listed species observed. A particularly widespread species is *Lantana camara*, which is one of the primary causes of habitat degradation. While a few areas are especially badly invaded and degraded, many of the natural vegetation fragments fortunately still have moderate to low numbers of invasive species, as well as low individual abundances. These areas are prime targets for clearing and management, and much restoration might potentially be achieved through this. Together with IAPs, encroaching native woody species (notably *Vachellia karroo*) are also a pervasive problem, as evidenced by historic satellite images that generally indicate a much more open nature for the area in contrast to current on-site conditions.

The principal risks associated with any development in the ELIDZ are direct habitat loss, increased fragmentation and edge effects, a potential loss of SCC and/or protected species, and the exacerbation of IAPs proliferation. Unmitigated, these risks are potentially highly significant, particularly to the SCC habitats and the overall faunal carrying capacity. However, the assessment confirms that through rigorous and proactive mitigation, all potential negative impacts can be reduced to acceptable levels of residual significance.

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i. List of Abbreviations

BODATSA: Botanical Database of Southern Africa
CARA: Conservation of Agricultural Resources Act (Act 43 of 1983)
CBA: Critical Biodiversity Area
CITES: Convention on International Trade in Endangered Species of Wild Fauna and Flora
CR: Critically Endangered (species threat status)
DD: Data Deficient (species threat status)
DDD: Data Deficient – Insufficient Information (species threat status)
DDT: Data Deficient – Taxonomically Problematic (species threat status)
EA: Environmental Authorization
ECO: Environmental Control Officer
EIA: Environmental Impact Assessment: EIA regulations promulgated under section 24(5) of NEMA and published in Government Notice R. 543 in Government Gazette 33306 of 18 June 2010
EMPr: Environmental Management Programme
EN: Endangered (species threat status)
EO: Environmental Officer
ESA: Ecological Support Area
EW: Extinct in the Wild (species threat status)
EX: Extinct (species threat status)
FEPA: Freshwater Ecosystem Priority Area
IAPs: Invasive Alien Plant species
IDZ: Industrial Development Zone
IUCN: International Union for Conservation of Nature
LC: Least Concern (species threat status)
MP: Moderately Protected (according to the National Biodiversity Assessment 2018 Ecosystem Protection Levels)
NE: Not Evaluated (species threat status)
NEM:BA A&IS: NEM:BA Alien and Invasive Species Regulations, 2020
NEM:BA: National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
NEMA: National Environmental Management Act (Act 107 of 1998)
NFA: National Forest Act 1998 (No. 84 of 1998)
NFEPA: National Freshwater Ecosystem Priority Areas; identified to meet national freshwater conservation targets (CSIR, 2011)
NP: Not Protected (according to the National Biodiversity Assessment 2018 Ecosystem Protection Levels)
NT: Near Threatened (species threat status)
NWA: National Water Act 36 of 1998
NWM: National Wetland Map
ONA: Other Natural Area
PA: Protected Area
PAOI: Project Areas of Influence
POSA: Plants of southern Africa (online database)
PP: Poorly Protected (according to the National Biodiversity Assessment 2018 Ecosystem Protection Levels)
RE: Regionally Extinct (species threat status)
REEA: SA Renewable Energy EIA Application Database (https://egis.environment.gov.za/)
RLE: Red List of Ecosystems for South Africa
SANBI: South African National Biodiversity Institute
SCC: Species of Conservation Concern (includes species listed under the IUCN Red List Criteria as Critically Endangered [CR], Endangered [EN], Vulnerable [VU], Near Threatened [NT], or Data Deficient [DDD or DDT], as well as range-restricted species which are not declining and are nationally listed as Rare or Extremely Rare [sometimes also termed "Critically Rare"])
SSV: Site Sensitivity Verification
SWSA: Strategic Water Source Area
VegMap: National Vegetation Map of Southern Africa, Lesotho, and Swaziland (as per Mucina and Rutherford, 2006, with subsequent updates, e.g., 2018)
VU: Vulnerable (species threat status)
WP: Well Protected (according to the National Biodiversity Assessment 2018 Ecosystem Protection Levels)

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v. Report Minimum Legal Requirements

The Protocol for the Specialist Assessment and Minimum Report Content Requirements For Environmental Impacts on Terrestrial Plant Species (GN 1150, 43855, 30 October 2020) and the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity (GN 320, 43110, 30 October 2020) are presented here, together with their fulfilments within this report.

Where protocol reference numbers differ between the two protocols, they are indicated either as PS (occurring in the Terrestrial Plant Species protocol) or TB (occurring in the Terrestrial Biodiversity protocol); otherwise they are the same between the protocols.

Protocol Reference	Plant Species and Terrestrial Biodiversity Specialist Assessment Report Content	Section(s) in this Report	Page
3.1.1.	Contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae	18	188
3.1.2.	A signed statement of independence by the specialist	vi	xiv
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	16.1	172
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	14 and 15.4	160 and 171
3.1.5.	A description of the assumptions made and any uncertainties or gaps in knowledge or data as well as a statement of the timing and intensity of site inspection observations	1.5	6
3.1.6.	A description of the mean density of observations/number of samples sites per unit area of site inspection observations	15.4	171
3.1.7. PS	Details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported	3.2	64
3.1.7. TB	Additional environmental impacts expected from the proposed development	3.5	73
3.1.8. PS	The online database name, hyperlink, and record accession numbers for disseminated evidence of SCC found within the study area	13	156
3.1.8. TB	Any direct, indirect, and cumulative impacts of the proposed development	3.5	73
3.1.9. PS 3.1.6 TB	The location of areas not suitable for development and to be avoided during construction where relevant	3	28
3.1.9. TB	The degree to which impacts and risks can be mitigated	3.5	73
3.1.10 TB	The degree to which the impacts and risks can be reversed	3.5	73
3.1.10. PS	A discussion on the cumulative impacts	3.5	73
3.1.11. PS	Impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr)	9	144
3.1.11 TB	The degree to which the impacts and risks can cause loss of irreplaceable resources	8.2	128
3.1.12.	A reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not, of the development related to the specific theme considered, and if the development should receive approval or not, related to the specific theme being considered, and any conditions to which the opinion is subjected if relevant	10	147
3.1.13.	A motivation must be provided if there were any development footprints identified that were identified as having “low” or “medium” terrestrial plant species sensitivity and were not considered appropriate	Not Applicable	Not Applicable
3.1.14. TB	A substantiated statement, based on the findings of the specialist assessment, regarding the acceptability, or not, of the proposed development, if it should receive approval or not	10.2	147
3.1.15 TB	Any conditions to which this statement is subjected	9	144

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Together with the aforementioned, the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species (GN 1150, 43855, 30 October 2020) is also presented here, together with its fulfilment within this report.

Protocol Reference	Terrestrial Animal Species Specialist Assessment Report Content	Section(s) in this Report	Page
3.1.1	Contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the assessment including a curriculum vitae;	18	188
3.1.2	A signed statement of independence by the specialist;	vi	xiv
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;	16.1	172
3.1.4	A description of the methodology used to undertake the site sensitivity verification, impact assessment and site inspection, including equipment and modelling used where relevant;	14 and 15.4	160 and 171
3.1.5	A description of the mean density of observations/number of sample sites per unit area12 and the site inspection observations;	1.5	6
3.1.6	A description of the assumptions made and any uncertainties or gaps in knowledge or data;	15.4	171
3.1.7	Details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported;	4.3	100
3.1.8	The online database name, hyperlink and record accession numbers for disseminated evidence of SCC found within the study area;	13	156
3.1.9	The location of areas not suitable for development and to be avoided during construction where relevant;	3	28
3.1.2	A discussion on the cumulative impacts;	3.5	73
3.1.10	Impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	9	144
3.1.11	A reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not of the development 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; and	10	147
3.1.12	A motivation must be provided if there were any development footprints identified as per paragraph 2.2.12 above that were identified as having “low” or “medium” terrestrial animal species sensitivity and were not considered appropriate	Not Applicable	Not Applicable

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vi. Declaration of Consultant Independence

The consultants hereby declare that they:

- Are independent specialists in this application;
- Regard the information contained in this report as it relates to specialist input/study to be true and correct at the time of publication;
- Do not, and will not, have any financial interest(s) in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA Environmental Impact Assessment Regulations, 2014, and any specific environmental management Act;
- Do not, and will not, have any vested interest(s) in the proceedings of the proposed activities;
- Have disclosed, to the applicant, EAP, and/or competent authority(-ies), any information that have, or may have, the potential to influence the decision of the competent authority(-ies) or the objectivity of any report, plan, or document required in terms of the NEMA Environmental Impact Assessment Regulations 2014, and any specific environmental management Act;
- Are fully aware of, and meet, the responsibilities in terms of the NEMA Environmental Impact Assessment Regulations 2014 (specifically in terms of regulation 13 of GN No. R. 326), and any specific environmental management Act, and that failure to comply with these requirements may result in disqualification;
- Have provided the competent authority(-ies) with access to all necessary information at their disposal at the time of publication regarding the application, whether such information is favourable to the applicant or not; and
- Are aware that a false declaration is an offense in terms of regulation 48 of GN No. R. 326.

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November 2025

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Summary of Qualifications: BSc (Hons) Zoology and Botany; MSc Botany (Phytosociology) from 2011 to present.



November 2025

APPROVED BY:

AGES OMEGA: Nolubabalo Ntunzi

SIGNATURE: 

DATE: 17/11/2025

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PART 1: Introduction and Background Information

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1. Introduction

1.1. General Information

This project, as well as any and all related areas/sites, will from here on interchangeably be referred to as either the "Project", "Project Area", "site", "proposed development site", or "study area". If proposed activity(-ies) will impact on Species of Conservation Concern (SCC) beyond the boundary of the preferred site, the "project areas of influence" (PAOI) will be defined and used where relevant. The development footprint in the context of this document means the area on which the proposed development will take place and includes the area that will be directly disturbed or impacted. The term "property" might also be used to refer to the entire property (that is, the area enclosed within the property boundary), and not just the proposed development site.

The acronyms IDZ (Industrial Development Zone) or ELIDZ (East London Industrial Development Zone) will also be used regularly.

AGES Omega (hereafter referred to as the "client"), on behalf of East London Industrial Development Zone (hereafter referred to as the "applicant"), approached EcoFloristix Specialist Botanical Surveys to conduct a Plant Species, Terrestrial Biodiversity, and Faunal Impact Assessment for the East London Industrial Development Zone (ELIDZ), Zones 1A, 1B, and 1C, Eastern Cape.

The Project was completed in collaboration with Nkurenkuru Ecology and Biodiversity (Pty) Ltd., specifically regarding faunal studies.

1.2. Terms of Reference (ToR)

The main aim of this assessment was to provide a professional opinion on botanical and terrestrial biodiversity issues related to the proposed activities within the study area. Specifically, this assessment intends to provide the relevant information for guiding and mitigating the risk(s) associated with the proposed activities and their impacts on the local plant communities and associated ecosystems within the study area and surrounds by conducting a desktop analysis and a Site Sensitivity Verification (also referred to as a "SSV").

Briefly, the following activities were performed:

- A desktop assessment to identify relevant ecologically important geographical features (for example, unique habitats, Critical Biodiversity Areas (CBAs), and threatened ecosystems);
- A desktop assessment to compile a list of species that might occur in the study area and surrounds, with a focus on Species of Conservation Concern (SCC);
- A field survey to assess the general species composition of the plant communities within and around the study area, as well as the presence of any SCC;
- A delineation and mapping of the plant communities and/or habitat types that occur within the study area, and a determination of their respective Site Ecological Importance values;
- An identification of the potential impacts of the proposed activities on the SCC and plant communities of the study area, and an evaluation of the risks associated with these potential impacts; and

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- A prescription of mitigation measures and recommendations for the identified risks.

1.3. Locality and Details of Proposed Activities

1.3.1. Locality and General Details

The study area is located southwest of East London, Eastern Cape (Map 1). Although the study area itself occurs within the ELIDZ (Map 2), it does not encompass the entire ELIDZ, which is designated as a Special Economic Zone (SEZ) and encompasses a total land area of approximately 462 hectares. The ELIDZ is divided into six individually fenced sub-zones, namely Zones 1A, 1B, 1C, 1D, 1E, and 1F, each specifically designed to cater to distinct manufacturing needs and encourage particular industrial clusters. It also includes an outlier area in Mdantsane, namely Fort Jackson.

The study area border is comprised of a few erfs that were selected for assessment, together with some additional space to allow for a more robust ecological assessment. Thus, the study area borders mostly coincide with Zones 1A, 1B, and 1C. Apart from vacant and partially developed land, various private open spaces occur within the study area.

1.3.2. Details of Proposed Activities

This assessment was based on the assumption of clearing indigenous vegetation for the construction of more infrastructure such as factories and other buildings (as is currently the status quo in the study area).

1.3.3. Alternatives

Two “Alternatives” are assessed here, namely the Baseline (or “No Development Scenario, i.e. maintaining the present circumstances and not proceeding with development) and Alternative 1. More specifically, Alternative 1 is assessed here in general as any clearing of indigenous vegetation for the purposes of infrastructure development, for example construction of factories, roads, etc. Although only one Alternative is assessed, different alternatives can include optimizing layouts to use indigenous vegetation patches as natural gardens or incorporating protected trees as focal points, minimizing footprints, retaining and maximizing the size of natural corridors, etc.

1.3.4. Specific Listed Activities Triggered by the Project

A specific listed activity triggered by the Project, and which is assessed within this report, is:

- Activity 27 (Listing Notice 1): The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.

1.3.5. Project Areas of Influence (PAOI)

The PAOI is considered the same as the study area boundary (Map 2).

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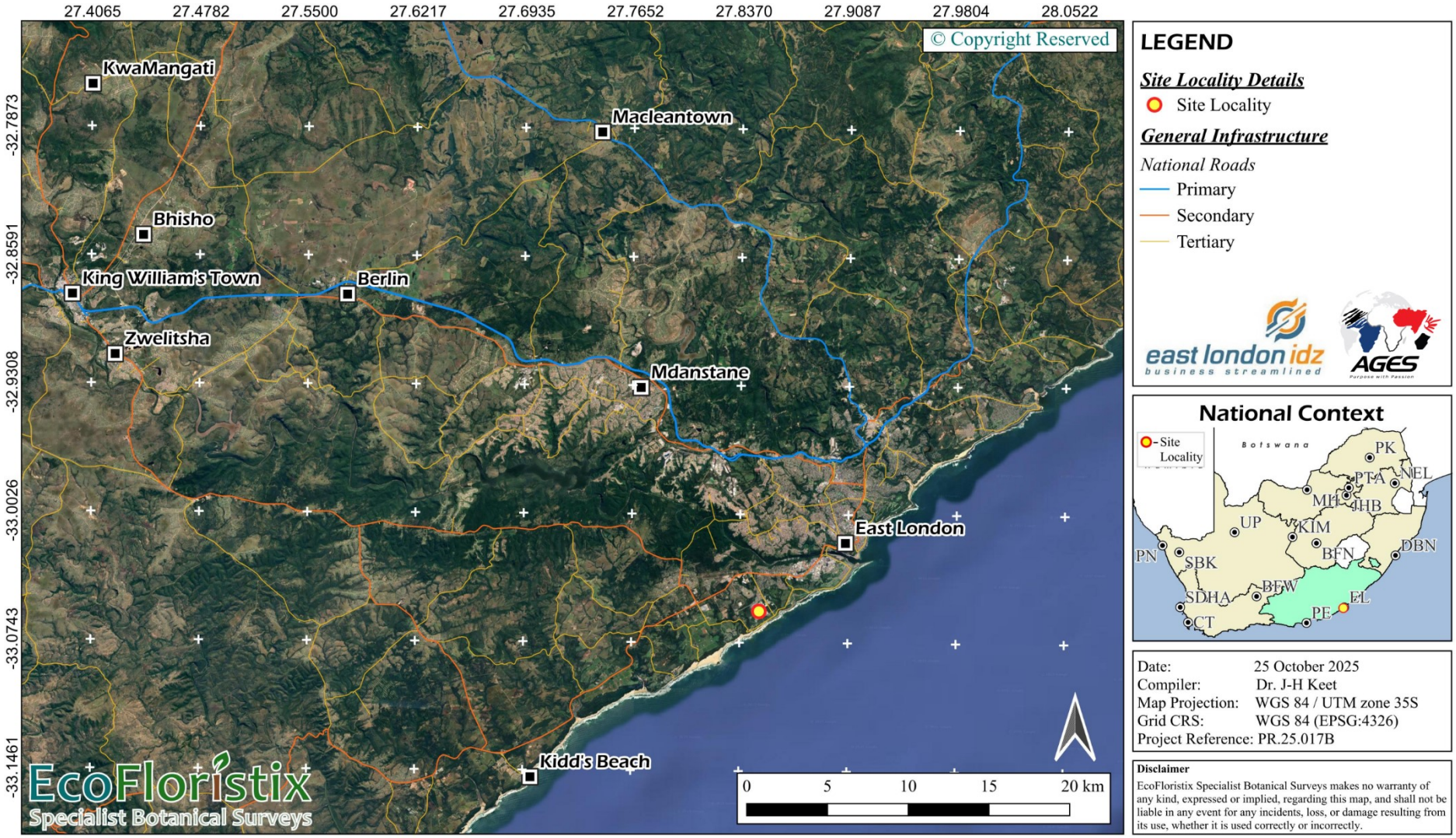

Map 1: Locality of the study area, zoomed out to give a broad context. The inset map shows the main map extent within the broader (national) context of South Africa.

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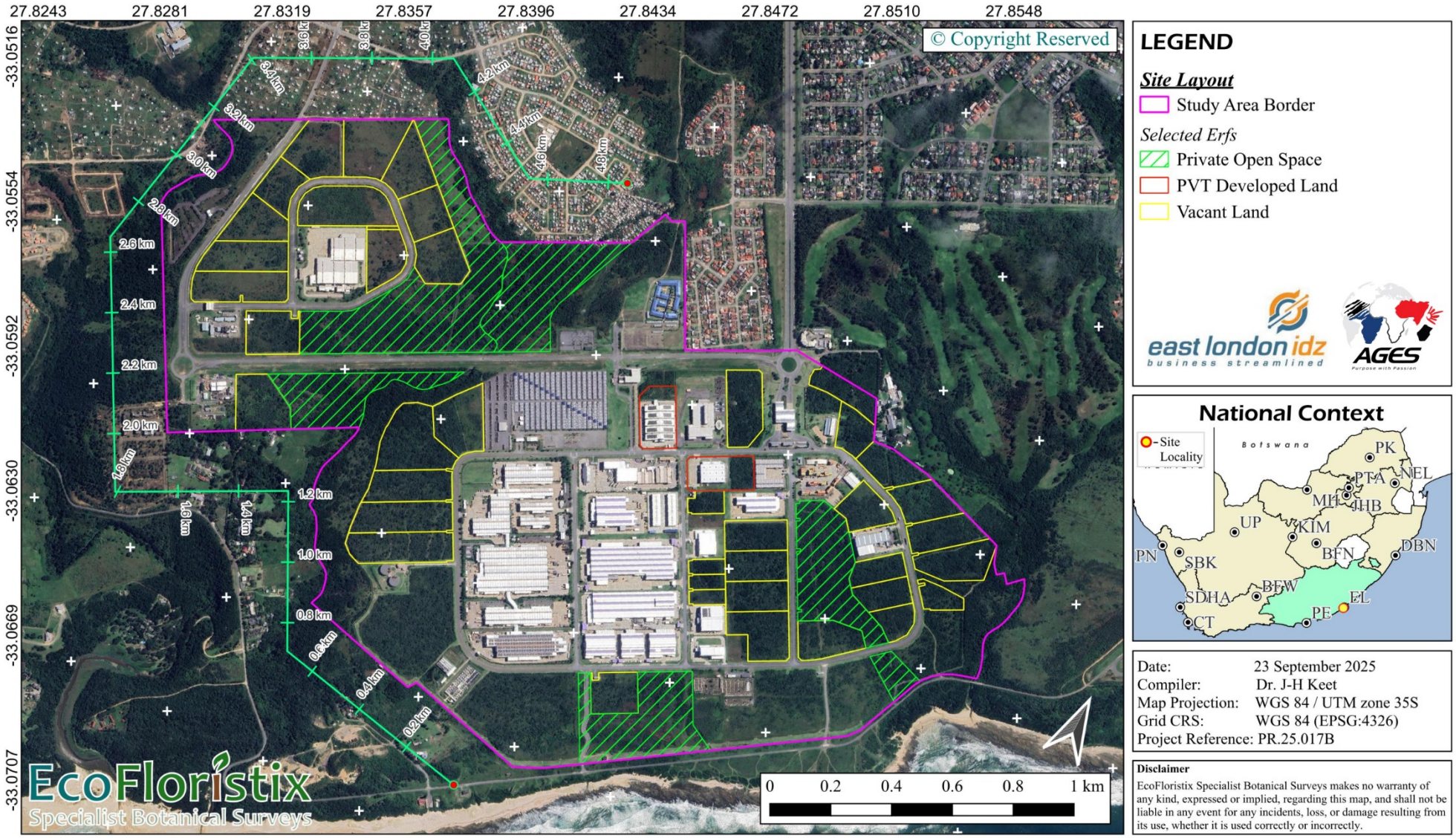

Map 2: Overview of the study area site. Note: to optimize space, true north faces to the top right. This applies to many of the subsequent maps.

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1.4. Conditions of This Report

This report deals exclusively with the study area as defined in sections 1.1 and 1.3, and the impacts upon plant diversity and natural ecosystems in that area. Therefore, all relevant project information provided by the applicant and/or the client, as well as any other relevant Environmental Impact Assessment practitioner(s), to the biodiversity specialists was assumed to be correct and valid at the time of its provision. This report is not liable to include and assess any alterations to the study area, as provided by the client, if such alterations occurred after the survey date(s).

All findings, recommendations, and conclusions provided in this report are based on the author's best scientific and professional knowledge at the time of compilation, as well as information available at the time of compilation. This report, whether in full or in part, may not be amended or extended in any way whatsoever without the prior explicit written consent of the authors. Any recommendations, statements, or conclusions drawn from, or based on, this report must clearly cite or make reference to this report, making sure to include the following reference: PR.25.017B. This report must be included in its entirety whenever any recommendations, statements, or conclusions relating to this report form any part of another report.

1.5. General Assumptions and Potential Limitations

Temporal variation plays an important role in the structure and patterns of plant biodiversity, communities, and species occurrences. One site visit (or even multiple visits), or a single season's survey, might not fully catalogue plant species diversity in an area (for example, due to seasonal variation in vegetation and plant growth patterns).

Specifically, some annual, short-lived, ephemeral (plants surviving unfavourable conditions as seeds), geophytic (species with underground storage organs), or other cryptic species might not be observable/detectable. That is, many plant species are known to completely die back during certain times of the year, depending on respective life strategies. Thus, during these times such species remain unobservable/undetectable and survive only as dormant bulbs, corms, tubers, or rhizomes (for geophytes), or seeds (for ephemeral species) below the soil surface. Together with this, rare and threatened plant species are generally uncommon and/or localized, and can easily be overlooked. Even multiple site visits might fail to locate such species.

Furthermore, flowers and fruits are crucial for the complete and accurate identification of plant species, and any absence of such flowers and fruits might prevent the complete and accurate identification of such plant species. Flowering and fruiting times are species specific, and there are invariably always some plant species not flowering and/or fruiting during surveying. This not only impacts identifiability, but also detectability/visibility.

Finally, in practice it is almost always impossible to survey any area to its full extent, both spatially (i.e., over land surface area) and temporally (i.e., over time). The total number of plant species recorded in any area is, therefore, almost always an underestimate of the potential number of species that could occur in such an area.

Considering all of the aforementioned, the possibility always exists that certain plant species might not be observable/detectable on site during the time of surveying, as a result of their potential annual, short-lived, dormant, cryptic, or ephemeral nature, or their rare and/or localized distributions on site, or the incomplete and inaccurate identification of plant species which lacked flowers and/or fruits and/or other characteristic features during surveying. This presents a gap

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in knowledge, but can be mitigated to a great extent by supplementing site species lists with records from online databases (see section 15.3 for more details).

1.6. Key Legislative Requirements

The lists below provide legislation, policies, and guidelines that are applicable to the current project in terms of biodiversity and ecological support systems. Although these lists are extensive, they are not exhaustive, and other legislation, policies, and guidelines may also apply.

International Legislation:

- Convention on Biological Diversity (CBD, 1993)
- The Convention on Wetlands (RAMSAR Convention, 1971)
- The United Nations Framework Convention on Climate Change (UNFCC,1994)
- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 1973)
- The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention, 1979)

National Legislation:

- Constitution of the Republic of South Africa (Act No. 108 of 1996)
- The National Environmental Management Act (NEMA) (Act No. 107 of 1998)
- The National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
- The National Environmental Management: Biodiversity Act (NEM:BA) (Act No. 10 of 2004), Threatened or Protected Species Regulations
- Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, GNR 320 of Government Gazette 43310 (March 2020)
- Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, GNR 1150 of Government Gazette 43855 (October 2020)
- The National Environmental Management: Waste Act, 2008 (Act 59 of 2008)
- The Environment Conservation Act (Act No. 73 of 1989)
- National Protected Areas Expansion Strategy (NPAES)
- Natural Scientific Professions Act (Act No. 27 of 2003)
- National Biodiversity Framework (NBF, 2009)
- National Forest Act (Act No. 84 of 1998)
- National Veld and Forest Fire Act (101 of 1998)
- National Water Act (NWA) (Act No. 36 of 1998)
- National Spatial Biodiversity Assessment (NSBA)
- World Heritage Convention Act (Act No. 49 of 1999)
- Municipal Systems Act (Act No. 32 of 2000)

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- Alien and Invasive Species Regulations and, Alien and Invasive Species Lists, published under NEM:BA (NEM:BA A&IS Regulations)
- South Africa's National Biodiversity Strategy and Action Plan (NBSAP)
- Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) (CARA)

Provincial Legislation:

- Provincial Nature Conservation Ordinance, (Act No. 19 of 1974)
- The Eastern Cape Biodiversity Conservation Plan (2019)

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2. Background Assessment Results

For all relevant methodology, see sections 15 and 16 at the end of this document.

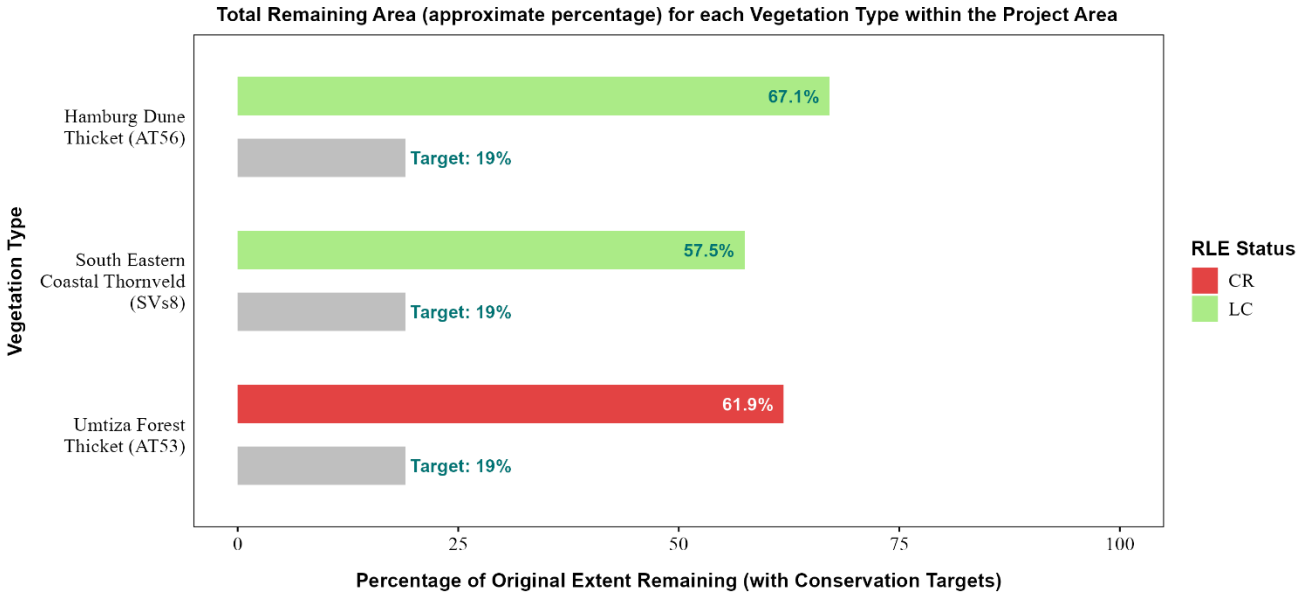
2.1. Desktop Analyses: Botanical Assessment

2.1.1. Vegetation Types of Study Area and Surrounds

According to VegMap, the study area overlaps with a single vegetation type, namely Hamburg Dune Thicket (AT 56). However, a three other vegetation types occur nearby, notably South Eastern Coastal Thornveld (SVs 8), Umtiza Forest Thicket (AT 53), and Cape Seashore Vegetation (AZd3) (Map 3 and Map 4; Table 1). The latter is very characteristic only of beaches, and does not occur on-site. Thus, it is not treated here.

Table 1: Total area sizes (approximate) for vegetation types occurring within, or near, the study area, as mapped by the National Vegetation Map 2018.

Vegetation Type	Historic Distribution		Current Distribution			RLE Threat Status
	Total Area (km^2)	Total Area (ha)	Total Area (km^2)	Total Area (ha)	Percentage Remaining (%)	
Hamburg Dune Thicket (AT56)	702	70 163	471	47 076	67.1	Least Concern
South Eastern Coastal Thornveld (SVs8)	1 590	158 989	914	91 419	57.5	Least Concern
Umtiza Forest Thicket (AT53)	27	2 711	17	1 678	61.9	Critically Endangered



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2.1.1.a) Hamburg Dune Thicket (AT 56)

This vegetation type occurs in the Eastern Cape Province on coastal stretches from the Fish River Mouth to just east of Kei Mouth. It features flat to moderately undulating coastal dunes and consists of low to medium-sized (1 – 4 m), dense thicket dominated by woody shrubs and stunted trees, with lianas and vines abundant, and the understorey poorly developed. These thickets are best developed in dune slacks, whereas on more open inland slopes they occur as small bush clumps in a matrix of low coastal grassland (*Panicum deustum*, *Stenotaphrum secundatum*). Where these grasslands occur on deep sandy soils (around Kiwane), several fynbos elements (*Agathosma*, *Aspalathus*, *Metalasia*, *Struthiola*) are present in the matrix, while savanna elements (*Phoenix reclinata*) are more common where the grasslands occur on richer soils (around Hamburg).

Conservation: LC according to RLE2021. Target: 19% according to NBA 2018. It is not currently conserved anywhere. About 31.44% is currently transformed. Threat include invasion by *Psidium guava*, as well as erosion in some areas. It is currently poorly protected.

Table 2: Key species associated with Hamburg Dune Thicket (AT 56).

IMPORTANT SPECIES	
Growth Form	**Key Species (d = "Dominant")**
Small tree	*Acokanthera oblongifolia, Canthium inerme, Canthium spinosum, Encephalartos altensteinii (e), Harpephyllum caffrum (d), Hyperacanthus amoenus, Mimusops caffra (d), Phoenix reclinata, Rothmannia globosa, Sideroxylon inerme, Strelitzia nicolai (d), Tarchonanthus littoralis (d), Vachellia karroo (d), Harpephyllum caffrum (d)*
Succulent shrub	*Cotyledon orbiculata, Gasteria excelsa (e), Lampranthus spectabilis (e)*
Succulent herb	*Bergeranthus multiceps (e), Crassula vaginata, Trichodiadema orientale, Faucaria subintegra (e), Haworthiopsis reinwardtii var. reinwardtii (e)*
Geophytic herb	*Bobartia gracilis (e)*
Herb	*Diascia personata (e)*
Succulent tree	*Aloe thraskii (e), Euphorbia triangularis*
Low shrub	*Acmadenia kiwanensis (e), Agathosma ovata, Anthospermum aethiopicum (d), Aspalathus spinosa (e), Disparago tortilis (e), Dicerothamnus rhinocerotis, Lasiosiphon anthylloides (e), Struthiola parviflora (e)*
Tall shrub	*Adenopodia spicata, Azima tetracantha, Brachylaena discolour (d), Carissa bispinosa, Euclea racemosa, Eugenia capensis (d), Grewia occidentalis, Gymnosporia buxifolia, Maytenus procumbens, Metalasia muricata (e), Monanthotaxis caffra, Mystroxylon aethiopicum, Passerina rigida (e), Pavetta revoluta, Psychotria capensis, Putterlickia pyracantha (e), Putterlickia verrucosa, Robsonodendron maritimum (e), Searsia glauca (e), Searsia lucida, Zanthoxylum capense*
Graminoid	*Panicum deustum (d), Stenotaphrum secundatum (d)*
Herbaceous climber	*Cynanchum natalitium (e), Gloriosa superba, Rhoicissus digitata*

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2.1.1.b) South Eastern Coastal Thornveld (SVs 8)

Distributed in the Eastern Cape, it occurs in gently to moderately undulating landscapes and dissected hilltop slopes close to the coast. It is characterized by short grassland (*Cynodon dactylon*, *Digitaria* spp., *Eragrostis* spp., *Themeda triandra*) with scattered bush clumps, dominated by small trees and woody shrubs, and with emergent *Euphorbia triangularis* occasional. Solitary *Vachellia karoo* trees are also common.

The region in which this unit occurs is a mosaic of several different structural vegetation types, ranging from grasslands to forest, and is a result of post-disturbance succession gradients as well as natural variation in geology, soil patterns and distribution of water in the landscape. It is likely that the current vegetation mosaic typical of the South Eastern Coastal Thornveld is anthropogenic and that the original (pre-settlement) vegetation was dominated by nonseasonal, dense thicket. The area of this unit was prime agricultural land which attracted early settlers who, presumably, cleared the vegetation for pastures (Hoare et al. 2006).

Conservation: LC according to RLE2021. Target: 19% according to NBA 2018. Currently conserved in the Addo Elephant National Park and Indalo Protected Environment Area. About 39.24% is currently transformed. Threat activities include cultivation, plantations, bush encroachment, urban sprawl, altered fire regimes. Erosion is low to medium. It is currently poorly protected.

Table 3: Key species associated with South Eastern Coastal Thornveld (SVs 8).

IMPORTANT SPECIES	
Growth Form	**Key Species (d = "Dominant")**
Small tree	*Vachellia karroo (d), Brachylaena elliptica (e), Canthium spinosum, Cussonia spicata, Ficus sur, Ochna arborea, Sideroxylon inerme, Zanthoxylum capense*
Succulent herb	*Plectranthus verticillatus (d), Crassula pellucida subsp. marginalis (e)*
Succulent tree	*Euphorbia triangularis*
Geophytic herb	*Cheilanthes hirta, Moraea pallida, Oxalis smithiana, Sansevieria hyacinthoides*
Herb	*Chamaecrista mimosoides (d), Abutilon sonneratianum, Acalypha ecklonii (e), Centella asiatica, Commelina africana, Cynoglossum hispidum, Eriosema squarrosum, Lactuca inermis, Lobelia erinus, Monsonia emarginata (e), Phyllopodium cuneifolium (e), Senecio burchellii (e), Sonchus dregeanus, Strelitzia reginae*
Low shrub	*Rhynchosia ciliata (d, e), Carissa bispinosa, Chrysocoma ciliata, Dyschoriste setigera (e), Helichrysum asperum, Pelargonium alchemilloides, Phyllanthus maderaspatensis, Selago corymbosa (e), Senecio pterophorus, Tephrosia capensis*
Graminoid	*Brachiaria serrata (d), Cynodon dactylon (d), Dactyloctenium australe (d), Digitaria natalensis (d), Ehrharta calycina (d), Eragrostis capensis (d), Eragrostis curvula (d), Eragrostis plana (d), Heteropogon contortus (d), Panicum deustum (d), Panicum maximum (d), Setaria sphacelata (d), Sporobolus africanus (d), Themeda triandra (d), Tristachya leucothrix (d), Cymbopogon marginatus, Ehrharta erecta, Elionurus muticus, Melica racemosa, Setaria megaphylla, Trachypogon spicatus*

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Tall shrub	*Clausena anisata, Volkameria glabra, Coddia rudis, Croton rivularis (e), Diospyros villosa, Grewia occidentalis, Gymnosporia buxifolia, Hippobromus pauciflorus, Mystroxylon aethiopicum, Pavetta lanceolata, Psydrax obovata, Pterocelastrus tricuspidatus (e), Scutia myrtina, Searsia lucida (e), Tarchonanthus littoralis (e), Turraea obtusifolia*
Woody succulent climber	*Cynanchum viminale*
Herbaceous climber	*Rhynchosia caribaea, Rhynchosia totta, Thunbergia capensis (e), Pilogyne scabra*
Woody climber	*Asparagus aethiopicus, Capparis sepiaria var. citrifolia, Clematis brachiata, Rhoiacarpos capensis, Rhoicissus digitata, Rhoicissus tridentata, Secamone alpini, Tecomaria capensis*
Tall tree	*Ekebergia capensis, Erythrina caffra*

2.1.1.c) Umtiza Forest Thicket (AT 53)

Distributed in the Eastern Cape, this vegetation type is restricted to the lower reaches of the Buffalo River Valley, within 12 km of the coast. It features medium-sized to tall (3 - 5 m) dense thicket, dominated by small and woody shrubs typical of AT21 Buffels Mesic Thicket, often with emergent *Euphorbia triangularis*, intergrading with pockets of tree-dominated (*Ekebergia capensis*, *Umtiza listeriana*) coastal forest, and with moderate to steep valley slopes and incised hilltops. The vegetation type typically occurs on the Middleton Formation of the Karoo Supergroup. The main land types are Db and Fa.

The present forest-like condition of Umtiza Forest Thicket may be attributable to "over-protection" from periodic fires and/or disturbance by large mammals (e.g. elephants). The presence of *Umtiza listeriana*, a tree that needs periodic disturbance to establish from seed, is one of our main reasons to believe that this unit should be regarded as a Thicket unit. The occurrence of unhealthy individuals of *Encephalartos altensteinii* and *Euphorbia triangularis* in the forest understorey supports the opinion that the dominance by forest trees is only a recent event. Periodic disturbance by large herbivores, such as elephants, and occasional spot-fires started by lightning probably reduced the dominance of the woody trees to the point that even grass patches may have occurred in this unit. These disturbance regimes would have allowed elements of both the forest and those of the thicket vegetation to co-occur in close association (Vlok & Euston-Brown 2002).

Conservation: CR according to RLE2021. Target: 19% according to NBA 2018. Currently conserved and moderately protected in the Umtiza Nature Reserve. About 35.10% is currently transformed, with threat activities including urban sprawl.

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Table 4: Key species associated Umtiza Forest Thicket (AT 53).

IMPORTANT SPECIES	
Growth Form	**Key Species (d = "Dominant")**
Small tree	*Allophylus decipiens (d), Ekebergia capensis (d), Harpephyllum caffrum*
Tall tree	*Umtiza listeriana (d), Canthium inerme (d), Gymnosporia buxifolia (d), Euphorbia triangularis (d)*

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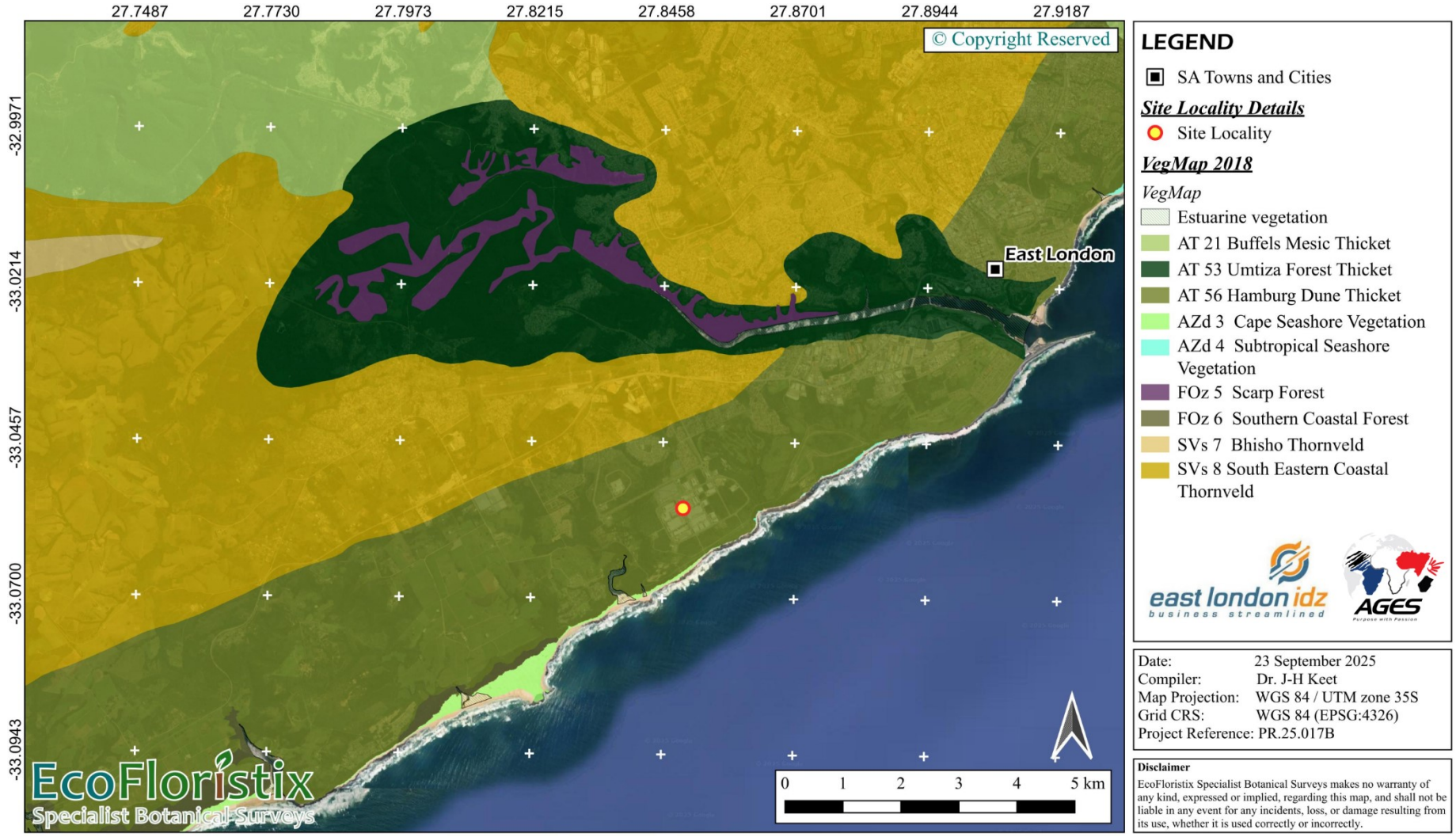

Map 3: Vegetation types (according to VegMap 2018 and subsequent updates) for the study area and surrounds. This map is specifically zoomed out to also show the broader extent of each vegetation type surrounding the study area (see Map 4 for site specific vegetation).

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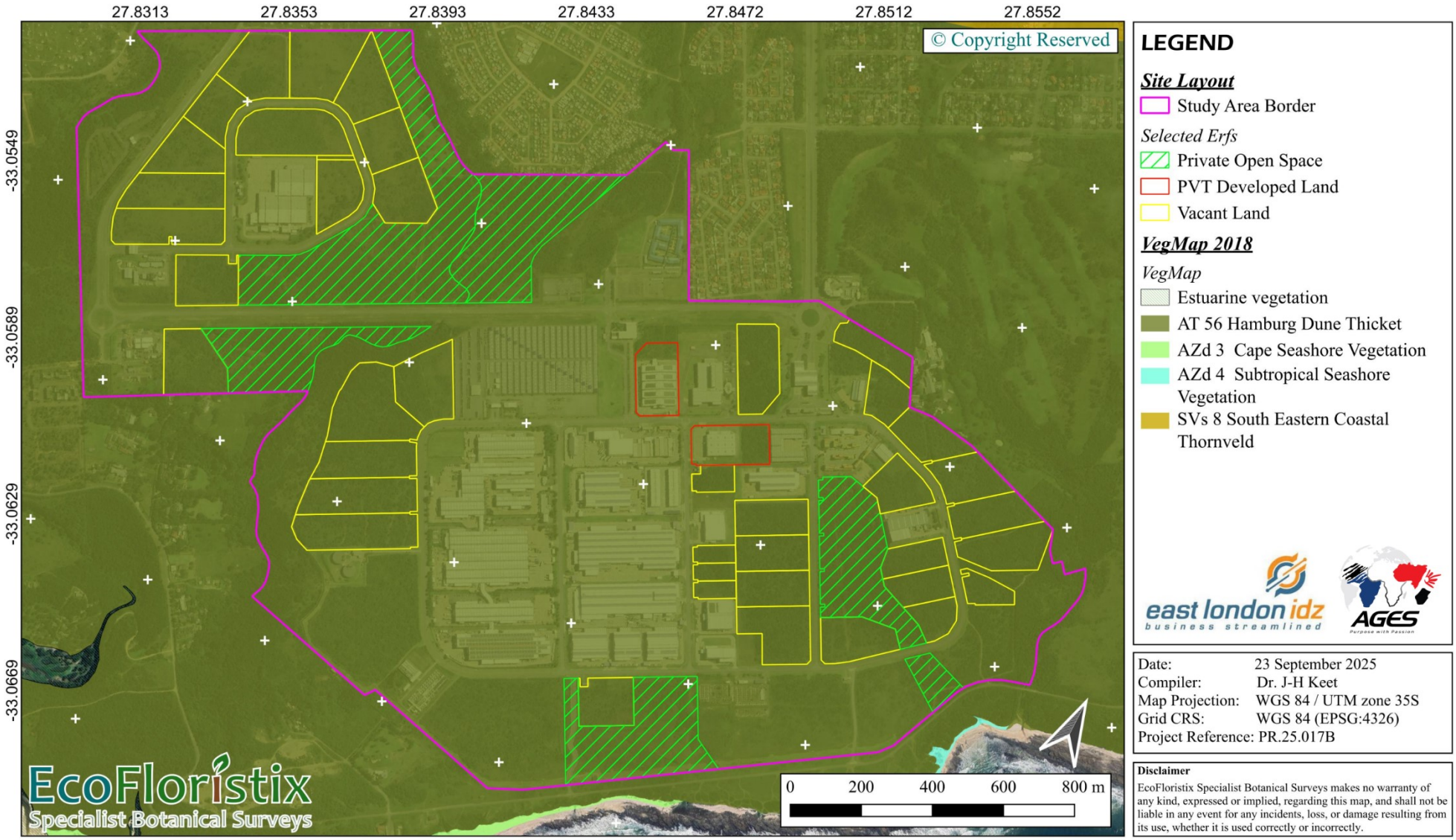

Map 4: Specific vegetation types (according to VegMap 2018 and subsequent updates) of the study area and surrounds.

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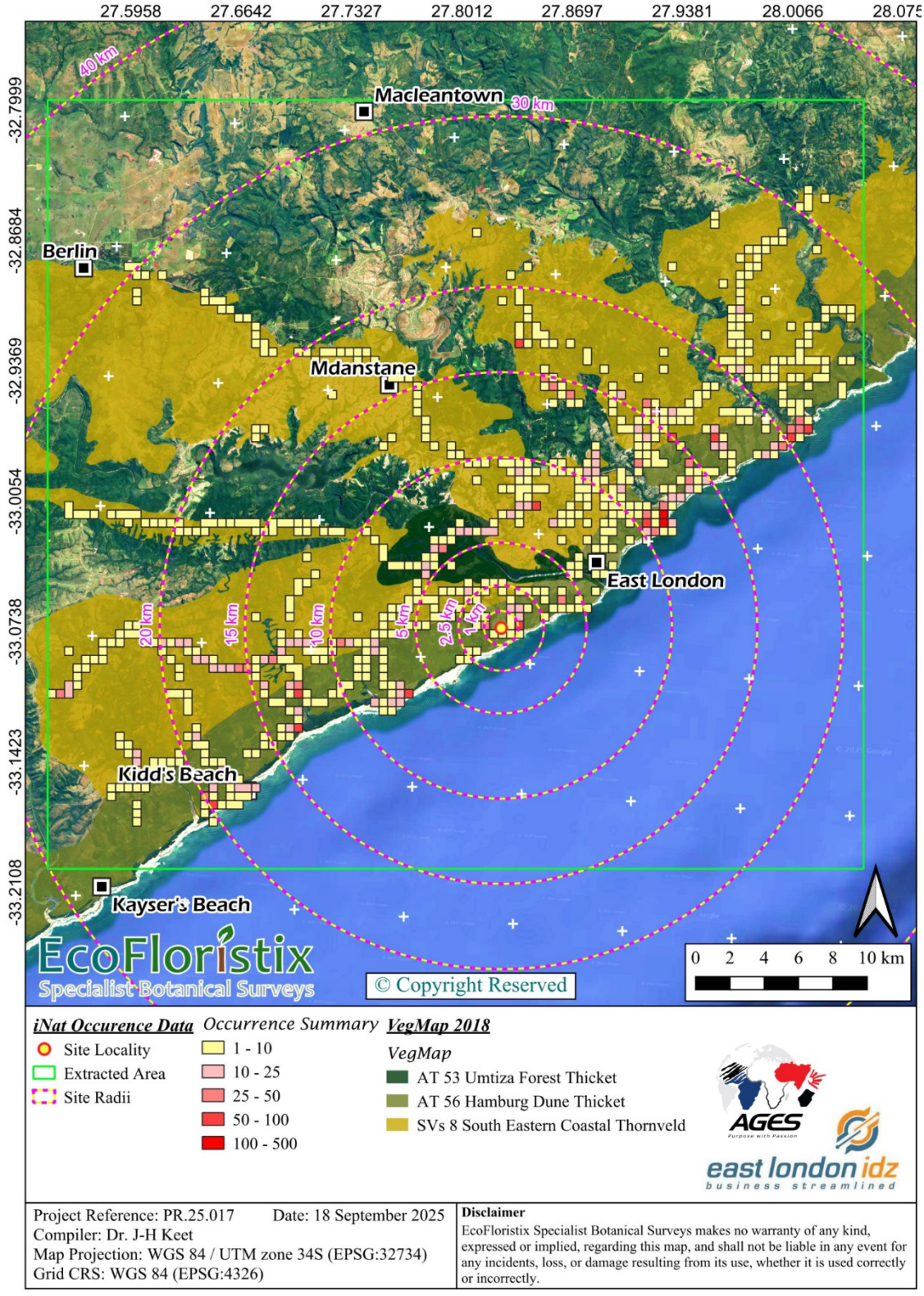
2.1.2. Species of Conservation Concern and General Species Occurrences



Map 5: Plant species occurrence data from iNaturalist, displayed as the number of records per each 0.5 x 0.5 km grid square (i.e., the small square blocks). Also shown are the mapped vegetation types (from VegMap) underlying the study area and its immediate surrounds. See section 15.3.1 for more details on methodology.

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Only SCC that might potentially occur in the study area and surrounds, as predicted by online databases (see section 15.3.1; Map 5), are listed in this section. The field survey(s) aimed to validate which of these species occur within the study area, and whether any additional species were present that may not yet have been recorded in official databases (see section 3). Also see section 1.6 for key legislation used to assess SCC and protected plant species. Note that many records that are in the POSA database do not have an IUCN listing, or might have a "Not Evaluated" listing, even though they are indigenous. This is because such records represent older taxonomic groupings that have subsequently been assigned criteria at higher, or lower, taxonomic levels (for example, a subspecies name that is no longer valid and which has been assigned an IUCN value at species level, or a record of a species that has subsequently been divided into subspecies, and therefore assigned IUCN values at subspecies level instead of species level). These records have been included in the analysis for the sake of comprehensiveness since they still represent valuable data.

A combined total of 9 502 records were extracted from the online POSA (1 264 records) and iNaturalist (8 238 records) databases. The total area used to extract the records covered 190 588 hectares (1 906 km^2), with the records covering a minimum convex hull area of 167 842 hectares (1 678 km^2).

Together, these records consisted of a combined total of 1 681 plant species that have been recorded within the extracted area (representing a total of 1 541 species at an inclusive level, i.e., without considering subspecies, varieties, etc.), with the top three representative families being Asteraceae (156 spp.), (137 spp.), and Fabaceae (129 spp.).

This list included a total of 44 SCC, including 19 threatened species (full summary: 4 CR, 3 EN, 12 VU, 7 NT, 1 Critically Rare, 7 DDT, 3 DDD, 974 LC, and 165 Not Evaluated). It should be noted that the high number of SCC is likely due to the use of an excessively large area for species record collection. Consequently, it is highly improbable that many of these species would be present within the proposed development site or its immediate vicinity.

A total of 20 of these SCC are protected. Apart from these, a further 254 species are also protected (thus yielding a total of 274 protected plant species, consisting of 266 provincially protected species and 8 nationally protected trees).

Finally, the online screening report also revealed the potential presence of 3 Sensitive Species (some of these might have been included in the other online databases). Note that, for their protection, some of the identities of these species will not be made public, and they have therefore been assigned random names.

The following is a full summary of SCC, according to descending threat status (this list might include sensitive species; if this is the case, note that, for their protection, their identities will not be made public, and they have therefore been assigned random names):

- *Encephalartos latifrons* (CR)
- *Euphorbia bupleurifolia* (CR)
- *Isoetes wormaldii* (CR)
- *Searsia albomarginata* (CR)
- *Cassipourea flanaganii* (EN)
- *Hyobanche robusta* (EN)
- *Metarungia galpinii* (EN)
- *Aloiampelos ciliaris var. redacta* (VU)
- *Clivia miniata var. miniata* (VU)
- *Dioscorea sylvatica* (VU)
- *Disperis woodii* (VU)
- *Encephalartos altensteinii* (VU)
- *Encephalartos natalensis* (VU)
- *Erica glumiflora* (VU)
- *Satyrium princeps* (VU)
- *Sensitive Species X1* (VU)
- *Sensitive Species X3* (VU)
- *Stangeria eriopus* (VU)
- *Umtiza listeriana* (VU; Nationally Protected Tree)
- *Albuca bifolia* (NT)
- *Aloe thraskii* (NT)
- *Aspalathus intermedia* (NT)
- *Crinum campanulatum* (NT)
- *Encephalartos friderici-guilielmi* (NT)

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- *Encephalartos longifolius* (NT)
- *Moraea maximiliani* (NT)
- *Asclepias monticola* (Critically Rare)
- *Cotula sericea* (Rare)
- *Dietes bicolor* (Rare)
- *Greyia flanaganii* (Rare)
- *Justicia bolusii* (Rare)
- *Riocreuxia flanaganii var. flanaganii* (Rare)
- *Streptocarpus formosus* (Rare)
- *Streptocarpus modestus* (Rare)
- *Asparagus intricatus* (DDT)
- *Curio talinoides* (DDT)
- *Cyrtanthus helictus* (DDT)
- *Erica orientalis* (DDT)
- *Galium amatymbicum* (DDT)
- *Monsonia galpinii* (DDT)
- *Plantago laxiflora* (DDT)
- *Albuca longifolia* (DDD)
- *Anisodontea capensis* (DDD)
- *Aspidoglossum flanaganii* (DDD)

2.1.3. Alien and Invasive Plant Species

A total of 212 alien plant species have been recorded within the extracted area, with 91 of them being listed invasive species within the NEM:BA A&IS Regulations (note that if "Category Multi" exists in this list, then it is intended to indicate that the listing of the species in question is context dependent; should such a species be found on site, then the category applicable to its context will be made clear in the sections on site-specific results). The NEM:BA A&IS Regulations species are:

- *Acacia cyclops* (Red eye; Category 1b)
- *Acacia elata* (Pepper tree wattle; Category 1b)
- *Acacia longifolia* (Long-leaved wattle; Category 1b)
- *Acacia mearnsii* (Black wattle; Category 2)
- *Acacia melanoxylon* (Australian blackwood; Category 2)
- *Acacia podalyriifolia* (Pearl acacia; Category 1b)
- *Acacia saligna* (Port Jackson, Port Jackson willow; Category 1b)
- *Agave sisalana* (Sisal hemp, Sisal; Category 2)
- *Ageratum conyzoides* (Invading ageratum; Category 1b)
- *Ageratum houstonianum* (Mexican ageratum; Category Multi)
- *Ailanthus altissima* (Tree-of-heaven; Category 1b)
- *Alpinia zerumbet* (Shell ginger, Pink porcelain lily; Category 3)
- *Anredera cordifolia* (Madeira vine, Bridal wreath; Category 1b)
- *Antigonon leptopus* (Coral creeper; Category 1b)
- *Ardisia elliptica* (Shoebutton ardisia; Category 1b)
- *Argemone ochroleuca* (White-flowered Mexican poppy; Category 1b)
- *Arundo donax* (Giant reed, Spanish reed; Category 1b)
- *Azolla filiculoides* (Azolla, Red water fern; Category 1b)
- *Callisia repens* (Creeping inch plant; Category 1b)
- *Canna indica* (Indian shot; Category 1b)
- *Cardiospermum grandiflorum* (Balloon vine; Category 1b)
- *Catharanthus roseus* (Madagascar periwinkle; Category Multi)
- *Cereus jamacaru* (Queen of the night; Category 1b)
- *Cestrum laevigatum* (Inkberry; Category 1b)
- *Cirsium vulgare* (Spear thistle, Scotch thistle; Category 1b)
- *Cortaderia selloana* (Pampas grass; Category 1b)
- *Cotoneaster franchetii* (Cotoneaster; Category 1b)
- *Datura ferox* (Large thorn apple; Category 1b)
- *Datura stramonium* (Common thorn apple; Category 1b)
- *Duranta erecta* (Forget-me-not-tree, Pigeon berry; Category Multi)
- *Eucalyptus grandis* (Saligna gum, Rose gum; Category Multi)
- *Eugenia uniflora* (Pitanga, Surinam cherry; Category 1b)
- *Furcraea foetida* (Mauritian hemp; Category 1a)
- *Grevillea robusta* (Australian silky oak; Category 3)
- *Hakea salicifolia* (Willow hakea; Category Multi)
- *Hedychium coronarium* (; Category)
- *Hedychium gardnerianum* (Kahili ginger lily; Category 1b)
- *Ipomoea alba* (Moonflower; Category 1b)
- *Ipomoea indica* (Blue morning glory; Category 1b)
- *Ipomoea purpurea* (Purple morning glory; Category 1b)
- *Jacaranda mimosifolia* (Jacaranda; Category Multi)
- *Lantana camara* (Lantana, Tickberry, Cherry pie; Category 1b)

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- *Malvastrum coromandelianum* (Prickly malvastrum; Category 1b)
- *Melia azedarach* (Syringa; Category Multi)
- *Mirabilis jalapa* (Four-o'clock, Marvel-of -Peru; Category 1b)
- *Montanoa hibiscifolia* (Tree daisy; Category 1b)
- *Murraya paniculata* (Orange Jessamine; Category Multi)
- *Myoporum insulare* (Manatoka, Boobyalla; Category 3)
- *Myriophyllum aquaticum* (Parrot's feather; Category 1b)
- *Nephrolepis cordifolia* (Erect sword fern, Ladder sword fern; Category Multi)
- *Nerium oleander* (Oleander; Category 1b)
- *Nicandra physalodes* (Apple-of-Peru; Category 1b)
- *Nicotiana glauca* (Wild tobacco; Category 1b)
- *Opuntia ficus-indica* (Mission prickly pear, Sweet prickly pear; Category Multi)
- *Opuntia monacantha* (Cochineal prickly pear, Drooping prickly pear; Category 1b)
- *Opuntia tomentosa* (Velvet opuntia, Velvet tree-pear; Category 1b)
- *Passiflora caerulea* (Blue passion flower; Category 1b)
- *Passiflora edulis* (Purple granadilla, Passion fruit; Category Multi)
- *Passiflora subpeltata* (Granadina; Category 1b)
- *Pereskia aculeata* (Pereskia, Barbados gooseberry; Category 1b)
- *Phytolacca dioica* (Belhambra; Category 3)
- *Phytolacca octandra* (Forest inkberry; Category 1b)
- *Pistia stratiotes* (Water lettuce; Category 1b)
- *Psidium guajava* (Guava; Category Multi)
- *Ricinus communis* (Castor-oil plant; Category 2)
- *Rivina humilis* (Rivina, Bloodberry; Category 1b)
- *Salvinia molesta* (Kariba weed, Salvinia; Category 1b)
- *Sambucus nigra* (European elder; Category 1b)
- *Senna bicapsularis* (Rambling cassia; Category 1b)
- *Senna didymobotrya* (Peanut butter cassia; Category Multi)
- *Senna septemtrionalis* (Arsenic bush, Smooth senna; Category 1b)
- *Sesbania punicea* (Red sesbania; Category 1b)
- *Solanum chrysotrichum* (Giant devil's fig; Category 1b)
- *Solanum mauritianum* (Bugweed; Category 1b)
- *Solanum pseudocapsicum* (Jerusalem cherry; Category 1b)
- *Solanum seaforthianum* (Potato creeper; Category 1b)
- *Solanum sisymbriifolium* (Wild tomato, Dense-thorned bitter apple; Category 1b)
- *Spathodea campanulata* (African flame tree; Category Multi)
- *Sphagneticola trilobata* (Singapore daisy; Category Multi)
- *Syngonium podophyllum* (Goose foot, Arrow- head vine; Category Multi)
- *Tecoma stans* (Yellow bells; Category 1b)
- *Tipuana tipu* (Tipu tree; Category 3)
- *Tithonia diversifolia* (Mexican sunflower; Category 1b)
- *Tradescantia fluminensis* (Wandering Jew; Category 1b)
- *Tradescantia zebrina* (Wandering Jew; Category 1b)
- *Triplaris americana* (Ant tree, Triplaris; Category 1a)
- *Verbena bonariensis* (Wild verbena, Tall verbena, Purple top; Category 1b)
- *Verbena brasiliensis* (Brazilian verbena; Category 1b)
- *Verbena rigida* (Veined verbena; Category 1b)
- *Xanthium spinosum* (Spiny cocklebur; Category 1b)
- *Xanthium strumarium* (Large cocklebur; Category 1b)

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2.2. Desktop Analyses: Ecologically Important Landscape Features

2.2.1. Ecosystem Threat Status: RLE 2021 and NBA 2018



Map 6: Ecosystem Threat Status, according to the Red List of Ecosystems for South Africa (2021), associated with the study area and surrounds.

According to the Red List of Ecosystems for South Africa (RLE 2021) spatial dataset the study area is located within a Least Concern ecosystem (Map 6). The National Biodiversity Assessment 2018 essentially presents the same information.

This is specifically based on the Hamburg Dune Thicket vegetation type. The Site Sensitivity Verification revealed that parts of the study area also conform to South Eastern Coastal Thornveld (SVs 8), which is also a Least Concern ecosystem.

See section 15.2.1 for more details and notes on Ecosystem Threat Status categories.

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2.2.2. Critical Biodiversity Areas and Ecological Support Areas



Map 7: Layout of Critical Biodiversity Areas within the study area and surrounds.

The study area is located within a CBA1 (Map 7). This is according to the the Eastern Cape Biodiversity Conservation Plan (2019).

Firstly, the built-up areas (roads, factories, etc.) by definition cannot be classified as a CBA. A few areas are correctly mapped like this, but this is not correct for built-up areas mapped as CBA1.

CBA1 are established to meet biodiversity goals. The main goal for these sites is to keep them in their natural state to protect local species, habitats, and ecosystems, if they indeed conform to CBA1 conditions.

A previous report considered that the CBA classification (CBA1) of the Private Open Space areas is valid and applicable (Hawley & Jackson, 2025). The findings of the current study generally support this, as well as for many of the other natural vegetation fragments on-site, but only insofar as they are mostly free of invasive alien plant species (IAPs) and their impacts. Although IAPs are quite ubiquitous in the majority of the ELIDZ and surrounds, they vary in abundances and in some places are not a large problem. However, a few areas are especially badly infested — a noteworthy example is the *Vachellia karroo - Lantana camara* infestation (see section 3.1.7 in Zone 1B (though it does not form part of a Private Open Space area). The latter area does not conform to CBA conditions.

Fortunately, quite a few natural vegetation fragments exist within the study area, some of which are large. Thus, some loss of these areas may be considered, especially if others are to be conserved and cleared from IAPs. Nevertheless, due care should must still be taken during all phases of any development to minimize any disturbances towards these areas.

See section 15.2.6 for more details and notes on CBA and ESA categories.

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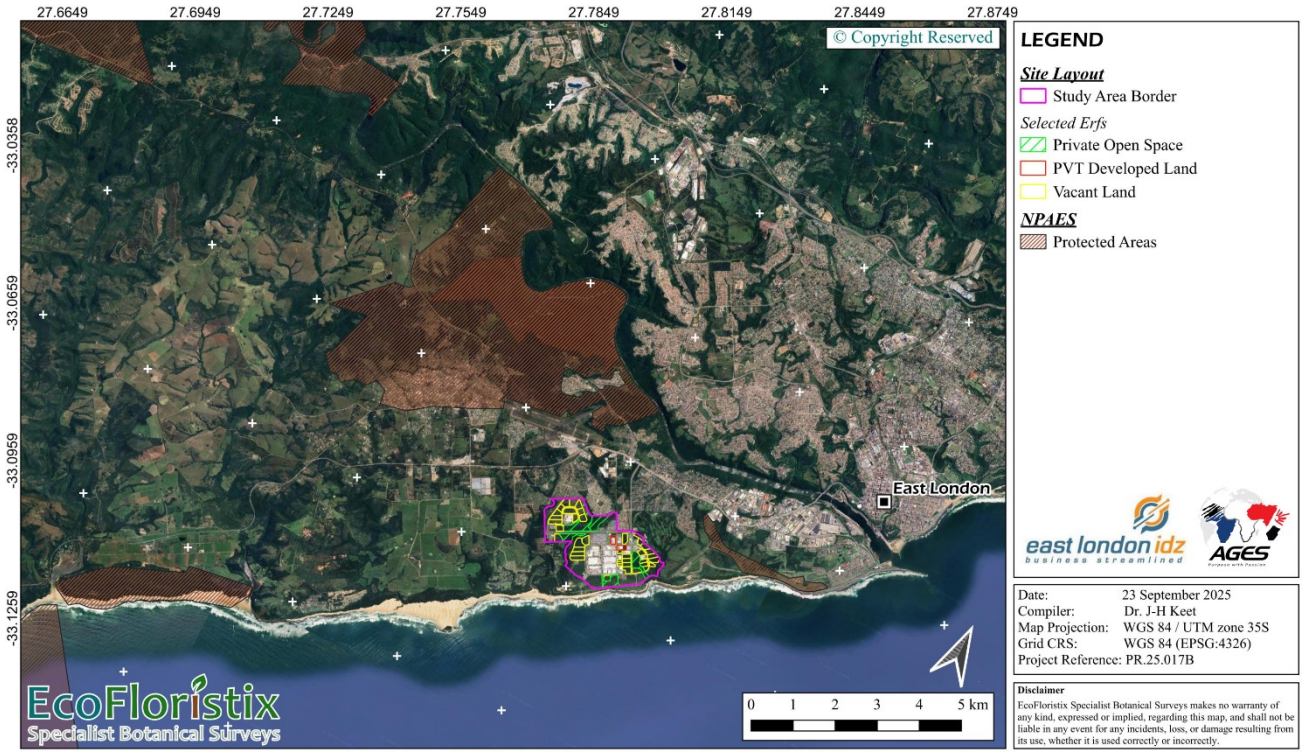
2.2.3. National Protected Area Expansion Strategy



Map 8: Study area locality in relation to designated areas of the National Protected Area Expansion Strategy (NPAES).

The study area is not located within any National Protected Area Expansion Strategy area (Map 8). The closest Focus Area (Bhisho Kei) is about 25 km north of the study area. The closest Conservation Area (Kwelera National Botanical Garden) is 20.7 km northeast, and while the closest National Park (Addo Elephant National Park) is 130.2 km southwest.

The study area does occur near a Protected Area (Potters Pass Nature Reserve), which is about 1.1 km northeast. However, development in the study area is unlikely to have impacts on this area.

Thus, development in the study area is not likely to have any major impacts on any NPAES area targets.

See section 15.2.3 for more details and notes on the NPAES.

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2.2.4. Hydrological Features



Map 9: Hydrological setting of the study area and surrounds in the context Strategic Water Source Areas (SWSA) and Freshwater Ecosystem Priority Areas (FEPA).

The study area is located within a SWSA (Amatole), but does not occur near any threatened rivers as determined by NFEPA (Map 9). However, a Vulnerable wetland (Ngqenga) overlaps slightly with the eastern border of the study area (coinciding at this part with the eastern border of the ELIDZ Zone 1A). This mapped wetland occurs along an unmapped watercourse.

An unnamed NFEPA river also flows to the west of the study area border, but this does not overlap with the selected erfs.

Given the highly localized nature of the study area, development is highly unlikely to have any major impacts on these hydrological features. However, if development is intended to occur near the indicated Vulnerable wetland, then it is desirable to seek an assessment of an aquatic specialist.

See sections 15.2.4 and 15.2.5 for more details and notes on NFEPA and SWSA.

2.3. Site History

The study area occurs within the Albany Thicket Biome, which is mostly unique to the Eastern Cape, with a few parts in the Western Cape (the term “thicket” itself is often used in a general sense to refer to natural vegetation fragments of the Albany Thicket Biome). It is a dense, often impenetrable, woody shrubland characterized by spiny, evergreen, and succulent plants (often from the genus *Euphorbia*). It is renowned for its high biodiversity and concentration of endemic plant species, particularly succulents.

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Albany Thicket is an ancient formation and is believed to have derived initially from elements in the forest formation. Albany Thicket can in some sense be thought of very loosely as a type of "dwarf forest" due to its low and dense canopy. However, it also includes many species derived from lineages associated with other biomes, and thus often contains a mix of elements that occur in forests, savanna, and even grassland. It is thus a transitional ecosystem, sharing characteristics with several other biomes, including Forest, Fynbos, Grassland, Savanna, and Nama-Karoo, which makes it an important ecological intersection. Thus, it remains fundamentally distinct and does not meet the necessary criteria to be classified as true or natural forest (see section 3.5).

Beyond its botanical richness, Albany Thicket supports a diverse array of fauna, including large herbivores like elephant and black rhino, which play a vital role in shaping the thicket's structure. These animals help create pathways and clearings, which in turn allow other species to move and thrive. Unfortunately, much of the original thicket has been degraded or lost due to removal of large herbivores and subsequent overgrazing by domestic livestock, and conversion for agriculture, placing many of its unique species and the ecosystem as a whole at risk.

The study area is currently heavily overgrown by woody shrubs. That is, bush encroachment seems to be a large problem. This can clearly be seen by comparing current on-site conditions (Map 2) to historic satellite imagery (Map 10 and Map 11), which shows large open and grassy spaces with interspersed thicket/bush clumps. While it is entirely possible that anthropogenic disturbances caused such an open environment, it most likely was nevertheless the case prior to human settlement since fire and herbivory by large game (both currently absent) would have been major drivers of disturbance.

In essence, all the thicket vegetation types originally start as a number of small bush clumps of woody species that establish in a particular environment. Under certain environmental conditions, these individual bush-clumps are able to increase in size and density. In the absence of a disturbance regime, these bush-clumps are ultimately able to link up with each other, and displace the original matrix vegetation (Vlok & Euston-Brown, 2002).

This seems to be exactly what has occurred on site: the current, large patches of dense thicket started off as smaller bush clumps. The removal of external disturbance factors, brought on by the fencing off of the ELIDZ, consequently allowed these clumps to expand (albeit with the addition of different plant species) and eventually link up.

A distinction can be made between Dune Thicket and Forest Thicket (see section 2.1.1). As such, while a large part of the study area seems to superficially resemble Forest Thicket given its dense nature, much of this does not truly conform to Forest Thicket, either compositionally or historically. Thus, in mapping the current on-site conditions, Forest Thicket was specifically and mostly delineated using its historic distribution, as well as its proximity to watercourses, except in a few instances. Moreover, a remote sensing technique (NDRE: Normalized Difference Red Edge index) was used to aid the delineation of Forest Thicket (more details are given in section 3). Finally, the on-site assessment aimed to validate this delineation using species characteristic of Forest Thicket.

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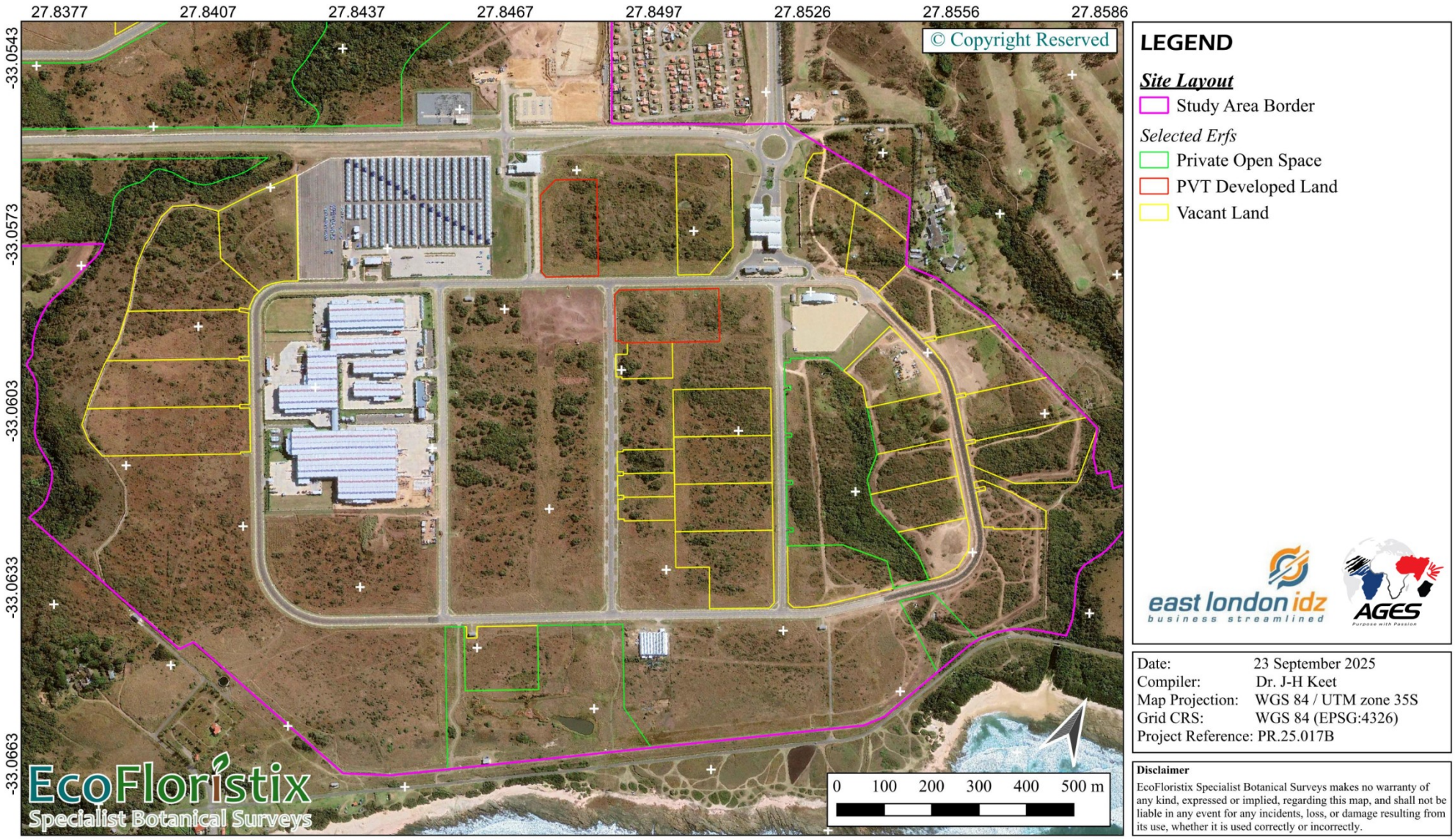

Map 10: Historic imagery (August 2009) of the ELIDZ. The study area as overlaid mostly coincides with remaining natural vegetation fragments currently on-site (but compare with Map 2 for an overview of the latest satellite imagery). This map specifically focuses on Zone 1A.

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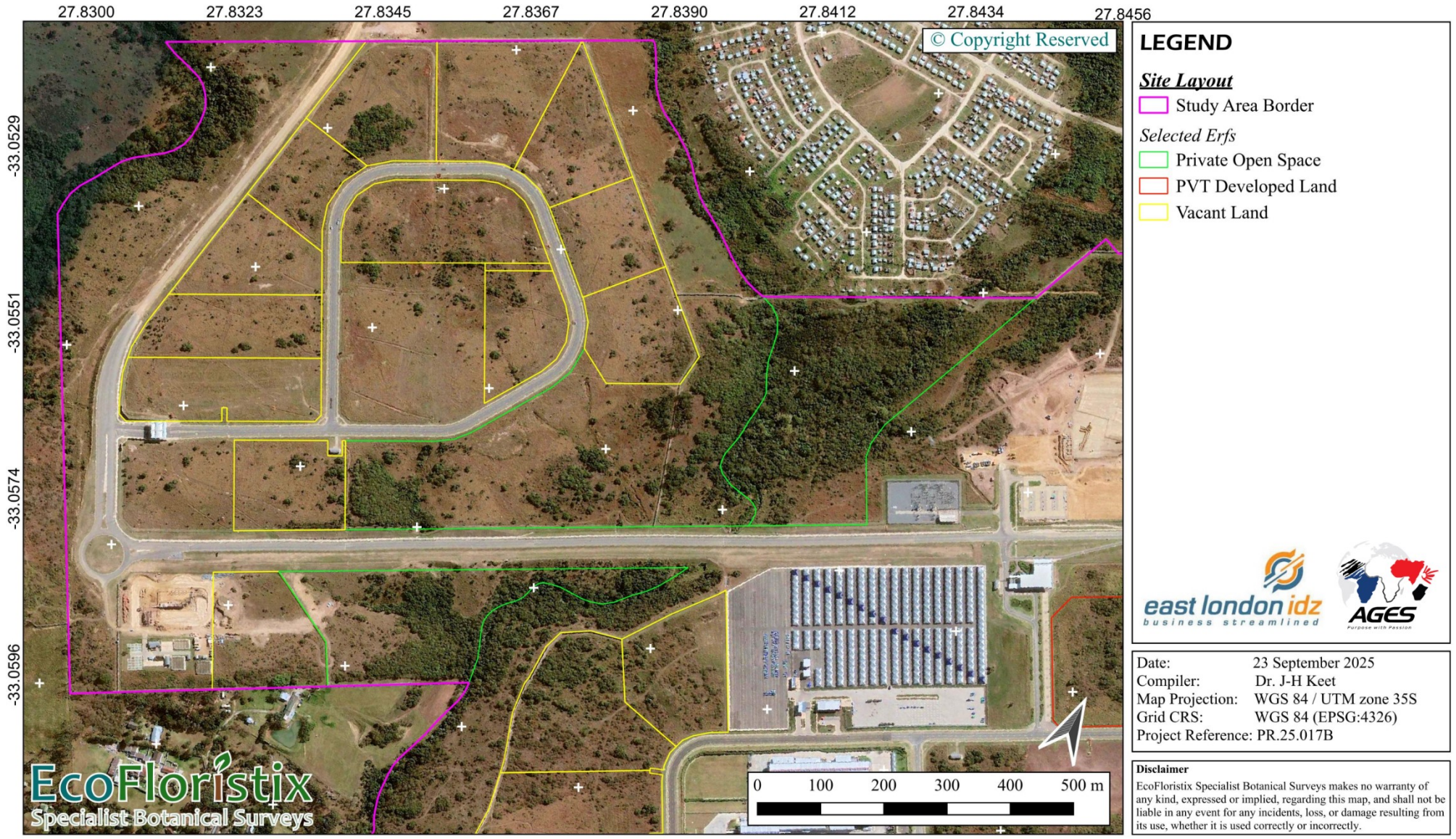

Map 11: Similar to Map 10, but with a specific focus on Zone 1B and 1C.

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PART 2: Findings of the Site Sensitivity Verification

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3. Fieldwork and Site Inspection: Flora and Terrestrial Biodiversity

This section describes the different habitats and vegetation patterns, as expressed in plant community types, observed within the study area and surrounds. As these are field-based observations, they are more reliable and applicable than the coarsely mapped results of VegMap, which does not yet adequately represent such finer details.

Surveys were conducted from 19 – 23 May and 08 – 12 September 2025. As such, surveying was conducted both outside and slightly within the optimum surveying period (which is generally accepted to be during spring and the beginning of summer; also see section 1.5 for assumptions and potential limitations). This provided a good opportunity to gather both in-season and out-of-season data.

A total distance of ± 21 km was surveyed on foot across the study area as well as by vehicle. Together with this, numerous drone reconnaissance trips were made to gain data and insights on various landscape features, such as differences in vegetation composition and structure, watercourses, infestations of invasive alien plant species, etc. The study area was therefore well surveyed.

3.1. Plant Community Types

The plant community types found on site mostly conformed either to Hamburg Dune Thicket (AT 56), South Eastern Coastal Thornveld (SVs 8), or Umtiza Forest Thicket (AT 53), or some variation of it (Map 12, Figure 4, Figure 5). Some degraded areas were also observed, and are classified as distinct units given their deviation in species composition and vegetation structure from the surrounding areas.

A total of 9 plant community types were found in the study area and surrounds:

- Coastal Scrub
- Coastal Thornveld
- Degraded Veld
- Dune Thicket
- Forest Thicket
- Semi-open Grassland
- Shallow Grassland
- *Vachellia karroo - Lantana camara* Infestation
- Wetlands

Plant communities are based on characteristic dominant plant species, and are discussed in more detail in the subsequent sections, and representative photos are given where applicable. These were the major plant community types present in, and surrounding, the study area. However, it must be noted that variation occurs across the landscape, and species presences and abundances are not constant in each natural vegetation fragment. Moreover, given the often-gradual integration of different vegetation types into each other, it is near impossible to accurately and fully map all fine-scale variation in an area.

The following is a brief overall summary (the sections hereafter present specific details): a total of 211 plant species were found within the surveyed areas, which consisted of 187 native, 1 SCC, 29 protected, 8 ECE, 24 alien, and 24 NEM:BA A&IS Regulations listed species.

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Furthermore, a total of 49 species were recorded within the surveyed area that were not recorded within online databases (i.e., POSA and iNaturalist), 6 of which are protected and 2 are alien. Also see Table 5.

Table 5: Plant species summary statistics for the plant community types/subtypes of the study area and broader surrounding area (compare with Map 12). "Unique" species were only observed in the specific plant community type/subtype in question, and not in others (note: this does not mean such species cannot or do not occur in others, but only that they were not specifically observed in the others during surveying; see section 1.5 for general survey limitations). "Shared" species were shared between two or more types/subtypes. Note that overall total values might be less than the sum of all the respective values, given that species can be shared between plant community types. Also note that these are summary values, and are expanded more in-depth in the figures that follow. SCC = Species of Conservation Concern; THREAT = Threatened species ("CR PE", "CR", "EN", or "VU"; see section 15.3.1); ECE = Eastern Cape Endemic; NEM:BA = Species listed under NEM:BA Alien and Invasive Species Regulations; N/A = Not Applicable. The row in green indicates the plant community type/subtype that had the highest number of plant species, while the row in light-red indicates the plant community type/ subtype that had the lowest number of plant species. Note that only main plant community types are included here.

	Total	Shared	Unique	%Unique	SCC	THREAT	Protected	ECE	Native	Alien	NEM:BA
Plant Community											
Coastal Scrub	63	41	22	35	0	0	10	4	57	6	6
Coastal Thornveld	64	54	10	16	0	0	9	1	55	9	9
Dune Thicket	118	67	51	43	0	0	15	5	97	21	21
Forest Thicket	36	17	19	53	0	0	6	0	32	4	5
Semi-open Grassland and Shallow Grassland	38	21	17	45	1	0	7	2	34	4	4
Vachellia karroo - *Lantana camara* Infestation	19	17	2	11	0	0	3	2	16	3	3
Wetlands	8	1	7	88	0	0	0	0	7	1	0
Totals											
N/A	211	N/A	N/A	N/A	1	0	29	8	187	24	24

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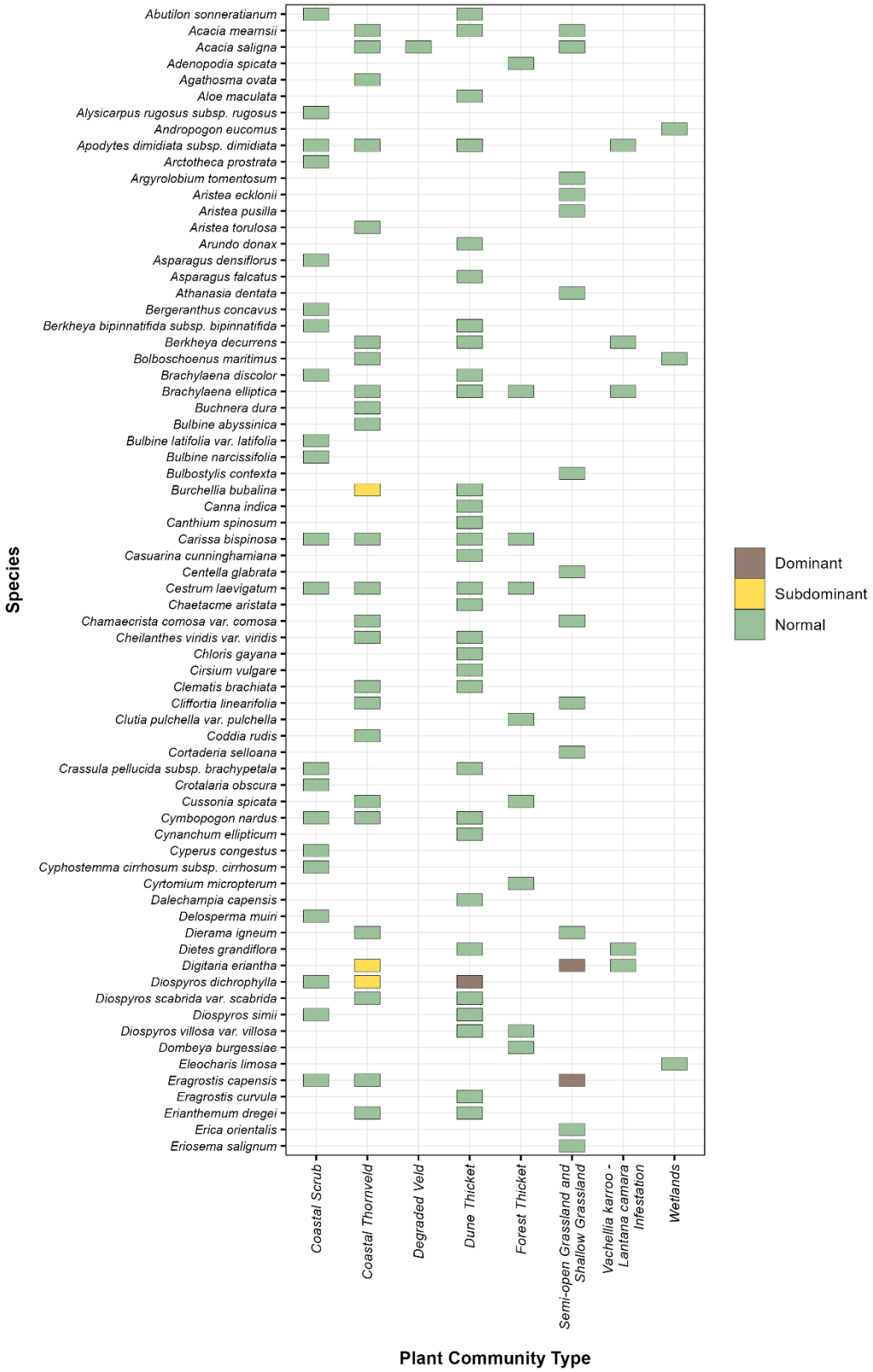

Figure 1: Presence/absence matrix of plant species for each plant community (or subcommunity) type within the study area and broader surrounds. The presence of a block indicates the presence of the respective plant species within the respective plant community. This figure is a valuable reference to visually determine either how many (and which) species occurred in a specific plant community, or in how many (and which) plant communities a specific species occurred.

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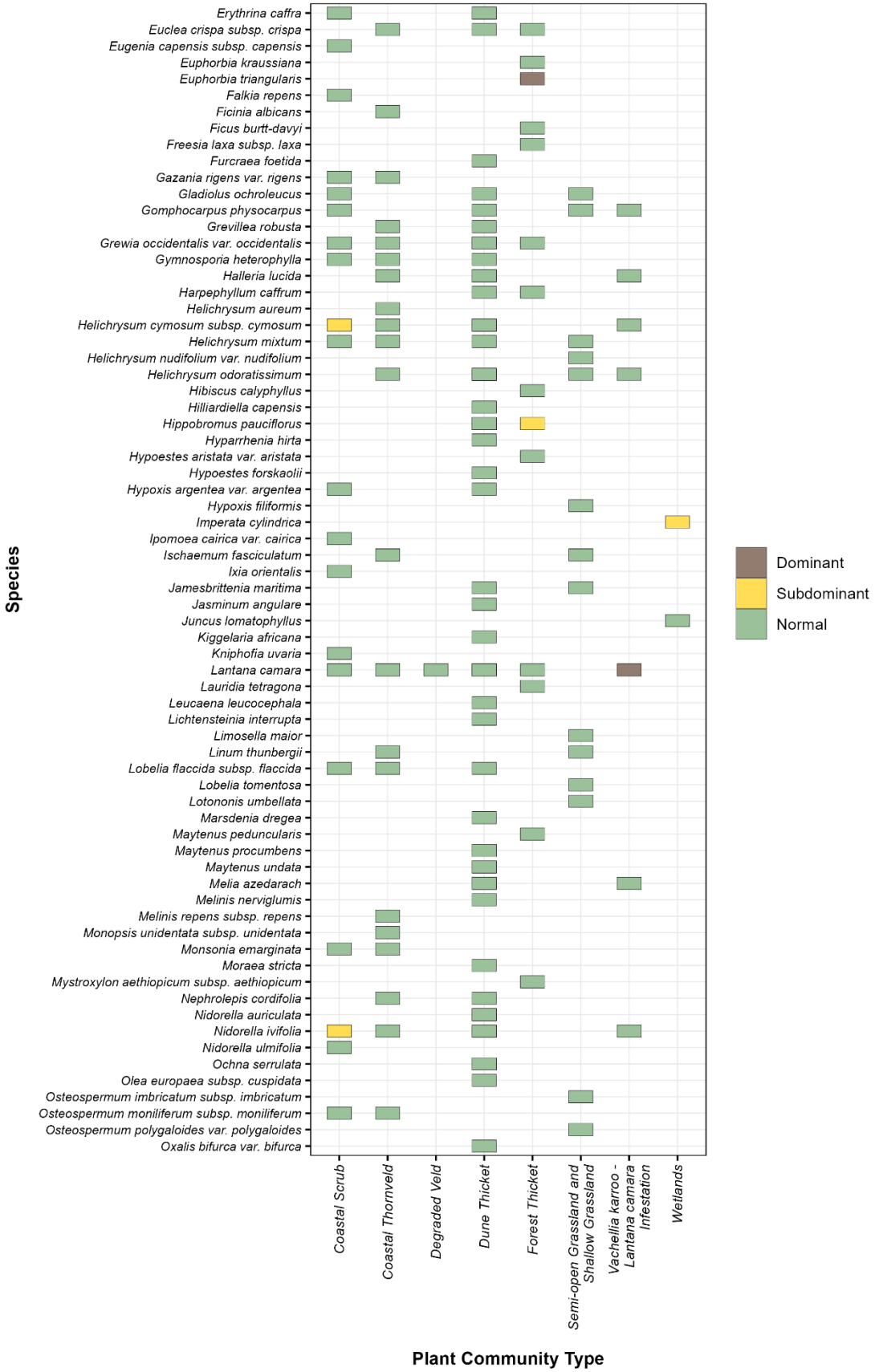

Figure 2: Continued from Figure 1.

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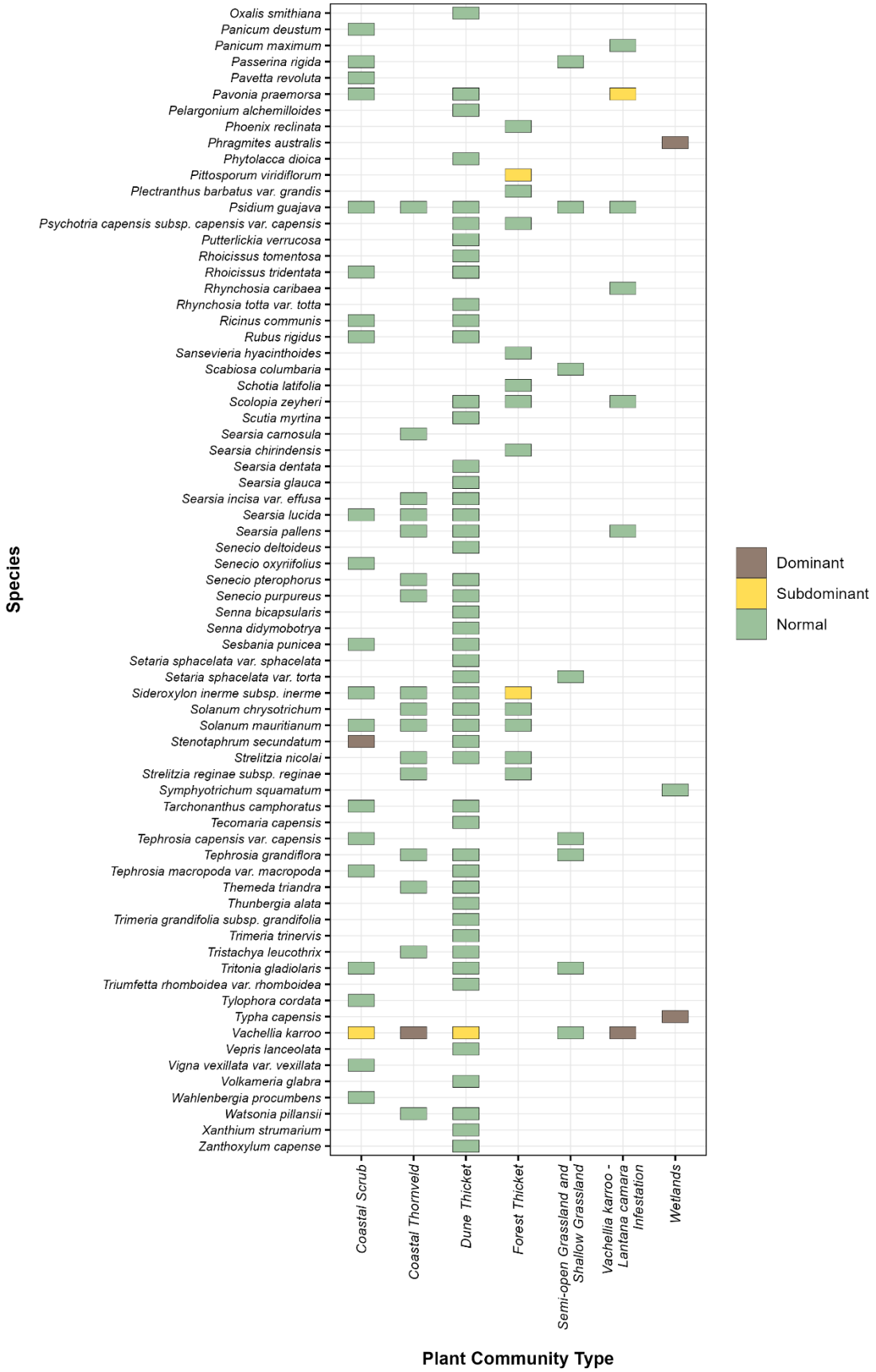

Figure 3: Continued frown Figure 2.

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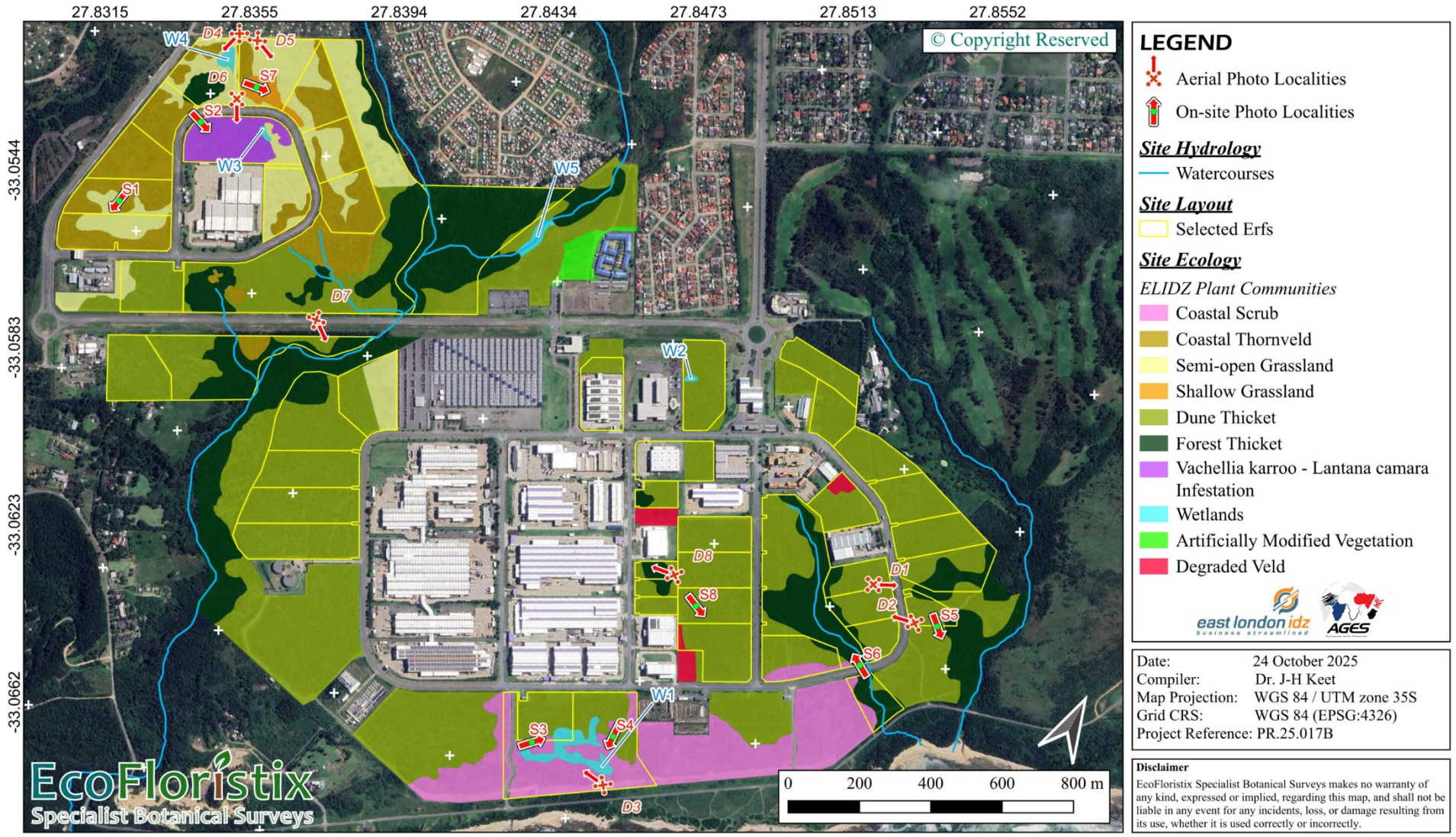

Map 12: Plant communities and other features that were observed in the study area and surrounds. Note: to optimize space, true north faces to the top right. See Figure 4 – Figure 7 for site photos. Note: arrows for aerial and site photos indicate the direction in which each respective photo was taken

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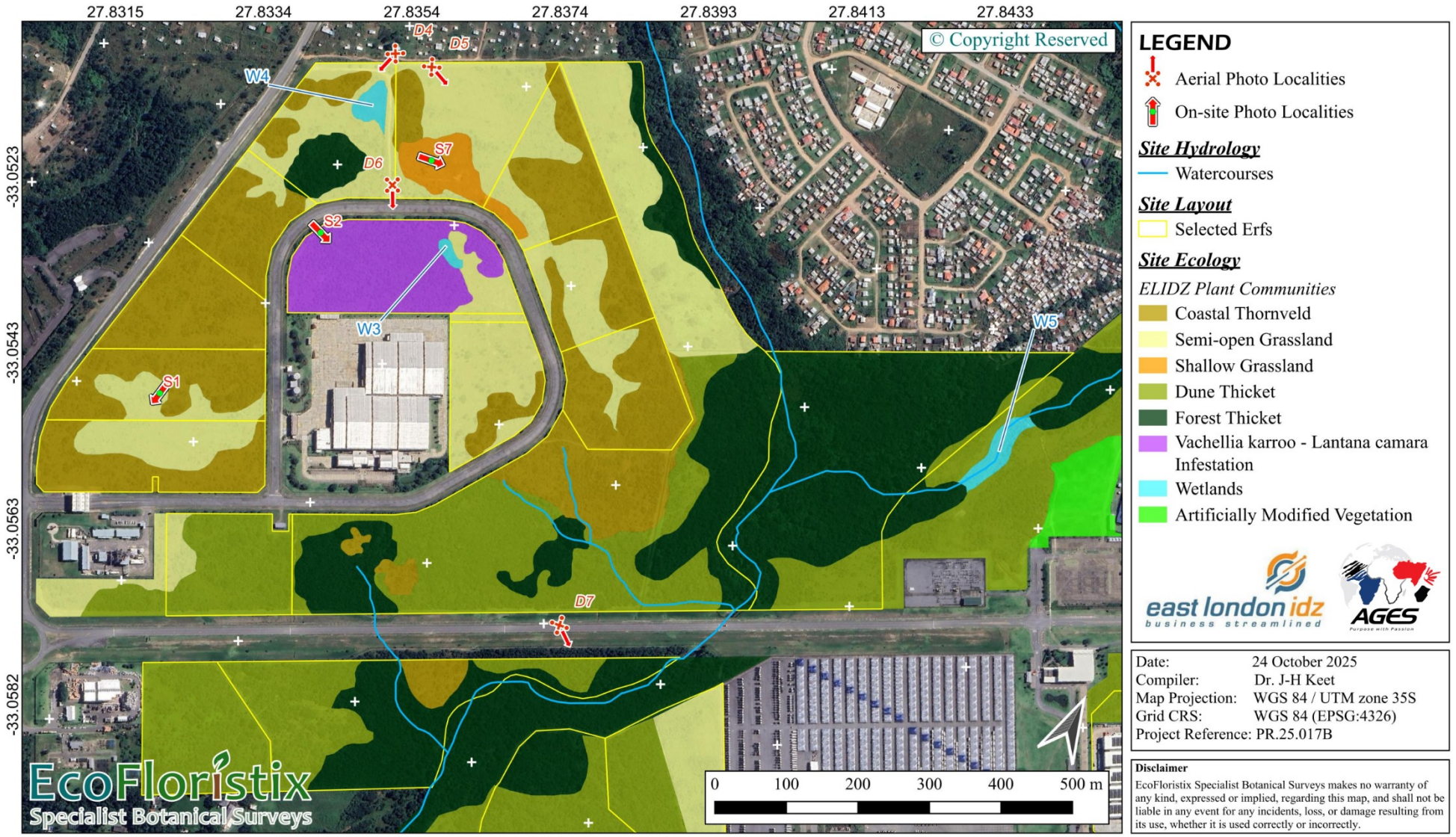

Map 13: Similar to Map 12, but with a specific focus on Zones 1B and 1C.

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Map 14: Similar to Map 12, but with a specific focus on Zone 1A.

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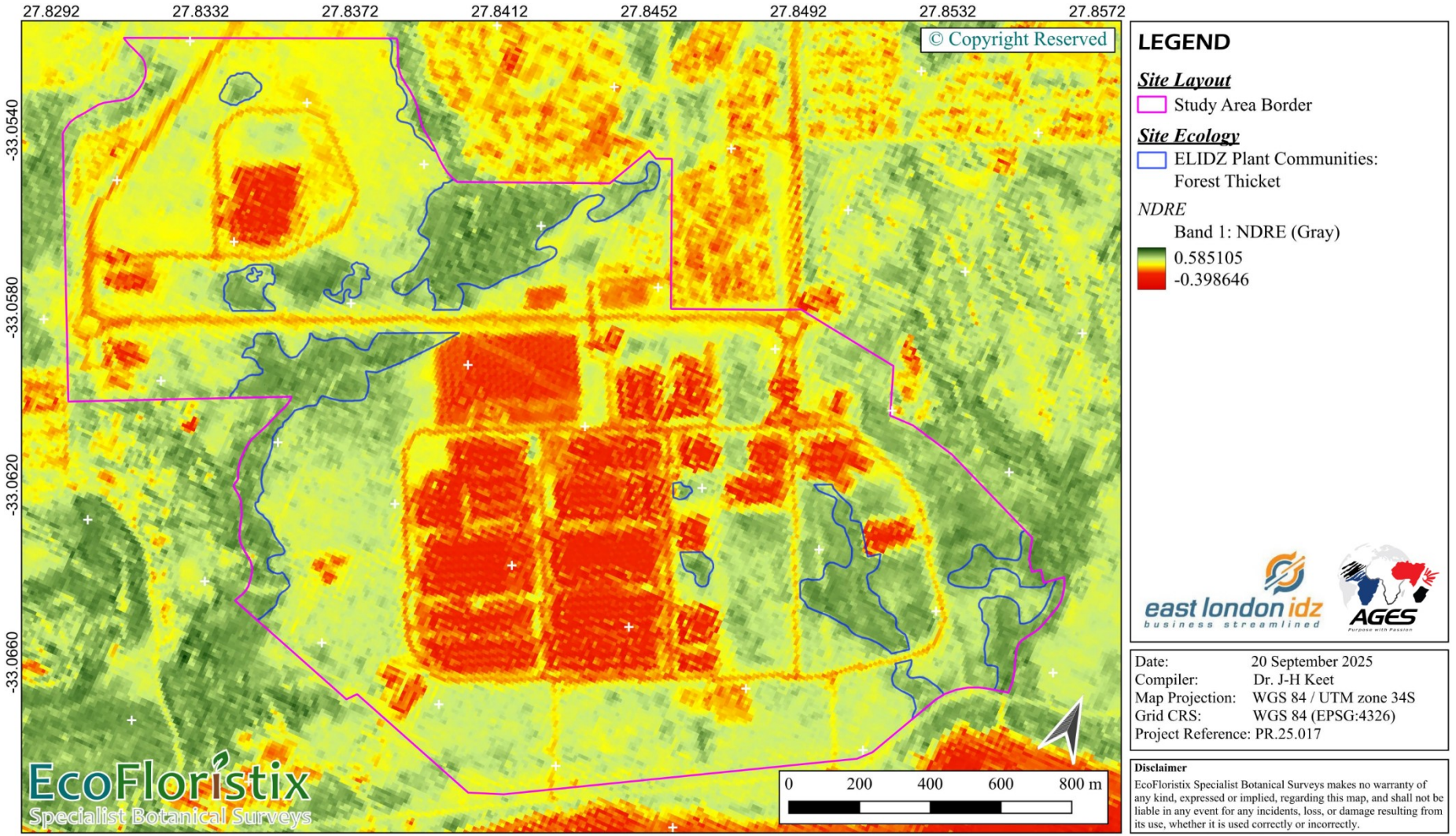

Map 15: NDRE (Normalized Difference Red Edge index) image showing the presence of Forest Thicket in the study area. The technique measures the amount of chlorophyll content in plants. Thus, mature and denser vegetation presents as darker green, while lighter areas indicate sparser and less green vegetation cover. Red areas are devoid of any significant plant cover (essentially infrastructure or the ocean). Certain specific dark green areas were not delineated as Forest Thicket (reasons for this are given in section 3.1.4).

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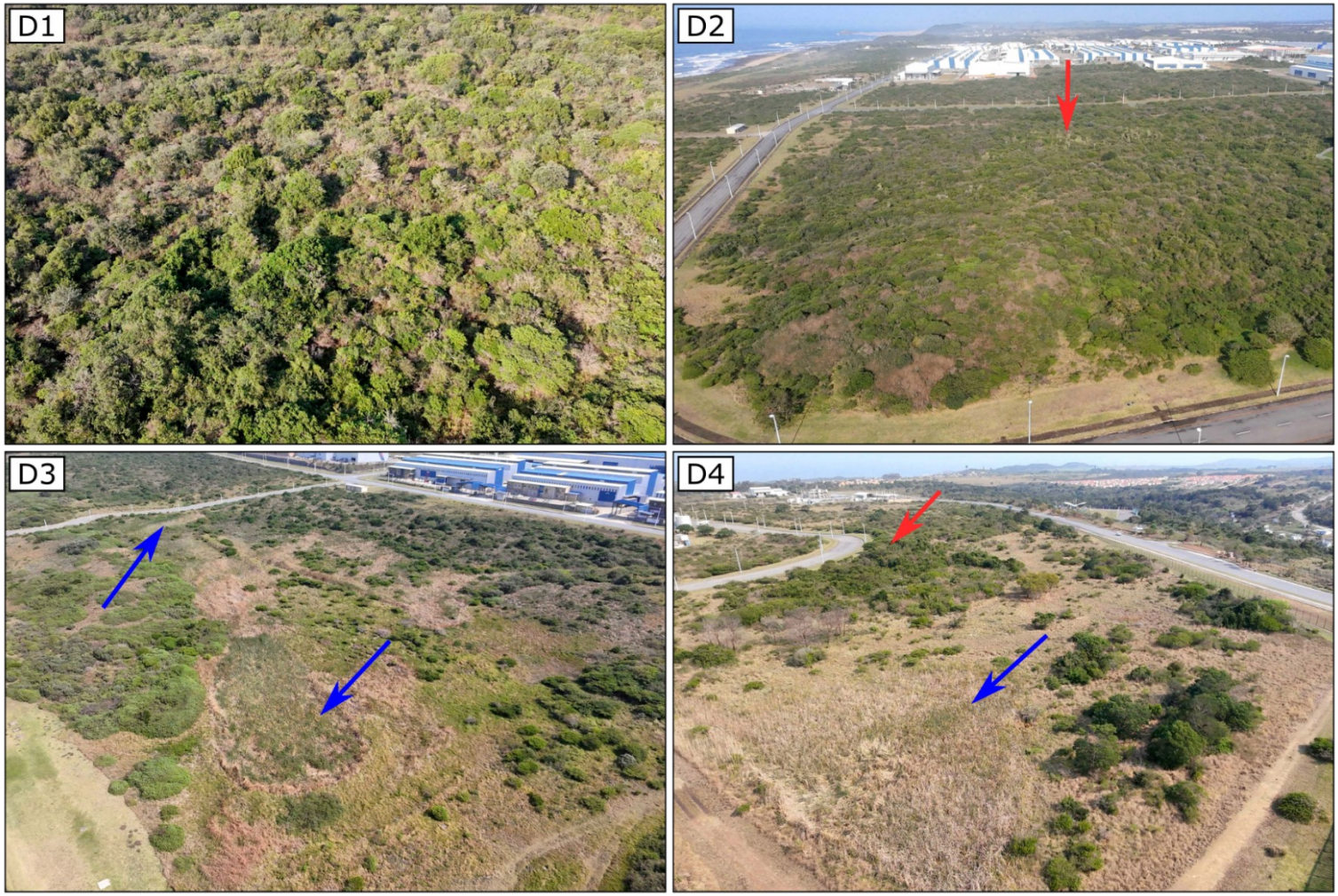

Figure 4: Aerial photos of the plant community types of the ELIDZ. D1) Dune Thicket showing the particularly dense nature of the type. D2) Forest Thicket (indicated by the red arrow showing the presence of *Euphorbia triangularis*) occurring along a watercourse and which integrates with the surrounding Dune Thicket. D3) Wetlands (indicated by blue arrows) in a surrounding matrix of Coastal Scrub, with Dune Thicket in the background. D4) Matrix of wetlands (blue arrow), Forest Thicket (red arrow), Semi-open Grassland, and Coastal Thornveld (as patches of co-dominating trees and grasses). See Map 12 - Map 14 for photo localities.

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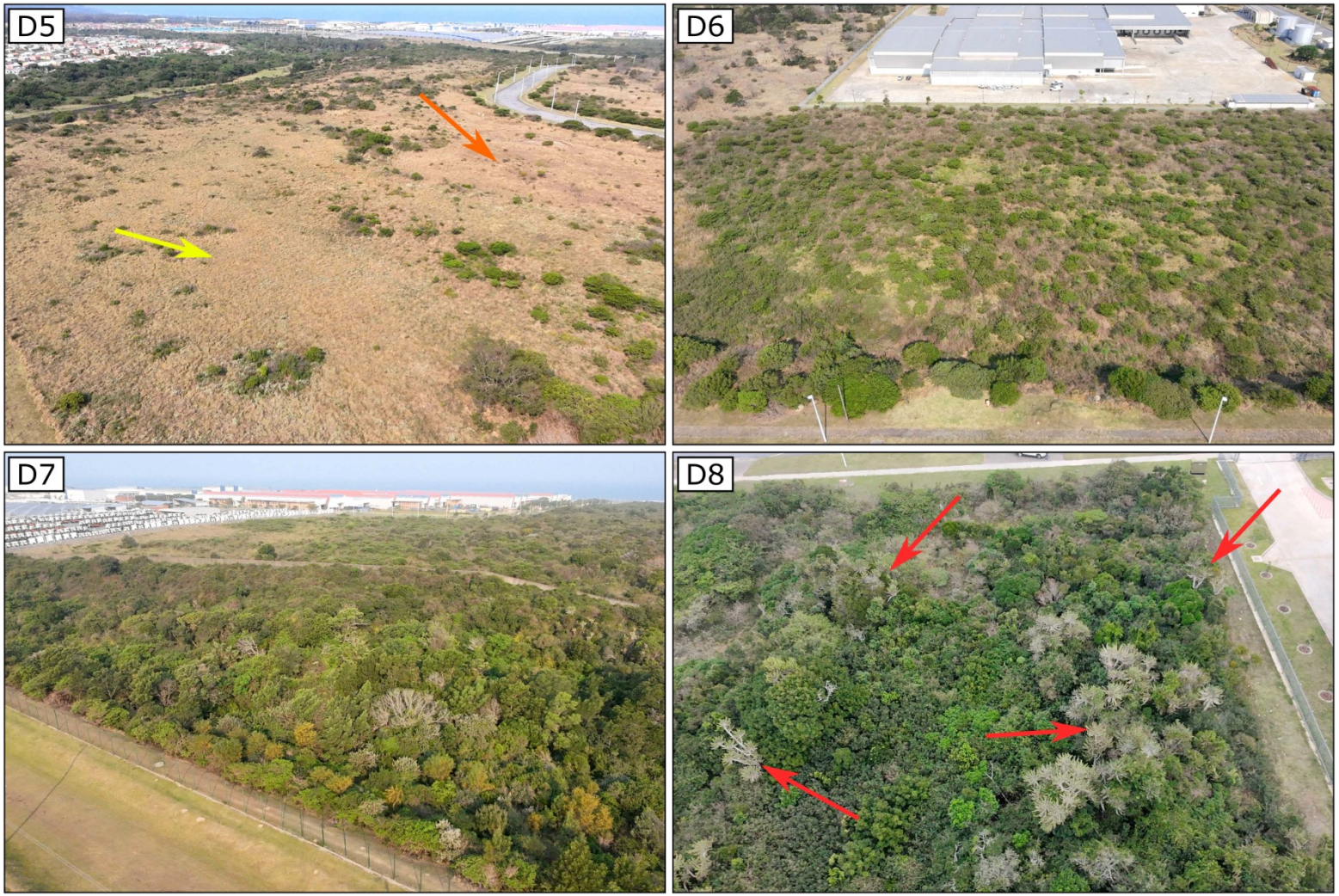

Figure 5. Continued from Figure 4. D5) Semi-open Grassland (yellow arrow) and Shallow Grassland (orange arrow). D6) *Vachellia karroo - Lantana camara* infestation showing the dense and almost impenetrable nature of this area. D7) Forest Thicket (in the foreground) occurring along a watercourse, with Dune Thicket in the top right and Semi-open Grassland in the top left. D8) A remnant of Forest Thicket, with the presence of characteristic *Euphorbia triangularis* indicated by red arrows.

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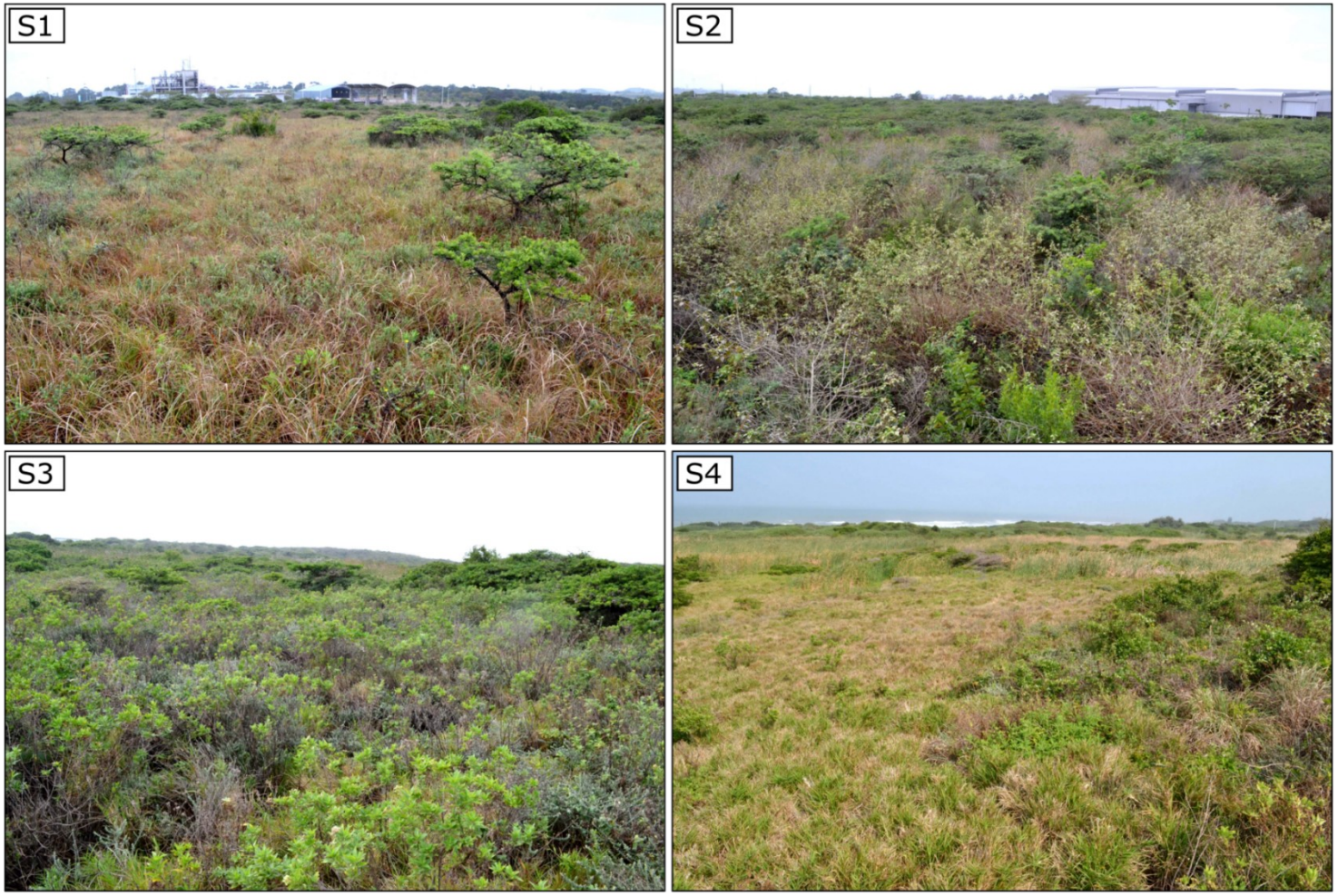

Figure 6: On-site photos of the various plant community types. S1) Semi-open Grassland integrating with Coastal Thornveld (in the background) in Zone 1B. S2) *Vachellia karroo - Lantana camara* infestation showing the almost impenetrable nature of this area. S3) A variation of Coastal Scrub showing the dominance of *Nidorella ivifolia* (light green shrubs in the foreground) and *Helichrysum cymosum* subsp. *cymosum* (bluish-grey plants); some *Vachellia karroo* shrubs occur the background. S4) Another variation of Coastal Scrub showing extensive *Stenotaphrum secundatum* lawns, with wetlands (dominated by *Typha capensis*) in the background. See Map 12 - Map 14 for photo localities, and compare with Figure 4 and Figure 5 for aerial photos.

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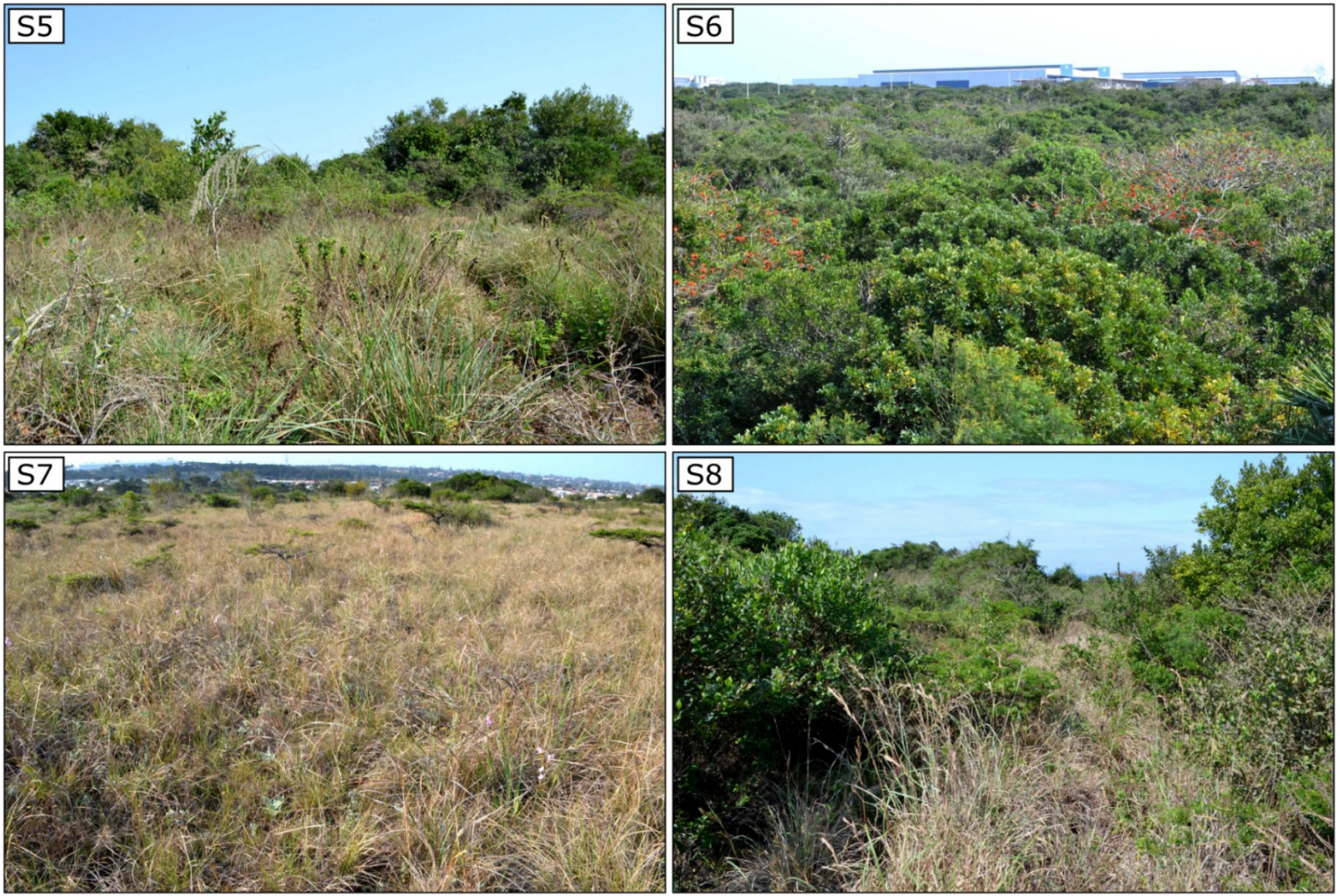

Figure 7: Continued from Figure 6. S5) A somewhat open patch of Dune Thicket integrating with Forest Thicket in the background. S6) Forest Thicket occurring along a watercourse (see D2 in Figure 4 for an aerial view); the red flowers are from *Erythrina caffra*. S7) Shallow Grassland in Zone 1B, with Coastal Thornveld in the background. S8) Dune Thicket in the southern part of Zone 1B.

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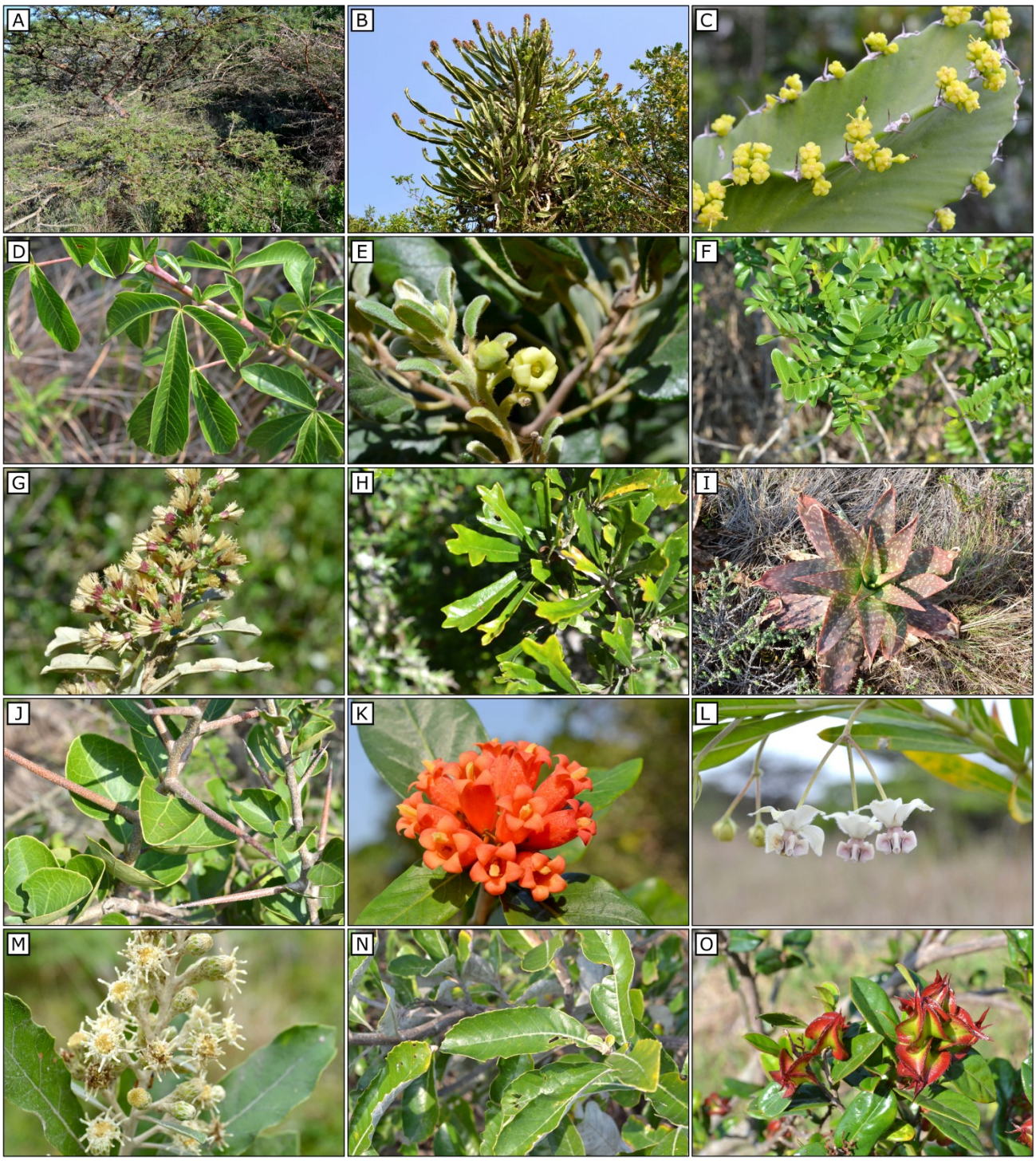

Figure 8: Selected representative plant species that were found within the study area: A) *Vachellia karroo*, B) and C) *Euphorbia triangularis*, D) *Searsia carnosula*, E) *Diospyros villosa* var. *villosa*, F) *Zanthoxylum capense*, G) and H) *Brachylaena elliptica*, I) *Aloe maculata*, J) *Scolopia zeyheri*, K) *Burchellia bubalina*, L) *Gomphocarpus physocarpus*, M) and N) *Brachylaena discolor*, O) *Diospyros scabrida* var. *scabrida*

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Figure 9: Continued from Figure 8. A) ***Lobelia tomentosa*****, B)** ***Bulbine narcissifolia*****, C)** ***Tephrosia grandiflora*****, D)** ***Nidorella auriculata*****, E)** ***Moraea stricta*****, F)** ***Dalechampia capensis*****, G)** ***Monsonia emarginata*****, H)** ***Erythrina caffra*****, I)** ***Senecio purpureus*****, J)** ***Pavonia praemorsa*****, K)** ***Scabiosa columbaria*****, L)** ***Aristea pusilla*****, M)** ***Volkameria glabra*****, N)** ***Kniphofia uvaria*****, O)** ***Dombeya burgessiae*****.**

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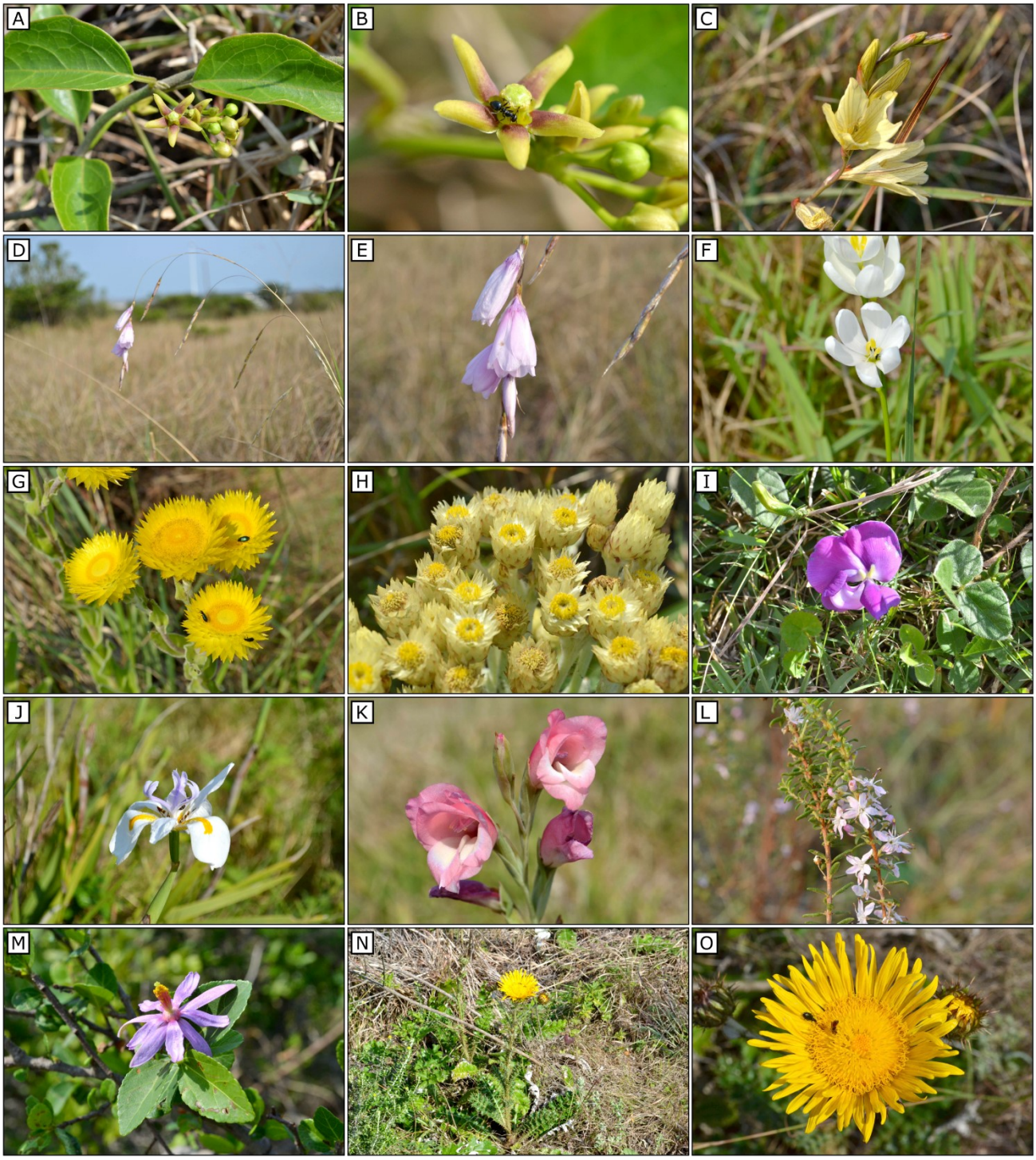

Figure 10: Continued from Figure 9. A) and B) *Marsdenia dregea*, C) *Tritonia gladiolaris*, D and E) *Dierama igneum*, F) *Ixia orientalis*, G) *Helichrysum aureum*, H) *Helichrysum mixtum*, I) *Vigna vexillata* var. *vexillata*, J) *Dietes grandiflora*, K) *Gladiolus ochroleucus*, L) *Agathosma ovata*, M) *Grewia occidentalis* var. *occidentalis*, N and O) *Berkheya decurrens*.

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Figure 11: Continued from Figure 10. A) *Psychotria capensis* subsp. *capensis* var. *capensis*, B) *Coddia rudis*, C) *Passerina rigida*, D) *Watsonia pillansii*, E) *Diospyros simii*, F) *Argyrolobium tomentosum*, G) *Senecio deltoideus*, H) *Tephrosia capensis* var. *capensis*, I) *Pelargonium alchemilloides*, J) *Cymbopogon nardus*, K) *Ischaemum fasciculatum*, L) *Eleocharis limosa*, M) *Cyperus congestus*, N) *Tristachya leucothrix*, O) *Panicum deustum*.

Note: in the sections that follow, "ECE" refers to Eastern Cape Endemic.

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3.1.1. Coastal Scrub

Species Summary Statistics:

Total: **63**

Shared:	41	SCC:	0	Native:	57
Unique:	22	Threatened:	0	Alien:	6
%Unique:	35	Protected:	10	NEM:BA:	6
		ECE:	4		

Vegetation Structure Summary:

Vegetation Density (%): >75

Tree Layer Height (cm):	0	Tree Layer Cover (%):	0
Shrub Layer Height (cm):	200	Shrub Layer Cover (%):	25 – 75
Forb Layer Height (cm):	50	Forb Layer Cover (%):	5
Graminoid Layer Height (cm):	75	Graminoid Layer Cover (%):	50 – 100

Note: This summary represents average values. Vegetation structure and composition can vary across the landscape, even within the same plant community.

This plant community type is located near the southeastern border of the IDZ in close proximity to the ocean. The community bears some resemblance to the VegMap vegetation type Hamburg Dune Thicket (AT 56). These thickets are best developed in dune slacks, whereas on more open inland slopes they occur as small bush clumps in a matrix of low coastal grassland (*Panicum deustum*, *Stenotaphrum secundatum*). However, given the large variation between this specific plant community type as compared to the other thickets occurring across much of the IDZ, especially in Zone 1A, it's best treated separately, which is the approach followed here (the other Hamburg Dune Thicket variation is treated under "Dune Thicket" in section 3.1.3.

The topography is characterized by moderate slopes with a south-eastern aspect, eventually becoming relatively flat close to the ocean where the community transitions to Cape Seashore Vegetation (AZd3) — note that the latter vegetation type does not occur in the IDZ.

Some variation occurs regarding vegetation structure. Extensive *Stenotaphrum secundatum* lawns occur towards the northeast of this unit, while shrub dominated (especially *Nidorella ivifolia* and *Helichrysum cymosum* subsp. *cymosum*) areas occur in the southwestern parts near the wetlands. Vegetation cover is very high (> 75%), especially in the *Stenotaphrum secundatum* lawns.

Dominant species include *Stenotaphrum secundatum*, with *Diospyros dichrophylla*, *Helichrysum cymosum* subsp. *cymosum*, *Nidorella ivifolia*, *Vachellia karroo* being subdominant. Nearer to the ocean *Osteospermum moniliferum* subsp. *moniliferum* becomes dominant.

No SCC were observed. However, one protected plant species was observed, namely *Sideroxylon inerme* subsp. *inerme* (LC; Nationally Protected Tree). It must be noted that a permit must be obtained from relevant local competent authorities

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to damage, destroy, or relocate any SCC or protected plant species; any such actions are considered illegal without a permit, in which case such species must be avoided completely. Furthermore, 6 NEM:BA A&IS Regulations listed species were observed, namely:

- *Cestrum laevigatum* (Inkberry; Category 1b)
- *Lantana camara* (Lantana, Tickberry, Cherry pie; Category 1b)
- *Psidium guajava* (Guava; Category 1b)
- *Ricinus communis* (Castor-oil plant; Category 2)
- *Sesbania punicea* (Red sesbania; Category 1b)
- *Solanum mauritianum* (Bugweed; Category 1b)

No large disturbances were observed in this plant community type, except for scattered occurrences of IAPs in certain areas, with a particularly problematic *Lantana camara* infestation near the centre of this unit. It is therefore capable of fulfilling its functional role within the landscape and broader ecosystem. However, historic satellite imagery shows that this area used to be much more open and grassier (section 2.3). One possible reason includes having served as grazing land for domestic livestock from the surrounding settlements — indeed, grazing by cows was observed occurring outside the IDZ fence during the site visit. Another reason might be that fire played a more important and regulatory role in the past, but has subsequently ceased given that fires are actively suppressed as much as possible near infrastructure. Given that the former is anthropogenic (livestock grazing) and the latter natural (presence of a natural fire cycle), it is thus difficult to determine with confidence what the specific plant species composition and structure must be in its natural state.

Nevertheless, the encroachment of invasive and/or native shrubs must be monitored and managed, if needed, in order to promote higher diversity.

Embedded within the plant community type are wetlands (see W1 in Map 14; treated more fully in section 3.1.6. These wetlands support a diversity of birds and aquatic animals, and should be regarded as a No-Go area.

The following species were only observed in this plant community type (however, this does not mean such species cannot or do not occur in the other types, but only that they were not specifically observed in the other types during surveying):

- *Alysicarpus rugosus subsp. rugosus* (LC)
- *Arctotheca prostrata* (LC)
- *Asparagus densiflorus* (LC)
- *Bergeranthus concavus* (LC)
- *Bulbine latifolia var. latifolia* (LC)
- *Bulbine narcissifolia* (LC)
- *Crotalaria obscura* (LC)
- *Cyperus congestus* (LC)
- *Cyphostemma cirrhosum subsp. cirrhosum* (LC)
- *Delosperma muiri* (LC)
- *Eugenia capensis subsp. capensis* (LC)
- *Falkia repens* (LC)
- *Ipomoea cairica var. cairica* (LC)
- *Ixia orientalis* (LC)
- *Kniphofia uvaria* (LC)
- *Nidorella ulmifolia* (LC)
- *Panicum deustum* (LC)
- *Pavetta revoluta* (LC)
- *Senecio oxyriifolius* (LC)
- *Tylophora cordata* (LC)
- *Vigna vexillata var. vexillata* (LC)
- *Wahlenbergia procumbens* (LC)

Finally, the following is a summary list of all species that were observed in this plant community type:

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- *Abutilon sonneratianum* (LC)
- *Alysicarpus rugosus subsp. rugosus* (LC)
- *Apodytes dimidiata subsp. dimidiata* (LC)
- *Arctotheca prostrata* (LC)
- *Asparagus densiflorus* (LC)
- *Bergeranthus concavus* (LC)
- *Berkheya bipinnatifida subsp. bipinnatifida* (LC)
- *Brachylaena discolor* (LC)
- *Bulbine latifolia var. latifolia* (LC)
- *Bulbine narcissifolia* (LC)
- *Carissa bispinosa* (LC)
- *Cestrum laevigatum* (Not Evaluated)
- *Crassula pellucida subsp. brachypetala* (LC)
- *Crotalaria obscura* (LC)
- *Cymbopogon nardus* (LC)
- *Cyperus congestus* (LC)
- *Cyphostemma cirrhosum subsp. cirrhosum* (LC)
- *Delosperma muiri* (LC)
- *Diospyros dichrophylla* (LC)
- *Diospyros simii* (LC)
- *Eragrostis capensis* (LC)
- *Erythrina caffra* (LC)
- *Eugenia capensis subsp. capensis* (LC)
- *Falkia repens* (LC)
- *Gazania rigens var. rigens* (LC)
- *Gladiolus ochroleucus* (LC)
- *Gomphocarpus physocarpus* (LC)
- *Grewia occidentalis var. occidentalis* (LC)
- *Gymnosporia heterophylla* (LC)
- *Helichrysum cymosum subsp. cymosum* (LC)
- *Helichrysum mixtum* (LC)
- *Hypoxis argentea var. argentea* (LC)
- *Ipomoea cairica var. cairica* (LC)
- *Ixia orientalis* (LC)
- *Kniphofia uvaria* (LC)
- *Lantana camara* (Not Evaluated)
- *Lobelia flaccida subsp. flaccida* (LC)
- *Monsonia emarginata* (LC)
- *Nidorella ivifolia* (LC)
- *Nidorella ulmifolia* (LC)
- *Osteospermum moniliferum subsp. moniliferum* (LC)
- *Panicum deustum* (LC)
- *Passerina rigida* (LC)
- *Pavetta revoluta* (LC)
- *Pavonia praemorsa* (LC)
- *Psidium guajava* (Not Evaluated)
- *Rhoicissus tridentata* (LC)
- *Ricinus communis* (Not Evaluated)
- *Rubus rigidus* (LC)
- *Searsia lucida* (LC)
- *Senecio oxyriifolius* (LC)
- *Sesbania punicea* (Not Evaluated)
- *Sideroxylon inerme subsp. inerme* (LC; Nationally Protected Tree)
- *Solanum mauritianum* (Not Evaluated)
- *Stenotaphrum secundatum* (LC)
- *Tarchonanthus camphoratus* (LC)
- *Tephrosia capensis var. capensis* (LC)
- *Tephrosia macropoda var. macropoda* (LC)
- *Tritonia gladiolaris* (LC)
- *Tylophora cordata* (LC)
- *Vachellia karroo* (LC)
- *Vigna vexillata var. vexillata* (LC)
- *Wahlenbergia procumbens* (LC)

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3.1.2. Coastal Thornveld

Species Summary Statistics:

Total: **64**

Shared:	54	SCC:	0	Native:	55
Unique:	10	Threatened:	0	Alien:	9
%Unique:	16	Protected:	9	NEM:BA:	9
		ECE:	1		

Vegetation Structure Summary:

Vegetation Density (%):	>75		
Tree Layer Height (cm):	350	Tree Layer Cover (%):	20
Shrub Layer Height (cm):	250	Shrub Layer Cover (%):	50 – 75
Forb Layer Height (cm):	40	Forb Layer Cover (%):	5
Graminoid Layer Height (cm):	180	Graminoid Layer Cover (%):	30 – 50

Note: This summary represents average values. Vegetation structure and composition can vary across the landscape, even within the same plant community.

This plant community type is mostly located in Zone 1B. The community conforms to a variation of the VegMap vegetation type South Eastern Coastal Thornveld (SVs 8). It is characterized by a very level topography within the IDZ.

The vegetation is co-dominated by small trees and shrubs (up to 3.5 m in height), and grasses (up to 1.8 m in height). Vegetation cover is typically high (> 75). Dominant species include *Vachellia karroo*, with *Digitaria eriantha*, *Burchellia bubalina*, and *Diospyros dichrophylla* being sub- or co-dominant.

No SCC were observed. However, one protected plant species was observed, namely *Sideroxylon inerme* subsp. *inerme* (LC; Nationally Protected Tree). It must be noted that a permit must be obtained from relevant local competent authorities to damage, destroy, or relocate any SCC or protected plant species; any such actions are considered illegal without a permit, in which case such species must be avoided completely. Furthermore, 9 alien species were also observed, all of which are NEM:BA A&IS Regulations listed species, namely:

- *Acacia mearnsii* (Black wattle; Category 2)
- *Acacia saligna* (Port Jackson, Port Jackson willow; Category 1b)
- *Cestrum laevigatum* (Inkberry; Category 1b)
- *Grevillea robusta* (Australian silky oak; Category 3)
- *Lantana camara* (Lantana, Tickberry, Cherry pie; Category 1b)
- *Nephrolepis cordifolia* (Erect sword fern, Ladder sword fern; Category 1b)
- *Psidium guajava* (Guava; Category 1b)
- *Solanum chrysotrichum* (Giant devil's fig; Category 1b)
- *Solanum mauritianum* (Bugweed; Category 1b)

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The region in which this unit occurs is a mosaic of several different structural vegetation types, ranging from grasslands to forest, and is a result of post-disturbance succession gradients as well as natural variation in geology, soil patterns and distribution of water in the landscape. It is thought that the current vegetation mosaic typical of the South Eastern Coastal Thornveld is anthropogenic and that the original (pre-settlement) vegetation was dominated by nonseasonal, dense thicket. The area of this unit was prime agricultural land which attracted early settlers who, presumably, cleared the vegetation for pastures (Hoare et al. 2006). Indeed, historic satellite imagery shows that this area used to be much more open and grassier (section 2.3). Similar to the previous plant community type, possible reasons include grazing for domestic livestock from the surrounding settlements, as well as a more frequent fire cycle, both of which have largely been eliminated with the fencing off of Zone 1B. However, unlike the Coastal Scrub and Dune Thicket areas that have significantly increased in vegetation density, this unit is still somewhat open, save for a few scattered clumps of denser vegetation. This unit also integrates with Semi-open Grassland (treated separately given it's open nature; see section 3.1.5.

A particularly problematic area that should likely also be Coastal Thornveld occurs directly to the north of the Yekani complex in Zone 1B, labelled as the "*Vachellia karroo - Lantana camara* Infestation" in Map 13 (specifically also see S2 in Figure 6 and D6 in Figure 5). An almost impenetrable complex of native *Vachellia karroo* (bush encroachment) and exotic *Lantana camara* (invasion) occurs here. As shown by historic satellite imagery, this area was much more open prior to the construction of the Yekani complex. In the year 2011, the entire area was cleared and levelled to prepare for the construction of the Yekani building complex (Figure 12). After construction was completed, the soil was presumably infilled/relevelled in the beginning of 2019. Revegetation subsequently began, and it is understandable why pioneering invasive *L. camara* colonized the site given such high levels of disturbance, and especially if there was an absence of management intervention. However, it seems that *V. karroo* was either mostly absent, or in seedling stage, up until about the end of December 2022, whereafter a drastic increase in population density occurred, and which was observed during the site surveys. This area requires urgent management intervention, firstly regarding the clearing of invasive *Lantana camara*, but also regarding thinning of bush encroaching *V. karroo*. That this area's functional integrity is compromised is clearly evident by contrasting the number of native plant species occurring in it with those occurring in the surrounding Coastal Thornveld complex (19 vs. 55).

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Figure 12: Origination and progression of the *Vachellia karroo - Lantana camara* infestation to the northwest of the Yekani building complex. Starting from directly prior to clearing and construction activities, this series of images showcases how this infestation came into being after the Yekani building complex was finished. The final image, specifically regarding the infestation, is similar to present-day conditions and satellite imagery.

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Apart from the aforementioned localized infestation, no other large disturbances were observed in this plant community type, except for scattered occurrences of IAPs in certain areas, notably *Acacia mearnsii* which occurs occasionally as clumps of individuals, as well as some *Acacia saligna*. It is therefore capable of fulfilling its functional role within the landscape and broader ecosystem. Nevertheless, the encroachment of invasive and/or native shrubs must be monitored and managed, if needed, in order to promote higher diversity.

An artificial wetland directly borders the *Vachellia karroo - Lantana camara* infestation to the northeast (see W3 in Map 13; treated more fully in section 3.1.6. This wetland supports a diversity of birds and aquatic animals, and should be regarded as a No-Go area.

The following species were only observed in this plant community type (however, this does not mean such species cannot or do not occur in the other types, but only that they were not specifically observed in the other types during surveying):

- *Agathosma ovata* (LC)
- *Aristea torulosa* (LC)
- *Buchnera dura* (LC)
- *Bulbine abyssinica* (LC)
- *Ficinia albicans* (LC)
- *Helichrysum aureum* (LC)
- *Melinis repens subsp. repens* (LC)
- *Monopsis unidentata subsp. unidentata* (LC)
- *Searsia carnosula* (LC)

Finally, the following is a summary list of all species that were observed in this plant community type:

- *Acacia mearnsii* (Not Evaluated)
- *Acacia saligna* (Not Evaluated)
- *Agathosma ovata* (LC)
- *Apodytes dimidiata subsp. dimidiata* (LC)
- *Aristea torulosa* (LC)
- *Berkheya decurrens* (LC)
- *Bolboschoenus maritimus* (LC)
- *Brachylaena elliptica* (LC)
- *Buchnera dura* (LC)
- *Bulbine abyssinica* (LC)
- *Burchellia bubalina* (LC)
- *Carissa bispinosa* (LC)
- *Cestrum laevigatum* (Not Evaluated)
- *Chamaecrista comosa var. comosa* (LC)
- *Cheilanthes viridis var. viridis* (LC)
- *Clematis brachiata* (LC)
- *Cliffortia linearifolia* (LC)
- *Cussonia spicata* (LC)
- *Cymbopogon nardus* (LC)
- *Dierama igneum* (LC)
- *Digitaria eriantha* (LC)
- *Diospyros dichrophylla* (LC)
- *Diospyros scabrida var. scabrida* (LC)
- *Eragrostis capensis* (LC)
- *Erianthemum dregei* (LC)
- *Euclea crispa subsp. crispa* (LC)
- *Ficinia albicans* (LC)
- *Gazania rigens var. rigens* (LC)
- *Grevillea robusta* (Not Evaluated)
- *Grewia occidentalis var. occidentalis* (LC)
- *Gymnosporia heterophylla* (LC)
- *Halleria lucida* (LC)
- *Helichrysum aureum* (LC)
- *Helichrysum cymosum subsp. cymosum* (LC)
- *Helichrysum mixtum* (LC)
- *Helichrysum odoratissimum* (LC)
- *Ischaemum fasciculatum* (LC)
- *Lantana camara* (Not Evaluated)
- *Linum thunbergii* (LC)
- *Lobelia flaccida subsp. flaccida* (LC)
- *Melinis repens subsp. repens* (LC)
- *Monopsis unidentata subsp. unidentata* (LC)
- *Monsonia emarginata* (LC)
- *Nephrolepis cordifolia* (Not Evaluated)

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- *Nidorella ivifolia* (LC)
- *Osteospermum moniliferum subsp. moniliferum* (LC)
- *Psidium guajava* (Not Evaluated)
- *Searsia carnosula* (LC)
- *Searsia incisa var. effusa* (LC)
- *Searsia lucida* (LC)
- *Searsia pallens* (LC)
- *Senecio pterophorus* (LC)
- *Senecio purpureus* (LC)
- *Sideroxylon inerme subsp. inerme* (LC; Nationally Protected Tree)
- *Solanum chrysotrichum* (Not Evaluated)
- *Solanum mauritianum* (Not Evaluated)
- *Strelitzia nicolai* (LC)
- *Strelitzia reginae subsp. reginae* (LC)
- *Tephrosia grandiflora* (LC)
- *Themeda triandra* (LC)
- *Tristachya leucothrix* (LC)
- *Vachellia karroo* (LC)
- *Watsonia pillansii* (LC)

3.1.3. Dune Thicket

Species Summary Statistics:

Total: **118**

Shared:	67	SCC:	0	Native:	97
Unique:	51	Threatened:	0	Alien:	21
%Unique:	43	Protected:	15	NEM:BA:	21
		ECE:	5		

Vegetation Structure Summary:

Vegetation Density (%): >75

Tree Layer Height (cm):	350	Tree Layer Cover (%):	50
Shrub Layer Height (cm):	250	Shrub Layer Cover (%):	50 – 80
Forb Layer Height (cm):	50	Forb Layer Cover (%):	5
Graminoid Layer Height (cm):	180	Graminoid Layer Cover (%):	10

Note: This summary represents average values. Vegetation structure and composition can vary across the landscape, even within the same plant community.

This is the most widespread and dominant habitat, and occurs across the majority of Zone 1A, as well as in large parts of Zones 1B and 1C. Its total area of occurrence is about 108.23 ha within the study area borders.

The community conforms to the VegMap vegetation type Hamburg Dune Thicket (AT 56). Its topography is quite variable, being sloped near watercourses and more level on hilltops. The vegetation of this plant community type is co-dominated by small trees and medium to tall shrubs. A few instances occur of more open areas where grasses also thrive, but this is not common. Vegetation cover is typically very dense (<75%) throughout its range.

Many species co-dominate in this unit, and it is difficult to assign dominance to any particular species. Nevertheless, some dominant species include *Diospyros dichrophylla* and *Vachellia karroo*, with *Burchellia bubalina* being subdominant, and *Cymbopogon nardus* being a subdominant grass in some places.

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No SCC were observed. However, one protected plant species was observed, namely *Sideroxylon inerme* subsp. *inerme* (LC; Nationally Protected Tree). It must be noted that a permit must be obtained from relevant local competent authorities to damage, destroy, or relocate any SCC or protected plant species; any such actions are considered illegal without a permit, in which case such species must be avoided completely. Furthermore, 21 NEM:BA A&IS Regulations listed species were also observed, namely:

- *Acacia mearnsii* (Black wattle; Category 2)
- *Arundo donax* (Giant reed, Spanish reed; Category 1b)
- *Canna indica* (Indian shot; Category 1b)
- *Casuarina cunninghamiana* (Beefwood; Category 1b)
- *Cestrum laevigatum* (Inkberry; Category 1b)
- *Cirsium vulgare* (Spear thistle, Scotch thistle; Category 1b)
- *Furcraea foetida* (Mauritian hemp; Category 1a)
- *Grevillea robusta* (Australian silky oak; Category 3)
- *Lantana camara* (Lantana, Tickberry, Cherry pie; Category 1b)
- *Leucaena leucocephala* (Leucaena; Category 2)
- *Melia azedarach* (Syringa; Category 1b)
- *Nephrolepis cordifolia* (Erect sword fern, Ladder sword fern; Category 1b)
- *Phytolacca dioica* (Belhambra; Category 3)
- *Psidium guajava* (Guava; Category 1b)
- *Ricinus communis* (Castor-oil plant; Category 2)
- *Senna bicapsularis* (Rambling cassia; Category 1b)
- *Senna didymobotrya* (Peanut butter cassia; Category 1b)
- *Sesbania punicea* (Red sesbania; Category 1b)
- *Solanum chrysotrichum* (Giant devil's fig; Category 1b)
- *Solanum mauritianum* (Bugweed; Category 1b)
- *Xanthium strumarium* (Large cocklebur; Category 1b)

This unit varies in its present ecological state and integrity across the various fragments, with some areas being more pristine and others having some infestation of IAPs. Generally, most of this plant community type is capable of effectively fulfilling its functional role within the landscape and broader ecosystem.

This unit had the highest plant species richness (total of 118 species) of all the plant community types observed in the study area. Most of these species (51; close to half of the total number) were not encountered in any of the other plant community types. This might be not be highly surprising given that it is, after all, the largest plant community type occurring in the study area. Therefore, a high number of species is to be expected simply given the large area. However, the Albany Thicket is renowned for its high biodiversity and concentration of endemic plant species, being considered a centre of plant endemism (A. E. van Wyk & Smith, 2001). Thus, the high number of species is also a function of the unique nature of the biome overall.

Unfortunately a large number of IAPs also occur in this unit, with a total of 21 NEM:BA A&IS Regulations listed species recorded. Not all of these occur in equal abundances, and the most problematic of these are *Acacia mearnsii*, *Cestrum laevigatum*, *Lantana camara*, *Melia azedarach*, *Psidium guajava*, *Senna bicapsularis*, and *Solanum mauritianum*. A few areas in particular are more invaded, and management intervention is required so that the high biodiversity of this unit can be maintained.

Also occurring in this unit are three highly degraded areas (labelled as "Degraded Veld" in Map 14), which presumably are remnants of previous clearing activities. These are dominated by weedy native species such as *Berkheya bipinnatifida*

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subsp. *bipinnatifida*, *Gomphocarpus physocarpus*, *Senecio pterophorus*, and *Stenotaphrum secundatum*, or other weedy alien species, such as *Plantago lanceolata*.

Finally, a small wetland occurs near the main entrance of Zone 1A (labelled W2 in Map 14). The wetland that predominantly occurs in Coastal Scrub (section 3.1.1 also borders Dune Thicket (labelled W1 in Map 14).

The following species were only observed in this plant community type (however, this does not mean such species cannot or do not occur in the other types, but only that they were not specifically observed in the other types during surveying):

- *Aloe maculata* (LC)
- *Asparagus falcatus* (LC)
- *Canthium spinosum* (LC)
- *Chaetacme aristata* (LC)
- *Chloris gayana* (LC)
- *Cynanchum ellipticum* (LC)
- *Dalechampia capensis* (LC)
- *Eragrostis curvula* (LC)
- *Hilliardiella capensis* (LC)
- *Hyparrhenia hirta* (LC)
- *Hypoestes forskaolii* (LC)
- *Jasminum angulare* (LC)
- *Kiggelaria africana* (LC)
- *Lichtensteinia interrupta* (LC)
- *Marsdenia dregea* (LC)
- *Maytenus procumbens* (LC)
- *Maytenus undata* (LC)
- *Melinis nerviglumis* (LC)
- *Moraea stricta* (LC)
- *Nidorella auriculata* (LC)
- *Ochna serrulata* (LC)
- *Olea europaea subsp. cuspidata* (LC)
- *Oxalis bifurca var. bifurca* (LC)
- *Oxalis smithiana* (LC)
- *Pelargonium alchemilloides* (LC)
- *Phytolacca dioica* (Not Evaluated)
- *Putterlickia verrucosa* (LC)
- *Rhoicissus tomentosa* (LC)
- *Rhynchosia totta var. totta* (LC)
- *Scutia myrtina* (LC)
- *Searsia dentata* (LC)
- *Searsia glauca* (LC)
- *Senecio deltoideus* (LC)
- *Senna bicapsularis* (Not Evaluated)
- *Senna didymobotrya* (Not Evaluated)
- *Setaria sphacelata var. sphacelata* (LC)
- *Tecomaria capensis* (LC)
- *Thunbergia alata* (LC)
- *Trimeria grandifolia subsp. grandifolia* (LC)
- *Trimeria trinervis* (LC)
- *Triumfetta rhomboidea var. rhomboidea* (LC)
- *Vepris lanceolata* (LC)
- *Volkameria glabra* (LC)
- *Xanthium strumarium* (Not Evaluated)
- *Zanthoxylum capense* (LC)

Finally, the following is a summary list of all species that were observed in this plant community type:

- *Abutilon sonneratianum* (LC)
- *Acacia mearnsii* (Not Evaluated)
- *Aloe maculata* (LC)
- *Apodytes dimidiata subsp. dimidiata* (LC)
- *Arundo donax* (Not Evaluated)
- *Asparagus falcatus* (LC)
- *Berkheya bipinnatifida subsp. bipinnatifida* (LC)
- *Berkheya decurrens* (LC)
- *Brachylaena discolor* (LC)
- *Brachylaena elliptica* (LC)
- *Burchellia bubalina* (LC)
- *Canna indica* (Not Evaluated)
- *Canthium spinosum* (LC)
- *Carissa bispinosa* (LC)
- *Casuarina cunninghamiana* (Not Evaluated)
- *Cestrum laevigatum* (Not Evaluated)
- *Chaetacme aristata* (LC)
- *Cheilanthes viridis var. viridis* (LC)
- *Chloris gayana* (LC)
- *Cirsium vulgare* (Not Evaluated)
- *Clematis brachiata* (LC)
- *Crassula pellucida subsp. brachypetala* (LC)
- *Cymbopogon nardus* (LC)
- *Cynanchum ellipticum* (LC)

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- *Dalechampia capensis* (LC)
- *Dietes grandiflora* (LC)
- *Diospyros dichrophylla* (LC)
- *Diospyros scabrida var. scabrida* (LC)
- *Diospyros simii* (LC)
- *Diospyros villosa var. villosa* (LC)
- *Eragrostis curvula* (LC)
- *Erianthemum dregei* (LC)
- *Erythrina caffra* (LC)
- *Euclea crispa subsp. crispa* (LC)
- *Furcraea foetida* (Not Evaluated)
- *Gladiolus ochroleucus* (LC)
- *Gomphocarpus physocarpus* (LC)
- *Grevillea robusta* (Not Evaluated)
- *Grewia occidentalis var. occidentalis* (LC)
- *Gymnosporia heterophylla* (LC)
- *Halleria lucida* (LC)
- *Harpephyllum caffrum* (LC)
- *Helichrysum cymosum subsp. cymosum* (LC)
- *Helichrysum mixtum* (LC)
- *Helichrysum odoratissimum* (LC)
- *Hilliardiella capensis* (LC)
- *Hippobromus pauciflorus* (LC)
- *Hyparrhenia hirta* (LC)
- *Hypoestes forskaolii* (LC)
- *Hypoxis argentea var. argentea* (LC)
- *Jamesbrittenia maritima* (LC)
- *Jasminum angulare* (LC)
- *Kiggelaria africana* (LC)
- *Lantana camara* (Not Evaluated)
- *Leucaena leucocephala* (Not Evaluated)
- *Lichtensteinia interrupta* (LC)
- *Lobelia flaccida subsp. flaccida* (LC)
- *Marsdenia dregea* (LC)
- *Maytenus procumbens* (LC)
- *Maytenus undata* (LC)
- *Melia azedarach* (Not Evaluated)
- *Melinis nerviglumis* (LC)
- *Moraea stricta* (LC)
- *Nephrolepis cordifolia* (Not Evaluated)
- *Nidorella auriculata* (LC)
- *Nidorella ivifolia* (LC)
- *Ochna serrulata* (LC)
- *Olea europaea subsp. cuspidata* (LC)
- *Oxalis bifurca var. bifurca* (LC)
- *Oxalis smithiana* (LC)
- *Pavonia praemorsa* (LC)
- *Pelargonium alchemilloides* (LC)
- *Phytolacca dioica* (Not Evaluated)
- *Psidium guajava* (Not Evaluated)
- *Psychotria capensis subsp. capensis var. capensis* (Not Evaluated)
- *Putterlickia verrucosa* (LC)
- *Rhoicissus tomentosa* (LC)
- *Rhoicissus tridentata* (LC)
- *Rhynchosia totta var. totta* (LC)
- *Ricinus communis* (Not Evaluated)
- *Rubus rigidus* (LC)
- *Scolopia zeyheri* (LC)
- *Scutia myrtina* (LC)
- *Searsia dentata* (LC)
- *Searsia glauca* (LC)
- *Searsia incisa var. effusa* (LC)
- *Searsia lucida* (LC)
- *Searsia pallens* (LC)
- *Senecio deltoideus* (LC)
- *Senecio pterophorus* (LC)
- *Senecio purpureus* (LC)
- *Senna bicapsularis* (Not Evaluated)
- *Senna didymobotrya* (Not Evaluated)
- *Sesbania punicea* (Not Evaluated)
- *Setaria sphacelata var. sphacelata* (LC)
- *Setaria sphacelata var. torta* (LC)
- *Sideroxylon inerme subsp. inerme* (LC; Nationally Protected Tree)
- *Solanum chrysotrichum* (Not Evaluated)
- *Solanum mauritianum* (Not Evaluated)
- *Stenotaphrum secundatum* (LC)
- *Strelitzia nicolai* (LC)
- *Tarchonanthus camphoratus* (LC)
- *Tecomaria capensis* (LC)
- *Tephrosia grandiflora* (LC)
- *Tephrosia macropoda var. macropoda* (LC)
- *Themeda triandra* (LC)
- *Thunbergia alata* (LC)
- *Trimeria grandifolia subsp. grandifolia* (LC)
- *Trimeria trinervis* (LC)
- *Tristachya leucothrix* (LC)
- *Tritonia gladiolaris* (LC)
- *Triumfetta rhomboidea var. rhomboidea* (LC)
- *Vachellia karroo* (LC)
- *Vepris lanceolata* (LC)
- *Volkameria glabra* (LC)
- *Watsonia pillansii* (LC)
- *Xanthium strumarium* (Not Evaluated)
- *Zanthoxylum capense* (LC)

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3.1.4. Forest Thicket

Species Summary Statistics:

Total: **36**

Shared:	17	SCC:	0	Native:	32
Unique:	19	Threatened:	0	Alien:	5
%Unique:	53	Protected:	6	NEM:BA:	5
		ECE:	0		

Vegetation Structure Summary:

Vegetation Density (%): >75

Tree Layer Height (cm):	400	Tree Layer Cover (%):	40
Shrub Layer Height (cm):	300	Shrub Layer Cover (%):	50
Forb Layer Height (cm):	75	Forb Layer Cover (%):	10
Graminoid Layer Height (cm):	30	Graminoid Layer Cover (%):	2

Note: This summary represents average values. Vegetation structure and composition can vary across the landscape, even within the same plant community.

This plant community type occurs mostly in association with watercourses both inside and outside the IDZ, and with a few isolated occurrences away from watercourses. Some of these are historic remnants (see section 2.3). It is thus scattered in the IDZ, but mainly occurs as three large areas, namely:

- The first instance is located in the eastern section of zone 1A and is associated with a watercourse traversing through a block of natural vegetation, then underneath Mkhokhokho Road through a culvert, ultimately draining into the ocean.
- The second instance occurs in the extreme Eastern side of the IDZ and is mostly associated with a water course occurring outside of the fence.
- The third instance occurs across most of Zone 1C, traversing across the road towards Zone 1A in its western section. Part of it also occurs in the southern section of Zone 1B

A few scattered instances occur as remnants in Zone 1A very close to infrastructure, as well as a historic patch in the northwestern section of Zone 1B. This community comprises a total area size of about 39.62 ha as mapped within the borders of the study area. The vegetation of this plant community type is co-dominated by shrubs and small trees (3 – 5 m in height), and is characterized by a dense canopy. Vegetation cover is typically very high (< 75%). The topography is usually characterized by moderate slopes associated with watercourses.

Whether or not this community conforms to the VegMap vegetation type Umtiza Forest Thicket, or more properly to Hamburg Dune Thicket, is difficult to determine with confidence given the paucity of information regarding Umtiza Forest Thicket. The official description (according to SANBI) lists only a few species associated with this type, most of which are very widespread (*Ekebergia capensis*, *Harpephyllum caffrum*, *Canthium inerme*, *Gymnosporia buxifolia*, *Euphorbia triangularis*) and found in many other vegetation types. Umtiza Forest Thicket is related to Buffels Mesic Thicket, but this

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occurs further inland and is characteristically associated with very steep slopes. Thus, the Forest Thicket as present here cannot truly be considered Umtiza Forest Thicket because it firstly lacks one of the dominant and characteristic species associated with it (*Umtiza listeriana*) — though the possibility always exists that it was just not specifically encountered — and because it shares many elements common to the surrounding dune thicket. However, given its preponderance for associating with watercourses, it is still classified as a separate plant community type from the surrounding Dune Thicket, but it is important to note that it might potentially only be overgrown Dune Thicket. Thus, Forest Thicket as presented here might actually have been true Dune Thicket historically, while the surrounding Dune Thicket areas might instead have been true Coastal Thornveld. Irrespective of these uncertainties, the current classification presented here conforms more practically to on-site conditions.

Various species alternate in dominance. A very characteristic species of this unit *Euphorbia triangularis*.

No SCC were observed. However, 2 protected plant species were observed, namely *Pittosporum viridiflorum* (LC) and *Sideroxylon inerme* subsp. *inerme* (LC), both which are Nationally Protected Trees. It must be noted that a permit must be obtained from relevant local competent authorities to damage, destroy, or relocate any SCC or protected plant species; any such actions are considered illegal without a permit, in which case such species must be avoided completely. Furthermore, 5 NEM:BA A&IS Regulations listed species were observed, namely:

- *Cestrum laevigatum* (Inkberry; Category 1b)
- *Lantana camara* (Lantana, Tickberry, Cherry pie; Category 1b)
- *Plectranthus barbatus var. grandis* (Abyssinian' coleus, Woolly plectranthus; Category 1b)
- *Solanum chrysotrichum* (Giant devil's fig; Category 1b)
- *Solanum mauritianum* (Bugweed; Category 1b)

Many of the Dune Thicket areas on-site can easily be confused with Forest Thicket, since both characteristically have a very high vegetation density. However, the high density of these Dune Thicket areas is likely mostly due to the absence of fire and large browsing animals. Consequently, many areas that appear to be Forest Thicket are actually overgrown thicket patches (or possibly even overgrown Coastal Thornveld in the case of Zone 1B). In fact, it is noted by others that the present forest-like condition of Umtiza Forest Thicket, which occurs not far away from the study area, may be attributable to "over-protection" from periodic fires and/or disturbance by large mammals (e.g. elephants). In the past periodic disturbance by large herbivores, such as elephants, and occasional spot-fires started by lightning probably reduced the dominance of the woody trees to the point that even grass patches may have occurred in this unit. These disturbance regimes would have allowed elements of both the forest and those of the thicket vegetation to co-occur in close association (Vlok & Euston-Brown 2002). This could highly likely even be the case with the Dune Thicket areas on-site.

Therefore, given the difficulties in distinguishing between, and delineating, Dune and Forest Thicket units, historic imagery was first used to delineate the Forest Thicket patches (see section 2.3). In conjunction with this, NDRE (Normalized Difference Red Edge index) imagery was used, which is a remote sensing metric that assesses the health and vitality of vegetation by measuring the amount of chlorophyll content in plants. NDRE is similar to NDVI (Normalized Difference Vegetation Index), but NDRE is more useful for monitoring mature, dense vegetation, and thus in this case presents as highly useful in distinguishing dense and dark green Forest Thicket areas from their surrounds. Finally, on-site verification was done based on characteristic species and these delimitations, both at ground level and from aerial photography. The

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final delineated areas are thus considered true Forest Thicket. They have certain characteristic species that are either absent or very sparse in the Dune Thicket units. Moreover, had past disturbance regimes still continued today, these Forest Thicket patches would likely not have spread further into the surrounding Dune Thicket.

When using NDRE satellite imagery it is clear that the Forest Thicket areas present as quite distinct from the surrounding Dune Thicket units (Map 15), which results from the darker green colour of their characteristic species in contrast to surrounding Dune Thicket. The only exceptions occur in the south-central part of Zone 1B and the eastern section of Zone 1A. In both of these areas, historic satellite imagery shows that Forest Thicket was not present to a significant degree, and these areas were thus eventually colonized by Dune Thicket. These areas were therefore not mapped as Forest Thicket.

Importantly, Forest Thicket as presented here cannot be considered a true or natural forest, such as Scarp Forest (FOz 5) which does occur in the broader surrounds. Species notably absent on-site, and which are indeed characteristic of true Scarp Forest, are *Buxus macowanii*, *B. natalensis*, *Millettia grandis, Vepris bachmanii, Philenoptera sutherlandii*, and *Rothmannia globosa*. Nevertheless, given the unique nature of this unit as well as its often close proximity to watercourses, it should still be regarded as sensitive. See section 3.5 for more details regarding the presence/absence of natural forests within the ELIDZ.

Overall this unit seems much less disturbed and prone to invasion than the other units, though certain IAPs are prevalent around the fringes of some of the Forest Thicket patches. The unit is therefore capable of effectively fulfilling its functional role within the landscape and broader ecosystem.

The following species were only observed in this plant community type (however, this does not mean such species cannot or do not occur in the other types, but only that they were not specifically observed in the other types during surveying):

- *Adenopodia spicata* (LC)
- *Clutia pulchella var. pulchella* (LC)
- *Cyrtomium micropterum* (LC)
- *Dombeya burgessiae* (LC)
- *Euphorbia kraussiana* (LC)
- *Euphorbia triangularis* (LC)
- *Ficus burtt-davyi* (LC)
- *Freesia laxa subsp. laxa* (LC)
- *Hibiscus calyphyllus* (LC)
- *Hypoestes aristata var. aristata* (LC)
- *Lauridia tetragona* (LC)
- *Maytenus peduncularis* (LC)
- *Mystroxylon aethiopicum subsp. aethiopicum* (LC)
- *Phoenix reclinata* (LC)
- *Pittosporum viridiflorum* (LC; Nationally Protected Tree)
- *Plectranthus barbatus var. grandis* (Not Evaluated)
- *Sansevieria hyacinthoides* (LC)
- *Schotia latifolia* (LC)
- *Searsia chirindensis* (LC)

Finally, the following is a summary list of all species that were observed in this plant community type:

- *Adenopodia spicata* (LC)
- *Brachylaena elliptica* (LC)
- *Carissa bispinosa* (LC)
- *Cestrum laevigatum* (Not Evaluated)
- *Clutia pulchella var. pulchella* (LC)
- *Cussonia spicata* (LC)
- *Cyrtomium micropterum* (LC)
- *Diospyros villosa var. villosa* (LC)
- *Dombeya burgessiae* (LC)
- *Euclea crispa subsp. crispa* (LC)
- *Euphorbia kraussiana* (LC)
- *Euphorbia triangularis* (LC)

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- *Ficus burtt-davyi* (LC)
- *Freesia laxa subsp. laxa* (LC)
- *Grewia occidentalis var. occidentalis* (LC)
- *Harpephyllum caffrum* (LC)
- *Hibiscus calyphyllus* (LC)
- *Hippobromus pauciflorus* (LC)
- *Hypoestes aristata var. aristata* (LC)
- *Lantana camara* (Not Evaluated)
- *Lauridia tetragona* (LC)
- *Maytenus peduncularis* (LC)
- *Mystroxylon aethiopicum subsp. aethiopicum* (LC)
- *Phoenix reclinata* (LC)
- *Pittosporum viridiflorum* (LC; Nationally Protected Tree)
- *Plectranthus barbatus var. grandis* (Not Evaluated)
- *Psychotria capensis subsp. capensis var. capensis* (Not Evaluated)
- *Sansevieria hyacinthoides* (LC)
- *Schotia latifolia* (LC)
- *Scolopia zeyheri* (LC)
- *Searsia chirindensis* (LC)
- *Sideroxylon inerme subsp. inerme* (LC; Nationally Protected Tree)
- *Solanum chrysotrichum* (Not Evaluated)
- *Solanum mauritianum* (Not Evaluated)
- *Strelitzia nicolai* (LC)
- *Strelitzia reginae subsp. reginae* (LC)

3.1.5. Semi-open Grassland and Shallow Grassland

Species Summary Statistics:

Total: **38**

Shared:	21	SCC:	1	Native:	34
Unique:	17	Threatened:	0	Alien:	4
%Unique:	45	Protected:	7	NEM:BA:	4
		ECE:	2		

Vegetation Structure Summary:

Vegetation Density (%): >75

Tree Layer Height (cm):	0	Tree Layer Cover (%):	0
Shrub Layer Height (cm):	180	Shrub Layer Cover (%):	10
Forb Layer Height (cm):	80	Forb Layer Cover (%):	20
Graminoid Layer Height (cm):	170	Graminoid Layer Cover (%):	80

Note: This summary represents average values. Vegetation structure and composition can vary across the landscape, even within the same plant community.

Although Semi-open Grassland and Shallow Grassland are mapped separately, they are treated together here given their similarities, and differences will be highlighted where applicable.

These plant communities are located from the northwestern to the eastern parts of Zone 1B. Both types technically form part of the larger VegMap vegetation type South Eastern Coastal Thornveld (SVs 8). However, given their compositional and structural nature (being dominated by grasses), they are treated as distinct units, and do not properly conform to South

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Eastern Coastal Thornveld (SVs 8). However, it must be noted that this is a fine scale classification, and it is still likely that these are just anomalous variations of South Eastern Coastal Thornveld (SVs 8).

These communities are characterized by a very level topography. A key difference between the Semi-open Grassland and Shallow Grassland areas relates to soil depth and subsequent rockiness. The Shallow Grassland section specifically has very shallow soils, giving rise to parts that are rockier in nature and which create a slightly different microclimate than the surrounding grassland, and thus house a few species that do not occur in the Semi-open Grassland areas.

The vegetation of both types are dominated by grasses, with some shrubs interspersed in it. Vegetation cover is typically high (> 75%) for the Semi-open Grassland areas, while the shallow soil nature of the Shallow Grassland area gives rise a slightly sparser (about 50%) cover.

Dominant species in both types include *Digitaria eriantha* and *Eragrostis capensis*, although other grasses vary in abundance and dominance (*Ischaemum fasciculatum*, *Setaria sphacelata* var. *torta*).

A few species seem to prefer the Shallow Grassland and indeed are mostly found in it and not in the Semi-open Grassland areas. These include *Argyrolobium tomentosum* (LC), *Athanasia dentata* (LC), *Centella glabrata* (LC), *Limosella maior* (LC), *Lobelia tomentosa* (LC), and *Osteospermum polygaloides var. polygaloides* (LC).

No protected plant species were observed. However, one SCC was found in the Semi-open Grassland, namely *Erica orientalis* (DDT). A single locality was found and only a few individuals were encountered. It's possible that more instances of it might occur beyond the study area border.

Few IAPs occur in this unit and do not seem to be a major problem, except for *Acacia saligna* (Port Jackson, Port Jackson willow; Category 1b), which occurs at a few areas, though never in extremely high abundances. Apart from these instances, no obvious disturbances were observed in this plant community type and it is mostly in a good condition; it is therefore capable of effectively fulfilling its functional role within the landscape and broader ecosystem.

The following species were only observed in these two plant community types (however, this does not mean such species cannot or do not occur in the other types, but only that they were not specifically observed in the other types during surveying):

- *Argyrolobium tomentosum* (LC)
- *Aristea ecklonii* (LC)
- *Aristea pusilla* (LC)
- *Athanasia dentata* (LC)
- *Bulbostylis contexta* (LC)
- *Centella glabrata* (LC)
- *Cortaderia selloana* (Not Evaluated)
- *Erica orientalis* (DDT)
- *Eriosema salignum* (LC)
- *Helichrysum nudifolium var. nudifolium* (LC)
- *Hypoxis filiformis* (LC)
- *Limosella maior* (LC)
- *Lobelia tomentosa* (LC)
- *Lotononis umbellata* (LC)
- *Osteospermum imbricatum subsp. imbricatum* (LC)
- *Osteospermum polygaloides var. polygaloides* (LC)
- *Scabiosa columbaria* (LC)

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Finally, the following is a summary list of all species that were observed in these plant community types:

- *Acacia mearnsii* (Not Evaluated)
- *Acacia saligna* (Not Evaluated)
- *Argyrolobium tomentosum* (LC)
- *Aristea ecklonii* (LC)
- *Aristea pusilla* (LC)
- *Athanasia dentata* (LC)
- *Bulbostylis contexta* (LC)
- *Centella glabrata* (LC)
- *Chamaecrista comosa var. comosa* (LC)
- *Cliffortia linearifolia* (LC)
- *Cortaderia selloana* (Not Evaluated)
- *Dierama igneum* (LC)
- *Digitaria eriantha* (LC)
- *Eragrostis capensis* (LC)
- *Erica orientalis* (DDT)
- *Eriosema salignum* (LC)
- *Gladiolus ochroleucus* (LC)
- *Gomphocarpus physocarpus* (LC)
- *Helichrysum mixtum* (LC)
- *Helichrysum nudifolium var. nudifolium* (LC)
- *Helichrysum odoratissimum* (LC)
- *Hypoxis filiformis* (LC)
- *Ischaemum fasciculatum* (LC)
- *Jamesbrittenia maritima* (LC)
- *Limosella maior* (LC)
- *Linum thunbergii* (LC)
- *Lobelia tomentosa* (LC)
- *Lotononis umbellata* (LC)
- *Osteospermum imbricatum subsp. imbricatum* (LC)
- *Osteospermum polygaloides var. polygaloides* (LC)
- *Passerina rigida* (LC)
- *Psidium guajava* (Not Evaluated)
- *Scabiosa columbaria* (LC)
- *Setaria sphacelata var. torta* (LC)
- *Tephrosia capensis var. capensis* (LC)
- *Tephrosia grandiflora* (LC)
- *Tritonia gladiolaris* (LC)
- *Vachellia karroo* (LC)

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3.1.6. Wetlands

Species Summary Statistics:

Total: 8

Shared:	1	SCC:	0	Native:	7
Unique:	7	Threatened:	0	Alien:	1
%Unique:	88	Protected:	0	NEM:BA:	0
		ECE:	0		

Vegetation Structure Summary:

Vegetation Density (%): >75

Tree Layer Height (cm):	0	Tree Layer Cover (%):	0
Shrub Layer Height (cm):	0	Shrub Layer Cover (%):	0
Forb Layer Height (cm):	50	Forb Layer Cover (%):	1
Graminoid Layer Height (cm):	250	Graminoid Layer Cover (%):	80 – 90

Note: This summary represents average values. Vegetation structure and composition can vary across the landscape, even within the same plant community.

This plant community type occurs as scattered instances across the IDZ in Zones 1A, 1B, and 1C. More specifically, 5 wetlands were identified, labelled as W1 – W5 in Map 12 to Map 14.

The community does not really conform to VegMap wetland vegetation types, though it is likely closest to Eastern Temperate Freshwater Wetlands (AZf 3). One potential reason is likely that at least two of the current wetlands (W3 and W4 in Zone 1B) did not exist on-site prior to the construction of the IDZ, as seen by historic satellite imagery. Furthermore, wetlands W1 and W2 in Zone 1A seem to have originated as shallow manmade dams, with W1 having subsequently expanded after large scale landscape alteration following construction at the IDZ. Only wetland W5 in Zone 1C existed as part of a natural drainage line, and is likely the only natural wetland on-site.

The vegetation of this plant community type is dominated by typical tall graminoids (2 – 3 m in height), notably *Phragmites australis* and *Typha capensis*, with *Eleocharis limosa* and *Imperata cylindrica* being subdominant in places, especially further away from the central wetland areas. Vegetation cover is typically high (< 75%), especially in the *P. australis* and *T. capensis* stands.

No SCC or protected plant species were observed in this plant community type. The only alien plant species observed was *Symphyotrichum squamatum* (Not Evaluated).

No obvious disturbances were observed in this plant community type and this plant community type is mostly in a good condition; it is therefore capable of effectively fulfilling its functional role within the landscape and broader ecosystem. Despite the artificial nature of some of these wetlands, all of them support unique species both in terms of plants and animals, also providing crucial habitat and sources of drinking water. Thus, they should be regarded as a No-Go areas. Also, the fact that these wetlands do not have a large number of plant species does not mean they are degraded. Rather,

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that is often the nature of wetland habitats — they may be heavily dominated by only a few aquatic species adapted to these conditions.

Finally, the following is a summary list of all species that were observed in this plant community type:

- *Andropogon eucomus* (LC)
- *Bolboschoenus maritimus* (LC)
- *Eleocharis limosa* (LC)
- *Imperata cylindrica* (LC)
- *Juncus lomatophyllus* (LC)
- *Phragmites australis* (LC)
- *Symphyotrichum squamatum* (Not Evaluated)
- *Typha capensis* (LC)

3.1.7. *Vachellia karroo - Lantana camara* Infestation

This unit is treated more fully under Coastal Thornveld (section 3.1.2 and is bookmarked here for ease of refence only.

3.1.8. Degraded Veld

This unit is treated more fully under Dune Thicket (section 3.1.3 and is bookmarked here for ease of refence only.

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3.2. Species of Conservation Concern (SCC)



Figure 13: Only one Species of Conservation Concern (SCC) was observed on-site, namely *Erica orientalis* (DDT). A) The plant in habitat. B) view of a flowering branch. C) and D) Close-up view of the flowers.

Ground truthing confirmed the occurrence of 1 SCC, namely *Erica orientalis* (DDT), and 29 protected plant species, 2 of which are Nationally Protected Trees, namely *Pittosporum viridiflorum* (LC) and *Sideroxylon inerme* subsp. *inerme* (LC).

The two tree species, as well as many of the other protected plant species, were found at various localities across the study area and in varying abundances. As such, their exact localities cannot be mapped since they are too numerous. However, *Erica orientalis* was found at a single locality in Zone 1B (Map 16), and only a few individuals were seen. This species is not a good candidate for search and rescue procedures, especially due its highly sensitive root system, as is characteristic of *Erica* species. Although it is likely that the species also occurs beyond the borders if the IDZ in similar plant community types, it is nevertheless highly recommended that, wherever possible, it is left undisturbed unless it is absolutely necessary to remove it. A 25 m buffer is recommended around it until further information is eventually gathered on its threat status. That is, DDT, short for "Data Deficient – Taxonomically Problematic", means that its taxonomy is currently still uncertain, and more studies might eventually either increase or lower its threat status. In the meanwhile, it's best to follow a precautionary approach.

Finally, it must be noted that a permit must be obtained from relevant local competent authorities to damage, destroy, or relocate any SCC or protected plant species; any such actions are considered illegal without a permit, in which case such species must be avoided completely.

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The following is a list of all the protected plant species occurring on-site, excluding the named SCC:

- *Agathosma ovata* (LC; Protected [Provincial Schedule 4])
- *Aloe maculata* (LC; Protected [Provincial Schedule 4])
- *Aristea ecklonii* (LC; Protected [Provincial Schedule 4])
- *Aristea pusilla* (LC; Protected [Provincial Schedule 4])
- *Aristea torulosa* (LC; Protected [Provincial Schedule 4])
- *Bergeranthus concavus* (LC; Protected [Provincial Schedule 4])
- *Carissa bispinosa* (LC; Protected [Provincial Schedule 4])
- *Cynanchum ellipticum* (LC; Protected [Provincial Schedule 4])
- *Delosperma muiri* (LC; Protected [Provincial Schedule 4])
- *Dierama igneum* (LC; Protected [Provincial Schedule 4])
- *Dietes grandiflora* (LC; Protected [Provincial Schedule 4])
- *Freesia laxa subsp. laxa* (LC; Protected [Provincial Schedule 4])
- *Gladiolus ochroleucus* (LC; Protected [Provincial Schedule 4])
- *Gomphocarpus physocarpus* (LC; Protected [Provincial Schedule 4])
- *Halleria lucida* (LC; Protected [Provincial Schedule 4])
- *Ixia orientalis* (LC; Protected [Provincial Schedule 4])
- *Kniphofia uvaria* (LC; Protected [Provincial Schedule 4])
- *Marsdenia dregea* (LC; Protected [Provincial Schedule 4])
- *Moraea stricta* (LC; Protected [Provincial Schedule 4])
- *Pittosporum viridiflorum* (LC; Nationally Protected Tree)
- *Sideroxylon inerme subsp. inerme* (LC; Nationally Protected Tree)
- *Strelitzia nicolai* (LC; Protected [Provincial Schedule 4])
- *Strelitzia reginae subsp. reginae* (LC; Protected [Provincial Schedule 4])
- *Tritonia gladiolaris* (LC; Protected [Provincial Schedule 4])
- *Tylophora cordata* (LC; Protected [Provincial Schedule 4])
- *Vepris lanceolata* (LC; Protected [Provincial Schedule 4])
- *Watsonia pillansii* (LC; Protected [Provincial Schedule 4])
- *Zanthoxylum capense* (LC; Protected [Provincial Schedule 4])

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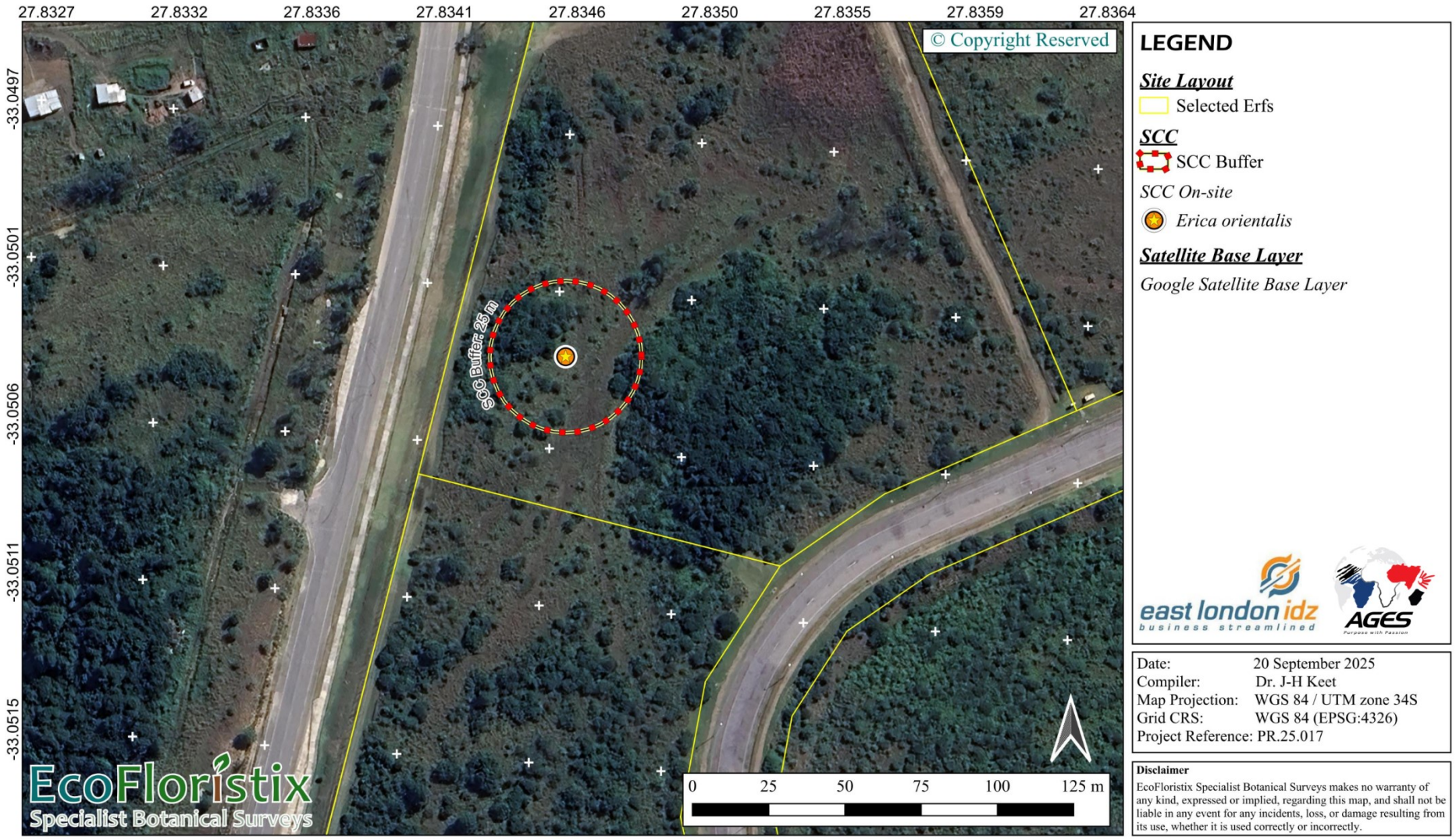

Map 16: Localities of plant Species of Conservation Concern (SCC) that were observed within the study area.

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3.3. Alien and Invasive Plant Species

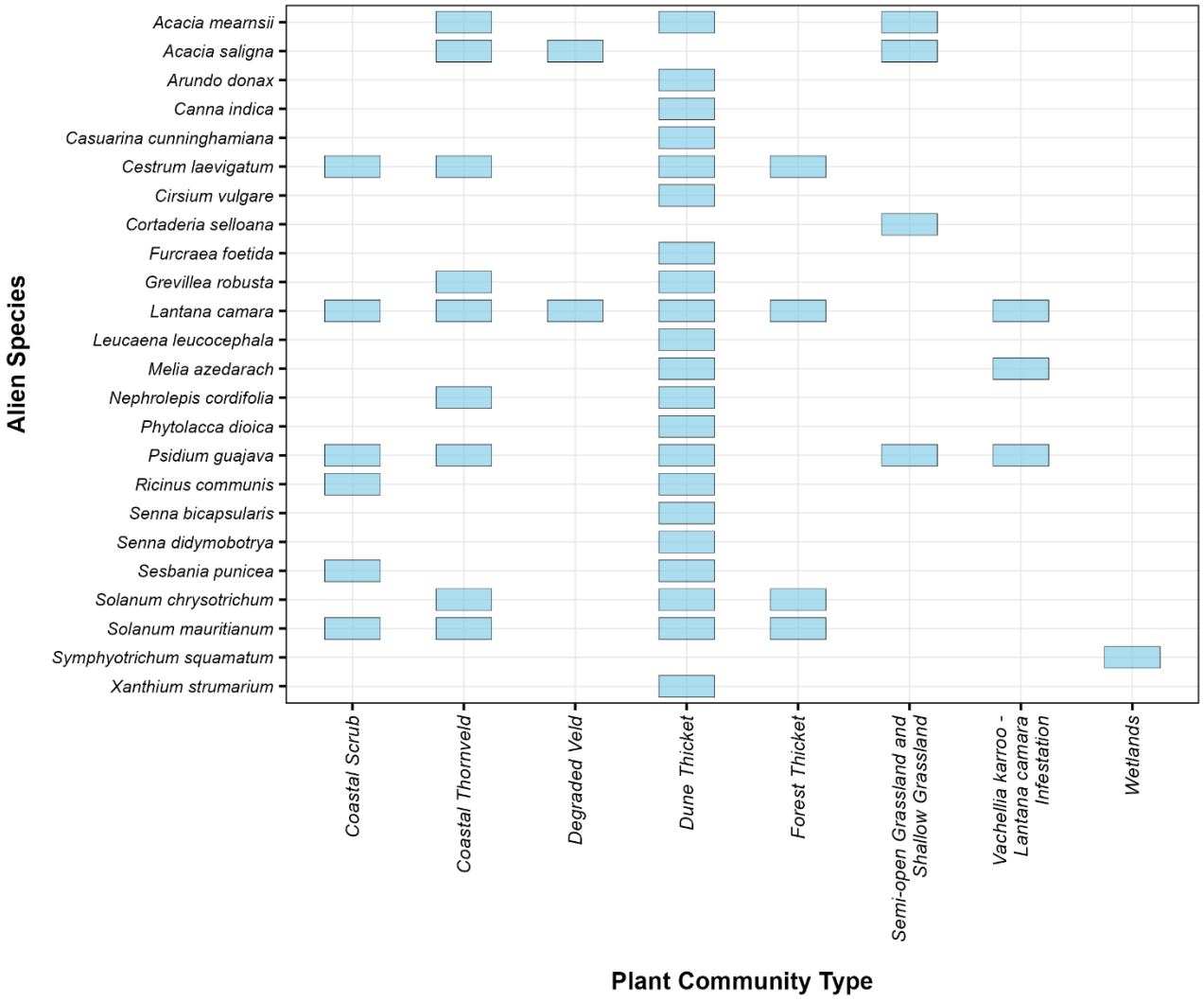

Figure 14: Presence/absence matrix of NEM:BA A&IS Regulations listed plant species for each plant community (or subcommunity) type within the study area and broader surrounds. The presence of a block indicates the presence of the respective plant species within the respective plant community. This figure is a valuable reference to visually determine either how many (and which) species occurred in a specific plant community, or in how many (and which) plant communities a specific species occurred

A very detailed assessment of the NEM:BA A&IS Regulations listed plant species within the ELIDZ was recently prepared (Keet, 2025) and it is highly recommended that the document be studied in conjunction with this report. This will allow valuable and detailed insights regarding the various IAPs occurring in the IDZ. Nevertheless, a brief summary is given here.

A total of 24 alien plant species were found within the study area, all of which are NEM:BA A&IS Regulations listed invasive species. The most widespread IAP in the IDZ is *Lantana camara* (Lantana, Tickberry, Cherry pie; Category 1b.

A full list of all NEM:BA A&IS Regulations listed species are:

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- *Acacia mearnsii* (Black wattle; Category 2)
- *Acacia saligna* (Port Jackson, Port Jackson willow; Category 1b)
- *Arundo donax* (Giant reed, Spanish reed; Category 1b)
- *Canna indica* (Indian shot; Category 1b)
- *Casuarina cunninghamiana* (Beefwood; Category 1b)
- *Cestrum laevigatum* (Inkberry; Category 1b)
- *Cirsium vulgare* (Spear thistle, Scotch thistle; Category 1b)
- *Cortaderia selloana* (Pampas grass; Category 1b)
- *Furcraea foetida* (Mauritian hemp; Category 1a)
- *Grevillea robusta* (Australian silky oak; Category 3)
- *Lantana camara* (Lantana, Tickberry, Cherry pie; Category 1b)
- *Leucaena leucocephala* (Leucaena; Category 2)
- *Melia azedarach* (Syringa; Category 1b)
- *Nephrolepis cordifolia* (Erect sword fern, Ladder sword fern; Category 1b)
- *Phytolacca dioica* (Belhambra; Category 3)
- *Psidium guajava* (Guava; Category 1b)
- *Ricinus communis* (Castor-oil plant; Category 2)
- *Senna bicapsularis* (Rambling cassia; Category 1b)
- *Senna didymobotrya* (Peanut butter cassia; Category 1b)
- *Sesbania punicea* (Red sesbania; Category 1b)
- *Solanum chrysotrichum* (Giant devil's fig; Category 1b)
- *Solanum mauritianum* (Bugweed; Category 1b)
- *Xanthium strumarium* (Large cocklebur; Category 1b)

3.4. Site Ecological Importance Assessment

Note that highly modified areas where applicable (roads, buildings, other infrastructure, etc.) are not assessed and are by default considered as having a Very Low Site Ecological Importance (SEI).

The Relative Plant Species Theme Sensitivity for the development site and surrounds, according to the online screening tool, was scored as "Medium" (Figure 15). The latter score is based on potential predicted presences of sensitive species in the area, as well as SCC (see sections 15.3.1 and 2.1.2). Only one SCC was confirmed to occur in the study area (see section 3.2). This was only the case for the Semi-open Grassland section in Zone 1B, which might thus be considered as having a true Relative Plant Species Theme Sensitivity of High instead of Medium according to the criteria given by Government Notice 1150 of Government Gazette 43855 (October 2020; see section 1.6 and 16.1.3). Even though no other SCC were found, much of the rest of the study area may still be considered as having a Medium Relative Plant Species Theme Sensitivity given that large natural areas occur which have potential to support SCC.

The Relative Terrestrial Biodiversity Theme Sensitivity for the development site and surrounds, according to the online screening tool, was scored as "Very High" (Figure 15). This is due to the study area occurring within CBA1 and SWSA (Amathole) areas. The CBA classifications are not correct for the entire study area, since invasive alien plant species occur in much of the area, though not in equal abundances everywhere. A few areas are particularly badly invaded. Moreover, a few instances of heavily degraded areas are also present. However, many of the other areas support a high plant species diversity and are in a relatively good present ecological state. A classification of "Medium" or similar would be more appropriate; however, the Relative Biodiversity Theme Sensitivity has only two categories ["Very High" and "Low"] as provided by Gazetted Protocol 43110 No. 320. Thus, the Site Ecological Importance score, as discussed below, is more preferable given its more nuanced and systematic method of assigning values.

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Field observations, together with the SEI assessment presented here (see section 16.1.3 for details), indicated that the development site should be classified as a combination of Very Low ranging to High (Table 6 and Map 17). The following specific reasons contributed towards these scores:

- SCC were observed on site, but only in the Semi-open Grassland plant community, and only one species was observed. This increases its SEI score.
- Some of the plant community types have more than 50% natural habitat and potential to support SCC, even though none were found. This increases SEI scores.
- Most of the plant community types can recover relatively quickly after disturbances, given the specific species occurring in them. An exception is Forest Thicket, which contains species with relatively longer generation times Also, the majority of plant species present within the various natural vegetation fragments are common and widespread. A quicker recovery period and higher receptor resilience decreases SEI scores.
- Many of the plant communities have a good habitat connectivity serving as functional ecological corridors, with minimal to moderate current negative ecological impacts. This increases SEI scores.
- Finally, degraded or highly invaded areas have major current negative ecological impacts and highly unlikely populations of SCC (and a low likelihood of supporting these). This decreases SEI scores.

The SEI system, although well-structured and relatively objective, is not without flaws. Specifically, Semi-open Grassland and Shallow Grassland, as well as Wetlands, scored SEI values of "Low" mostly because of the High receptor resilience in the former and absence of SCC in the latter. However, the specialist considers these to be of higher importance and in both instances the SEI scores were overruled and assigned as Medium given the importance of these plant community types within the broader landscape.

The SEI score interpretations according to the *Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa* (South African National Biodiversity Institute, 2020) are as follows (specifically see Figure 20 and details given in section 16.2):

- "Very Low": Minimization mitigation.
- "Low": Minimization and restoration mitigation.
- "Medium": Minimization and restoration mitigation.
- "High": Avoidance mitigation wherever possible.

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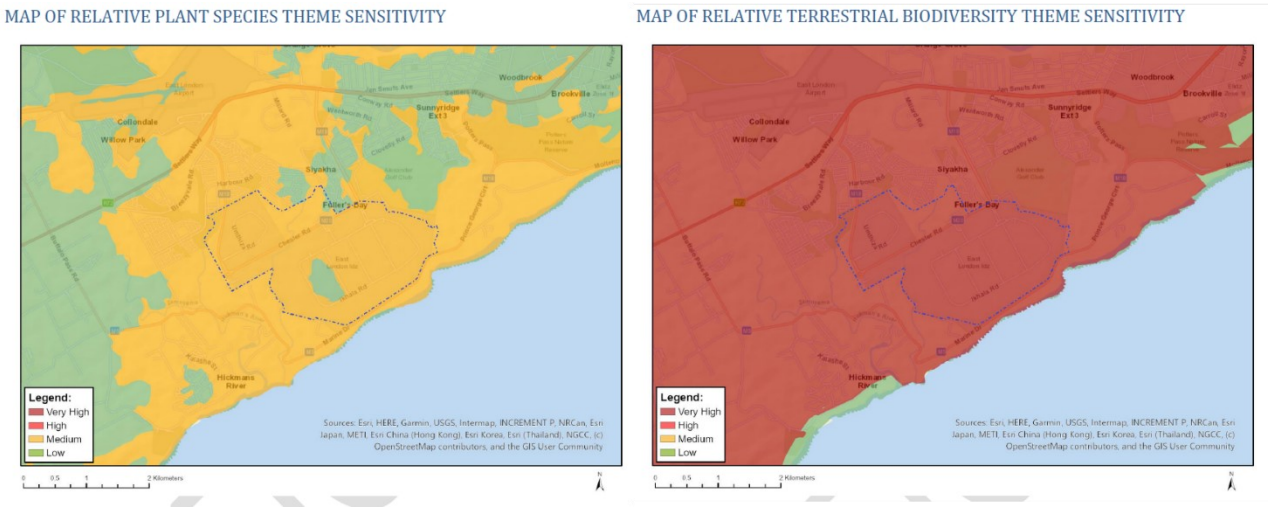

Figure 15: Relative Plant Species and Terrestrial Biodiversity Theme Sensitivities for the study area and surrounds, as indicated by the National Web-based Environmental Screening Tool.

Table 6: Evaluation of Site Ecological Importance (SEI) for the plant community type(s) within the study area. BI = Biodiversity Importance. See section 16.1.3 for more details.

Plant Community Type / Habitat	Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience (RR)	SEI
Coastal Scrub	Low: No confirmed or highly likely populations of SCC.	High: Only minor current negative ecological impacts (some invasive species) with no signs of major past disturbance (e.g., ploughing) and good rehabilitation potential.	High: Habitat that can recover relatively quickly (5–10 years) to restore > 75% of the original species composition and receptor functionality given that much of comprise disturbance adapted species given their proximity to the ocean.	Low (BI: Medium)
Coastal Thornveld	Medium: More than 50% of receptor contains natural habitat with potential to support SCC.	High: Only minor current negative ecological impacts with no signs of major past disturbance and good rehabilitation potential.	High: Habitat that can recover relatively quickly (5–10 years) to restore > 75% of the original species composition and receptor functionality, as can be seen from historic satellite imagery.	Low (BI: Medium)
Degraded Veld	Very Low: No confirmed and highly unlikely populations of SCC.	Low: Several minor and major current negative ecological impacts, such as proliferation of native weedy species and historic habitat alteration.	Very High: Habitat that can recover rapidly (less than 5 years) to restore > 75% of the original species composition and receptor functionality given that it mostly comprises weedy species.	Very Low (BI: Very Low)
Dune Thicket	Medium: More than 50% of receptor contains natural habitat with potential to support SCC.	Very High: Minimal current negative ecological impacts with no signs of major past disturbance in much of the area; however, invasive alien plant species are a problem in certain areas.	High: Habitat that can recover relatively quickly (5–10 years) to restore > 75% of the original species composition and receptor functionality.	Medium (BI: High)
Forest Thicket	Medium: More than 50% of receptor	Very High: No or minimal current	Medium: Will recover slowly (more	High (BI: High)

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	contains natural habitat with potential to support SCC.	negative ecological impacts with no signs of major past disturbance; however, some invasive alien plant species occur in some areas.	than 10 years) to restore > 75% of the original species composition and receptor functionality, especially given the long-lived nature of many of the species and their longer generation times.	
Semi-open Grassland and Shallow Grassland	Medium: More than 50% of receptor contains natural habitat with potential to support SCC, and a single instance of SCC was observed, namely *Erica orientalis* (DDT).	High: Only minor current negative ecological impacts, with a few instances of invasive alien plant species present.	High: Habitat that can recover relatively quickly (5–10 years) to restore > 75% of the original species composition and receptor functionality, considering that the majority of species are grasses with relatively short generation times.	Medium (determined by specialist) *ORIGINAL SCORE:* *Low* *(BI: Medium)*
Vachellia karroo - Lantana camara Infestation	Very Low: No confirmed and highly unlikely populations of SCC.	Very Low: Several major current negative ecological impacts: dense infestation of invasive *Lantana camara* as well as bush encroachment by *Vachellia karroo*.	Medium: Will recover slowly (more than 10 years) to restore > 75% of the original species composition and receptor functionality, especially given how soil conditions are often modified by invasive species as nitrogen fixing legumes (such as *Vachellia karroo*)	Very Low (BI: Very Low)
Wetlands	Very Low: No confirmed and highly unlikely populations of SCC.	Very High: No or minimal current negative ecological impacts.	Medium: Will recover slowly (more than 10 years) to restore > 75% of the original species composition and receptor functionality.	High (determined by specialist) *ORIGINAL SCORE:* *Low* *(BI: Low)*

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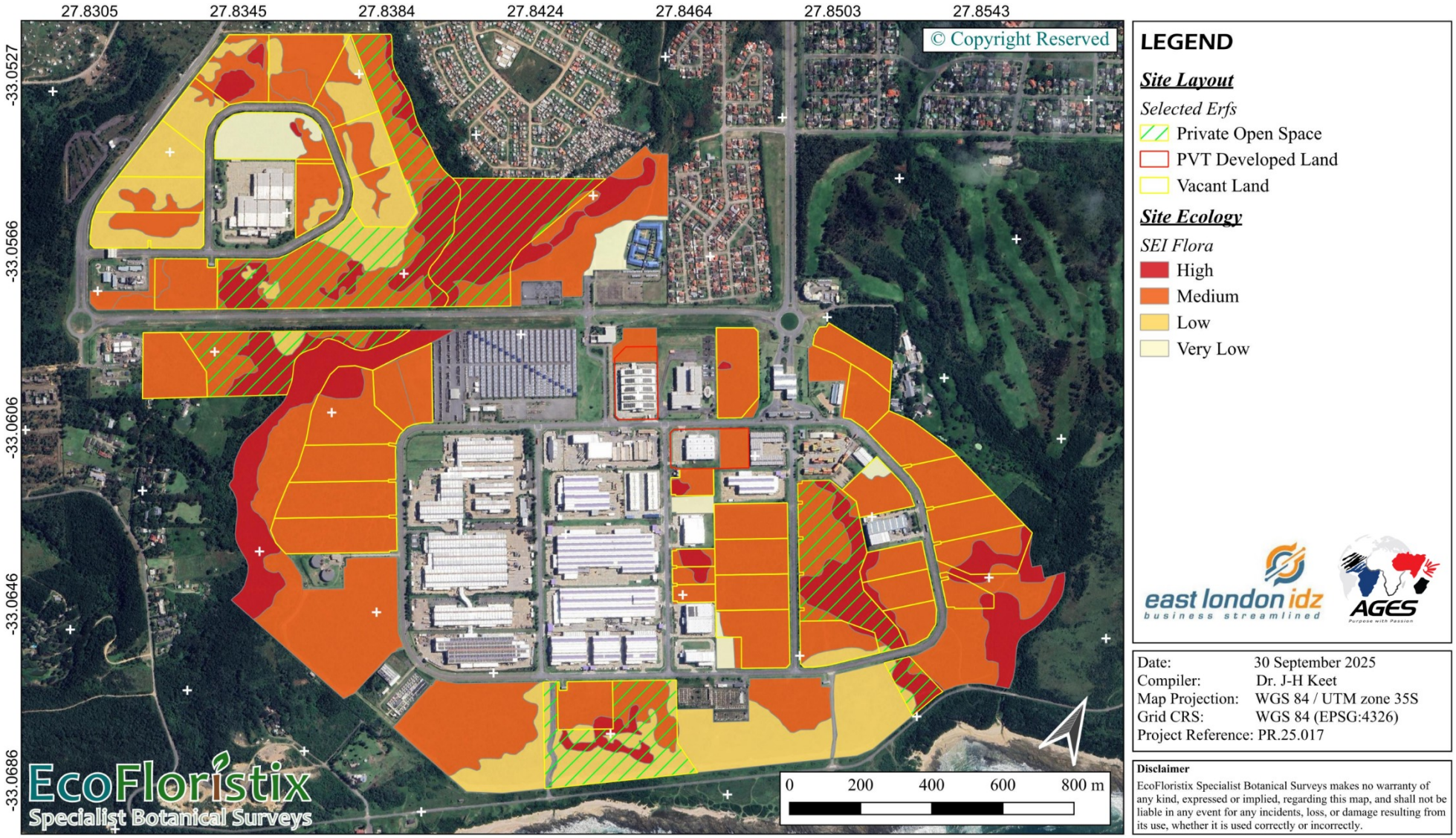

Map 17: Botanical Site Ecological Importance (SEI) for the study area (see Table 6 for more details).

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3.5. Notes Regarding the Presence/Absence of Natural Forests in the ELIDZ

3.5.1. Introduction and Definitions

According to section 3(2)(a) of the National Forests Act (No. 84 of 1998), or NFA, an organ of State **must** take into account the differences between natural forests, woodlands, and plantations, when applying the principles that guide decisions affecting forests.

The NFA specifically defines in section 2(1)(x) that "forest" includes (emphasis added):

a). a **natural forest**, a **woodland** and a **plantation**;
b). the forest produce in it; and
c). the ecosystems which it makes up.

Thus, it defines three types of forest in South Africa. Of these, only natural forests are subject to protection by default according to section 7(1), which states that no person may cut, disturb, damage, or destroy any indigenous living tree in, or remove or receive any such tree from, a natural forest except in terms of a licence issued under subsection (4) or section 23.

Then, the NFA specifically defines a "natural forest" under section 2(1)(xx) as being (with emphasis added) a **group** of **indigenous trees** —

a). whose **crowns** are **largely contiguous**; or
b). which have been declared by the Minister to be a natural forest under section 7(2)(xxviii).

Thus, excluding paragraph (b) of section 2(1)(xx) — i.e., declaration by the Minister — there are four key things that collectively determine what can be considered a natural forest, namely:

a). It must comprise of **trees** (not shrubs or other lifeforms); and
b). The trees must be **indigenous** (not alien); and
c). The indigenous trees must occur as a **group** (not single individuals), and
d). The crowns of the group of indigenous trees must be **largely contiguous** (that is, sharing a common border or touching). In other words, the canopy must be mostly closed with few gaps.

Failure on any of these criteria thus disqualifies an area of vegetation as being a natural forest.

3.5.2. References to Forests in the ELIDZ

It seems that confusion has arisen in the past due to at least two previous biodiversity reports on the ELIDZ that used the term "forest" loosely. More specifically, correspondence from Forestry Management (Directorate: Forest Resource Protection, dated 23 September 2025) to Digby Wells regarding the ELIDZ, titled "ACKNOWLEDGMENT OF INCOMPLETE LICENCE APPLICATION FORM TO UNDERTAKE GEOPHYSICAL STUDY, HERITAGE ASSESSMENT, ERF 60870 AND ERF 60871 IN TERMS OF SECTION 7(1) OF THE NATIONAL FORESTS ACT, ACT NO. 84 OF 1998 AS AMENDED.", points out the term "dune forest" (corresponding number 3) was used in an S7 Licence application form. It specifically, and correctly, points out the contradiction that the applicant argued no natural

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forests occur on-site, but proceeded to use the S7 Licence application form (which specifically pertains to natural forests), specifying that it was for "dune forest".

Presumably, a biodiversity report prepared for the ELIDZ used the term "dune forest" in reference to certain plant communities occurring within the ELIDZ. It is not clear whether it regarded such dune forest to be a natural forest or not, since the document was not available at the time of writing.

Furthermore, another report prepared by CES (Hawley & Jackson, 2025) used the term "forest" or "riparian forest" to mostly refer to areas of dense vegetation occurring along watercourses. These generally coincide with what has been mapped as Forest Thicket in this report (see section 3.1.4 and Map 12).

While not incorrect per se, these terms have seemingly and inadvertently caused the perception that some form of natural forest exists on-site. Terms such as "dune forest", "riparian forest", or similar, are often used more as descriptive terms to be understood by laymen and often do not correspond to official terminology. While highly useful, unfortunately such terms can be misinterpreted. Moreover, the CES report explicitly also states as an impact "The loss of riparian forest, which is **protected by the National Forest Act**" (emphasis added). In doing so it actually classifies riparian forest as a natural forest, which should thus implicitly align with the definitions provided in the NFA (as highlighted in section 3.5.1).

Unfortunately, the CES report itself cites as an example of riparian forest an area overrun by alien *Acacia mearnsii*, which by definition disqualifies it from being a natural forest given that natural forests must be groups of **indigenous** trees. This further complicates the matter.

3.5.3. The Actual Presence/Absence of Natural Forests in the ELIDZ

The ELIDZ was surveyed extensively during the preparation of this report, and the authors have concluded that there are no natural forests present on-site. There are multiple reasons why no natural forests exist within the ELIDZ, which will be addressed both legally and ecologically.

Legally:

As mentioned, a natural forest must comprise of a group of indigenous trees whose crowns are largely contiguous. The NFA does not specifically define exactly what a tree is, though it does specify in section 2(1)(xxxvi) that a "tree" includes any tree seedling, sapling, transplant or coppice shoot of any age and any root, branch or other part of it. From the official Vegetation of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006) and its lifeform definitions used to categorize the various national vegetation types, five types of tree are defined (Table 7), namely:

- Small Tree
- Tall Tree
- Emergent Tree
- Succulent Tree
- Tree Fern (technically a special category of Small Tree)

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Table 7: Definitions and descriptions of different types of "trees" and "shrubs" in South Africa according to the Vegetation of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006). The image has been extracted as is from the actual source (where it is numbered "Table 2.1").

Category/ Subcategory	Main Traits	Example	Note
Tree	secondary (woody) thickening of tissues; single-stemmed		
Small Tree	lower than 15 m in forests; lower than 10 m in savanna	*Acacia karroo*	excluding Succulent Trees
Tall Tree	taller than 15 m in forests; lower than 10 m in savanna	*Ekebergia capensis*	excluding Succulent Trees
Emergent Tree	taller than 25 m (overtopping canopy)	*Afrocarpus falcatus*	excluding Succulent Trees; only in tall-grown forests
Succulent Tree	succulent stems and branches; taller than 6 m	*Euphorbia triangularis*	
Tree Fern	fern of tree stature; always less than 5 m tall	*Cyathea capensis*	special category of Small Tree
Shrub	secondary (woody) thickening of tissues (at least at base); multistemmed as a rule; when single-stemmed, then branching from base		excluding all epiphytic forms
Low Shrub	lower than 2 m; no parasitic or semiparasitic feeding; non-succulent	*Pentzia incana*	excluding Soft Shrubs, succulent and (semi)parasitic shrubs
Tall Shrub	taller than 2 m; no parasitic or semiparasitic feeding; non-succulent	*Gymnosporia buxifolia*	excluding Soft Shrubs, succulent and (semi)parasitic shrubs
Soft Shrub	secondary (woody) thickening of tissues along main stem; herbaceous tips of branches	*Plectranthus fruticosus*	a transition category between Herbs and Shrubs, typical of some warm-temperate and subtropical forests
Geoxylic Suffrutex	large underground woody 'rhizome'; usually imitating Low Shrub form above ground	*Dichapetalum cymosum*	excluding Shrubs with smaller lignotubers
Succulent Shrub	succulent leaves and/or stems; any height	*Ruschia caroli*	very common among Aizoaceae; including Stem-succulent Shrub, Stem- & Leaf-succulent Shrub and Leaf-succulent Shrub (recognised only in Chapter 6)
Semiparasitic Shrub	green, but parasitising on xylem of other plants; any height	*Thesium hystrix*	growth form limited to few families (mainly Santalaceae)
Semicarnivorous Shrub	feeding on animal waste resembling carnivory	*Roridula gorgonias*	only 2 species of genus *Roridula*

From Table 7, it is evident that trees are first and foremost single-stemmed with secondary (woody) thickening. Thus, a species such as wild banana (*Strelitzia nicolai*), which occurs in the densely vegetated areas, does not qualify because it does not have secondary thickening, and is instead considered to be a megaherb. Also, shrubs are multi-stemmed as a rule and even in high densities with largely contiguous crowns do not satisfy the criteria of natural forest according to the NFA. The majority of species occurring in the Forest Thicket areas that make up the canopy are not trees, but instead shrubs and other lifeforms (though trees are present). Thus, although the canopy does indeed become quite dense in some of the Forest Thicket areas, and although some trees are present, these canopies are not predominantly from trees, instead being a mixture of trees, shrubs, and other lifeforms.

Moreover, in instances where alien invasive trees dominate, the requirement of being a natural forest is disqualified on the basis of the trees not being indigenous.

Thus, no natural forests exist in the ELIDZ given that there is nowhere a **group** of **indigenous trees** whose **crowns are largely contiguous**, and none of the areas have specifically been declared as natural forests by the Minister according to the NFA. Crucially, the dominant woody lifeforms in the Forest Thicket areas are not mostly trees.

Ecologically:

Forests are first and foremost classified within their own biome in South Africa according to VegMap with related information and descriptions. Broadly, they are categorized as either Zonal & Intrazonal Units, or Azonal Units. According to VegMap (Mucina & Rutherford, 2006), indigenous forest in South Africa is defined as a generally multilayered vegetation unit dominated by trees (largely evergreen or semi-deciduous), whose combined strata have overlapping crowns (i.e. the crown cover is 75% or more), and where graminoids in the herbaceous stratum (if present) are generally rare. Stand

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height ranges from high forest over 30 m to scrub forest with a height of just over 3 m. All indigenous forest of southern Africa is evergreen. Besides the obviously distinctive structure, the forests differ from the surrounding vegetation (fynbos, thicket, grassland, savanna) by a large specific set of flora.

For example, forests are generally characterized by an abundance of specific forest trees, including Real (*Podocarpus latifolius*) or Outeniqua Yellowwood (*Afrocarpus falcatus,* formerly *Podocarpus falcatus*), Stinkwood (*Ocotea bullata*), Assegai (*Curtisia dentata*), Cape Chestnut (*Calodendrum capense*), Ironwood (*Olea capensis*), and White Stinkwood (*Celtis africana*). Other species that also occur abundantly in natural forests are Natal Mahogany (*Trichilia dregeana*), White Pear (*Apodytes dimidiata*), Cape Ash (*Ekebergia capensis*), Cape Beech (*Rapanea melanophloeos*), White Alder / Witels (*Platylophus trifoliatus*), Red Alder / Rooi-els (*Cunonia capensis*), Wild Plum (*Harpephyllum caffrum*), and Kamassi (*Gonioma kamassi*). These trees often grow to be exceptionally large and tall, especially in forests (note: this list is not meant to be exhaustive).

Southern Coastal Forest (FOz 6), which is a more specialized type of forest and that occurs in the area, is characterized by a dominance of White Stinkwood (*Celtis africana*), Coastal Red Milkwood (*Mimusops caffra*), Milkwood (*Sideroxylon inerme*), and Dune Sourberry (*Dovyalis rotundifolia*).

Of all these species, only Milkwood, White Pear, and Wild Plum occur on-site, and only as scattered individuals. Furthermore, the aforementioned forest trees contrast sharply with species typical of the Albany Thicket and Savanna Biomes, and which were found on-site, like *Acacia karroo*, *Euphorbia* spp., *Diospyros* spp., *Euclea crispa*, and *Searsia* spp., which are generally multi-stemmed, smaller, often deciduous, and rarely form the required high, closed-canopy structure of a true forest.

Thus, ecologically forests are:

- Characterized by an abundance of specific tree species.
- Evergreen.
- Structurally very tall, often 20 m high or more (excluding some scrub forests).
- Classified in their own biome (i.e., the Forest Biome; *Acacia karroo* dominance indicates a bushveld/thicket component).
- Multilayered in structure due to the tall nature of the trees and with a closed canopy.

None of the plant communities on-site have the above set of characteristics. As an aside, it must also be noted that dense bush encroached areas where *Acacia karroo* dominates and potentially does form contiguous crowns, do not qualify as natural forest, since this would distort the Biome classification and management priorities across the country.

Furthermore, only two forest vegetation types have been mapped in the broader region surrounding the ELIDZ (Map 18), namely:

- Scarp Forest (FOz 5) occurring approximately 2.01 km north of the ELIDZ.
- Southern Coastal Forest (FOz 6) occurring approximately 2.03 km southwest of the ELIDZ.

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Neither Scarp- nor Southern Coastal Forest occurs on-site, since the former is restricted to very steep fire-shadow slopes, while the latter is restricted to stable coastal dunes. Milkwood (*Sideroxylon inerme* subsp. *inerme*) is very characteristic of Southern Coastal Forest, and although the species is present on site, it only occurs as scattered individuals among many other species.

The only other forest type mapped in the broader region is Mangrove Forest (FOa 3). It is not present on-site as it is restricted to coastal mangrove areas over 10 km away.

As a final note, historic satellite imagery also demonstrates that many of the current and densely vegetated areas in the ELIDZ (and even surrounding it) should actually be much more open — similar to grassland or savanna — with only a few patches truly conforming to thicket (specifically see section 2.3). The situation currently on-site is thus more a result of a lack of disturbance (for example, the absence of frequent fires and large herbivores) instead of being truly natural.

Given the aforementioned, it is conclusively demonstrated that none of the plant community types occurring within the ELIDZ conform legally or ecologically to what can be considered natural forest.

3.5.4. Conclusion

Given the legal and ecological requirements and characteristics of what constitutes natural forests, it is conclusively shown that no natural forests occur within the boundaries of the study area. Furthermore, it is again reiterated here that the term "**Forest Thicket**" as used in this report (specifically see section 3.1.4) refers to a type of thicket vegetation in the Albany Thicket Biome that is forest-like in its appearance, but does not constitute a true or natural forest. The term was purposefully chosen to be similar to official terminology, specifically the vegetation type Umtiza Forest Thicket (AT 53), which it resembles to some degree, and which forms part of the Albany Thicket Biome and not the Forest Biome.

Finally, it must be emphasised that while no natural forests occur within the ELIDZ, two nationally protected tree species are indeed present (*Pittosporum viridiflorum* and *Sideroxylon inerme* subsp. *inerme*, see section 3.2). These species are protected according to sections 12 to 15 of the NFA. Specifically, section 15(1)(a) states that no person may cut, disturb, damage or destroy any protected tree except (i) under a licence granted by the Minister. Thus, while all trees in a natural forest are protected, only individuals of a protected tree species are specifically protected. While no natural forests occur on-site, thus excluding any patch of vegetation in the ELIDZ to be protected by default, all individuals of *Pittosporum viridiflorum* and *Sideroxylon inerme* subsp. *inerme* are indeed protected.

Two options are therefore possible here: 1) either a licence/permit regarding protected trees must be obtained to cut, disturb, damage, or destroy individuals of *Pittosporum viridiflorum* or *Sideroxylon inerme* subsp. *inerme*, or 2) individuals of these species must simply be avoided. If the latter option (avoidance) is chosen, a botanical specialist must be contracted to identify and clearly mark all individuals that are to be protected.

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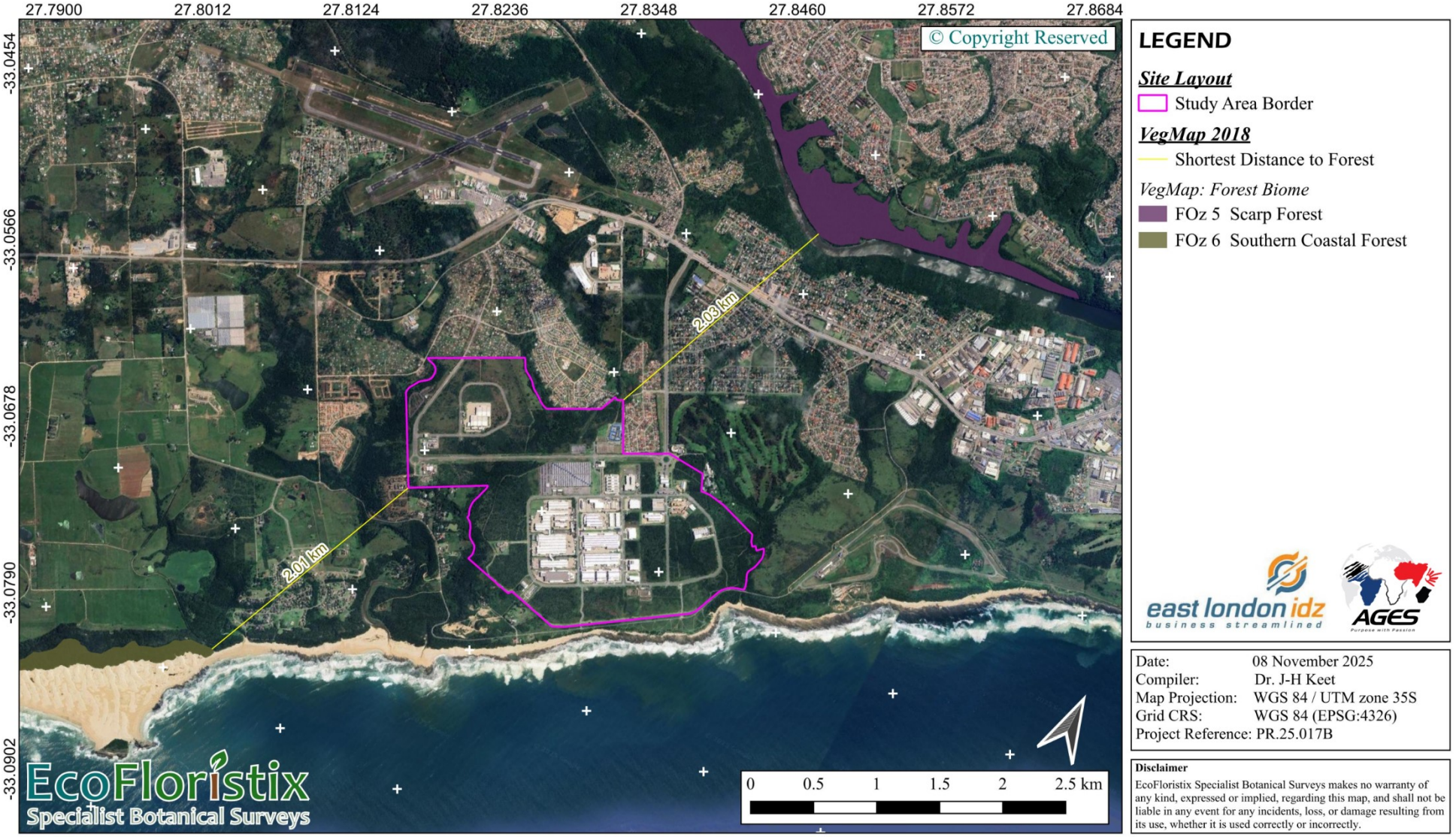

Map 18: Mapped occurrences of Forest Biome units, according to VegMap, occurring near the ELIDZ.

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4. Fieldwork and Site Inspection: Fauna

4.1. Faunal Habitats

Faunal species are adapted to a particular niche which often comprises a unique set of environmental conditions creating optimal habitat. The reliance of fauna on species-specific plant resources indicates the interconnected nature between faunal and floristically diversity. These "micro-habitats" do not always correspond strictly to vegetation associations, but rather to a combination of vegetation structure and species composition, topography, land use, available food source and other factors. Landscape composed of spatially heterogeneous abiotic conditions create a greater diversity of potential niches for fauna species, providing both diverse forage as well as refuge areas. Habitat availability is often used to determine databases due to the often cryptic, nocturnal and highly mobile nature displayed by many fauna species.

The study area encompasses a mosaic of faunal habitats, ranging from relatively intact Forest Thicket & Riparian Strips and seasonally inundated Depression Wetlands, to heterogeneous Thicket–Grassland and Open Woodland–Grassland Mosaics, as well as ecologically degraded Transformed/Invaded Habitats and highly simplified Artificially Cleared Areas (Map 19). These habitat types correspond to distinct botanical communities and structural vegetation units, each supporting a unique assemblage of fauna with varying degrees of overlap and connectivity.

Collectively, these habitats host a rich faunal community of 215 recorded species. Alpha diversity (species richness within each habitat) varies markedly: the Open Woodland–Grassland Mosaic is the most species-rich unit with 101 species (47% of total site richness), followed by the Forest Thicket & Riparian Strip (92 species; 42.8%), and the Artificially Cleared Areas (64 species; 29.8%). The Depression Wetlands support 58 species (27%), the Thicket–Grassland Mosaic sustains 52 species (24.2%), while the Transformed/Invaded Thickets are the poorest, with only 25 species (11.6%).

Patterns of beta diversity (species turnover between habitats) further reveal the ecological distinctness of certain units. The Forest Thicket & Riparian Strip harbours 36 specialists restricted to this habitat, underscoring its role as a reservoir of unique fauna. The Open Woodland–Grassland Mosaic similarly contributes 30 specialists, many of which are open-habitat obligates tied to grasslands, termitaria, and rock outcrops. The Depression Wetlands support 17 specialists, largely wetland-dependent taxa such as amphibians, aquatic invertebrates, and reed-nesting birds. In contrast, the Transformed/Invaded Thickets recorded no specialists, demonstrating their ecological homogenisation and dependence on spill-over generalists from surrounding habitats. Interestingly, the Artificially Cleared Areas contained 25 specialists, many of which exploit secondary anthropogenic niches such as culverts, buildings, and short-mown firebreaks.

Ecotones and transitional zones between these habitats play an outsized role in maintaining diversity. Higher faunal richness and activity were consistently recorded at transitions between thickets and grasslands, and between wetlands and grasslands. These zones facilitate foraging, movement, and species interactions across structural boundaries, elevating both alpha and beta diversity and functioning as biodiversity hotspots.

Summary of Results:

- Total site richness: 215 species.
- Highest richness: Open Woodland–Grassland Mosaic (101 spp.; 47%).
- High richness & uniqueness: Forest Thicket & Riparian Strip (92 spp.; 36 specialists).

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- Moderate richness: Artificially Cleared Areas (64 spp.; 25 specialists, largely anthropogenic niche species).
- Wetland distinctness: Depression Wetlands (58 spp.; 17 specialists, strongly tied to aquatic conditions).
- Intermediate heterogeneity: Thicket–Grassland Mosaic (52 spp.; 8 specialists, important for ecotonal diversity).
- Lowest richness: Transformed/Invaded Thickets (25 spp.; 0 specialists, ecologically homogenised).
- Key/dominant species: 17 in Forest Thicket, 14 in Depression Wetlands, 7 in Thicket–Grassland Mosaic, 21 in Open Mosaic, 6 in Invaded Thickets, and 6 in Artificially Cleared Areas.
- Cosmopolitan/common species (≥4 habitats): 13 in thickets, 13 in wetlands, 14 in mosaics, 18 in open grasslands, 14 in invaded thickets, and 13 in artificial areas.

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Map 19: Faunal community types that were observed in the study area and surrounds. Note: to optimize space, true north faces to the top right.

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4.1.1. Forest Thicket & Riparian Strip

The Forest Thicket and Riparian Strip corresponds to the Forest Thicket plant community and is closely associated with watercourses, valley bottoms, and drainage lines. Structurally, the habitat is multi-layered with a dense shrub and tree canopy reaching up to 6 – 8 m in height. This canopy is often dominated by species such as *Euphorbia triangularis, Erythrina caffra, and Diospyros dichrophyll*a, with protected species such as *Sideroxylon inerme* also present. Beneath the canopy, climbers, lianas, and shade-tolerant shrubs including *Burchellia bubalina* form a tangled understory, while ferns, herbs, and leaf litter dominate the ground layer. This complex vegetation structure creates a cool, moist microclimate with significant habitat diversity.

The present ecological condition of the Forest Thicket and Riparian Strip is relatively intact compared to other habitats on site, though edge effects from surrounding roads, fences, and human disturbance are evident. Invasive alien species such as *Lantana camara, Cestrum laevigatum,* and *Psidium guajava* frequently establish along disturbed margins, gradually displacing native vegetation. Fire suppression further alters successional processes, promoting woody thicket persistence. Despite these threats, the habitat continues to function as a biodiversity reservoir. Mammals such as Cape Grysbok, Cape Grey Mongoose, and Small-spotted Genet utilise the dense cover, while Vervet Monkeys forage in canopy layers where trees provide access routes. Bird diversity is high, with Southern Boubou, Dark-capped Bulbul, and White-browed Scrub Robin occurring frequently. Shaded microhabitats also sustain a rich assemblage of butterflies and odonates, making this habitat a keystone ecological unit in the landscape.

The present ecological condition of this habitat is relatively good compared to surrounding areas, although fragmentation and edge effects have impacted some sections. Alien species such as *Lantana camara*, *Cestrum laevigatum*, and *Psidium guajava* have been recorded along disturbed fringes, while suppression of natural fire regimes alters successional patterns. Despite these pressures, the habitat still provides essential ecological services. It supports faunal movement along riparian corridors, offers dense cover for mammals such as Cape Grysbok and genets, and provides foraging and nesting opportunities for birds and invertebrates. The ecological significance of this habitat is therefore high, although invasive alien plant encroachment remains a persistent threat.

This habitat supports a total of 92 species, representing approximately 42.8% of the total site richness (215 species). Of these, 17 species were recorded as key or dominant, while 36 species are specialists, occurring only within this habitat. Additionally, 13 species are cosmopolitan/common, occurring in four or more habitat types across the site. The results highlight the importance of this thicket-riparian system as a diversity anchor, sustaining high alpha diversity and contributing strongly to beta diversity through its large specialist complement. Its modest compositional similarity with other habitats confirms the strong uniqueness of this assemblage.

Key and dominant species: include for example the Forest Malachite (*Chlorolestes tessellatus*), Common Threadtail (*Elattoneura glauca*), Painted Sprite (*Pseudagrion hageni*), Rock Hooktail (*Paragomphus cognatus*), False Wanderer (*Pseudacraea eurytus imitator*), and Purple-brown Hairstreak (*Hypolycaena philippus philippus*).

Specialist species restricted to this habitat: include the Vine-leaf Vagrant (*Eronia cleodora*), Sulphur Orange Tip (*Colotis auxo auxo*), Variable Diadem (*Hypolimnas anthedon wahlberg*i), and Pearl Charaxes (*Charaxes varanes varanes*), among others.

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Common species also occurring here: include Spotted Sugar Ant (*Camponotus maculatus*), Ringleg Black Millipede (Doratogonus annulipes), Common Mole-rat (*Cryptomys hottentotus*), Cape Porcupine (*Hystrix africaeaustralis*), and Four-striped Grass Mouse (*Rhabdomys pumilio*).

Sensitive and noteworthy species: several butterflies, odonates, and mammals recorded here are flagged as provincially protected or sensitive in your database, underscoring the need for ongoing monitoring.

4.1.2. Depression Wetlands (*Typha-Phragmites* Wetlands)

The Depression Wetlands occur in shallow depressions that are seasonally or permanently inundated and are dominated by tall emergent macrophytes, particularly *Typha capensis* and *Phragmites australis*. These form dense monodominant stands, often reaching 2 – 3 m in height, with fringing zones extensively colonised by the stoloniferous grass *Stenotaphrum secundatum*. The dense sods of *Stenotaphrum* outcompete most native grasses and forbs, simplifying the vegetation structure and creating homogeneous reedbeds.

The ecological condition of these wetlands is moderately degraded. Although hydrological functions such as stormwater retention, sediment capture, and nutrient cycling remain intact, plant diversity is suppressed by the dominance of *Typha, Phragmites*, and *Stenotaphrum*. Nutrient-enriched runoff from surrounding areas accelerates reed proliferation, further reducing species richness. Despite this, the habitat is faunally productive. The abundance of cover and seed availability supports large populations of *Rhabdomys pumilio* (Four-striped Mouse) and *Otomys* species, which in turn attract predators such as Cape Grey Mongoose, Large Grey Mongoose, and Marsh Mongoose. A resident pair of African Marsh Harriers has been observed foraging frequently in these wetlands and likely breeds within the reedbeds. The Pondoland River Crab (*Potamonautes danielsi*) is also abundant, benefiting from permanent pools within the depressions. Avifauna such as Thick-billed Weaver, Southern Masked Weaver, Southern Red Bishop, Levaillant's Cisticola, Lesser Swamp Warbler, and African Reed Warbler nest and forage extensively within the reedbeds. The threats posed by reed and grass monodominance are considerable, however, as they exclude species dependent on diverse sedge-forb assemblages and open water patches.

This habitat contains 58 species (≈ 27% of site richness), with 14 species recorded as key/dominant and 17 species identified as specialists. A further 13 species are cosmopolitan/common. The relatively high proportion of specialists indicates that, despite its physiognomic simplification by dense reed growth, the wetland remains ecologically distinct, harbouring species dependent on aquatic and reedbed environments.

Key and dominant species: include the Vlei Rat (*Otomys irroratus*), Lesser Swamp Warbler (*Acrocephalus gracilirostris*), African Reed Warbler (*Acrocephalus baeticatus*), Thick-billed Weaver (*Amblyospiza albifrons*), and Southern Red Bishop (*Euplectes orix*).

Specialist species restricted to this habitat: include the Pondoland River Crab (*Potamonautes danielsi*), aquatic odonates such as the Slate Sprite (*Pseudagrion salisburyense*), and amphibians closely tied to wetland habitats.

Common species also occurring here: include the Four-striped Grass Mouse (*Rhabdomys pumilio)*, Cape Longclaw (*Macronyx capensis*), and Fiscal Flycatcher (*Sigelus silens*).

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Sensitive and noteworthy species: wetland-dependent invertebrates and amphibians flagged under provincial and ecological criteria, reinforcing the conservation significance of this unit.

4.1.3. Thicket-Grassland Mosaic

The Thicket–Grassland Mosaic is a heterogeneous habitat composed of thicket clumps, coastal scrub, and grassy patches, typically occurring on sandy rolling dune topography. Dense shrub clusters dominated by *Diospyros dichrophylla* and *Vachellia karroo* are interspersed with grasslands dominated by *Panicum deustum* and *Themeda triandra*, while forb and geophyte species contribute substantially to seasonal diversity. This mosaic of woody and grassy patches produces high structural heterogeneity, providing a range of ecological niches.

The ecological condition of this habitat varies between moderately intact and degraded. Where undisturbed, plant diversity is high, with numerous geophytes, forbs, and dwarf shrubs. However, disturbance favours the spread of *Lantana camara* and the encroachment of *Vachellia karroo*, both of which reduce grassland extent and suppress herbaceous layers. Faunal diversity is high in transitional areas, where thicket cover and grassy forage areas converge. Cape Grysbok and other small antelope use the thickets for cover but move into the grasslands to feed, while rodents and mongooses are common throughout. Bird activity is notable, with Fiscal Flycatcher, Southern Boubou, Brown-backed Honeybird, White-browed Scrub Robin, and cisticolas frequently recorded along ecotone fringes. Ant communities dominated by *Crematogaster* and *Camponotus* species support important myrmecophile associations with Lycaenid butterflies such as *Hypolycaena philippus* and *Anthene amarah*. The primary threats to this habitat are woody encroachment and alien plant invasion, both of which reduce habitat heterogeneity and diminish its faunal productivity.

This mosaic habitat supports 52 species (≈ 24.2%), with 7 species listed as key/dominant and 8 specialists restricted to this unit. It also supports 14 cosmopolitan species. Its highest similarity is with the Open Woodland–Grassland Mosaic, reflecting the strong faunal exchange along ecotones. Despite a smaller specialist load, these taxa are significant indicators of the importance of habitat patchiness and the presence of both woody and grassy microhabitats.

Key and dominant species: include the Brown-backed Honeybird (*Prodotiscus regulus*), Southern Boubou (*Laniarius ferrugineus*), and several Lycaenid butterflies linked to ant associations.

Specialist species restricted to this habitat: include certain edge-associated odonates and grass–shrub interface butterflies unique to this unit.

Common species also occurring here: overlap strongly with the Open Mosaic, including Cape Grysbok (*Raphicerus melanotis*), Common Mole-rat (*Cryptomys hottentotus*), and Spotted Thick-knee (*Burhinus capensis*).

4.1.4. Open Woodland-Grassland Mosaic

The Open Woodland–Grassland Mosaic represents semi-open shallow grasslands interspersed with scattered shrubs and small trees. Dominant grasses include *Themeda triandra, Digitaria eriantha, and Cymbopogon nardus*, with scattered *Vachellia karroo* providing a woodland element. Termitaria and surface boulders contribute structural complexity, creating microhabitats for a variety of invertebrates, reptiles, amphibians, and small mammals.

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The ecological condition of this habitat is moderate but declining under pressure from bush encroachment by *Vachellia karroo* and the invasion of *Lantana camara* and *Acacia mearnsii*. Fire suppression has also altered grassland structure by favouring woody expansion. Nevertheless, this habitat remains one of the most productive, supporting a wide diversity of fauna. Termitaria and moribund mounds are extensively used by reptiles, amphibians, and small mammals, while boulders shelter arachnids, insects, and scorpions such as *Uroplectes carinatus*. Ants including *Crematogaster peringueyi, Pheidole megacephala,* and *Camponotus maculatus* are abundant, supporting myrmecophilous butterfly larvae. Bird diversity is also high, with species such as Crowned Lapwing, Cape Longclaw, Spotted and Water Thick-knees, and swallows nesting in culverts. Mammals include small rodents and mongooses, while occasional antelope forage in open patches. The key threats to this habitat remain bush encroachment, fragmentation, and poaching pressure along settlement edges.

The open mosaic is the richest habitat, containing 101 species (≈ 47% of site richness). It has the largest number of key/dominant species (21) and a substantial 30 specialists. It also supports the largest complement of 18 cosmopolitan species. These values underscore the importance of this unit as both a stronghold of open-habitat specialists and as a hub of species exchange across ecotones.

Key and dominant species: include the Crowned Lapwing (*Vanellus coronatus*), Cape Longclaw (*Macronyx capensis*), Spotted Thick-knee (*Burhinus capensis*), various odonates such as the Yellow-veined Widow (*Palpopleura lucia*), and the Spotted Sugar Ant (*Camponotus maculatus*).

Specialist species restricted to this habitat: include rock- and termitaria-associated invertebrates, and grassland butterflies such as the African Monarch (*Danaus chrysippus*) and Zulu Blue (*Leptotes pirithous*).

Common species also occurring here: include widespread generalists like the Fiscal Flycatcher (*Sigelus silens*) and Four-striped Grass Mouse (*Rhabdomys pumilio*).

Sensitive and noteworthy species: several endemic or provincially protected butterflies and reptiles occur here, associated with termitaria and rock outcrops.

4.1.5. Transformed / Invaded Habitats (*Lantana* & *Vachellia karroo* Thickets)

The Transformed and Invaded habitats are dominated by dense stands of *Lantana camara* and encroaching *Vachellia karroo*. Vegetation structure is simplified, consisting of near-impenetrable thickets with very sparse groundcover. Plant diversity is significantly reduced, with only disturbance-tolerant species persisting.

The ecological condition of these habitats is poor. Comparative surveys recorded only 19 plant species in these thickets compared to 63 species in adjacent thornveld, highlighting the severity of ecological simplification. These habitats provide limited value to native fauna, though they may offer cover for generalist mammals such as mongooses and rodents. Bird and invertebrate diversity is extremely low. Ecologically, these thickets act as sinks and represent an ongoing threat to surrounding habitats through continued spread and dominance.

These invaded thickets contain only 25 species (≈ 11.6% of site richness), with 6 species marked as key/dominant. Importantly, 0 specialists were recorded here, indicating complete reliance on spill-over generalists from other habitats.

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Nevertheless, 14 common species also occur. These figures confirm that this habitat acts primarily as an ecological sink, offering little unique contribution.

Key and dominant species: include disturbance-tolerant birds such as Cape Wagtail (*Motacilla capensis*) and generalist invertebrates associated with dense shrub cover.

Common species also occurring here: consist of widespread disturbance-tolerant ants, rodents, and birds.

Sensitive and noteworthy species: no unique sensitive taxa were recorded here.

4.1.6. Artificially Cleared Areas

Artificially cleared habitats include firebreaks, roads, lawns, and areas around infrastructure. Vegetation is dominated almost exclusively by *Stenotaphrum secundatum*, which forms dense mats due to mowing, trampling, and nutrient enrichment. Structural diversity is minimal, and plant composition is extremely simplified.

The ecological condition of these habitats is highly degraded. Although plant diversity is negligible, they support a suite of cosmopolitan fauna. Birds such as Fiscal Flycatcher, Cape Wagtail, Cape Longclaw, Crowned Lapwing, and Blacksmith Lapwing forage in cleared areas, while buildings and structures provide nesting sites for House Sparrow, Cape Sparrow, Speckled Pigeon, and Spotted Eagle-Owl. Culverts are frequently used by White-throated Swallows. However, domestic cats and invasive rodents are also common, posing risks to native species.

Artificial areas support 64 species (≈ 29.8%), with 6 key/dominant species and a surprising 25 specialists, most of which are anthropogenic microhabitat specialists exploiting culverts, short-mown swards, and buildings. A total of 13 common species were also recorded. These findings demonstrate that, while ecologically degraded, artificially cleared areas contribute unique biodiversity through secondary niches.

Key and dominant species: include the White-throated Swallow (*Hirundo albigularis*), Speckled Pigeon (*Columba guinea*), House Sparrow (*Passer domesticus*), and Spotted Eagle-Owl (*Bubo africanus*).

Specialist species restricted to this habitat: include swallow species breeding in culverts and pigeon populations nesting in infrastructure, confirming the development of novel niches.

Common species also occurring here: include Fiscal Flycatcher (*Sigelus silens*) and Blacksmith Lapwing (*Vanellus armatus*).

Sensitive and noteworthy species: few sensitive species occur here, but monitoring is recommended for predator impacts from invasive cats and rodents.

4.1.7. Ecotones and Transitional Zones

The ecotones and transitional zones between major habitats on site are of particular importance. Higher faunal diversity was consistently observed between the Forest Thicket & Riparian Strip and the Open Woodland–Grassland Mosaic, between the Thicket–Grassland Mosaic and the Open Woodland–Grassland Mosaic, and between the Depression Wetlands

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and adjacent grasslands. These zones exhibit structural heterogeneity where thickets meet open grasslands or reedbeds grade into grassy fringes, creating conditions favourable to a wide range of species.

Mammals such as Cape Grysbok and small-spotted Genet exploit the cover of thickets while foraging into adjacent open grasslands, while insectivorous birds including Fiscal Flycatcher, Southern Boubou, Brown-backed Honeybird, and various cisticolas show heightened activity in ecotones due to increased insect abundance. Invertebrates, especially butterflies and dragonflies, are most abundant where sunlight and open conditions intersect with shrub or wetland edges. Ants and their associated Lycaenid butterflies were also frequently observed within these zones, highlighting the importance of ecotones for specialised interactions.

Ecotones are ecologically significant because they increase both alpha and beta diversity, functioning as biodiversity hotspots and centres of productivity. They sustain prey–predator dynamics, provide movement corridors, and maintain pollinator and insect diversity. In a fragmented and fenced system such as this, ecotones are disproportionately important as ecological bridges, sustaining species interactions that would otherwise decline.

The primary threats to ecotones include the invasion or encroachment of *Lantana camara*, *Vachellia karroo*, and *Stenotaphrum secundatum*, which reduce their structural heterogeneity and floristic diversity. In wetland margins, the dominance of *Typha* and *Phragmites* similarly simplifies vegetation, excluding species that depend on patchy, open habitats.

In conclusion, the ecotones and transitional zones represent critical biodiversity areas within the project site, underpinning ecological resilience and functioning. Their protection and inclusion in management frameworks is essential to maintaining faunal diversity and ecosystem services.

4.1.8. Habitat Connectivity, Isolation and Ecological Implications

The study area and its immediate surroundings are characterised by a highly fractured and isolated landscape, functioning effectively as a closed “island system”. A large palisade fence with electrified wiring extends to the ground, preventing the movement of medium to large mammals. Only highly mobile species such as Vervet Monkeys are able to cross the fence where overhanging trees provide access. The result is that all larger fauna are effectively excluded from the broader landscape, and the fauna that remain within the site are confined to the enclosed system.

Surrounding the site, dense informal and formal settlements occur to the north, northeast, and northwest. These areas are subject to intense anthropogenic activity, including livestock grazing, wood harvesting, and poaching. The risks associated with crime and poaching make the creation of wildlife-friendly access points or corridors unfeasible, as such measures could compromise both security and conservation objectives. Consequently, the site cannot be considered permeable to faunal movement, and resident species are effectively trapped within the fenced boundary.

Historically, riverine thickets and valley thickets provided critical faunal corridors across the region, linking grasslands, slopes, and thicket pockets. However, these features have been fragmented by agriculture, road networks, and urban development. Today, most open grassy areas that once supported high faunal activity have been converted to settlements, industrial zones, or monoculture pastures. Even if the site itself were permeable, the larger regional connectivity network is already severely compromised, reducing opportunities for mammals to disperse between patches of suitable habitat.

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The ecological implications of this fragmentation are significant. Species with limited dispersal abilities or specialised habitat requirements face heightened vulnerability due to reduced gene flow and restricted access to resources. Smaller mammals displaced during construction may be forced into adjacent disturbed areas where they face elevated predation and poaching risks. Avifauna that once relied on open grasslands and natural corridors are impacted by the loss of foraging and nesting sites, while invertebrate communities — particularly pollinators and specialist ant-butterfly associations — suffer from the simplification of habitats into woody thickets or urbanised areas.

Such island systems also alter predator–prey dynamics. Rodents, particularly *Rhabdomys pumilio*, thrive in dense *Stenotaphrum* sod and reedbeds, resulting in inflated populations of mesopredators such as mongooses. This shift places pressure on smaller or more sensitive prey species, including amphibians, reptiles, and invertebrates. Over time, predator inflation in closed systems may reduce biodiversity resilience, leading to declines in less adaptable species.

The regional-scale consequence of this isolation is the loss of ecological processes such as dispersal, seasonal migration, and natural recolonisation of disturbed patches. This undermines the long-term persistence of populations within the site, which may eventually decline due to inbreeding, resource limitations, or ecological imbalances. Studies from South African landscapes have shown that fragmented and fenced "island" habitats often experience reduced mammal richness and altered species composition, with generalists dominating at the expense of specialists.

For impact assessment and management, these conditions necessitate a shift in approach. The study area must be managed as a self-contained ecological island, where biodiversity maintenance depends on maximising habitat quality and ecological functionality within the fence rather than relying on landscape-scale connectivity. This underscores the importance of conserving intact habitat patches (e.g., Forest Thicket, Wetlands, and mosaics), protecting ecotones that sustain high diversity, and rehabilitating degraded or invaded areas. Management should focus on enhancing internal heterogeneity, controlling invasive species, and maintaining sufficient prey–predator balance to support resilient faunal populations.

In conclusion, the fractured and isolated nature of the site amplifies the ecological value of every remaining natural habitat and transitional zone. Protecting and managing these areas is not only critical for local biodiversity but also for ensuring that the "island" system remains ecologically functional in the absence of wider connectivity.

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4.2. Faunal Diversity

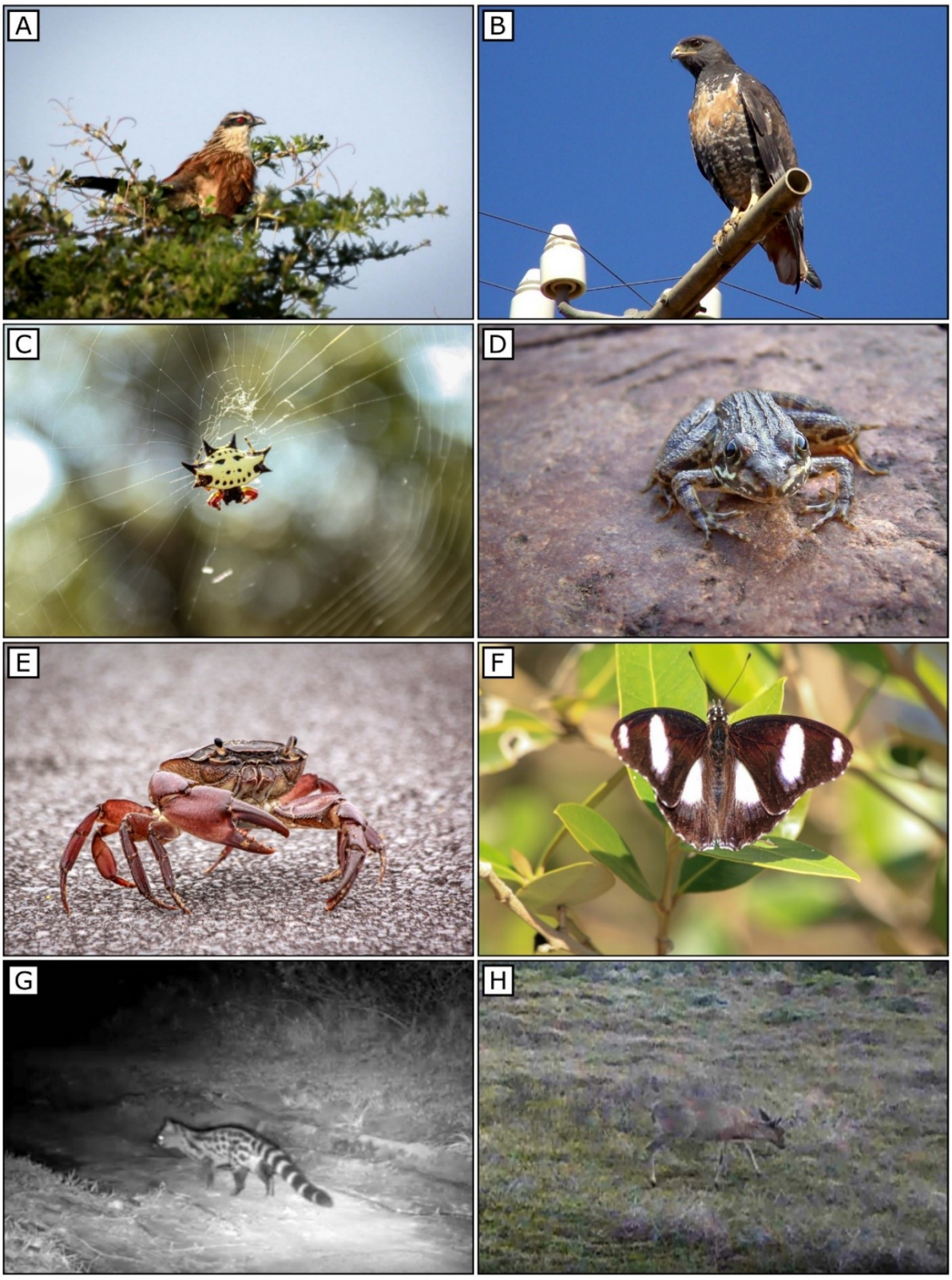

Figure 16: Selected faunal species that were observed within the study area: A) Burchell's Coucal (*Centropus burchellii*), B) Jackal Buzzard (*Buteo rufofuscus*), C) Short-Wing Kite Spider (*Gasteracantha sanguinolenta*), D) Common River Frog (*Amietia delalandii*), E) Pondoland River Crab (*Potamonautes danielsi*), F) Common Diadem (*Hypolimnas misippus*), G) Cape Genet (*Genetta tigrina*), and H) Common Duiker (*Sylvicapra grimmia*).

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The faunal diversity of the ELIDZ (Figure 16) is a reflection of its mosaic of habitats, including Open Woodland–Grassland Mosaics, Thicket–Grassland Mosaics, Dense Thicket–Riparian Strips, and Reedbed–Bulrush Depression Wetlands. Transitional ecotones, particularly between thicket and grassland or between riparian strips and open mosaics, emerged as biodiversity hotspots. These ecotones concentrate nectar sources, invertebrate prey, cover, and basking substrates, and were consistently observed to sustain the highest levels of activity across taxa, including Odonata, Lepidoptera, insectivorous birds, rodents, amphibians, and mesopredators.

In total, the survey and collation of available records yielded 213 species across major faunal groups. This included 116 invertebrates, 69 birds, 20 mammals, 6 amphibians, and 2 reptiles. The African Marsh Harrier (*Circus ranivorus*), a confirmed breeding species within the site, is the only recorded Species of Conservation Concern (VU). A total of 19 endemic species were also noted, predominantly among Lepidoptera, underscoring the regional conservation value of the site.

Diversity analysis further refines this picture. Shannon Diversity (H′) values indicated that birds ($H' \approx 4.2$) and Lepidoptera ($H' \approx 3.8$) exhibit the most diverse and balanced assemblages. Mammals, arachnids, and other invertebrates show moderate diversity ($H' \approx 2.5 – 3.0$), while amphibians and reptiles remain low ($H' < 1$), reflecting both ecological realities and survey limitations. Endemism was highest in Lepidoptera (27.8%), with smaller endemic contributions in Odonata and Aves.

These findings are broadly consistent with the previous faunal biodiversity assessment of the area, which also reported moderate mammalian diversity, low reptile and amphibian richness, and strong representation among birds and invertebrates. However, the current dataset provides more detail on endemism, IUCN status, and habitat associations, and confirms the breeding presence of the African Marsh Harrier.

The sections that follow discuss each faunal group in detail, accompanied by complete species tables.

4.2.1. Invertebrates

4.2.1.a) General Notes

Invertebrates represent a fundamental component of the biodiversity within the study area, functioning as pollinators, decomposers, prey items, and regulators of ecological processes. The updated survey recorded a total of 116 species, making this one of the most diverse faunal groups on site. Their taxonomic spread includes Lepidoptera, Arachnida, Hymenoptera, Coleoptera, Odonata, Orthoptera, and a variety of less common taxa such as termites, cockroaches, freshwater crabs, millipedes, thrips, and springtails. This diversity reflects a balanced and complex assemblage, with both generalist and specialist species present.

The most species-rich groups were the butterflies (Lepidoptera; 36 species, 31% of total) and spiders (Araneae; 24 species, 21%), followed by wasps, bees, and ants (Hymenoptera; 12 species, 10%) and beetles (Coleoptera; 9 species, 8%). Dragonflies (7) and damselflies (8) together contributed 13% of recorded species, while Orthoptera (grasshoppers, katydids, and crickets) were represented by five species (4%). Other groups such as termites, cockroaches, freshwater crabs, millipedes, thrips, and springtails were recorded in lower numbers, highlighting the broad taxonomic coverage of the survey.

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All species were assessed as Least Concern (LC) on the IUCN Red List, reflecting the general resilience of the invertebrate fauna. However, 20 species were identified as endemic and 1 as near-endemic, underlining the conservation value of the site for locally restricted taxa. Endemic species were concentrated among spiders, butterflies, and Odonata, groups which are particularly sensitive to habitat structure and microclimatic variation.

Analysis of the dataset shows clear trends:

- The assemblage is dominated by Lepidoptera and Araneae, which together comprise over half (52%) of all species recorded. This reflects a system where pollination and invertebrate predation are strongly represented ecological functions.
- Endemic species make up nearly one-fifth of the fauna, which is high relative to many transformed or isolated landscapes, confirming that the site retains ecological uniqueness despite anthropogenic pressures.
- Functional diversity is broad: herbivores, pollinators, predators, detritivores, and aquatic taxa are all present, supporting multiple trophic levels.

Invertebrates fulfil multiple ecological roles across the study area:

- Pollination and seed dispersal: Butterflies, bees, and certain beetles support plant reproduction and maintain floral diversity.
- Predation and pest regulation: Spiders, wasps, and predatory beetles suppress herbivorous insect populations.
- Food web support: Lepidoptera larvae, orthopterans, and odonates provide a major prey base for birds, amphibians, reptiles, and small mammals.
- Ecosystem engineering: Termites and millipedes contribute to nutrient cycling and soil aeration, while freshwater crabs link aquatic and terrestrial systems.

The invertebrate community is diverse, functionally rich, and ecologically significant, with 116 species recorded, including 21 taxa of conservation interest due to their endemic or near-endemic status. The dominance of pollinators and invertebrate predators reflects robust ecosystem functioning, while the presence of multiple functional groups underlines the role of invertebrates in maintaining biodiversity resilience. These findings highlight the importance of conserving invertebrate diversity not only as an integral component of biodiversity but also as a cornerstone of ecosystem processes.

4.2.1.b) Symbiotic Relationships and Dependencies among Invertebrates

Ant–Lycaenid Butterfly Associations:

One of the most notable symbiotic interactions recorded within the study area is the mutualistic relationship between lycaenid butterfly larvae (family Lycaenidae) and ants (family Formicidae). Several lycaenid species listed in the dataset, such as *Hypolycaena philippus* (Purple-brown Hairstreak), *Anthene amarah* (Black-striped Ciliate Blue), *Azanus jesous* (Topaz Babul Blue), *Actizera lucida* (Rayed Blue), and *Zizeeria knysna* (African Grass Blue), are known to engage in varying degrees of ant-association during their larval stages.

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- Mechanism of association: Lycaenid larvae possess specialised secretory glands (dorsal nectary organs and tentacular organs) that secrete sugar- and amino acid-rich substances. These secretions are consumed by ants, which in turn provide protection to the larvae against predators and parasitoids.
- Ant dependence: Ants recorded from the site such as *Crematogaster peringueyi* (Black Cocktail Ant), *Crematogaster castanea* (Red Cocktail Ant), and *Camponotus maculatus* (Spotted Sugar Ant) are particularly important partners. These species are well documented to tend lycaenid larvae, shepherding them onto host plants, and actively defending them against invertebrate predators such as spiders, wasps, and predatory bugs.
- Ecological significance: This ant-lycaenid mutualism is a classic example of myrmecophily, a phenomenon especially common in African savanna and grassland systems. For the lycaenids, ant protection substantially increases larval survival rates, while ants benefit from a supplementary food source.

The presence of both ant species and lycaenid butterflies in the survey suggests that these associations are active and ecologically functional within the project site. Such mutualisms strengthen the resilience of butterfly populations and influence community dynamics in several ways:

- Butterfly survival and diversity: Ant protection reduces larval mortality, supporting higher lycaenid population densities. This is particularly important in a site where small patches of host plants may be vulnerable to browsing or disturbance.
- Ant foraging and colony expansion: By exploiting lycaenid secretions, ants increase their energy intake, potentially allowing colonies to expand. This can indirectly influence ant-mediated ecosystem services, such as soil turnover and seed dispersal.
- Indirect impacts on vegetation: Because ants defend lycaenid larvae aggressively, herbivory on specific host plants may increase as ant protection reduces natural predation on butterfly larvae. This creates a complex tri-trophic interaction linking plants, herbivores (larvae), and ants.
- Indicator value: The co-occurrence of ant-tended lycaenids is often used as a bioindicator of intact ecological interactions. Their presence confirms not only the persistence of invertebrate diversity but also the maintenance of species interactions critical for ecological functioning.

Beyond ant–lycaenid mutualisms, several other relationships are ecologically relevant:

- Odonata-wetland dependency: Dragonflies and damselflies (e.g., *Lestes plagiatus*, *Chlorolestes tessellatus*, *Ceriagrion glabrum*) require aquatic habitats for breeding and larval development. Adults are aerial predators of midges, mosquitoes, and other flying insects, contributing to insect regulation.
- Pollinator-plant relationships: Butterflies, bees (*Apis mellifera*), and certain beetles serve as primary pollinators for flowering forbs and shrubs, facilitating seed set and genetic exchange. Their presence ensures ecological resilience of plant communities.
- Predator-prey regulation: Spiders (e.g. *Evarcha*, *Heliophanus*, *Thomisus*) are important predators of herbivorous insects, while mantids and assassin bugs prey on Lepidoptera and Orthoptera. These relationships help maintain balance within invertebrate guilds.

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The invertebrate assemblage of the site is not only rich in species but also underpinned by critical symbiotic and co-dependent relationships. The ant–lycaenid mutualism stands out as one of the most ecologically significant interactions, with mutual benefits to both partners and cascading effects across trophic levels. Such interactions highlight the need to conserve both species groups simultaneously, as the loss of either ants or host plants would disrupt the survival of associated lycaenid butterflies. Protecting these interactions is therefore vital to sustaining the site's broader ecological integrity.

Table 8: Summary of invertebrate diversity recorded in the study area.

Group	Orders Represented	No. of Species	% of Total	Notes
Lepidoptera (Butterflies & Moths)	Lepidoptera	36	31%	Largest group; important pollinators; several endemic species.
Arachnida (Spiders)	Araneae	24	21%	Key invertebrate predators; include endemics such as Hyllus brevitarsus.
Hymenoptera (Ants, Bees, Wasps)	Formicidae, Apidae, Vespidae	12	10%	Includes ant species with myrmecophilous associations with Lycaenids.
Coleoptera (Beetles)	Coleoptera	9	8%	Diverse feeding roles; include pollinators, decomposers, and predators.
Odonata (Dragonflies & Damselflies)	Anisoptera, Zygoptera	15	13%	Aquatic–terrestrial link; endemic Chlorolestes tessellatus recorded.
Orthoptera (Grasshoppers, Katydids, Crickets)	Orthoptera	5	4%	Important prey base for birds and reptiles.
Other groups	Termites, Cockroaches, Crabs, Millipedes, Thrips, Springtails	15	13%	Minor representation but ecologically important in soil and nutrient cycling.
Total	—	**116**	**100%**	—

Table 9: Conservation status of invertebrates recorded in the study area.

Category	No. of Species	% of Total	Examples
IUCN Least Concern (LC)	116	100%	All of the recorded species
Near Endemic	1	<1%	Zizeeria knysna knysna (African Grass Blue)
Endemic	21	18%	*Chlorolestes tessellatus, Zosteraeschna minuscula, Cassionympha cassius, Pseudonumpha magus, Pseudonumpha varii varii, Actizera lucida, Apallaga mokeezi mokeezi, Eagris nottoana knysna, Eretis umbra umbra, Spialia ferax, Gegenes letterstedti, Solenopsis punctaticeps, Cochlitoma zebra, Zinophora punctata, Potamonautes danielsi, Heliophanus demonstrativus, Hyllus brevitarsus, Thomisus stenningi, Hogna spenceri, Pardosa crassipalpis*
Introduced / Alien	0	0%	None recorded

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4.2.2. Mammals

A total of 20 mammal species were recorded within the project site. All species are currently assessed as Least Concern under the IUCN Red List, but provincial legislation lists the Cape Grysbok (*Raphicerus melanotis*) as a protected species. This small antelope is especially associated with dense thicket cover and fringing ecotones, where it forages selectively on grasses, forbs, and shrubs while using the thickets as refuge from predation and human disturbance.

Rodents, especially the Four-striped Grass Mouse (*Rhabdomys pumilio*), were highly abundant across the mosaic habitats. Their dominance likely reflects:

- Fencing and isolation, which has excluded larger mammalian predators — such as Caracal (*Caracal caracal*), Black-backed Jackal (*Canis mesomelas*), or Serval (*Leptailurus serval*) — that would naturally regulate rodent numbers.
- Habitat structure, with ecotones providing abundant seed and grass cover, coupled with low predation pressure.
- Disturbance regimes, including cleared patches and edge habitats, which *R. pumilio* actively exploits.

The absence of larger predators has created conditions where mesopredators, especially mongooses (Cape Grey Mongoose, Large Grey Mongoose, Yellow Mongoose, and Water Mongoose), exert the primary predatory pressure on *R. pumilio*. This has created a mesopredator-prey dynamic, with *R. pumilio* forming the dominant prey base.

Shannon diversity ($H' \approx 2.6$) indicates a moderately balanced mammal assemblage. However, the community is strongly skewed towards generalist rodents and mesopredators, with few sensitive species persisting.

The Fence and "Island Effect"

The fenced and isolated nature of the study area creates a classic ecological island, limiting immigration and emigration of mammals. This has several effects:

- Restricted dispersal: Larger mammals and wide-ranging species are absent because they cannot enter or leave the site. This includes potential apex predators and grazers.
- Concentration of small generalists: Rodents, small carnivores, and adaptable species thrive under the stable conditions, resulting in inflated local densities.
- Increased competition: Sensitive species are likely suppressed due to competition and predation from dominant generalists.

Over time, such isolation may lead to community simplification, with fewer trophic levels and reduced ecological resilience.

Prey–Predator Interactions

The dominance of *R. pumilio* has cascading effects:

- Rodent overabundance provides a reliable prey base for mongooses and other small carnivores, supporting higher-than-expected densities of these mesopredators.

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- Mesopredator release: With no larger predators to regulate their numbers, mongooses exert disproportionate predation pressure on other small mammals, reptiles, amphibians, and ground-nesting birds.
- This dynamic can lead to suppression of sensitive species vulnerable to mongoose predation and competitive exclusion.

Thus, while the predator-prey interaction between *R. pumilio* and mongooses appears balanced, it is artificially maintained in the absence of apex predators. The result is a system dominated by generalist species at the expense of specialist and sensitive taxa.

Other Observations and Ecological Roles

The Common Duiker (*Sylvicapra grimmia*), and to a lesser extent the Cape Grysbok (*Raphicerus melanotis*), persist as the dominant herbivores across the study area, particularly within thicket-grassland ecotones. The survey confirmed that duiker densities are relatively high when compared with regional baselines, a trend amplified by the absence of apex predators, the restricted dispersal potential created by perimeter fencing, and the concentration of resources in ecotones and mosaics. As generalist browsers, duikers consume leaves, shoots, fruits, and occasionally small vertebrates, and their population success reflects the favourable habitat structure of the site. However, elevated duiker numbers pose potential ecological risks. Overbrowsing may reduce the recruitment of key woody plant species such as *Diospyros*, *Euclea*, and other thicket shrub and tree species, altering successional trajectories within thickets and riparian areas. Over time, this could lead to structurally simplified understories, diminished forage availability for more selective browsers such as Cape Grysbok, and reduced faunal habitat diversity. In addition, duiker expansion may increase competition with other antelope species, displacing them into less suitable habitats. The unchecked growth of duiker populations represents a form of trophic imbalance, reflecting predator release in a closed system. While they are not directly regulated by mesopredators, their overabundance nevertheless disrupts food web balance and may indirectly suppress biodiversity across multiple taxa. Though risks of human-wildlife conflict are reduced in an industrial landscape, experience from other fenced reserves shows that unchecked duiker growth can lead to problems such as crop raiding, road collisions, and increased disease transmission. Their elevated population is therefore both a symptom of site isolation and a driver of potential long-term habitat change, necessitating monitoring, browsing impact assessments, and — if required — active population management.

The abundance and distribution of the Four-striped Grass Mouse (*Rhabdomys pumilio*) is also closely linked to the suppression of fire and the absence of significant grazing pressure. This generalist rodent thrives in dense grassy cover and ecotones, where it forages on seeds while using vegetation for shelter from predators. Without fire, grasslands accumulate dense, moribund biomass and undergo progressive woody encroachment by species such as *Vachellia karroo* and *Lantana camara*. While this reduces palatable grass diversity, it provides continuous ground cover favourable to *R. pumilio*. Similarly, insufficient grazing by bulk grazers allows grass swards to remain intact and seed-rich, further boosting rodent numbers. Normally, fire and grazing create a patchy habitat mosaic with short grass patches (predator-exposed) interspersed with taller cover (predator-safe), regulating rodent numbers. In the absence of these processes, cover becomes continuous, reducing predation efficiency and enabling rodent populations to expand unchecked. Within the closed ELIDZ system, where apex predators are absent, this imbalance is exacerbated. Mesopredators such as mongooses disproportionately rely on *R. pumilio*, sustaining artificially high densities of both predator and prey. Elevated *R. pumilio*

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numbers can outcompete more sensitive small mammals, and the resultant mesopredator boom exerts additional pressure on amphibians, reptiles, and ground-nesting birds. Over the long term, continued suppression of fire and grazing promotes woody encroachment, eventually shrinking grassland patches and reducing *R. pumilio* habitat suitability. Thus, while *R. pumilio* populations initially benefit, long-term habitat change may destabilise predator-prey relationships, simplifying the mammal assemblage and eroding ecological resilience.

Camera trapping and field observations confirmed the presence of several important carnivores. The Water Mongoose (*Atilax paludinosus*) was recorded along depression wetlands and riparian corridors, underscoring the importance of aquatic and semi-aquatic habitats in maintaining carnivore diversity. The Large Grey Mongoose (*Herpestes ichneumon*) and Slender Mongoose (*Galerella sanguinea*) were also frequently recorded, highlighting the dominance of mesopredators within the mosaic habitats. Notably, both the Cape Genet (*Genetta tigrina*) and Small-spotted Genet (*Genetta genetta*) were confirmed by camera traps, showing that some nocturnal predators do persist despite the site's isolation. Nevertheless, the overall absence of larger carnivores such as African Civet (*Civettictis civetta*), Caracal (*Caracal caracal*), and Black-backed Jackal (*Canis mesomelas*) suggests that fencing has severely limited connectivity and immigration of wide-ranging species.

Among other mammals, the Vervet Monkey (*Chlorocebus pygerythrus*) demonstrates the persistence of arboreal niches in riparian and thicket habitats, while the Cape Porcupine (*Hystrix africaeaustralis*) functions as an ecosystem engineer. Numerous signs of porcupine activity — including gnawed branches, geophyte excavations, and frequent camera trap detections — indicate a well-established population, although deep burrow systems were less common than expected. Fossorial species, such as the Common Mole-rat (*Cryptomys hottentotus*) and Cape Mole-rat (*Georychus capensis*), highlight the role of sandy soils in supporting below-ground biodiversity and underscore the contribution of subterranean mammals to soil turnover and ecosystem processes.

The mammalian assemblage indicates a functionally simplified but stable predator–prey system dominated by rodents and mesopredators. The absence of larger predators and grazers reflects the island effect of fencing, which restricts colonisation and creates closed-system dynamics.

While this has allowed *R. pumilio* populations to flourish, their high abundance fuels mesopredator populations, which in turn exert pressure on other small mammals, reptiles, and amphibians. The long-term risk is a community skewed towards dominant generalists, with a loss of ecological balance and reduced resilience.

From a conservation perspective, mammalian diversity within the site has moderate value, but requires careful management of edge habitats and invasive encroachment to avoid further skewing of the faunal assemblage.

Table 10: Conservation and provincial protection status of mammals recorded in the study area.

Category	No. of Species	No. of Species	Species
IUCN Least Concern (LC)	20	100%	
Provincially Protected Species	1	5%	Cape Grysbok (Raphicerus melanotis)
Endemic / Near Endemic (South Africa)	3	15%	Cape Grysbok (endemic), Cape Genet (endemic), Cape Grey Mongoose (near endemic)

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Table 11: Summary of mammal diversity recorded in the study area.

Category	No. of Species	% of Total	Species
Primates	Cercopithecidae	1	3%
Lagomorpha	Leporidae	1	3%
Rodentia	Bathyergidae, Hystricidae, Muridae	6	20%
Carnivora	Herpestidae, Viverridae, Mustelidae	8	27%
Artiodactyla	Bovidae	9	30%
Chiroptera	Vespertilionidae, Rhinolophidae	4	13%
Total	—	**29**	**100%**

4.2.3. Avifauna

A total of 69 bird species were recorded during surveys, making avifauna the most species-rich vertebrate group on site. This richness is consistent with expectations for a mosaic landscape comprising wetlands, thickets, riparian strips, and grassland patches. Bird diversity was quantified with a Shannon diversity index ($H' \approx 4.2$), the highest of all faunal groups assessed, reflecting both high richness and an even spread of species across habitats.

The most significant conservation finding was the presence of a breeding pair of African Marsh Harriers (*Circus ranivorus*), a Vulnerable (IUCN Red List) raptor, associated with the depression wetland (labelled as W1 in Map 12 and Map 14) and adjacent open grassland areas used for foraging. Their presence confirms the site's importance as a refuge for SCC. In addition, four endemic bird species were recorded, most notably the Cape Longclaw (*Macronyx capensis*), which was strongly associated with open grassland–thicket ecotones.

The bird assemblage comprises a range of functional guilds:

- The raptor community on-site is diverse and functionally important, comprising species such as the African Marsh Harrier (*Circus ranivorus*), African Goshawk (*Accipiter tachiro*), African Harrier-Hawk (*Polyboroides typus*), European Honey Buzzard (*Pernis apivorus*), and Common Buzzard (*Buteo buteo*), as well as more widespread species Yellow-billed Kite (*Milvus aegyptius*). Collectively, these species exploit different habitats and prey types, reflecting the structural heterogeneity of the site.
    - African Marsh Harrier was strongly associated with wetlands and adjacent open grasslands, using low gliding flight over reedbeds and sedge zones to hunt small mammals, amphibians, and reptiles. Its reliance on the depression wetland confirms the study area's conservation significance, as this species is regionally threatened.
    - African Goshawk favours forested and dense thicket habitats, particularly where tall trees provide perching and roosting sites. This species typically hunts by still-hunting from perches in cover, occasionally flying above the canopy and stooping into dense vegetation to ambush prey. Its diet is primarily avian, but also includes small mammals and reptiles. The presence of this species underscores the ecological role of riparian strips and thicket patches in supporting raptor diversity.

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- African Harrier-Hawk occurs in closed and open woodland, forest edges, wooded cliffs, and ravines. This highly adaptable species forages by climbing and hopping between branches in the canopy, probing crevices and cavities with its uniquely jointed legs to extract prey. It hunts a wide variety of items including nestlings, reptiles, and small mammals. Its propensity for nest-raiding makes it an important regulator of smaller bird populations.
- European Honey Buzzard is a specialist feeder on wasp larvae and is closely associated with tree-covered habitats, particularly thickets, forests, and riparian corridors. It typically forages by digging into wasp nests in the soil or within tree cavities, making it an unusual raptor that contributes to regulating invertebrate populations rather than vertebrates.
- Common Buzzard, along with Yellow-billed Kite, is more generalist in foraging behaviour, hunting small mammals, reptiles, and carrion in open grassland and wetland ecotones. These species exploit the prey base created by the high abundance of rodents such as *Rhabdomys pumilio, thereby partially fulfilling predator roles absent due to the lack of mammalian apex predators.*

Together, these raptors represent a multi-guild predator assemblage that spans wetland, dune thicket, forest thicket, and open grassland habitats. They play critical ecological roles in regulating prey populations (rodents, birds, reptiles, and invertebrates) and help balance food webs that are otherwise destabilised by the absence of larger mammalian predators. The diversity of hunting strategies, from low aerial hunting by harriers, to perch-hunting by goshawks, to cavity-foraging by harrier-hawks, illustrates the breadth of ecological niches available to raptors within the site.

Wetland-associated birds included Lesser Swamp Warbler (*Acrocephalus gracilirostris*), African Reed Warbler (*Acrocephalus baeticatus*), Levaillant's Cisticola (*Cisticola tinniens*), Southern Red Bishop (*Euplectes orix*), and Southern Masked Weaver (*Ploceus velatus*), among others. These species were strongly tied to dense reedbeds and stands of *Typha capensis*, which provide critical nesting habitat. Colonies of bishops and weavers were observed anchoring nests to reed stems, while warblers and cisticolas constructed nests deep within emergent vegetation, protected from predators and concealed by the dense cover. The noteworthy absence of waders, herons, and other open-water specialists suggests that the wetlands on site are too densely vegetated and lack areas of shallow open water or sedge-dominated margins, which are essential for foraging by such species. This pattern indicates that while reed- and *Typha*-dominated systems support some wetland birds, they simultaneously exclude guilds dependent on open wetland microhabitats.

Thicket and woodland species included Forest Canary (*Crithagra scotops*), Southern Boubou (*Laniarius ferrugineus*), White-browed Scrub Robin (*Cercotrichas leucophrys*), Red-capped Robin-Chat (*Cossypha natalensis*), Bar-throated Apalis (*Apalis thoracica*), Sombre Greenbul (*Andropadus importunus*), Crowned Hornbill (*Lophoceros alboterminatus*), and Knysna Turaco (*Tauraco corythaix*). These species were primarily associated with riparian strips, dense thicket margins, and forest thicket patches within the study area. Their dependence on structurally complex vegetation highlights the importance of thicket habitats and riparian corridors in sustaining arboreal and semi-arboreal bird communities. Species such as Knysna Turaco and Crowned Hornbill also serve as important dispersers of fruiting tree species, linking avifaunal presence to broader ecosystem processes.

Grassland specialists were represented by Lazy Cisticola (*Cisticola aberrans*), Cape Longclaw (*Macronyx capensis*), Neddicky (*Cisticola fulvicapilla*), Wailing Cisticola (*Cisticola lais*), and Karoo Prinia (*Prinia maculosa*). These species

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were concentrated in open mosaic habitats and transitional zones between thicket and grassland. Insectivorous in nature, they were observed foraging on invertebrates flushed from the grass sward, with species such as Cape Longclaw also dependent on ecotones for nesting. Their presence confirms the importance of maintaining open grassy patches within the site, as excessive woody encroachment would diminish habitat availability for this guild.

Generalists and disturbance-adapted species such as Rock Pigeon (*Columba livia*), Laughing Dove (*Spilopelia senegalensis*), Blacksmith Lapwing (*Vanellus armatus*), Cape Sparrow (*Passer melanurus*), Hadeda Ibis (*Bostrychia hagedash*), and Village Weaver (*Ploceus cucullatus*) were frequently observed in artificially cleared areas, road verges, built-up areas and disturbed edges. These species are highly adaptable and often exploit anthropogenic habitats, feeding on a wide range of seeds, invertebrates, and food waste. While their presence boosts overall avifaunal richness, they contribute little to conservation value, as they tend to dominate in degraded or transformed habitats.

The bird assemblage clearly demonstrates the influence of habitat structure and availability on avifaunal diversity. Raptors highlight the role of open grasslands and wetlands in sustaining predator-prey dynamics, particularly in regulating rodent populations. Wetland-associated passerines and colony-nesting weavers underscore the dependence of certain guilds on reed- and *Typha*-dominated habitats, while the absence of waders and herons points to the loss of open-water functionality within these wetlands. Grassland specialists, concentrated in ecotones and open mosaics, indicate that woody encroachment poses a direct threat to this guild. Thicket and woodland species reinforce the conservation value of riparian strips and dense thickets, while disturbance-adapted generalists demonstrate the growing influence of anthropogenic habitats.

The avifaunal assemblage indicates a robust, functionally diverse community. High richness and evenness suggest that the site provides sufficient structural heterogeneity to support multiple bird guilds. The dominance of Least Concern species reflects the adaptability of many birds to both natural and transformed areas, but the presence of the African Marsh Harrier (VU) elevates the conservation significance of the site.

Habitat associations highlight the critical role of ecotones and wetlands in sustaining avifaunal diversity. Reedbeds and sedge-fringed pools provide nesting and foraging habitat for wetland specialists, while open grassland–thicket transitions support insectivorous passerines and endemic species. Artificial areas, while less structurally diverse, still contribute by providing foraging opportunities for generalist species.

The absence of larger forest-dependent species (e.g., Crowned Eagle, Olive Woodpecker) reflects the lack of tall forest habitats within the site, while the relatively low representation of migratory waterbirds suggests limited wetland size and heterogeneity. However, the assemblage as recorded is comparable in diversity to other mosaic landscapes in the region, indicating that the project site retains considerable avifaunal value despite its isolation.

The following ecological roles and conservation implications can be deduced:

- Predator regulation: Raptors, exert top-down pressure on rodent populations, partially compensating for the absence of mammalian apex predators.
- Pollination and seed dispersal: Nectar-feeding species (e.g., sunbirds) and frugivores (e.g., bulbuls) contribute to plant reproduction and regeneration, particularly in thickets and riparian zones.

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- Indicator value: The continued presence of wetland-dependent birds indicates that aquatic habitats, while threatened by *Typha* and *Phragmites* encroachment, retain ecological function.
- Endemism and uniqueness: Endemic species such as Cape Longclaw reinforce the regional biodiversity value of the site, particularly within grassland–thicket mosaics.

Conservation concerns are centred on the potential degradation of wetlands and ecotones. Encroachment by invasive and woody vegetation could reduce habitat suitability for ground-nesting species and insectivores, while ongoing disturbance from development could favour generalists at the expense of specialists. Maintaining open grassland patches, wetland heterogeneity, and thicket–grassland ecotones is therefore crucial to sustaining avifaunal diversity.

4.2.4. Amphibians

Six amphibian species were recorded, all Least Concern. They were primarily associated with depression wetlands (5 species) and pools of the seasonal watercourses (2 species). Shannon diversity ($H' \approx 0.9$) was low, but consistent with small amphibian assemblages. Field observations confirmed that reed and bulrush encroachment habitat heterogeneity.

The amphibian community reflects both the importance and vulnerability of wetland habitats. The low richness but strong habitat association underscores their value as bioindicators of wetland health, particularly under encroachment pressures.

4.2.5. Reptiles

Only two reptile species were recorded. Shannon diversity was very low ($H' \approx 0.7$). Habitat features (rocks, woody debris, thickets) suggest greater reptile potential, indicating likely under-sampling. The reptile assemblage recorded is sparse, but the presence of generalist species indicates that the site can sustain reptiles under better survey conditions.

4.3. Species of Conservation Concern (SCC)

When animal SCC occur in a proposed development area, Project activities can elevate extinction risk for local subpopulations and, cumulatively, for the species; permits are therefore required to damage, destroy or translocate protected/SCC individuals. These definitions and categories follow SANBI's Red List framework and guidance.

A preliminary list of threatened animals likely for the site was assembled from the DFFE Screening Tool, SANBI's Red List of South African Animal Species, the IUCN Red List, ADU/Virtual Museum and iNaturalist (South Africa).

In terms of the Environmental Screening tool the sensitivity rating of the study area is considered HIGH due to the confirmed presence of 5 threatened bird species. A further 7 threatened bird/mammal and invertebrate species also have a distribution that include the study area and may inhabit the area (Medium) namely:

- Aves
    - Crowned Eagle - *Stephanoaetus coronatus* (VU): High Sensitivity
    - African Marsh Harrier - *Circus ranivorus* (EN): High Sensitivity
    - Knysna Warbler - *Bradypterus sylvaticus* (VU): High Sensitivity
    - Lanner Falcon - *Falco biarmicus* (VU): High Sensitivity
    - Martial Eagle - *Polemaetus bellicosus* (EN): High Sensitivity

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  - Grey Crowned Crane - *Balearica regulorum* (EN): Medium Sensitivity
  - White-bellied Korhaan - *Eupodotis senegalensis* (VU): Medium Sensitivity
- Mammalia
  - Smanago Monkey - *Cercopithecus albogularis* (VU): Medium Sensitivity
  - Giant Golden Mole - *Chrysospalax trevelyani* (EN): Medium Sensitivity
  - Eastern Tree Dassie - *Dendrohyrax arboreus* (EN): Medium Sensitivity
- Invertebrates
  - Sensitive Species 8 (VU): Medium Sensitivity
  - Bladder Grashopper - *Prostalia granulata* (EN): Medium Sensitivity

Consistent with the Screening Tool (see section 4.4 and Figure 17), the study area's sensitivity is High, based on confirmed presence of one threatened bird species and the potential presence of several additional threatened bird, mammal, and invertebrate species.

4.3.1.a) Study Area Context and Likelihood of Occurrence (LoO)

The study area is a closed "island system": a palisade fence with electrified wires to ground level excludes all but small fauna and agile climbers; surrounding settlements, busy roads and agricultural land further fracture regional connectivity and elevate edge disturbance. Historic riverine and valley thickets that once served as corridors are now largely severed; even if the fence were permeable, functional landscape linkages remain compromised. These constraints, plus frequent patrols and general edge activity, strongly reduce the probability of residency for large, disturbance-sensitive or wide-ranging SCC and shape the Likelihood of Occurrence (LoO) judgements below.

Ecologically, the site comprises Forest Thicket & Riparian Strips, Depression Wetlands dominated by *Typha capensis* and *Phragmites australis*, Thicket–Grassland and Open Woodland–Grassland mosaics, plus invaded thickets and artificially cleared areas. Observations confirm strong faunal concentration along ecotones — especially riparian thicket-open grassland edges — driven by invertebrate abundance and cover-forage contrasts that favour butterflies, odonates, insectivorous birds and small-medium mammals.

4.3.1.b) Likelihood of Occurrence Categories Used

Below is a LoO assessment for each listed Species of Conservation Concern (SCC), based on the study area habitat units, the island-like, fenced context, and the documented prey/associations recorded on site (abundant small rodents in reedbeds and lawns; rich invertebrate base in ecotones; limited large-mammal fauna; regular anthropogenic disturbance along edges). LoO categories have the following definitions: Confirmed (recorded on site), High (requirements broadly present: habitat, forage/prey, nesting/perching/breeding sites), Medium (some requirements present; others limiting and/or species highly sensitive), Low (requirements largely absent; species especially sensitive to disturbance).

4.3.1.c) Species Accounts

Crowned Eagle (*Stephanoaetus coronatus, VU*) — Likelihood: Low

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A large forest raptor requiring extensive, continuous indigenous forest for nesting (massive platform nests in tall canopy trees) and a stable prey base of medium-sized mammals (notably primates and small antelope). On site, forest-like structures are limited to narrow Forest Thicket & Riparian strips that, while multi-layered, do not approximate the large, uninterrupted forest blocks favoured for nesting. The fenced, island context restricts movements of medium-sized mammalian prey; inside the fence, small antelope and medium mammals occur only patchily and at low densities. Although occasional perching/soaring over the Open Woodland–Grassland Mosaic is possible, the combined constraints of insufficient nest trees/forest depth, limited suitable prey biomass, and high sensitivity to anthropogenic activity render occupancy/nesting improbable. Foraging as a transient visitor cannot be ruled out, but residency or breeding on site is unlikely.

African Marsh Harrier (*Circus ranivorus*, EN) — Likelihood: Confirmed

A resident breeding pair uses the Depression Wetlands (W1 in Map 12 and Map 14) dominated by *Typha* and *Phragmites*, nesting within dense reeds/sedges and foraging across drier wetland margins, adjacent grasslands and ecotones. Their diet is rodent-dominated, particularly Four-striped Mouse (*Rhabdomys pumilio*) and Vlei Rats (*Otomys* spp.), supplemented by small birds, frogs and fish where available. Site observations and trapping confirm high small-mammal biomass driven by sod-forming *Stenotaphrum secundatum* around wetland edges, which also facilitates rodent movement and predator-prey encounters. To minimise breeding disturbance, a precautionary buffer around active nests within the southern wetland is recommended (Map 20), by analogy to disturbance distances collated for Eurasian/hen harriers (typically 300 – 500 m) in the absence of species-specific local guidance.

Knysna Warbler (*Bradypterus sylvaticus*, VU) — Likelihood: Medium

A skulking understorey insectivore of evergreen forest and dense riparian thicket with perennial seepage/streams and continuous, tangled shrub layer. The study area's Forest Thicket & Riparian Strip offers structural analogues (dense, shaded, moist microclimate) and high invertebrate abundance; however, forest-like extent and continuity are limited and the landscape is highly fragmented. The species is disturbance-sensitive and prefers low-disturbance riparian/forest gullies. Given the suitable microstructure but constrained spatial extent and the island context, occurrence as low-density, local pairs is plausible, but sustained occupancy and breeding would depend on maintaining undisturbed, permanently moist understorey and connectivity along riparian strips. This leads an LoO of Medium (habitat partly suitable; sensitivity and limited extent are key constraints).

Lanner Falcon (*Falco biarmicus*, VU) — Likelihood: Medium

A versatile open-country falcon hunting small birds and bats/insects over open grasslands, mosaics, and agricultural edges, often using pylons, buildings, or cliff faces for perching and nesting (including anthropogenic structures). The study area provides ample foraging airspace (Open Woodland–Grassland Mosaic; edges of Artificially Cleared Areas), perch sites (infrastructure, poles), and abundant avian/insect prey along ecotones. Constraints are the lack of cliffs/ledges and the restricted size of the "island," which may limit territory viability for breeding. As a foraging visitor and possible local hunter, the LoO is Medium. Breeding is less likely without suitable ledges or equivalent structures and low disturbance.

Martial Eagle (*Polemaetus bellicosus*, EN) — Likelihood: Low

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A very large raptor requiring extensive open savanna with very tall trees for nesting and a substantial prey base (medium-to-large birds and mammals). The site's fenced, fragmented footprint, scarcity of towering nest trees, and limited larger-prey availability (due to isolation) are strong negatives. While occasional overflight cannot be excluded, residency or breeding is improbable. Sensitivity to human activity and the need for large home ranges further reduce likelihood on this small, enclosed system.

Grey Crowned Crane (*Balearica regulorum*, EN) — Likelihood: Medium–Low

Prefers shallow, open wetlands with sedge mosaics and short-grass foraging lawns. Here, wetlands are tall, dense *Typha–Phragmites* with limited open water and the landscape is fenced, reducing safe roosting/nesting options. Short mown swards exist in artificial areas and open mosaics, so fly-through foraging is possible; breeding prospects are poor unless margins are diversified and disturbance reduced.

White-bellied Korhaan (*Eupodotis senegalensis*, VU) — Likelihood: Low

A disturbance-sensitive bustard of open to lightly wooded grasslands needing contiguous territories. Although some swards suit foraging, the island footprint, edge disturbance and human activity make long-term occupancy unlikely; transient passage cannot be excluded.

Samango Monkey (*Cercopithecus albogularis*, VU) — Likelihood: Medium–Low

A forest-dependent primate requiring tall indigenous forest canopies for shelter/feeding and arboreal connectivity. The site's Dense Thicket & Riparian units provide local canopy and fruiting/shrub resources, but a forest-like extent/continuity are limited, and the island fence constrains broader troop movements and demographic exchange. Vervet use of edge trees was recorded on-site, but Samango generally demands deeper forest. Short-term foraging is possible where canopy is denser, yet stable occupancy is constrained. This results in a LoO of Medium–Low.

Giant Golden Mole (*Chrysospalax trevelyani*, EN) — Likelihood: Low

A very range-restricted, forest-litter and soft-soil specialist associated with deep, moist leaf litter in Afromontane/coastal scarp forests, typically with minimal disturbance. While the riparian thicket understorey offers moist microhabitats, the limited forest-like extent, isolation, and disturbance render presence unlikely. No strong indicators (e.g., characteristic surface workings) were recorded. Its LoO is thus Low.

Eastern Tree Dassie / Tree Hyrax (*Dendrohyrax arboreus*, EN) — Likelihood: Low

Requires mature forest with large cavity-bearing trees or rocky/arboreal dens, and typically low disturbance. study area's thicket ribbons lack the large-tree density and continuity commonly used for roosting/breeding. The island setting also limits colonization. Occasional transient use of dense thicket is possible but resident population is improbable. It LoO is Low.

"Sensitive Species 8" (VU; prior study) — Likelihood: Medium (moderate)

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Habitat: Coastal Scrub, woodlands and forested areas. LoO: Moderate — some suitable habitat occurs in the site's thicket-grassland mosaic and riparian thicket, but human disturbance and fragmentation may limit persistence. This aligns with on-site evidence of ecotone-driven invertebrate richness where scrub meets grassland and wetland margins, coupled with frequent edge activity.

Bladder Grasshopper (*Prostalia granulata*, EN) — Likelihood: Medium–Low

This group often shows vegetation specificity in coastal scrub/strandveld/thicket mosaics and is noise- and disturbance-sensitive. While the Thicket–Grassland Mosaic and dune-scrub components provide structural fit, woody invasion and encroachment (*Lantana camara*, *Vachellia karroo*) and edge disturbance degrade microhabitats. Targeted nocturnal/acoustic surveys in peak season are recommended to refine its status.

***Aslauga australis* (Lycaenidae; EN) — Likelihood: Medium**

A myrmecophilous lycaenid typically linked to ant-rich ecotones and shrubby/grassy mosaics, often with host interactions mediated by ants (e.g., *Crematogaster* spp.). The study area's ecotones between Thicket–Grassland and Open Mosaic hold abundant ants and high Lepidoptera activity, matching the species' guild needs (concealed larvae, ant attendance, localised host use). Where host plants and key ant partners co-occur, a LoO of Medium is appropriate.

4.3.1.d) Management Implications for SCC

The following is recommended regarding management:

1. Treat the study area as a closed system and manage internal quality. Given impermeability and regional fragmentation, offsets via connectivity are unrealistic in the short term; impact assessment should emphasise on-site habitat quality, micro-scale heterogeneity and ecotone integrity as primary levers for SCC persistence.
2. Secure and widen ecotones in the Open Space Plan. Expand the Open Space Plan to explicitly include ecotones and a few metres into the adjacent Grassland and Open Woodland–Grassland units, not only watercourses and riparian thickets, because these because these zones disproportionately sustain diversity and trophic flux.
3. Apply a buffer to the wetland associated with Marsh Harriers. Maintain a minimum no-go area around this wetland (see section 7).
4. Restore heterogeneity and control invasive and encroaching plants strategically.
5. Manually remove of *L. camara* and selectively thin *V. karroo* in grassland mosaics. Given the industrial setting, prescribed fire is inappropriate; instead consider the potential for short-duration, high-pressure controlled grazing in small blocks, and continue hand-clearing in sensitive areas.
6. Manage synanthropic predators/commensals. Monitor and control domestic cats and potential invasive rodents around buildings. Commensal predator presence are recurrent in industrial edges — adaptive management should reduce spill-over impacts on SCC prey during sensitive periods.

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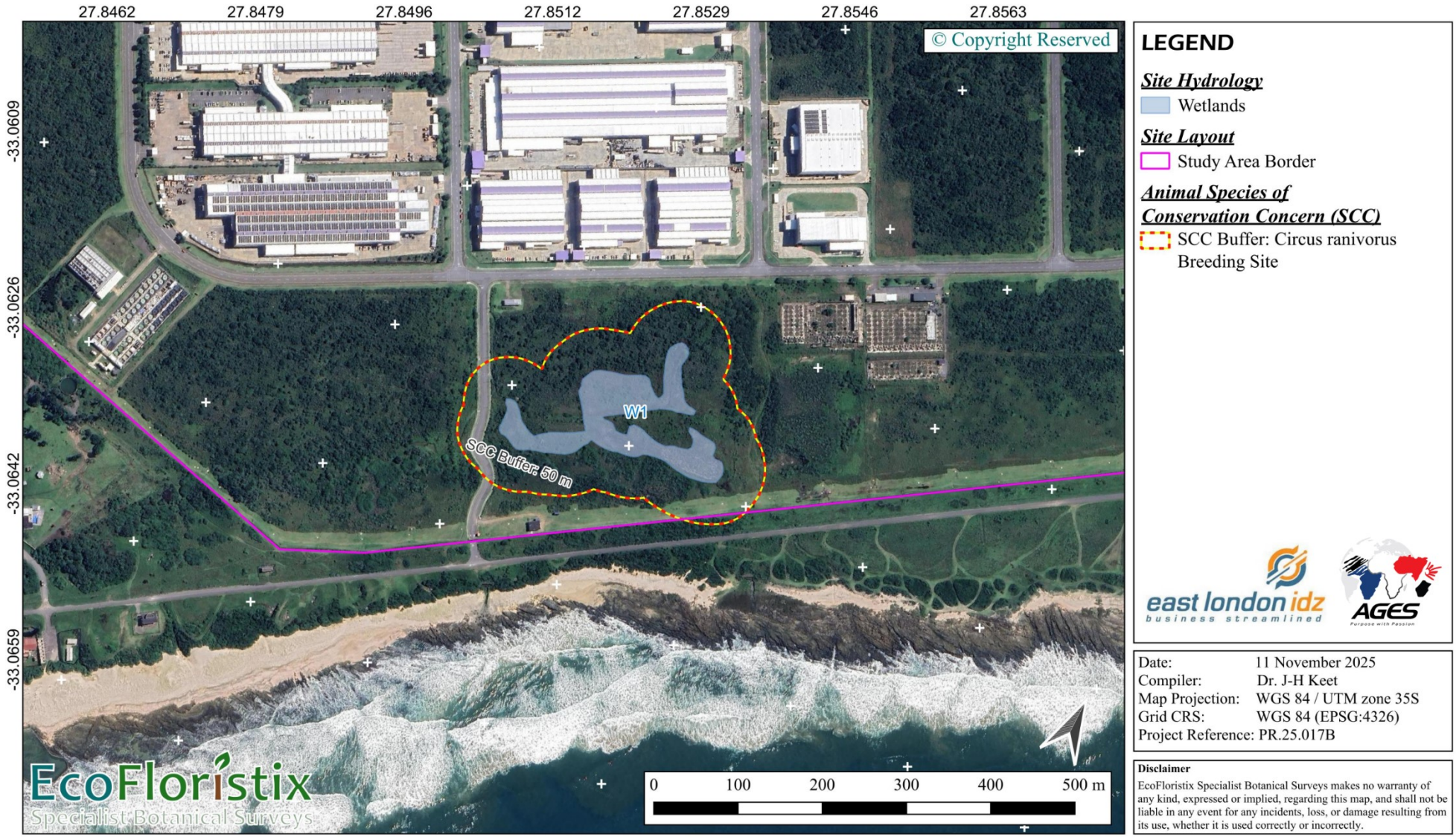

Map 20: Locality of animal Species of Conservation Concern (SCC) that were observed within the study area. Wetland (W1) serves as a breeding site for *Circus ranivorus*.

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4.4. Site Ecological Importance Assessment

The study area supports a mosaic of faunal habitat types, ranging from relatively intact thicket and forest-like systems and wetlands to mosaics of grassland and scrub, as well as heavily degraded transformed and artificial areas. The study area is enclosed by electrified fencing and bordered by agricultural, residential, and industrial activities, creating an "island effect" that restricts larger mammal movement, concentrates generalist species such as rodents, and amplifies mesopredator–prey dynamics. This isolation, coupled with pervasive alien plant invasion and anthropogenic pressures, has reduced the overall ecological significance of the site in a broader landscape context. Despite this, the wetlands and riparian thicket–forest units remain regionally important due to their structural integrity, biodiversity representation, and the confirmed presence of SCC such as the African Marsh Harrier (*Circus ranivorus*). In contrast, the transformed thickets and artificially cleared areas provide little ecological value beyond supporting disturbance-tolerant generalists. For subsequent paragraphs, refer to Map 21 and Table 12.

The Thicket–Grassland Mosaic provides ecological niches for a range of species. Small antelope such as Cape Grysbok use thicket patches as refuge and forage in grassy openings, while rodents, mongooses, and insectivorous birds occur throughout. Ecotonal areas are particularly significant, supporting Lycaenid butterflies engaged in ant-dependent associations with *Crematogaster* and *Camponotus* species. The CI of this habitat is moderate, reflecting its biodiversity value, but FI is compromised by extensive bush encroachment, particularly of *Vachellia karroo* and invasive *Lantana camara*, which reduce structural diversity. Receptor resilience is high, as many associated species are generalist and adaptable. BI is considered medium, with 52 species recorded, including eight specialists restricted to this habitat. Given these factors, the SEI of this unit is assessed as Low, reflecting its reduced landscape importance under isolation and ongoing degradation. The sensitivity of the habitat is moderate, as although ecotones retain biodiversity value, further invasion or encroachment could severely diminish ecological productivity.

The Open Woodland–Grassland Mosaic is the most species-rich habitat on site, supporting 101 species, including 30 specialists and 21 dominant species. It contains shallow grasslands interspersed with scattered shrubs, small trees, boulders, and termitaria, creating diverse microhabitats for invertebrates, reptiles, small mammals, and ground-nesting birds. Ecologically, it is highly productive, functioning as a stronghold for open-habitat specialists and a hub of faunal activity. Its CI is medium, based on its contribution to faunal richness and the presence of endemic butterflies and reptiles. FI is moderate but declining due to woody encroachment, fire suppression, and alien plant invasions. RR is high, as many of the species recorded are disturbance-tolerant or adaptable to shifting grassland–woody mosaics. BI is considered medium, given its role in supporting high species turnover across ecotones. Despite these values, the SEI of this habitat is rated as Low, as surrounding transformation and isolation reduce its regional significance. The sensitivity of the habitat is moderate, with notable biodiversity retained, but it remains vulnerable to bush encroachment, poaching pressure, and the broader island effect.

The Depression Wetlands are shallow seasonal or permanent depressions dominated by dense stands of *Typha capensis* and *Phragmites australis*, fringed by *Stenotaphrum secundatum*. Although structurally simplified by monodominant reed growth, these wetlands remain faunally productive, supporting rodents (*Rhabdomys pumilio*, *Otomys* spp.), Pondoland River Crab (*Potamonautes danielsi*), Marsh Mongoose, and wetland-associated birds. Critically, a breeding pair of African Marsh Harriers (VU, IUCN) has been confirmed, underscoring the high CI of this habitat. FI is moderate: while

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hydrological functions remain intact, biodiversity is suppressed by invasive dominance and nutrient enrichment. RR is medium, as wetland specialists persist but resilience is limited by homogenisation of vegetation structure. BI is medium, reflecting distinct wetland assemblages and 17 specialist species tied to aquatic conditions. Accordingly, SEI is rated as Medium, highlighting its significance as one of the most important faunal habitats on site in terms of regional conservation value. Sensitivity is High, as disturbance to hydrology, reedbed structure, or ecotonal margins would directly impact SCC and dependent fauna.

The Forest Thicket and Riparian Strip represents one of the most intact habitats on site, associated with non-perennial watercourses and their drainage lines. These systems are not only structurally diverse, with multi-layered canopy vegetation, climbers, and shaded understories, but also contain a variety of aquatic and semi-aquatic biotypes along their channels and banks. The inclusion of seasonal pools, and variable microhabitats within the riparian corridors substantially increases ecological heterogeneity and enhances ecological services such as water regulation, sediment capture, nutrient cycling, and connectivity for semi-aquatic fauna.

This habitat supports a rich faunal assemblage, with 92 species recorded, including 36 habitat specialists. Mammals such as Cape Grysbok, Cape Grey Mongoose, and Small-spotted Genet utilise the dense thicket for cover, while Vervet Monkeys exploit the arboreal layers. Bird diversity is particularly high, with species such as Southern Boubou, Dark-capped Bulbul, and White-browed Scrub Robin common in the understory, and raptors like the African Goshawk using taller riparian trees for hunting perches. The shaded and moist conditions also provide habitat for odonates, butterflies, and other invertebrates reliant on structurally complex environments.

The CI of this habitat is medium, reflecting its regional role as one of the last remaining riparian refuges. FI is high, as despite alien encroachment (*Lantana camara*, *Psidium guajava*, *Cestrum laevigatum*), the vegetation and underlying hydrological functions remain intact. RR is medium, since while some faunal groups are disturbance-sensitive, the diversity of niches within riparian corridors affords resilience to others. BI is medium, with a strong complement of specialists, including several endemic butterflies and odonates. Overall, SEI is assessed as medium, underscoring its ecological importance relative to other habitats on site.

While this unit provides high heterogeneity and multiple ecological services linked to non-perennial watercourses, its narrow linear form and susceptibility to alien plant invasion make it vulnerable, and its sensitivity is thus Moderate to High. Protecting these riparian strips is critical for maintaining faunal diversity, aquatic–terrestrial linkages, and the broader ecological functioning of the site.

The Transformed and Invaded Habitats are dominated by alien *Lantana camara* and encroaching *Vachellia karroo*, with dense, impenetrable thickets and minimal plant diversity. Only 25 species were recorded here, none of which were habitat specialists, demonstrating their ecological homogenisation. CI and FI are both low, as these habitats offer little biodiversity value and are ecologically degraded. RR is high but only for disturbance-tolerant species, while BI is low. Consequently, SEI is rated as very low, reflecting their role as ecological sinks rather than biodiversity contributors. Sensitivity is also low, as these habitats are already degraded; however, they pose a significant threat to adjacent natural habitats through continued spread of alien species.

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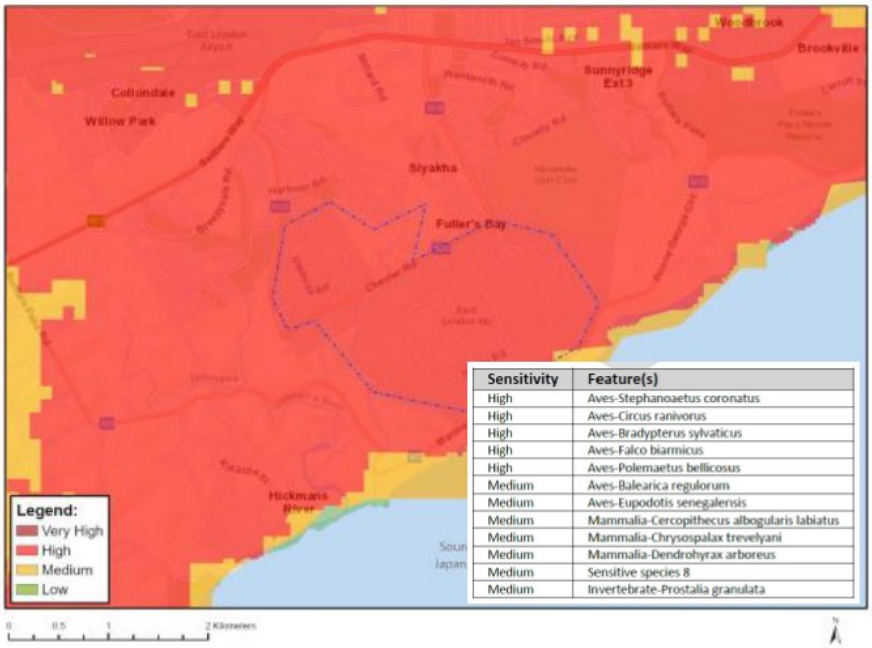
Finally, Artificially Cleared Areas, including firebreaks, lawns, and roads, are dominated by *Stenotaphrum secundatum* and have minimal vegetation diversity or ecological function. Despite this, they support a surprising 64 species, including 25 specialists that exploit anthropogenic niches such as culverts, buildings, and short-mown firebreaks. Birds such as White-throated Swallow, Speckled Pigeon, and House Sparrow use artificial structures for nesting, while invasive cats and rodents pose risks to native fauna. CI and FI are very low, while RR is medium due to the adaptability of associated species. BI is very low, reflecting their simplified assemblages. SEI is assessed as Very Low, with ecological contributions limited to secondary niches of low conservation significance. Sensitivity is also Very Low, as these areas are already heavily altered and dominated by disturbance-tolerant assemblages.

The faunal habitats within the study area vary widely in importance and sensitivity. The Depression Wetlands and Forest Thicket–Riparian Strip represent the most ecologically significant habitats, supporting SCC and habitat specialists and maintaining structural integrity in an otherwise isolated landscape. The Thicket–Grassland and Open Woodland–Grassland Mosaics retain moderate biodiversity value but are heavily impacted by alien encroachment, edge disturbance, and the island effect, reducing their long-term significance. Transformed/Invaded Habitats and Artificially Cleared Areas contribute little ecological value beyond supporting generalists and novel niche species. In the broader landscape context, the site's ecological importance is diminished by isolation and surrounding transformation; however, maintaining and managing the remaining natural habitats, particularly wetlands and riparian corridors, remains crucial for sustaining biodiversity and ecological processes.

The SEI score interpretations according to the *Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa* (South African National Biodiversity Institute, 2020) are as follows (specifically see Figure 20 and details given in section 16.2):

- "Very Low": Minimization mitigation.
- "Low": Minimization and restoration mitigation.
- "Medium": Minimization and restoration mitigation.



Sensitivity	Feature(s)
High	Aves-Stephanoaetus coronatus
High	Aves-Circus ranivorus
High	Aves-Bradypterus sylvaticus
High	Aves-Falco biarmicus
High	Aves-Polemaetus bellicosus
Medium	Aves-Balearica regulorum
Medium	Aves-Eupodotis senegalensis
Medium	Mammalia-Cercopithecus albogularis labiatus
Medium	Mammalia-Chrysospalax trevelyani
Medium	Mammalia-Dendrohyrax arboreus
Medium	Sensitive species 8
Medium	Invertebrate-Prostalia granulata

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Figure 17: Relative Animal Species Theme Sensitivity for the study area and surrounds, as indicated by the National Web-based Environmental Screening Tool.

Table 12: Evaluation of Site Ecological Importance (SEI) for the faunal community types within the study area. BI = Biodiversity Importance. See section 16.1.3 for more details.

Plant Community Type / Habitat	Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience (RR)	SEI
Thicket–Grassland Mosaic	Medium: More than 50% of receptor contains natural habitat with potential to support SCC.	Medium: Mostly minor current negative ecological impacts with some major impacts and a few signs of minor past disturbance. Moderate rehabilitation potential.	High: Habitat that can recover relatively quickly (5–10 years) to restore > 75% of the original species composition and 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.	Low (BI: Medium)
Open Woodland–Grassland Mosaic	Medium: More than 50% of receptor contains natural habitat with potential to support SCC.	Medium: Mostly minor current negative ecological impacts with some major impacts and a few signs of minor past disturbance. Moderate rehabilitation potential.	High: Habitat that can recover relatively quickly (5–10 years) to restore > 75% of the original species composition and 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.	Low (BI: Medium)
Depression Wetlands (Typha–Phragmites Wetlands)	High: Confirmed or highly likely occurrence of CR, EN, or VU species that have a global EOO of > 10 km^2.	Medium: Mostly minor current negative ecological impacts with some major impacts and a few signs of minor past disturbance. Moderate rehabilitation potential.	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.	Medium (BI: Medium)
Forest Thicket & Riparian Strip	Medium: More than 50% of receptor contains natural habitat with potential to support SCC.	High: Only minor current negative ecological impacts with no signs of major past disturbance (e.g., ploughing) and good rehabilitation potential.	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	Medium (BI: Medium)

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			disturbance or impact has been removed.	
Transformed / Invaded Habitats (Lantana & V. karroo Thickets)	Low: Less than 50% of receptor contains natural habitat with limited potential to support SCC.	Low: Several minor and major current negative ecological impacts.	High: Habitat that can recover relatively quickly (5–10 years) to restore > 75% of the original species composition and 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.	Very Low (BI: Low)
Artificially Cleared Areas	Very Low: No confirmed and highly unlikely populations of SCC.	Very Low: Several major current negative ecological impacts.	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.	Very Low (BI: Very Low)

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Map 21: Faunal Site Ecological Importance (SEI) for the study area (see Table 6 for more details).

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5. Combined Site Ecological Importance (SEI) for the Study Area.

To allow the competent authority to evaluate the SEI for the PAOI rapidly and efficiently, all subset SEI's determined (e.g. for flora and fauna) must be consolidated into a single SEI evaluation as per SANBI's *Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa* (South African National Biodiversity Institute, 2020). This single consolidated view enables the competent authority to quickly and efficiently evaluate the ecological significance of the study area. The consolidated SEI results by combining all receptors and selecting the maximum SEI assigned for each. For instance, if a habitat is rated Medium SEI by a mammal specialist and later High SEI by a botanical specialist, the final combined SEI for that habitat becomes High.

The combined SEI for the study area ranges from Very Low to High (Table 13; for more details see sections 3.4 and 4.4).

The SEI score interpretations (South African National Biodiversity Institute, 2020) are as follows (specifically see Figure 20 and details given in section 16.2):

- "Very Low": Minimization mitigation.
- "Low": Minimization and restoration mitigation.
- "Medium": Minimization and restoration mitigation.
- "High": Avoidance mitigation wherever possible.

Table 13: Combined Site Ecological Importance (SEI) for plant and faunal community types within the study area.

Plant Community	Faunal Habitat	Flora	Fauna	Combined
Forest Thicket	Forest Thicket & Riparian Strip	High	Medium	High
Wetlands	Depression Wetlands (*Typha* - *Phragmites* Wetlands)	High	Medium	High
Coastal Scrub	Thicket-Grassland Mosaic	Low	Low	Low
Coastal Thornveld	Open Woodland-Grassland Mosaic	Low	Low	Low
Dune Thicket	Thicket-Grassland Mosaic	Medium	Low	Medium
Shallow Grassland	Open Woodland-Grassland Mosaic	Medium	Low	Medium
Semi-open Grassland	Open Woodland-Grassland Mosaic	Medium	Low	Medium
Vachellia karroo - *Lantana camara* Infestation	Transformed and Invaded Habitats (*Lantana camara* & *Vachellia karroo* Thickets)	Very Low	Very Low	Very Low
Artificially Modified Vegetation	Artificially Cleared and Modified Areas	Very Low	Very Low	Very Low
Degraded Veld	Artificially Cleared and Modified Areas	Very Low	Very Low	Very Low

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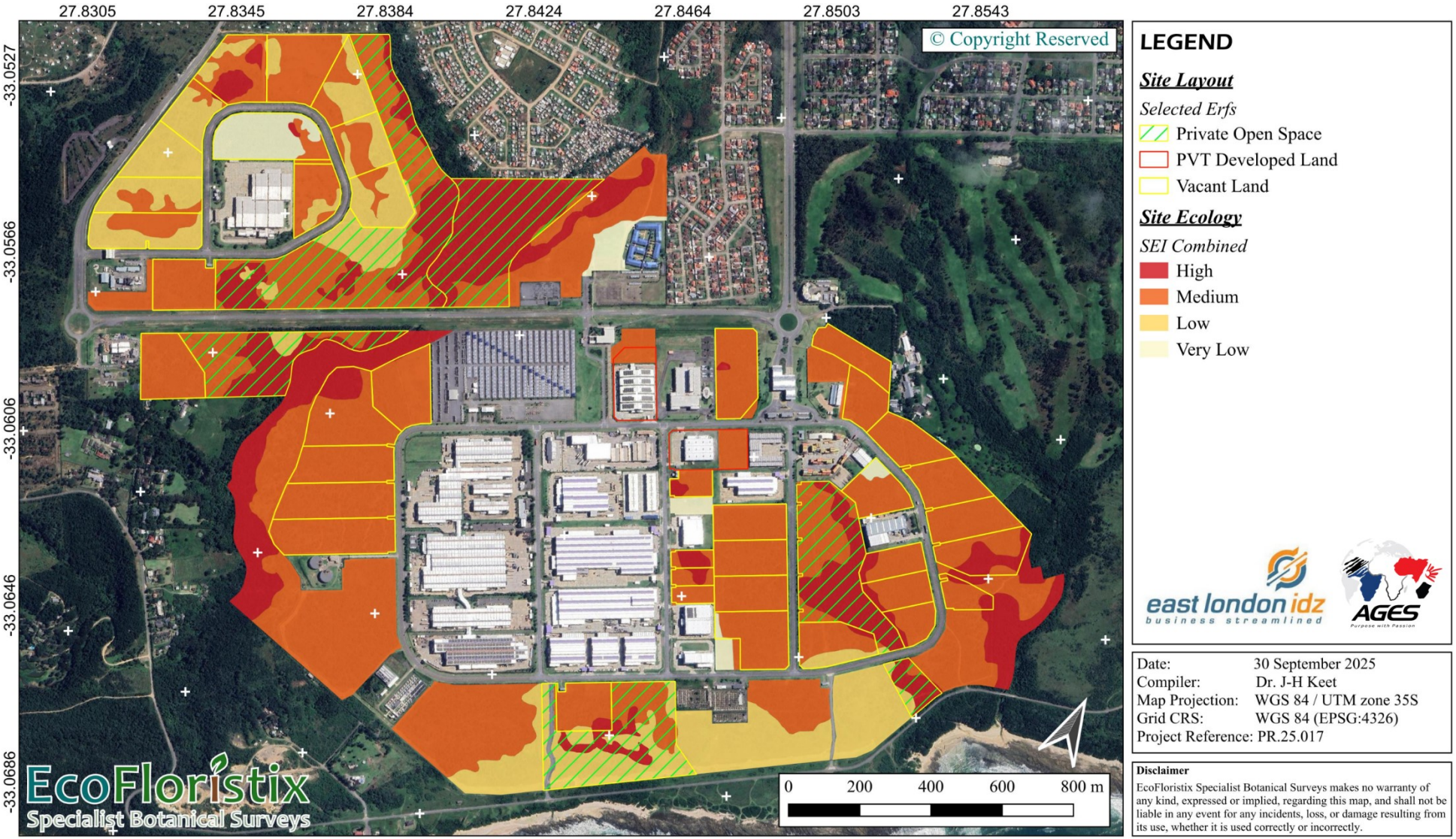

Map 22: Combined Site Ecological Importance (SEI) for the study area.

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6. Recommendations for SCC and Protected Species

6.1. General Recommendations

The applicant **must** apply for a TOPS Permit from the relevant Authority for any "restricted activity" regarding a listed species. This is particularly crucial for plants that may be directly destroyed or animals that may need to be actively relocated. Also refer to section 17 for additional relevant notes on SCC and protected species.

6.2. Flora SCC

Group	Species	Status	Likelihood	Activity Requiring Permit	Recommendation	Permitting Authority
Plants	*Erica orientalis*	DDT	Confirmed	Damage, removal, or destruction.	Individuals are not to be disturbed and a 25 m buffer is recommended around them until further information is eventually gathered on its threat status. Its taxonomy is currently still uncertain, and more studies might eventually either increase or lower its threat status. A precautionary approach is thus desirable in this case	Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEAT)

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6.3. Nationally Protected Trees

Group	Species	Status	Likelihood	Activity Requiring Permit	Recommendation	Permitting Authority
Plants	*Pittosporum viridiflorum*	LC	Confirmed	Damage, removal, or destruction.	Very large specimens should preferably be incorporated into the design and layout of developments to preserve them. Smaller individuals may selectively be removed. These species will not relocate well and should not be included in a Search and Rescue plan.	Department of Forestry, Fisheries and the Environment (DFFE)
	Sideroxylon inerme subsp. inerme	LC	Confirmed			

6.4. Provincially Protected Plant Species

Group	Species	Status	Likelihood	Activity Requiring Permit	Recommendation	Permitting Authority
Plants	*Aloe maculata*	LC	Confirmed	Damage, removal, or destruction.	Fortunately, all of these species are well suited to relocation efforts because they are either succulent or geophytic in nature (i.e., having underground storage organs), which enable them to survive harsh conditions such as removal from the soil. Thus, it is recommended that they be relocated wherever possible using suitable methods (see example below) and suitably qualified personnel.	Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEAT
	Bergeranthus concavus	LC	Confirmed			
	Delosperma muiri	LC	Confirmed			
	Dierama igneum	LC	Confirmed			
	Dietes grandiflora	LC	Confirmed			
	Freesia laxa subsp. *laxa*	LC	Confirmed			
	Gladiolus ochroleucus	LC	Confirmed			
	Ixia orientalis	LC	Confirmed			
	Kniphofia uvaria	LC	Confirmed			
	Moraea stricta	LC	Confirmed			
	Strelitzia reginae subsp. reginae	LC	Confirmed			
	Tritonia gladiolaris	LC	Confirmed			
	Watsonia pillansii	LC	Confirmed			

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					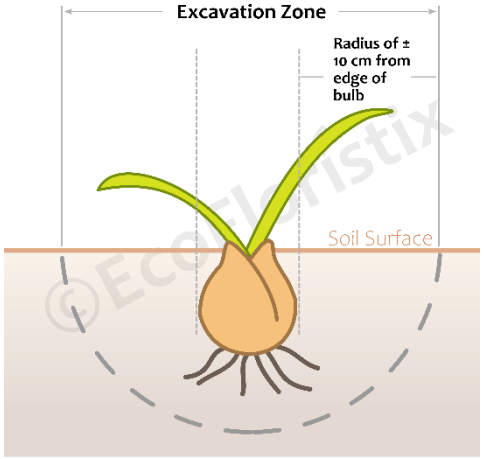	
	Agathosma ovata	LC	Confirmed	Damage, removal, or destruction.	These species are unlikely to be relocated well given that they either have sensitive or very deep root systems. Thus, their roots might highly likely be irreparably damaged. Moreover, many of them do not have dedicated water storage organs and might suffer from dehydration during excavation and relocation. It is recommended that they be incorporated into existing designs (for example, natural gardens) wherever possible so that they may remain. Otherwise, they may be destroyed, since none of them are a conservation concern and they generally occur widely outside the ELIDZ and in large numbers	
	Aristea ecklonii	LC	Confirmed			
	Aristea pusilla	LC	Confirmed			
	Aristea torulosa	LC	Confirmed			
	Carissa bispinosa	LC	Confirmed			
	Cynanchum ellipticum	LC	Confirmed			
	Gomphocarpus physocarpus	LC	Confirmed			
	Halleria lucida	LC	Confirmed			
	Marsdenia dregea	LC	Confirmed			
	Strelitzia nicolai	LC	Confirmed			
	Tylophora cordata	LC	Confirmed			
	Vepris lanceolata	LC	Confirmed			
	Zanthoxylum capense	LC	Confirmed			

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6.5. Fauna SCC

Group	Scientific Name	Common Name	Red List Status (SANBI)	Red List Status (IUCN)	Likelihood of Occurrence	Permitting Category	Legal Instrument / Authority	Trigger for Permit	Key Notes	Recommendations and Mitigation Measures
Avifauna	*Stephanoaetus coronatus*	Crowned Eagle	VU	NT	Low	» Provincial (Schedule 2)	» EC Ordinance: DEDEAT	Handling/capture/possession; destruction/removal of nests	» Passive displacement (movement away due to disturbance) does not require a permit.	» Maintain & manage natural thickets/riparian strips within green zones / open spaces as identified within the client's layout plan. » No clearing or development allowed in open spaces apart from specific maintenance and monitoring activities. » Retain riparian shade/leaf-litter. » No widening of existing tracks and paths; » Security patrols on foot/LUV only; » Mechanical IAP control.
	Bradypterus sylvaticus	Knysna Warbler	VU	NT	Medium	» Provincial (Schedule 2)	» EC Ordinance: DEDEAT		» Sensitive to disturbance; dependent on shaded riparian understorey. » Passive displacement (movement away due to disturbance) does not require a permit.	
	Polemaetus bellicosus	Martial Eagle	EN	EN	Low	» TOPS – Endangered » Provincial	» NEMBA/TOPS: DFFE; » EC Ordinance: DEDEAT		» Low potential for occasional overflight; no nesting recorded. » Passive displacement (movement away due to disturbance) does not require a permit.	
	Circus ranivorus	African Marsh Harrier	EN	LC	Confirmed	» Provincial (Schedule 2)	» EC Ordinance: DEDEAT		» Primary on-site SCC. » May not be displaced from breeding site. » No permit required if buffer & seasonal rules implemented.	» Retain wetland + no-go buffer (no new construction or development within these areas and only activities included in the areas are specific maintenance and management activities). » Avoid disturbance. » Edge-works outside Sept–May; » ECO/EO inspections and monitoring; » Adaptive halt if breeding pair of African Marsh Harrier is disturbed. » Predator control (feral cats and rats).
	Balearica regulorum	Grey Crowned Crane	EN	EN	Medium–Low	» TOPS – Endangered » Provincial (Schedule 2)	» NEMBA/TOPS: DFFE; » EC Ordinance: DEDEAT		» Occasional visitor (unlikely); breeding (highly unlikely). » Implementation of buffer around wetland will ensure no disturbance or harm to potential visiting species.	
	Eupodotis senegalensis	White-bellied Korhaan	VU	LC (declining)	Low	» Provincial (Schedule 2)	» EC Ordinance: DEDEAT		» Requires large intact grasslands; sensitive to disturbance. » Passive displacement (movement away due to disturbance) does not require a permit.	» Maintain open mosaics; » Rotational grazing 2-yearly in dry season. » Manage woody encroachment; » Avoid breeding season disturbance.

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	All recorded indigenous birds except those explicitly excluded by the EC Ordinance and not mentioned above	-	-	-	All confirmed species recording during field survey (refer to species list)	» Provincial Schedule 2	» EC Ordinance: DEDEAT		» Passive displacement (movement away due to disturbance) does not require a permit	» Apply bird-nest checks in pre-construction walk-throughs; » Avoid disturbance / destruction of active nests; » Include nests under DEDEAT once-off permit if unavoidable
Mammals	*Cercopithecus mitis labiatus*	Samango Monkey	VU	LC	Medium–Low	» TOPS – Vulnerable » Provincial (Schedule 2)	» NEMBA/TOPS: DFFE; » EC Ordinance: DEDEAT	TOPS/Provincial: Handling/capture/possession	» Transient forest forager; no troops recorded. » Passive displacement (movement away due to disturbance) does not require a permit.	» Maintain & manage natural thickets/riparian strips within green zones / open spaces as identified within the client's layout plan. » No clearing or development allowed in open spaces apart from specific maintenance and monitoring activities. » Retain riparian shade/leaf-litter. » No widening of existing tracks and paths; » Security patrols on foot/LUV only; » Mechanical IAP control.
	Chrysospalax trevelyani	Giant Golden Mole	EN	EN	Low	» Red-List only	» NEMA EA/EMPr	No species permit; manage via EA conditions	» Depends on shaded leaf-litter forest habitat. » Passive displacement (movement away due to disturbance) does not require a permit.	
	Dendrohyrax arboreus	Eastern Tree Dassie	EN	LC	Low	» Provincial (Schedule 2)	» EC Ordinance: DEDEAT	Handling/capture/possession	» Found in large trees; none recorded. » Passive displacement (movement away due to disturbance) does not require a permit.	
	Sensitive Species 8		VU	NT	Medium	» Provincial (Schedule 2)	» EC Ordinance: DEDEAT	Handling/capture/possession	» Restricted-range species associated with intact thicket and grassy ecotones. » Passive displacement (movement away due to disturbance) does not require a permit.	
	Raphicerus melanotis	Cape Grysbok	LC	LC	Confirmed	» Provincial (Schedule 2)	» EC Ordinance: DEDEAT	Handling/capture/possession	» Shy small antelope; » Passive displacement (movement away due to disturbance) does not require a permit.	» Refer to the allowed and disallowed activities within natural thickets, forest thicket and riparian habitats that are located within the planned open spaces under Giant Golden Mole, Samango Monkey and Eastern Tree Dassie. » Phased construction within properties approved for development (outside of green zones / open spaces) to allow escape. » ECO pre-checks. » Once-off DEDEAT permit if it is required for an individual to be captured and relocated.

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Amphibia	Anura Order	All indigenous toads and frogs	-	-	Confirmed	» Provincial (Schedule 2)	» EC Ordinance: DEDEAT	Handling/capture/possession	» The following amphibians have been recoded within the project site: o Raucous Toad o Painted Reed Frog o Rattling Frog o Common River Frog o Striped Stream Frog o Clicking Stream Frog » Most of these amphibian species are associated with wetter areas (wetlands and streams) and if these areas are excluded from the developable areas (included in green zones) these species apart from potentially Raucous Toad, which sometimes move away from waterbodies, will not be impacted by the development and will thus not require permits. » However, these species are typically slow moving and if encountered within a development site will likely require physical removal which will require a permit DEDEAT once-off permit.	» Dune Thickets, Forest Thicket, Riparian Habitats o Maintain & manage natural thickets/riparian strips within green zones / open spaces as identified within the client's layout plan. o No clearing or development allowed in open spaces apart from specific maintenance and monitoring activities. o Retain riparian shade/leaf-litter. o No widening of existing tracks and paths; o Security patrols on foot/LUV only; o Mechanical IAP control. » Wetlands and buffers: o Retain wetland + no-go buffer (no new construction or development within these areas and only activities included in the areas are specific maintenance and management activities). o Avoid disturbance. o Edge-works outside Sept–May; o ECO/EO inspections and monitoring; o Predator control (feral cats and rats). » If encountered within construction site ECO will be required to catch-and-release/relocate these species. » Upon catching these species aim to immediately relocate species to a suitable habitat within green zones under DEDEAT once-off permit, and with minimal handling.
Reptiles	Lacertilia spp.	All indigenous lizards	-	-	Medium-High	» Provincial (Schedule 2)	» EC Ordinance: DEDEAT	Handling/capture/possession	» No species belonging to the suborder Lacetilia have been recorded. » However, there is a likelihood for such species to occur within the project site. » If any lizard species (take note that geckos are not	» ECO/EO capture-and-relocate/release to adjacent green areas under once-off permit. » Upon catching these species aim to immediately relocate species to suitable habitat with minimal handling. » Staff awareness training.

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									included in this suborder), these species will likely be passively displaced or will have to be physically removed by the EO/ECO » If catch-and-release/relocate is required the affected species will have to be included in the DEDEAT once-off permit.	» No persecution.
	Testudinata spp.	All indigenous tortoises/turtles	-	-	Medium	» Provincial (Schedule 2)	» EC Ordinance: DEDEAT	Handling/capture/possession	» No species belonging to Testudinata have been recorded. » Passive displacement (movement away due to disturbance) does not require a permit. » Typically, slow moving and if encountered within a development site will likely require physical removal which will require a permit (DEDEAT once-off permit).	
	Colubridae genera	Protected colubrid snakes including wolf snakes, water snakes, house snakes, green/bush snakes, egg-eaters, slug-eaters, file snakes	-	-	Confirmed/Likely	» Provincial (Schedule 2)	» EC Ordinance: DEDEAT	Handling/capture/possession	» Only Common Brown Water Snake recorded: o Strictly restricted to aquatic habitats o Aquatic habitats excluded from development – green zones o Thus, will not be impacted by development and subsequently no permit will be required. » Other terrestrial Colubrid species: » Passive displacement (movement away due to disturbance) does not require a permit. » If species have to be physically removed and released the affected species should be included in the DEDEAT once-off permit.	

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Invertabrates	*Prostalia granulata*	Bladder Grasshopper	EN	EN	Low	» Red-List only	» NEMA EA/EMPr	No species permit; manage via EA conditions	» Restricted-range orthopteran associated with intact thicket and grassy ecotones' » Not protected under TOPS or provincial ordinance	» Maintain & manage natural thickets and riparian strips within all designated green zones / open spaces as indicated in the approved layout plan. These areas form potential refugia and microhabitat for both *Prostalia granulata* and *Aslauga australis*. » No clearing, infilling, or development may occur within these open spaces except for approved maintenance and ecological monitoring activities. » Retain riparian shade, surface mulch, and natural leaf-litter layers, as these create the moist, microclimatic refuges required by the grasshopper and the butterfly's host plants and mutualistic ant species. » No widening or upgrading of existing paths, foot tracks, or firebreaks within these natural habitat patches. » Limit movement and noise disturbance in these areas; allow only security patrols on foot or by light utility vehicle (LUV). » Mechanical control only for invasive alien plants (IAPs); no foliar spray herbicides permitted. Where removal of woody IAPs (e.g., *Lantana camara, Cestrum laevigatum*) or encroaching *Vachellia karroo* is necessary, restrict herbicide use to stump treatments or, if unavoidable, low-impact pellet formulations, applied under calm, dry conditions. » Incorporate fringing ecotones / transitional zones between thicket habitats and adjacent natural grassland mosaics into the broader green-space network wherever feasible. These transitional habitats host vital micro-faunal and floral diversity and provide dispersal and foraging corridors for
	Aslauga australis	Southern Purple Butterfly	EN	EN	Low-Medium	» Red-List only				

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										potential *Prostalia granulata* and *A. australis*. » Manage and monitor ecotones to maintain structural heterogeneity: » Prevent woody encroachment through block-based, short-duration grazing or periodic manual thinning; » Maintain a mosaic of short and medium grass heights; » Avoid burning or intensive mowing in transitional zones. » Avoid any pesticide, herbicide, or insecticide applications within or adjacent to these sensitive ecotones. » Monitor the condition of these ecotone and thicket-grassland interface habitats bi-annually during the first three years post-construction to confirm vegetation heterogeneity, absence of IAP reinvasion, and continued ecological function

6.6. Additional Information Regarding Fauna SCC

6.6.1. Passive Displacement and Habitat-Sensitive Construction

Most Schedule 2 faunal species — under the Nature and Environmental Conservation Ordinance (No. 19 of 1974), as amended — are expected to move away naturally from the development footprint during early construction activity (passive displacement). Such passive displacement does not require a permit, as the animals are not intentionally captured or harmed. Nevertheless, construction should proceed in a phased and systematic manner, allowing fauna to vacate progressively. This minimises mortality, reduces human–wildlife conflict, and promotes recolonisation of the retained open-space network.

6.6.2. Pre-Construction Walk-Through Surveys

Prior to the onset of vegetation clearance or ground disturbance, the ECO/EO must conduct a walk-through survey for each development phase or property. The survey should:

- Identify protected species (amphibians, reptiles, or active bird nests).
- Facilitate safe relocation of individuals that have not naturally moved away/outside of the construction site, by the ECO/EO (or, if required, a qualified faunal specialist or snake handler).

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- Ensure all actions comply with DEDEAT's permit conditions.

Temporary capture and relocation of Schedule 2 species may occur only under a valid DEDEAT permit.

6.6.3. Avifaunal Nest Management

The ECO/EO must inspect the construction footprint prior to site preparation for active bird nests. If nests of protected species are located:

- They should be buffered and avoided until breeding concludes.
- Only if avoidance is impossible should relocation be undertaken under a valid once-off Ordinary Permit.

The non-breeding season (June – August) represents the most appropriate window for site clearance and vegetation disturbance near thickets, riparian areas, or wetland buffers.

6.6.4. General Measures

- Retain all wetlands, natural forest thickets, and riparian corridors as green/open-space zones in accordance with the layout plan.
- Enforce no-go buffers around wetlands, primarily to protect the breeding habitat of the African Marsh Harrier (*Circus ranivorus*), which is confirmed on site. This same buffer will also provide adequate protection for any occasional foraging or visiting individuals of the Grey Crowned Crane (*Balearica regulorum*), a TOPS-listed species.
- The wetland area and buffer should be considered as a "No-Go" zone for any new developments or activities and no disturbance, vegetation clearing, earthworks, or high-noise construction activities may occur at any time. Only approved activities allowed with the buffer and wetland area are vegetation management activities such as woody encroachment and invasive alien plant control or controlled grazing.
- Where development occurs near the buffer edge, such activities should be scheduled outside the main avifaunal breeding season (September – May).
- Conduct ECO/EO pre-construction walk-throughs prior to the start of each new development phase to confirm the absence of nests, burrows, or sensitive fauna within and adjacent to construction areas.

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7. No-Go and Sensitive Areas

This section details No-Go areas and reasons for considering them as such. Map 23 shows these No-Go areas within the study area.

7.1. Wetlands

Various wetlands occur on-site. Not all of these are considered equally sensitive, especially given that only one of these can be considered truly natural with confidence, namely W5 (see section 3.1.6 for more details, as well as Map 12 to Map 14) since it exists as part of a natural watercourse. Nevertheless, following the precautionary principle, all wetlands should be considered No-Go areas, with the only exception being wetland W3. This is due to its close proximity to a highly disturbed habitat (*Vachellia karroo* - *Lantana camara* infestation) and being itself somewhat disturbed. Moreover, it is the only wetland on-site that is known with certainty to be artificial since it did not exist on-site prior to construction activities in Zone 1B (see section 3.1.2 for an explicit treatment of this area). Furthermore, wetland W2 serves as an important isolated area supporting birds that favour aquatic habitats. Finally, wetlands W1 and W4, although likely artificial, are sufficiently large to support a diversity of fauna associated with wetland habitats. In summary, wetlands W1, W2, W4, and W5 are all considered No-Go areas.

7.2. SCC Buffer Zones

Two SCC were observed on-site, namely the plant *Erica orientalis* (DDT) and the bird *Circus ranivorus* (EN), the latter which has a breeding site near wetland W1.

A 25 m buffer zone (see section 3.2) is recommended around individuals of *E. orientalis* until further information is eventually gathered on its threat status. Its taxonomy is currently still uncertain, and more studies might eventually either increase or lower its threat status. A precautionary approach is thus desirable in this case.

A buffer zone (see section 4.3) that includes erven 60883 and 60884, as well as 30 m inside erven 60886 (eastern boundary) and 60882 (western boundary) is recommended around the wetland (W1) and breeding site of African Marsh Harriers (*Circus ranivorus*), which is deemed appropriate given its Endangered status in South Africa. This buffer zone mostly coincides in any case with the current private open space plan. It must be noted that this buffer zone only applies to new developments, thus **excluding existing infrastructure where present**. This No-Go configuration for wetland W1 remains ecologically sufficient to sustain the breeding pair of African Marsh Harriers recorded at this site. Field observations confirm that the pair's nesting and foraging activity are concentrated within these zones, with persistent breeding success (likely well over 10 years) despite moderate industrial activity nearby. The wetland's structure, fringing *Stenotaphrum* lawns, and adjacent grasslands provide all essential nesting, prey, and foraging habitat (also supporting *Rhabdomys pumilio*, the primary prey species), while the harriers have shown behavioural tolerance where noise, light, and access are well controlled. With strict enforcement of timing, lighting, noise and access mitigation measures, this No-Go layout is scientifically defensible and should remain designated as a High SEI No-Go area. By maintaining an undisturbed hydrology and vegetation structure within this area, the configuration preserves all habitat elements critical to breeding success and persistence.

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7.3. Forest Thicket

Forest Thicket presents as a somewhat unique feature in the current landscape that is dominated by Dune Thicket and Coastal Thornveld. Thus, it harbours species that are unique to it and limited within the broader landscape (for example *Euphorbia triangularis*). Secondly, given the propensity of Forest Thicket to develop and occur close to watercourses, it presents as a more sensitive ecosystem fulfilling various roles related to these watercourses, including habitat for fauna that prefer proximity to such watercourses. Large parts of Forest Thicket occurs within the Private Open Space in any case, and it is suggested that these be preserved wherever possible. The largest portions of Forest Thicket should thus preferably be treated as No-Go areas. Smaller patches, especially those not occurring along watercourses or occurring as small isolated stands close to factories, may be considered as acceptable loss for development and these have been excluded from Map 23.

7.4. Notes on Management in No-Go Areas

It should be noted that No-Go areas as indicated here are specifically considered as such in light of new developments. Approved activities are, however, allowed within these areas, such as management activities, examples of which include woody encroachment control where applicable, invasive alien plant species control, strip clearing near the fence perimeter, road management, or controlled grazing. The latter is specifically considered within the buffer zone of the *Circus ranivorus* breeding site. Also, No-Go areas are only considered for areas of natural vegetation (thus excluding already existing infrastructure).

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7.5. Suggested Development Types for Sensitive Areas

The allocation of developments and related activities should be guided by the principle of sustainable development, ensuring that economic objectives do not compromise critical ecological functions. This section presents a framework for determining the environmental acceptability of proposed development sectors based on the Site Ecological Importance (SEI) of the receiving environment (see section 5, as well as sections 3.4 and 4.4). The SEI classification — ranging from Very Low to Very High — is a metric reflecting the irreplaceable nature and conservation value of an area's biodiversity, habitat integrity, and ecosystem services.

While the strategic objective is to direct most development toward areas classified as Very Low or Low SEI to minimize environmental conflict, realistic planning requires assessing the degree to which higher-sensitivity areas (Medium and, in limited instances, High SEI) can be potentially tolerated. The following table identifies the maximum SEI level that might be considered for each development type, but crucially, details proposed mitigation measures and constraints that should preferably be applied to achieve conditional environmental acceptability in higher-sensitivity zones. However, it must be noted that these are general conditions; more specific assessments are desirable once development footprints are known.

Sector	Description	Max SEI Limit	Unacceptable SEI	Conditions
Industrial Infrastructure Development	Development of custom-built factories, warehousing, and logistics hubs for manufacturing and export	Medium	High / Very High	Avoidance of all pristine habitat preferable. Maximum 80% footprint development (20% must be managed open space/rehabilitation).
Sector-Specific Investment Projects	Automotive Components Manufacturing (such as facilities for suppliers to major OEMs like Mercedes-Benz)	Medium	High / Very High	Similar to above. Also avoid watercourses or highly sensitive ecological features.
Green Energy Projects	Hydrogen, solar, and wind energy projects	High	Very High	Detailed micro-siting study required to exclude highly sensitive features. Wind: Do not operate close to nesting sites of threatened bird species. Solar: Minimise ground disturbance.
ICT and Electronics Developments or Projects	Facilities for tech assembly and innovation	Medium	High / Very High	Ensure smallest possible footprint. Protect and manage the remaining natural areas.
Science and Technology Park (STP)	Hubs for industrial research, technology incubation, and emerging tech industries	Medium	High / Very High	Design must prioritise rehabilitation and restoration of any disturbed Medium SEI areas post-construction. Footprint limited to core infrastructure zones. Incorporate remnant fragments of vegetation as natural gardens.
Property and Real Estate Development Projects	Commercial office parks, business centres, and mixed-use precincts	Medium	High / Very High	Design must comply with ecological design principles. Incorporate remnant fragments of vegetation as natural gardens.

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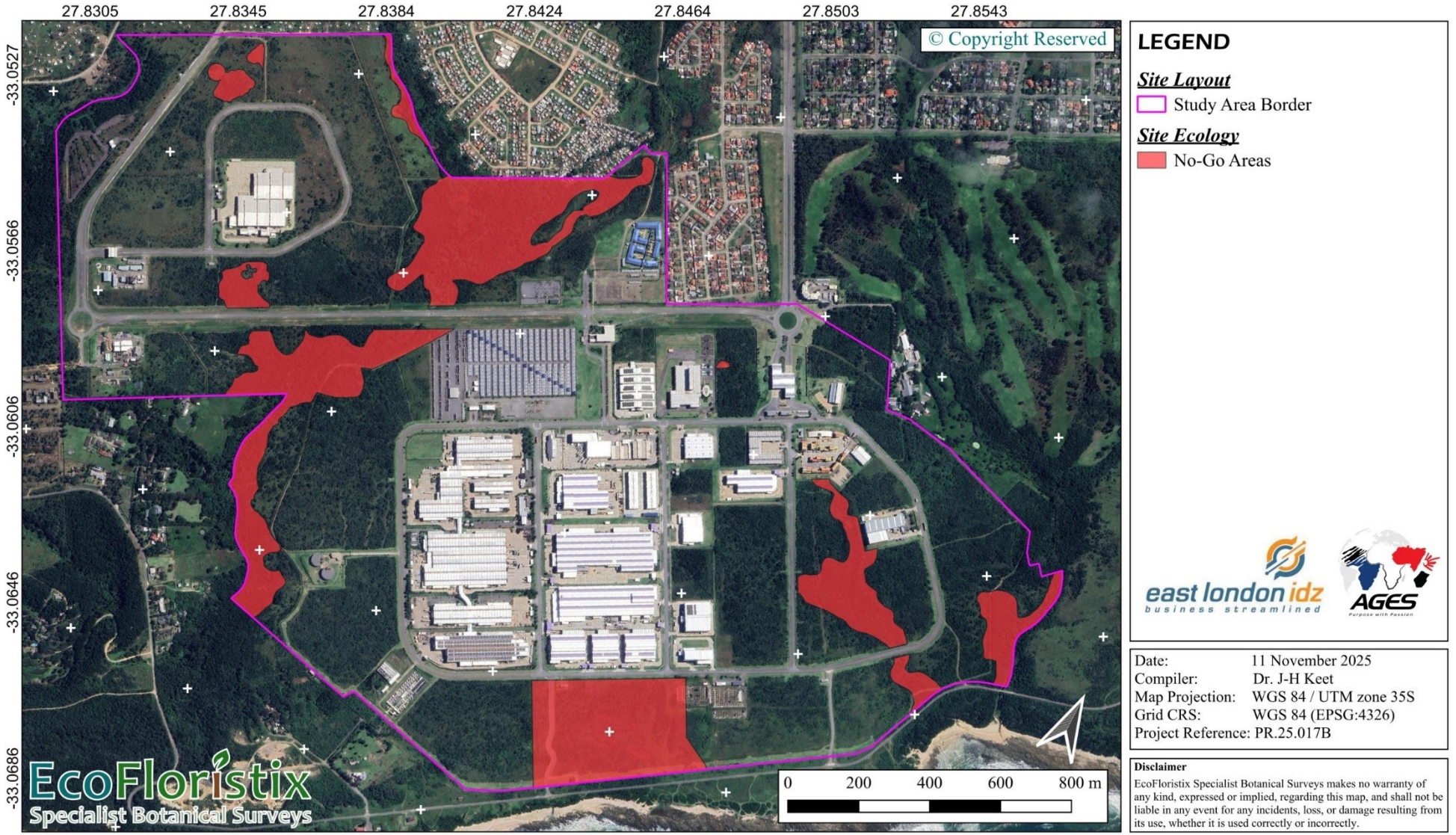

Map 23: No-Go areas within the study area.

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8. Impact Risk Assessment

This section describes and summarizes the significance of perceived impacts on the terrestrial ecology of the study area. Potential impacts were evaluated based on desktop and field assessment data. The relevant impacts associated with the proposed activities were then subjected to the impact assessment methodology as described in section 16.4. Finally, relevant maps should be consulted as presented in section 3.

Two Alternatives are considered here, namely the study area and associated activities as considered in section 1.3 (from here on referred to as "A1"), as well as the so-called "Baseline" scenario is also considered.

8.1. Present Impacts to Biodiversity

Anthropogenic activities and influences occur within the landscape, and a few current negative impacts to biodiversity were observed within the study area and surrounds, including:

- Fragmentation of plant communities (i.e. breaking up of continuous plant communities into smaller, isolated patches by linear infrastructure), which in turn causes "edge effects" that alter microclimates and favour generalist species at the expense of specialists.
    - Genetic Isolation: fragmentation can also prevent gene flow between isolated plant populations, leading to reduced genetic diversity and increased vulnerability.
- Invasive alien plant species (IAPs): Although many of the natural vegetation fragments in the IDZ are in a good condition, IAPs are a persistent problem both within and outside the IDZ borders. Some areas are much more invaded than others. Without any management intervention, ecosystems will increasingly be overrun by IAPs and increase in degradation, potentially losing characteristic native species.

8.2. Identification and Assessment of Potential Impacts

The assessment of impact significance usually considers both pre- and post-mitigation scenarios. Moreover, it usually considers these scenarios for all the phases during the project lifecycle, namely:

- Construction: The construction phase refers to the period of construction when all proposed features of the project are constructed.
- Operational: The operational phase refers to the period when the construction phase has been completed, and the proposed activities of the project commences.
- Decommissioning (if applicable): The phase where regular daily activities have ceased, and the project has ended.

Also assessed is the scenario if no development occurs, termed "Baseline", which is also sometimes referred to as the "No Development Scenario", "No-Go Option", or the "Do Nothing Scenario" — that is, maintaining the present circumstances and not proceeding with the proposed project (the term "Baseline" is preferred here to avoid confusion with No-Go areas). This can be seen as a baseline against which to measure impacts. Note that this is not always the best scenario, since development can actively mitigate against unwanted and negative on-site conditions (for example proliferation of invasive alien plant species, degrading infrastructure, pollution etc.). That is, existing environmental problems may remain unaddressed and can worsen over time due to a lack of innovation, investment in sustainable solutions, and adaptation to

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ongoing changes. Moreover, important opportunities to implement cleaner technologies and restore ecosystems might be missed.

For flora only construction phase and cumulative impacts are assessed here given that the listed activities addressed in this report entail the clearing of indigenous vegetation, which only occurs during the construction phase. However, the operational phase is assessed for fauna given that animals are more prone to impacts by day-to-day activities of the industrial zone.

8.3. Flora

While the plant community types of the ELIDZ were classified into specific units, these habitats, together with their transitional zones or ecotones, still provide a diverse range of microhabitats even within specific types that variously support either more specialist or more generalist species.

The assessment identified several risks to plant community types, most of which are associated with direct vegetation clearing, habitat fragmentation, and invasive alien plant species. The most important are:

- **General Loss of Plant Community Types**: While the vegetation types occurring on-site are fortunately not listed as threatened, a loss of any vegetation type still constitutes an overall reduction in that type, as well as a loss and reduction in genetic diversity associated with the individual plants occurring within it.
- **Potential Loss of SCC and Protected Species**: Although only a few individual of only one SCC were observed, it is always possible that more exist and that these might inadvertently be lost.
- **Fragmentation and Edge Effects**: Some of the natural vegetation fragments in the ELIDZ are already quite fragmented, and a continued fragmentation will serve to exacerbate associated edge effects — that is, an increase in the amount of land area of degraded edges relative to fragment cores.
- **Invasive Alien Plant Species**: IAPs are a pervasive problem across the entire ELIDZ. Fortunately, not all areas are heavily invaded, but a lack of management, together with increased disturbance levels associated with infrastructure expansion, may serve to severely increase infestation sizes, which could in turn detrimentally affect indigenous plants, as well as animals relying on them.

Unmitigated, several of these impacts are of high significance. However, with effective mitigation and management, all impacts can be reduced to medium or low residual significance, which falls within acceptable levels for environmental authorisation.

The most critical mitigation measures identified in this assessment are:

- **Habitat Retention and Avoidance**: Developing in highly disturbed and low sensitivity areas first is a highly effective avoidance mitigation. Minimizing development footprints would further enhance mitigation measures.
- **Protection of SCC**: A recommended buffer zone of 25 m is placed around the individuals of *Erica orientalis* (see section 3.2) to prevent their destruction. This species is not well suited to translocation, and search and rescue procedures are thus not considered an effective mitigation.

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- **IAPs Control and Habitat Rehabilitation**: Active removal and management of invasive alien plant species, as well as bush encroaching woody species (*Vachellia karroo*), is considered a critical measure to promote ecosystem integrity.

While the plant community types of the ELIDZ face risks due to its fragmented and invaded nature, this assessment demonstrates that with the rigorous implementation of mitigation and management measures, all impacts can be reduced to acceptable levels.

8.3.1. Construction Phase

8.3.1.a) General Loss of Plant Community Types

Specific Impact(s): General loss of plant community types.

No listed vegetation types occur in the study area, and all are listed as Least Concern. Nevertheless, loss of any natural vegetation impacts ecological process, including loss of habitats contributing to ecological processes, loss of landscape connectivity, altered natural disturbance and/or fire regimes, loss of structural complexity, loss of genetic diversity, altered biotic interactions and population dynamics, and altered hydrological and nutrient cycling processes, among other things.

Nature and Type of Impact: Negative, Direct.

Baseline Conditions: The natural vegetation fragments on site, and that will be impacted, are mostly in good condition. However, the invasive alien plant species are quite ubiquitous but vary in their abundances. A few areas in particular are quite badly invaded, and at least in these instances the baseline conditions are potentially worse off than if management intervention is applied. Thus, in the absence of any management interventions, specifically invasive alien plant species management, many of these natural vegetation fragments will likely continue to degrade and become dominated by invasive species, which is already the case in some places. A continuous degradation of plant communities can not only lead to lowered native plant species diversity, but can also lead to altered faunal communities.

Mitigation Measures: General loss of plant community types can firstly be mitigated by reducing the total area of natural vegetation fragments cleared. Secondly, areas that are infested with invasive alien plant species or highly are degraded can be cleared of these invasives and rehabilitated, which will help to counterbalance losses of plant community types and biodiversity in general. More specific and detailed measures are given in section 4.

Significance of Impacts:

	Baseline	A1 Before Mitigation	A1 After Mitigation
Extent	Site-specific	Site-specific	Site-specific
Duration	Short-term	Permanent	Medium-term
Magnitude	Very Low	Medium	Medium
Consequence	**Very Low**	**Medium**	**Low**
Probability	Probable	Definite	Highly Probable
Loss of Irreplaceable Resource	Marginal loss	Marginal loss	Marginal loss
Reversibility	Irreversible	Irreversible	Moderately reversible
Confidence	High	High	High
Significance	**Low**	**Medium-High**	**Medium-Low**

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	Baseline	A1 Before Mitigation	A1 After Mitigation
Avoidance			Partial Avoidance
Management			Moderately Effective
Mitigation			Moderately Effective
Residual Impact			Medium-Low

8.3.1.b) Potential Loss of SCC

Specific Impact(s): Potential loss of SCC and/or protected species.

Nature and Type of Impact: Negative, Direct.

Baseline Conditions: A single occurrence of a SCC (*Erica orientalis*) was found in the study area. Although it is always possible that SCC were overlooked during surveying, their occurrence is unlikely given that the study area was well surveyed. However, two protected tree species were also found (*Pittosporum viridiflorum* and *Sideroxylon inerme* subsp. *inerme*), and these did indeed occur in varying abundances across the study area.

Mitigation Measures: Mitigation measures include avoidance of SCC wherever possible, since it is unlikely that relocation via search and rescue procedures will be feasible given the highly sensitive nature of *Erica* root systems. Avoidance mitigation is also highly recommended for the protected tree species. However, destruction of some individuals will not impact their conservation statuses since both species are widespread not only in the study area, but also in South Africa in general. Nevertheless, it must be noted that a permit must be obtained from relevant local competent authorities to damage, destroy, or relocate any SCC or protected plant species; any such actions are considered illegal without a permit, in which case such species must be avoided completely.

Significance of Impacts:

	Baseline	A1 Before Mitigation	A1 After Mitigation
Extent	Site-specific	Local	Site-specific
Duration	Long-term	Medium-term	Short-term
Magnitude	Medium	Medium	Very Low
Consequence	**Medium**	**Low**	**Very Low**
Probability	Probable	Highly Probable	Improbable
Loss of Irreplaceable Resource	Marginal loss	Marginal loss	No loss
Reversibility	Moderately reversible	Moderately reversible	Fully reversible
Confidence	Medium	High	High
Significance	**Medium**	**Medium-Low**	**Low**
Avoidance			Complete Avoidance
Management			Highly Effective
Mitigation			Highly Effective
Residual Impact			Low

8.3.1.c) Fragmentation

Specific Impact(s): Increased fragmentation of natural vegetation fragments with resultant increase of edge effects.

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Nature and Type of Impact: Negative, Indirect.

Baseline Conditions: In general, fragmentation within the IDZ is not a large problem since most of the natural vegetation fragments are quite large in size, which means that the ratio of land area to edge is reduced (only a few small natural vegetation fragments exist in the IDZ.

Mitigation Measures: To reduce impacts when severing current intact natural vegetation fragments, smaller fragments might potentially be rejoined by eliminating cleared areas between them. At this stage it is difficult to determine how this might be implemented, but design plans can be scrutinized when such arise to find optimal ways of rejoining isolated fragments, which will lessen the impacts of edge effects and isolation by increasing overall fragment sizes.

Significance of Impacts:

	Baseline	A1 Before Mitigation	A1 After Mitigation
Extent	Site-specific	Site-specific	Site-specific
Duration	Medium-term	Medium-term	Permanent
Magnitude	Low	Medium	Low
Consequence	**Very Low**	**Low**	**Low**
Probability	Probable	Highly Probable	Highly Probable
Loss of Irreplaceable Resource	Marginal loss	Marginal loss	Marginal loss
Reversibility	Moderately reversible	Moderately reversible	Moderately reversible
Confidence	High	High	High
Significance	**Low**	**Medium-Low**	**Medium-Low**
Avoidance			Limited Avoidance
Management			Moderately Effective
Mitigation			Moderately Effective
Residual Impact			Medium-Low

8.3.1.d) Invasive Alien Plant Species (IAPs)

Specific Impact(s): Spread and/or establishment of alien and/or invasive species.

Clearance of indigenous vegetation and resultant disturbance produces areas that are highly prone to colonization and invasion by alien plant species. This will be especially exacerbated by current levels of IAPs within eh IDZ. This is the most significant potential impact.

Nature and Type of Impact: Negative, Direct.

Baseline Conditions: A very detailed assessment of the NEM:BA A&IS Regulations listed plant species of the ELIDZ was recently prepared (Keet, 2025) and it is highly recommended that the document be studied in conjunction with this report. This will allow valuable and detailed insights regarding the various IAPs occurring in the IDZ. Nevertheless, a brief summary is given here.

A total of 24 NEM:BA A&IS Regulations listed invasive species were found within the study area. The most widespread of these is *Lantana camara* (Lantana, Tickberry, Cherry pie; Category 1b). Furthermore, while much of the vegetation on-site is in relatively good condition, some areas are particularly badly invaded, and these serve as a continual source of

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propagules for invasion in other areas. Without any management intervention, the scale and magnitude of the existing infestations will increase.

Mitigation Measures: This impact can be mitigated by implementing invasive alien plant species clearing and management. Given the widespread abundance of many of the IAPs within the broader region, and not only in the IDZ, it is highly unlikely that IAPs will be eradicated within the IDZ. However, if implemented well, IAPs management can likely reduce the majority of IAPs to acceptable and manageable levels.

Significance of Impacts:

	Baseline	A1 Before Mitigation	A1 After Mitigation
Extent	Local	Local	Site-specific
Duration	Long-term	Long-term	Medium-term
Magnitude	Medium	High	Medium
Consequence	**Medium**	**High**	**Low**
Probability	Highly Probable	Highly Probable	Highly Probable
Loss of Irreplaceable Resource	Marginal loss	Marginal loss	Marginal loss
Reversibility	Moderately reversible	Moderately reversible	Moderately reversible
Confidence	High	High	High
Significance	**Medium**	**High**	**Medium-Low**
Avoidance			Partial Avoidance
Management			Moderately Effective
Mitigation			Moderately Effective
Residual Impact			Low

8.4. Fauna

The faunal communities of the ELIDZ project site are supported by a mosaic of habitats including Open Woodland–Grassland Mosaics, Thicket–Grassland Mosaics, Riparian Thicket–Forest Complexes, and Reedbed–Bulrush Depression Wetlands. These habitats, together with their transitional zones or ecotones, provide a diverse range of microhabitats that sustain species from multiple faunal guilds, including small antelope, mesopredators, amphibians, reptiles, ground-nesting birds, and invertebrates such as Odonata and Lepidoptera. Surveys confirmed the presence of a breeding pair of African Marsh Harriers (*Circus ranivorus*, Endangered) as the only animal Species of Conservation Concern (SCC) within the site, in addition to few provincially protected species.

The site functions as an isolated ecological island due to fencing and surrounding land uses, which amplifies the consequences of habitat loss and fragmentation, as fauna cannot disperse into, or recolonise from, the wider landscape. In this context, even localised disturbances translate into disproportionately severe impacts on population persistence, habitat viability, and ecosystem functioning.

The assessment identified several significant risks to faunal communities, most of which are associated with habitat loss, fragmentation, and carrying capacity decline. The most severe unmitigated impacts include:

- **Direct Habitat Loss and Fragmentation**: The removal of ecotones and productive mosaics threatens biodiversity "hotspots" within the site, leading to permanent loss of foraging and breeding grounds.

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- **Loss of SCC and Protected Species**: The African Marsh Harrier faces risks from foraging habitat loss and disturbance, while thicket-dwelling protected fauna may face increased competition and displacement.
- **Permanent Loss of Habitat and Reduced Carrying Capacity**: Long-term operational impacts reduce the site's ability to sustain viable populations of grazers, invertebrates, and ground-nesting birds.

Other impacts, including faunal mortality of less mobile species, disturbance and displacement, chronic operational disturbance from lighting, noise, and traffic, and infrastructure creating habitat for generalists, are considered moderate but remain relevant due to the cumulative stress they impose in an enclosed faunal system.

Unmitigated, several of these impacts are of high significance. However, with effective mitigation and management, all impacts can be reduced to medium or low–medium residual significance, which falls within acceptable levels for environmental authorisation.

The main threats across impacts are:

- Permanent loss of ecotones and transitional habitats between grasslands, thickets, and riparian strips.
- Isolation of populations in a fenced system, preventing recolonisation.
- Reduction in prey and forage resources for sensitive species, especially African Marsh Harrier, and also Cape Grysbok and Common Duiker.
- Woody and alien plant encroachment (*Vachellia karroo, Lantana camara, Stenotaphrum* sods) which degrade grassland and ecotone quality.
- Expansion of monotonic reedbeds and bulrush wetlands that reduce amphibian and bird diversity.
- Increased generalist dominance (rodents, mongooses, feral cats, pigeons) leading to competition and predation pressure.

The most critical mitigation measures identified in this assessment are:

- **Habitat Retention and Avoidance**: Incorporating ecotones, grassland fringes, and transitional habitats into the open space system, with enforced no-go zones during construction.
- **Protection of SCC**: A buffer around the African Marsh Harrier nesting wetland, and strict protection of thicket refuges for Cape Grysbok and other provincially protected species.
- **Habitat Rehabilitation**: Active removal of invasive alien plants (*Lantana camara*, *Acacia mearnsii*) and encroaching woody species (*Vachellia karroo*), coupled with reseeding and restoration of native grassland and ecotone habitats.
- **Faunal Walk-Throughs and Relocations**: Prior to construction, targeted rescue and relocation of reptiles, amphibians, and ground-nesting birds, with the potential of the creation of artificial refugia (brush piles, rock shelters).
- **Operational Controls**: Downward-directed, low-spectrum lighting, dust suppression, speed limits and fauna signage on access roads, and noise/activity restrictions near wetlands during breeding seasons.
- **Generalist Control**: Infrastructure design and optimization to reduce nesting/roosting by pigeons, waste management to deter rodents, and active feral cat management if deemed necessary.

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- **Long-Term Monitoring**: Ongoing population and habitat monitoring (Marsh Harrier breeding success, invertebrate diversity, antelope and rodent populations) with adaptive management to address emerging threats.

While the ELIDZ faunal system faces substantial risks due to its isolation and vulnerability to irreversible habitat loss, this assessment demonstrates that with the rigorous implementation of the above mitigation and management measures, all impacts can be reduced to acceptable levels. The most severe residual impacts — habitat fragmentation, carrying capacity loss, and SCC sensitivity — will remain of medium significance post-mitigation, but within acceptable thresholds provided that the open space plan is proactively managed as a biodiversity refuge.

8.4.1. Construction Phase

8.4.1.a) Direct Habitat Loss and Fragmentation

Specific Impact(s): The most significant impact of the development is the direct loss and fragmentation of habitats. Construction will remove parts of the productive Open Woodland–Grassland and Thicket–Grassland mosaics, which are key for grazers, small antelope, rodents, ground-nesting birds, and invertebrates. Termitaria, surface rocks, and scattered woody clumps in these mosaics provide vital microhabitats for ants, reptiles, amphibians, and Lycaenid butterflies.

Particularly critical are ecotones; the transition zones between grasslands and thickets, and between Riparian Thicket–Forest strips and adjoining mosaics. These areas host the highest observed faunal activity, including Lepidoptera, Odonata, insectivorous birds (e.g., flycatchers, cisticolas, scrub robins), and small carnivores. The African Marsh Harrier uses these ecotones along with Open Woodland–Grassland and Thicket–Grassland mosaics as hunting grounds for rodents and amphibians. Fragmentation will sever these functional linkages, isolating thickets from foraging grounds and reducing the ecological viability of dependent fauna.

Within the already island-like composition of the ELIDZ, such fragmentation is amplified, as recolonisation from the broader landscape is impossible. Once habitats are lost, populations have no external refugia or source populations to replenish local losses.

Nature and Type of Impact: Negative, Direct.

Baseline Conditions: If left undeveloped, these habitats would persist but degrade over time due to encroachment by *Vachellia karroo*, and invasive *Lantana camara*, and the spread of *Stenotaphrum secundatum*, which homogenises grasslands and reduces forb and geophyte diversity. Wetland fringes may become dominated by *Typha capensis* and *Phragmites australis*, decreasing amphibian, bird, and invertebrate diversity. Rodent overabundance (*Rhabdomys pumilio*) is already evident, driven by sod expansion and providing disproportionate prey for mongooses, increasing predation pressure on more sensitive fauna.

Mitigation Measures: Avoidance is key. Ecotones between riparian strips, dense thickets, and open mosaics should be retained and buffered in the open space plan where possible. Rehabilitation programmes must manage woody encroachment and invasive aliens through selective clearing, alien plant removal, and reseeding with native grasses and forbs. Artificial ecotones can be created by rehabilitating degraded riparian–grassland boundaries

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Unmitigated, the impact is of high significance, given the permanent loss of biodiversity hotspots. With mitigation, significance can be reduced to medium, but residual loss persists due to irreversible conversion of some ecotones.

Significance of Impacts:

	Baseline	A1 Before Mitigation	A1 After Mitigation
Extent	Site-specific	Site-specific	Site-specific
Duration	Short-term	Permanent	Long-term
Magnitude	Low	High	Low
Consequence	**Very Low**	**High**	**Low**
Probability	Definite	Definite	Definite
Loss of Irreplaceable Resource	Marginal loss	Substantial loss	Reasonable loss
Reversibility	Moderately reversible	Partly reversible	Moderately reversible
Confidence	High	High	High
Significance	**Medium-Low**	**High**	**Medium**
Avoidance			Limited Avoidance
Management			Moderately Effective
Mitigation			Partially Effective
Residual Impact			Medium

8.4.1.b) Potential Loss of SCC

Specific Impact(s): The site supports a breeding pair of African Marsh Harriers (*Circus ranivorus*, Endangered) that are dependent on wetlands for nesting and grassland ecotones for hunting. Habitat loss and disturbance threaten their breeding success. No other SCC or highly range-restricted species were confirmed during surveys.

Although wetlands and thickets fall largely within the open space plan, the loss of surrounding grasslands reduces prey abundance and hunting grounds for the Marsh Harrier.

Nature and Type of Impact: Negative, Direct.

Baseline Conditions: If undeveloped, the Marsh Harriers would retain foraging and nesting sites, but unmanaged reed and woody shrub encroachment could reduce prey diversity over time.

Mitigation Measures: A buffer must be applied around the wetland area utilized by the Marsh Harrier. Ecotone habitats used for foraging should be maintained, and wetland vegetation structure should be managed to prevent reed/bulrush dominance. Monitoring of Marsh Harrier breeding success can also be considered.

Unmitigated significance is high, given the presence of a breeding Endangered species. With mitigation, this can be reduced to medium, though foraging habitat loss remains an irreducible residual effect.

Significance of Impacts:

	Baseline	A1 Before Mitigation	A1 After Mitigation
Extent	Site-specific	Local	Site-specific
Duration	Long-term	Medium-term	Short-term

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	Baseline	A1 Before Mitigation	A1 After Mitigation
Magnitude	Low	High	Very Low
Consequence	**Low**	**Medium**	**Very Low**
Probability	Improbable	Probable	Probable
Loss of Irreplaceable Resource	No loss	Substantial loss	Marginal loss
Reversibility	Irreversible	Irreversible	Irreversible
Confidence	Medium	High	High
Significance	**Low**	**Medium**	**Low**
Avoidance			Complete Avoidance
Management			Highly Effective
Mitigation			Highly Effective
Residual Impact			Low

8.4.1.c) Faunal Mortality

Specific Impact(s): Construction will most likely cause direct mortality of less mobile fauna such as amphibians (frogs, toads), reptiles (snakes, chameleons, skinks), and ground-nesting birds. These species are vulnerable to clearing, excavation, and vehicle movement. In a closed system, such mortality can cause localised population collapses, with little chance of recolonisation.

Nature and Type of Impact: Negative, Indirect.

Baseline Conditions: Without development, mortality risk remains low, though habitat degradation may slowly reduce populations of amphibians and reptiles due to encroachment and wetland homogenisation.

Mitigation Measures: Faunal rescue operations prior to clearing should relocate amphibians and reptiles from thickets and other habitats. Timing of clearing should avoid peak amphibian breeding. Brush piles and artificial refugia can be created within open space areas to provide replacement shelter.

Unmitigated significance is medium, but with effective mitigation this can be reduced to low–medium, although some unavoidable mortality remains.

Significance of Impacts:

	Baseline	A1 Before Mitigation	A1 After Mitigation
Extent	Site-specific	Site-specific	Site-specific
Duration	Medium-term	Medium-term	Short-term
Magnitude	Low	Medium	Low
Consequence	**Very Low**	**Low**	**Very Low**
Probability	Improbable	Probable	Highly Probable
Loss of Irreplaceable Resource	No loss	Marginal loss	Marginal loss
Reversibility	Irreversible	Irreversible	Irreversible
Confidence	High	High	High
Significance	**Low**	**Low**	**Medium-Low**
Avoidance			Partial Avoidance
Management			Moderately Effective
Mitigation			Moderately Effective
Residual Impact			Low

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8.4.1.d) Faunal Disturbance and Displacement

Specific Impact(s): Noise, dust, and human activity during construction will displace fauna into smaller open space patches, resulting in habitat compression. In the closed ELIDZ, displaced fauna cannot move into the surrounding landscape, increasing competition and stress. Ground-nesting birds may abandon nests, amphibians may leave breeding pools, and invertebrate activity may be disrupted potentially disrupted.

Nature and Type of Impact: Negative, Direct.

Baseline Conditions: Without development, displacement would not occur, though progressive encroachment would gradually force fauna into less optimal microhabitats.

Mitigation Measures: Disturbance should be limited by phasing construction, applying dust suppression, and avoiding breeding seasons. Quiet zones must be maintained around wetlands and thickets. Unmitigated significance is medium. With mitigation, residual significance is reduced to low–medium, as disturbance impacts are temporary and reversible.

Significance of Impacts:

	Baseline	A1 Before Mitigation	A1 After Mitigation
Extent	Local	Local	Site-specific
Duration	Long-term	Long-term	Long-term
Magnitude	Low	Medium	Low
Consequence	**Low**	**Medium**	**Low**
Probability	Improbable	Definite	Definite
Loss of Irreplaceable Resource	No loss	Reasonable loss	Marginal loss
Reversibility	Moderately reversible	Partly reversible	Moderately reversible
Confidence	High	High	High
Significance	**Low**	**Medium-High**	**Medium**
Avoidance			Partial Avoidance
Management			Moderately Effective
Mitigation			Moderately Effective
Residual Impact			Medium-Low

8.4.1.e) Artificial Faunal Habitats

Specific Impact(s): Anthropogenic infrastructure creates habitat for generalist and invasive species (feral cats, brown and house rats, rock pigeons, weavers, swallows). These species thrive in disturbed areas, displacing sensitive fauna and altering community composition. Over time, faunal assemblages may homogenise, with reduced representation of native species.

Nature and Type of Impact: Negative, Indirect.

Baseline Conditions: Without development, artificial habitat opportunities would not expand, though generalist dominance is already facilitated by invasive thickets and sod grasses.

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Mitigation Measures: Infrastructure should be rodent-proofed and designed to deter nesting by invasive birds. Waste management must prevent attraction of generalist predators. Cat management programmes should be implemented. Artificial refugia in open space areas may sustain native small vertebrates. Unmitigated significance is medium. With mitigation, residual significance can be reduced to low–medium, though exclusion of generalists cannot be fully achieved.

Significance of Impacts:

	Baseline	A1 Before Mitigation	A1 After Mitigation
Extent	Site-specific	Local	Site-specific
Duration	Short-term	Medium-term	Long-term
Magnitude	Very Low	Medium	Low
Consequence	**Very Low**	**Low**	**Low**
Probability	Improbable	Definite	Highly Probable
Loss of Irreplaceable Resource	No loss	Marginal loss	Marginal loss
Reversibility	Moderately reversible	Partly reversible	Moderately reversible
Confidence	High	High	High
Significance	**Low**	**Medium**	**Medium-Low**
Avoidance			Partial Avoidance
Management			Moderately Effective
Mitigation			Moderately Effective
Residual Impact			Medium-Low

8.4.2. Operational Phase

8.4.2.a) Permanent Habitat Loss

Specific Impact(s): The operational phase results in permanent conversion of habitats, particularly ecotones between grasslands, thickets, and riparian strips, which are faunal biodiversity hotspots. Observations show high concentrations of Odonata, Lepidoptera, insectivorous birds, and small mammals in these ecotones, which provide both cover and foraging opportunities. Their loss reduces the site's carrying capacity for grazers, ground-nesting birds, mesopredators, and pollinators.

Over time, faunal diversity will decline, with sensitive species lost and generalist species (rodents, pigeons, mongooses) dominating. The site risks becoming an ecological sink, where mortality and competition exceed recruitment.

Nature and Type of Impact: Negative, Direct.

Baseline Conditions: If undeveloped, habitats would persist but carrying capacity would decline slowly under woody encroachment, alien invasion, and reed/bulrush expansion. Management could partially reverse this degradation. In contrast, development causes permanent loss, which is mostly irreversible.

Mitigation Measures: Management of retained open space must be prioritised through alien clearing, controlled woody thinning, reseeding with native grasses, and rehabilitation of degraded patches. Monitoring of faunal populations (rodents, antelope, invertebrates, insectivorous birds) is required, with adaptive interventions to prevent collapse.

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Unmitigated significance is high, as carrying capacity declines permanently. With mitigation, the impact can be reduced to medium, though residual losses are inevitable due to irreversible habitat conversion.

Significance of Impacts:

	Baseline	A1 Before Mitigation	A1 After Mitigation
Extent	Local	Local	Site-specific
Duration	Medium-term	Medium-term	Long-term
Magnitude	Medium	High	Low
Consequence	**Low**	**Medium**	**Low**
Probability	Probable	Definite	Definite
Loss of Irreplaceable Resource	Marginal loss	Reasonable loss	Reasonable loss
Reversibility	Moderately reversible	Moderately reversible	Moderately reversible
Confidence	High	High	High
Significance	**Low**	**Medium-High**	**Medium**
Avoidance			Limited Avoidance
Management			Moderately Effective
Mitigation			Partially Effective
Residual Impact			Medium

8.4.2.b) Chronic Faunal Disturbance

Specific Impact(s): Operational noise, vehicle traffic, and 24-hour lighting cause chronic disturbance. Artificial lighting disrupts insect movement, disorients pollinators, and alters predator-prey dynamics for owls and bats. Traffic increases roadkill risk for amphibians, reptiles, and small mammals. Sensitive species may avoid otherwise suitable habitats, reducing the functional extent of the open space system.

Nature and Type of Impact: Negative, Direct.

Baseline Conditions: Under baseline conditions, chronic disturbance would not increase beyond existing levels. Faunal stress would remain, but without the compounded impact of new development.

Mitigation Measures: Lighting should use downward-directed, low-spectrum fixtures with minimal spill. Speed limits and fauna crossing signage should be implemented. Night-time activity near wetlands should be minimised.

Unmitigated significance is medium. With mitigation, impacts can be reduced to low–medium, though operational disturbance cannot be eliminated entirely.

Significance of Impacts:

	Baseline	A1 Before Mitigation	A1 After Mitigation
Extent	Regional	Regional	Site-specific
Duration	Medium-term	Medium-term	Long-term
Magnitude	Very Low	Medium	Low
Consequence	**Very Low**	**Medium**	**Low**
Probability	Improbable	Highly Probable	Highly Probable
Loss of Irreplaceable Resource	No loss	Marginal loss	Marginal loss

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	Baseline	A1 Before Mitigation	A1 After Mitigation
Reversibility	Moderately reversible	Partly reversible	Moderately reversible
Confidence	High	High	High
Significance	**Low**	**Medium**	**Medium-Low**
Avoidance			Partial Avoidance
Management			Moderately Effective
Mitigation			Moderately Effective
Residual Impact			Low

8.5. Cumulative Impacts

8.5.1. Conservation Targets

Specific Impact(s): Reduced ability to meet conservation targets.

The loss of vegetation types on a cumulative basis from the broader area negatively impacts provincial and national conservation targets. Fortunately, none of the vegetation types occurring on-site are threatened.

Furthermore, only one plant SCC was encountered, and in low abundance, within the study area. Although it can easily be avoided, its accidental destruction (and others that might not have been detected) might contribute either directly or indirectly to its conservation status. On a cumulative basis, its loss might in future contribute to affecting national listings if similar habitats in the surrounding area also disappear.

Nature and Type of Impact: Negative, Direct.

Baseline Conditions: Even no listed vegetation types occur on-site, many of The natural vegetation fragments are in relatively good condition and contribute to conservation targets on a cumulative basis together with simar types surrounding the IDZ. Degraded and disturbed fragments do not, however, contribute.

Mitigation Measures: The most effective mitigation is firstly and simply avoidance consideration wherever possible. It involves first targeting areas that have already been disturbed or degraded, which do exist in the study area. *Vachellia karroo - Lantana camara* infestation and other degraded veld areas are good candidates. Avoidance of key habitats, such as Forest Thicket and Wetlands, as well as areas with SCC, will also enhance mitigation. Hereafter, any project footprint can be further adjusted or minimized wherever possible. Finally, any degraded areas can be rehabilitated or restored to increase the total area of natural vegetation fragments. Controlling invasive alien plant species is especially imperative for the study area.

Significance of Impacts:

	Baseline	A1 Before Mitigation	A1 After Mitigation
Extent	Regional	Regional	Site-specific
Duration	Medium-term	Medium-term	Medium-term
Magnitude	Low	Medium	Low
Consequence	**Low**	**Medium**	**Very Low**
Probability	Highly Probable	Highly Probable	Probable

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	Baseline	A1 Before Mitigation	A1 After Mitigation
Loss of Irreplaceable Resource	Marginal loss	Marginal loss	Marginal loss
Reversibility	Moderately reversible	Moderately reversible	Moderately reversible
Confidence	High	High	High
Significance	**Medium-Low**	**Medium**	**Low**
Avoidance			Partial Avoidance
Management			Moderately Effective
Mitigation			Moderately Effective
Residual Impact			Medium-Low

8.5.2. Broad-Scale Ecological Processes

Specific Impact(s): Disruption of broad-scale ecological processes.

Habitat destruction and fragmentation can potentially disrupt the connectivity of the landscape for fauna and flora, and impair their ability to respond to environmental fluctuations. It can also eventually lead indirectly to the loss of local plant community types, SCC, protected plant species, and genetic diversity, among other things, if these occur on a cumulative basis in the surrounding areas

Nature and Type of Impact: Negative, Indirect.

Baseline Conditions: Some areas are already fragmented to some degree which means that their ecological functioning within the broader landscape is already affected. Areas that are highly disturbed or degraded are also already highly compromised, and impacts on these areas would not be major. Iin contrast, many of the natural vegetation fragments are in a good present ecological state and capable of fulfilling and participating in broad-scale ecological processes.

Mitigation Measures: Small scale losses would not impact broad-scale ecological processes to any significant degree because all of these plant community types exist outside the IDZ. However, large scale vegetation clearing might affect these processes, especially if rarer species and/or unique habitats are eliminated. Mitigation can involve strategic project designs that maximize the connectivity of the landscape, for example ensuring as many natural corridors as possible are established, thereby reducing fragmentation and isolation of ecosystems.

Significance of Impacts:

	Baseline	A1 Before Mitigation	A1 After Mitigation
Extent	Site-specific	Local	Site-specific
Duration	Short-term	Medium-term	Medium-term
Magnitude	Low	Medium	Low
Consequence	**Very Low**	**Low**	**Very Low**
Probability	Improbable	Highly Probable	Improbable
Loss of Irreplaceable Resource	Marginal loss	Marginal loss	Marginal loss
Reversibility	Moderately reversible	Moderately reversible	Moderately reversible
Confidence	High	High	High
Significance	**Low**	**Medium-Low**	**Low**
Avoidance			Partial Avoidance
Management			Moderately Effective
Mitigation			Moderately Effective

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	Baseline	A1 Before Mitigation	A1 After Mitigation
Residual Impact			Low

8.6. Summary Scores for Anticipated Impacts

The following table offers a brief overview of the scores for the anticipated impacts within the PAOI, and draws from the assessments presented in the previous section. It intends solely to be a concise summary, and the previous sections should be consulted for a detailed overview. Abbreviations: A1 — Alternative 1.

Phase	Impact	Baseline	A1 Before Mitigation	A1 After Mitigation
Construction: Flora	Loss of Plant Community Types	Low	Medium-High	Medium-Low
Construction: Flora	Loss of Plant SCC and/or Protected Species	Medium	Medium-Low	Low
Construction: Flora	Habitat Fragmentation	Low	Medium-Low	Medium-Low
Construction: Flora	Spread and/or Establishment of Alien and/or Invasive Species.	Medium	High	Medium-Low
Construction: Flora	Direct Habitat Loss and Fragmentation	Medium-Low	High	Medium
Construction: Fauna	Loss of Faunal SCC and/or Protected Species	Low	Medium	Low
Construction: Fauna	Faunal Mortality of Less Mobile Species	Low	Low	Medium-Low
Construction: Fauna	Disturbance and Displacement	Low	Medium-High	Medium
Construction: Fauna	Infrastructure as Artificial Habitat for Generalists	Low	Medium	Medium-Low
Construction	Impact on Watercourses	Medium-Low	Medium-Low	Medium-Low
Operational: Fauna	Permanent Loss of Habitat and Reduced Carrying Capacity	Low	Medium-High	Medium
Operational: Fauna	Chronic Disturbance: Noise, Traffic, and Lighting	Low	Medium	Medium-Low
Cumulative	Reduced Ability to Meet Conservation Targets	Medium-Low	Medium	Low
Cumulative	Disruption of Broad-scale Ecological Processes	Low	Medium-Low	Low

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9. Proposed Mitigation Measures for Consideration in the EMPr

Construction and Operational Phases	
Impact	**Mitigation**
Potential impacts on plant communities, and SCC and/or protected plant species.	No plant species, whether native or exotic, should be brought into, or removed from, the development site, to prevent the spread of exotic or invasive species or the illegal collection of plants. No plants may be translocated or otherwise uprooted or disturbed for rehabilitation or other purposes without express permission from the Contractor's EO or without the relevant permits. Clearing of vegetation should be minimized and avoided where possible. Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. Immediately rehabilitate all areas outside of the development site that were disturbed and implement mitigation measures to prevent associated impacts from re-occurring. All temporary structures used during the construction phase must be removed upon project completion. No storage of vehicles or equipment will be allowed outside of the designated project areas. All vehicles, if present on site, must remain on demarcated roads and no unnecessary driving in the veld outside these areas are allowed. Areas that are denuded during construction must be re-vegetated with indigenous vegetation to prevent erosion. This will also reduce the likelihood of encroachment by IAPs. After construction and/operation, rehabilitate any damaged areas to have an acceptable vegetation cover according to rehabilitation recommendations as provided within a site-specific Rehabilitation Plan compiled by a suitably qualified botanist. Revegetation should occur naturally where topsoils were not severely altered.
Impacts on faunal communities.	Site access should be controlled and no unauthorised persons should be allowed onto the site. Any fauna directly threatened by the associated activities should be removed to a safe location by a suitably qualified specialist. The collection/trapping, hunting, or poisoning of any animals at the site is strictly forbidden. Signs must be put up to enforce this. Personnel should not be allowed to wander off demarcated areas. Fires must not be allowed on site. All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel, and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. Schedule activities and operations during the least sensitive periods, to avoid migration, nesting, and breeding seasons. Use environmentally friendly chemical products wherever possible.

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Soil erosion and associated degradation of ecosystems.	Minimize the number of disturbed areas; only disturb the absolute minimum number of areas required for the project. All other areas should be left undisturbed. Any signs of erosion resulting from the project activities must be rectified immediately and monitored thereafter to ensure that they do not re-occur. Any activity occurring on or near steep slopes will require that adequate slope protection is provided. All denuded areas resulting from the development should be re-vegetated, post-construction, with locally occurring native plant species to bind the soil and limit erosion potential. Roads and other disturbed areas within the study area should be regularly monitored for erosion problems, and problem areas should receive follow-up monitoring to assess remediation success. Existing access routes and walking paths must be made use of wherever possible. Silt/sediment traps/barriers should be used where there is a danger of topsoil or material stockpiles eroding and entering downstream drainage lines and/or other sensitive areas. These sediment/silt barriers should be regularly maintained and cleared so as to ensure effective drainage of the areas The construction of any stabilisation features must be undertaken to prevent erosion, where deemed necessary. If any soil becomes disturbed, then it must be stabilized until revegetation can take place. This can be done either temporarily or permanently, and can include methods such as using layers of either sterile mulch (that will not drastically alter soil conditions), blankets, wood binders, geo-textiles (such as geojute netting), artificial turf blankets, mats, or fibre rolls, depending on availability and how appropriate the measures are for the project. Runoff water on exposed areas should be controlled, for example with use of sediment traps, articulated concrete blocks, riprap, or geotextiles.
Spread and/or establishment of alien and/or invasive species.	IAPs, wherever present, must be removed from the site as per NEM:BA requirements. Regular monitoring for alien plants at the site should occur and could be conducted simultaneously with erosion monitoring. When alien plants are detected, these should be controlled and cleared using the recommended control measures for each species to ensure that the problem is not exacerbated or does not re-occur and increase to problematic levels. Clearing methods should aim to keep disturbance to a minimum and must be undertaken in accordance with relevant guidelines. Any area that is cleared of IAPs must receive regular follow-up treatments (preferably at least three follow-ups) to ensure that populations do no re-establish after such initial clearing efforts. Any chemicals/herbicides used during clearing efforts must strictly be used only in accordance with the manufactures guidelines. Under no circumstances should unqualified persons be allowed to conduct IAPs clearing using chemicals/herbicides without supervision from a suitably qualified pest control officer. Such a qualified pest control officer must be present on site at all times during IAPs clearing. No planting or importing of any alien species to the site for landscaping, rehabilitation, or any other purpose should be allowed.

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Cumulative Impacts	
Impact	**Mitigation**
Reduced ability to meet conservation obligations and targets.	Avoid damage to listed vegetation types wherever possible. The activity footprints of various other developments in the area must be kept to a minimum and natural vegetation should be encouraged to return in any disturbed areas; if active rehabilitation or restoration is necessary, then is should be implemented. Reduce the development areas as much as possible. Any signs of erosion resulting from the project activities must be rectified immediately and monitored thereafter to ensure that they do not re-occur. All denuded areas resulting from the development should be re-vegetated, post-construction, with locally occurring native species, to bind the soil and limit erosion potential. Roads and other disturbed areas within the development site should be regularly monitored for erosion problems, and problem areas should receive follow-up monitoring to assess the success of the remediation. Silt/sediment traps/barriers should be used where there is a danger of topsoil or material stockpiles eroding and entering any downstream drainage lines and other sensitive areas. These sediment/silt barriers should be regularly maintained and cleared so as to ensure effective drainage of the areas A suitable weed management strategy must be implemented in the construction and operational phases, and can be included in the EMPr. Note that it is a legal requirement that any Category 1a, 1b, and Category 2 invasive species be controlled in accordance with NEM:BA A&IS Regulations. Regular monitoring for alien plants at the site should occur and could be conducted simultaneously with erosion monitoring. When alien plants are detected, these should be controlled and cleared using the recommended control measures for each species to ensure that the problem is not exacerbated or does not re-occur and increase to problematic levels.
Impacts on broad-scale ecological processes.	The footprints of the individual development areas should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas post-operational phase. Reduce the development areas as much as possible.

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10. Conclusion and Impact Statement

10.1. Conclusion

EcoFloristix Specialist Botanical Surveys, in collaboration with Nkurenkuru Ecology and Biodiversity (Pty) Ltd., was appointed to conduct a botanical, faunal, and terrestrial biodiversity survey and evaluation for the East London Industrial Development Zone (ELIDZ).

Any proposed development, while posing substantial risks to a fragmented and isolated biodiversity system, can likely proceed without unacceptable residual environmental damage provided that all identified mitigation and management measures are fully and rigorously implemented. The most critical factor for achieving acceptable environmental outcomes is a commitment to habitat retention and avoidance of sensitive features as much as possible, together with restoration wherever possible. Among other things, this requires the protection of all confirmed SCC localities, specifically:

- Avoidance and buffering of the African Marsh Harrier nesting wetland (requiring a recommended buffer zone as presented in section 7.2).
- Avoidance and buffering of the *Erica orientalis* locality (requiring a minimum 25 m buffer).
- Prioritized avoidance of High Site Ecological Importance (SEI) habitats to maintain functional ecological corridors.

Furthermore, compliance with national and provincial legislation — including securing the necessary permits for any interaction with SCC or protected species — is mandatory.

A robust, long-term IAPs control plan (together with a habitat rehabilitation programme) is essential to restore ecosystem integrity, counteract fragmentation, and maintain faunal carrying capacity, serving as the cornerstone of both pre- and post-construction management. Fortunately, a rigorous and detailed assessment and control plan was recently developed for IAPs in the ELIDZ, and its speedy implementation is again emphasized here.

The remaining unavoidable impacts, primarily concerning long-term habitat fragmentation and reduced faunal carrying capacity, will be mitigated to an acceptable Low to Medium-low residual significance.

The mitigations, management, and associated monitoring regarding all the impacts identified in this report are the most important factors of this project and must be considered by the competent authority.

10.2. Impact Statement

The mitigation measures described in this report can be implemented to achieve, on average a Low to Medium-low residual impact.

The main expected impacts of the proposed activities include:

- habitat loss, fragmentation, and/or degradation;
- potential loss of SCC and protected plant species;
- species disturbance and displacement caused during construction and operation; and

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- a potential increased proliferation of IAPs, with consequent further degradation of ecosystems.

FINAL STATEMENT

Considering all the findings of this report, no fatal flaws were evident. However, this is strictly contingent on all the mitigation measures are discussed in this report.

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PART 3: References, Methodology, and Supplementary Information

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11. References

Baselga, A. (2010a). Multiplicative partition of true diversity yields independent alpha and beta components; additive partition does not. *Ecology*, *91*(7), 1974–1981. https://doi.org/10.1890/09-0320.1

Baselga, A. (2010b). Partitioning the turnover and nestedness components of beta diversity. *Global Ecology and Biogeography*, *19*, 134–143. https://doi.org/10.1111/j.1466-8238.2009.00490.x

Baselga, A. (2013). Multiple site dissimilarity quantifies compositional heterogeneity among several sites, while average pairwise dissimilarity may be misleading. *Ecography*, *36*, 124–128. https://doi.org/10.1111/j.1600-0587.2012.00124.x

Boon, R. (2010). *Pooley's Trees of Eastern South Africa: A Complete Guide* (2nd ed.). Flora & Fauna Publications Trust.

Bromilow, C. (2010). *Problem Plants and Alien Weeds of South Africa* (3rd ed.). Briza Publications.

Coates Palgrave, M. (2005). *Keith Coates Palgrave Trees of Southern Africa* (3rd ed.). Struik Publishers.

Dayaram, A., Harris, L., Grobler, B. A., van der Merwe, S., Rebelo, A. G., Powrie, L. W., Vlok, J. H. J., Desmet, P., Qabaqaba, M., Hlahane, K. M., & Skowno, A. L. (2018). Vegetation Map of South Africa, Lesotho and Swaziland 2018: A description of changes since 2006. *Bothalia*, *49*(1), a2452. https://doi.org/10.4102/ abc.v49i1.2452

DFFE. (2023). National Environmental Management: National Biodiversity Offset Guideline. Gazette 48841, NO. .569. In *Government Gazette*. www.gpwonline.co.za

Fish, L., Mashau, A. C., Moeaha, M. J., & Nembudani, M. T. (2015). *Identification guide to southern African Grasses: An identification manual with keys, descriptions and distributions, Strelitzia 36*. South African National Biodiversity Institute.

Hawley, G., & Jackson, E. (2025). *GHS Green Hydrogen ELIDZ (Pty) Ltd - pilot production facility and PV facility* (Issue March).

Henderson, L. (2020). *Invasive Alien Plants in South Africa. PPRI Handbook No 21.* Department of Environment, Forestry and Fisheries of South Africa.

Johnson, S., Bytebier, B., & Stärker, H. (2015). *Orchids of South Africa: A Field Guide*. Struik Nature.

Keet, J.-H. (2025). *Invasive Alien Plant Species Management Framework for the East London Industrial Development Zone (IDZ), East London, Eastern Cape Province, South Africa (PR.25.017)* (Issue June).

Manning, J. C. (2007). *Field Guide to Fynbos*. Struik Nature.

Manning, J. C., & Goldblatt, P. (2012). Plants of The Greater Cape Floristic Region 1: The Core Cape Flora. In *Strelitzia 29* (Vol. 29). South African National Biodiversity Institute.

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

Nel, J., Maherry, A. M., Peterson, C. P., Roux, D. J., Driver, A., Hill, L., van Deventer, H., Funke, N., Swartz, E. R., Smith-Adao, L. B., Mbona, N., Downsborough, L., & Nienaber, S. (2011). *Technical Report for the National Freshwater Ecosystem Priority Areas project. WRC Report No. 1801/2/11.*

Pooley, E. (2005). *A Field Guide to the Wild Flowers of KwaZulu-Natal and the Eastern Region*. The Flora Publications Trust.

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

Skowno, A. L., Poole, C. J., Raimondo, D., Sink, K., van Deventer, H., van Niekerk, L., Harris, L. R., Smith-Adao, L. B., Tolley, K. A., Zengeya, T. A., Foden, W., Midgley, G. F., & Driver, A. (2019). *National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity. Synthesis Report. South African National Biodiversity Institute, an entity of the Department of Environment, Forestry and Fisheries.*

South African National Biodiversity Institute. (2018). *The Vegetation Map of South Africa, Lesotho and Swaziland, Mucina, L., Rutherford, M.C. and Powrie, L.W. (Editors), Version 2018*. http://bgis.sanbi.org/Projects/Detail/186

South African National Biodiversity Institute. (2020). *Species Environmental Assessment Guideline. Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa* (Issue 3.1). South African National Biodiversity Institute.

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Van Oudtshoorn, F. (2012). *Gids tot Grasse van suider-Afrika* (3rd ed.). Briza Publications.

van Wyk, A. E., & Smith, G. F. (2001). *Regions of Floristic Endemism: A Review with an Emphasis on Succulents*. Umdaus Press.

van Wyk, A. E., & Van Wyk, P. (2013). *Field Guide to Trees of Southern Africa* (2nd ed.). Struik Nature.

Van Wyk, B.-E., & Smith, G. F. (2010). *Guide to Aloes of South Africa* (2nd ed.). Briza Publications.

Whitehouse, C. M. (2021). *A monograph on the genus Cliffortia. Strelitzia 43.* South African National Biodiversity Institute.

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12. Appendix A: Plant Species List

The plant species list presented here is a combination of online databases (e.g., POSA and iNaturalist) and site survey data, and is indented to provide a comprehensive overview of important species that could potentially occur in the study area and surrounds. However, note that while all species that were observed on site are listed, only SCC from online databases are included.

Descriptions of colours and symbols are given below:

Species in **bold**:	Species that were observed during the Site Sensitivity Verification.
Species marked with *:	Protected plant species.
Species marked with ~:	Plant Species of Conservation Concern (SCC).
Species highlighted in orange:	Threatened (CR, EN, VU) plant species.
Species highlighted in blue:	Alien plant species.
Species marked with NEM:BA:	Invasive Alien Plant species listed in the NEM:BA A&IS Regulations.
Species marked with ECE:	Eastern Cape Endemic.
Small letters in []:	Vegetation/plant community type in which the species was found:

- a: Coastal Scrub
- b: Coastal Thornveld
- c: Degraded Veld
- d: Dune Thicket
- e: Forest Thicket
- f: Semi-open Grassland and Shallow Grassland
- g: *Vachellia karroo - Lantana camara* Infestation
- h: Wetlands

Family	Species	IUCN	Family	Species	IUCN	Family	Species	IUCN
Malvaceae	***Abutilon sonneratianum*** [ad]	**LC**	Zamiaceae	*~Encephalartos latifrons* (ECE)	CR	**Asteraceae**	***Osteospermum moniliferum*** subsp. ***moniliferum*** [ab]	**LC**
Fabaceae	***Acacia mearnsii*** (NEM:BA)[bdf]	**NE**	Zamiaceae	*~Encephalartos longifolius* (ECE)	NT	**Asteraceae**	***Osteospermum polygaloides*** var. ***polygaloides*** [f]	**LC**
Fabaceae	***Acacia saligna*** (NEM:BA)[bcf]	**NE**	Zamiaceae	*~Encephalartos natalensis*	VU	**Oxalidaceae**	***Oxalis bifurca*** var. ***bifurca*** (ECE)[d]	**LC**
Fabaceae	***Adenopodia spicata*** [e]	**LC**	**Poaceae**	***Eragrostis capensis*** [abf]	**LC**	**Oxalidaceae**	***Oxalis smithiana*** [d]	**LC**
Rutaceae	****Agathosma ovata*** [b]	**LC**	**Poaceae**	***Eragrostis curvula*** [d]	**LC**	**Poaceae**	***Panicum deustum*** [a]	**LC**
Hyacinthaceae	*~Albuca bifolia* (ECE)	NT	**Loranthaceae**	***Erianthemum dregei*** [bd]	**LC**	**Poaceae**	***Panicum maximum*** [g]	**LC**
Hyacinthaceae	*~Albuca longifolia* (ECE)	DDD	Ericaceae	*~*Erica glumiflora*	VU	**Thymelaeaceae**	***Passerina rigida*** [af]	**LC**
Asphodelaceae	****Aloe maculata*** [d]	**LC**	**Ericaceae**	***~*Erica orientalis*** (ECE)[f]	**DDT**	**Rubiaceae**	***Pavetta revoluta*** [a]	**LC**
Asphodelaceae	*~*Aloe thraskii*	NT	**Fabaceae**	***Eriosema salignum*** [f]	**LC**	**Malvaceae**	***Pavonia praemorsa*** (ECE)[adg]	**LC**
Asphodelaceae	*~Aloiampelos ciliaris* var. *redacta*	VU	**Fabaceae**	***Erythrina caffra*** [ad]	**LC**	**Geraniaceae**	***Pelargonium alchemilloides*** [d]	**LC**
Fabaceae	***Alysicarpus rugosus*** subsp. ***rugosus*** [a]	**LC**	**Ebenaceae**	***Euclea crispa*** subsp. ***crispa*** [bde]	**LC**	**Arecaceae**	***Phoenix reclinata*** [e]	**LC**
Poaceae	***Andropogon eucomus*** [h]	**LC**	**Myrtaceae**	***Eugenia capensis*** subsp. ***capensis*** [a]	**LC**	**Poaceae**	***Phragmites australis*** [h]	**LC**
Malvaceae	*~Anisodontea capensis*	DDD	Euphorbiaceae	*~*Euphorbia bupleurifolia*	CR	**Phytolaccaceae**	***Phytolacca dioica*** (NEM:BA)[d]	**NE**

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Icacinaceae	*Apodytes dimidiata* subsp. *dimidiata* [abdg]	LC
Asteraceae	*Arctotheca prostrata* [a]	LC
Fabaceae	*Argyrolobium tomentosum* [f]	LC
Iridaceae	**Aristea ecklonii* [f]	LC
Iridaceae	**Aristea pusilla* [f]	LC
Iridaceae	**Aristea torulosa* [b]	LC
Poaceae	*Arundo donax* (NEM:BA)[d]	NE
Apocynaceae	~**Asclepias monticola* (ECE)	Critically Rare
Fabaceae	~*Aspalathus intermedia*	NT
Asparagaceae	*Asparagus densiflorus* [a]	LC
Asparagaceae	*Asparagus falcatus* [d]	LC
Asparagaceae	~*Asparagus intricatus*	DDT
Apocynaceae	~**Aspidoglossum flanaganii* (ECE)	DDD
Asteraceae	*Athanasia dentata* [f]	LC
Aizoaceae	**Bergeranthus concavus* (ECE)[a]	LC
Asteraceae	*Berkheya bipinnatifida* subsp. *bipinnatifida* (ECE)[ad]	LC
Asteraceae	*Berkheya decurrens* (ECE)[bdg]	LC
Cyperaceae	*Bolboschoenus maritimus* [bh]	LC
Asteraceae	*Brachylaena discolor* [ad]	LC
Asteraceae	*Brachylaena elliptica* [bdeg]	LC
Orobanchaceae	*Buchnera dura* [b]	LC
Asphodelaceae	*Bulbine abyssinica* [b]	LC
Asphodelaceae	*Bulbine latifolia* var. *latifolia* [a]	LC
Asphodelaceae	*Bulbine narcissifolia* [a]	LC
Cyperaceae	*Bulbostylis contexta* [f]	LC
Rubiaceae	*Burchellia bubalina* [bd]	LC
Cannaceae	*Canna indica* (NEM:BA)[d]	NE
Rubiaceae	*Canthium spinosum* [d]	LC
Apocynaceae	**Carissa bispinosa* [abde]	LC
Rhizophoraceae	~*Cassipourea flanaganii*	EN
Casuarinaceae	*Casuarina cunninghamiana* (NEM:BA)[d]	NE
Apiaceae	*Centella glabrata* [f]	LC
Solanaceae	*Cestrum laevigatum* (NEM:BA)[abde]	NE
Ulmaceae	*Chaetacme aristata* [d]	LC
Fabaceae	*Chamaecrista comosa* var. *comosa* [bf]	LC
Euphorbiaceae	*Euphorbia kraussiana* [e]	LC
Euphorbiaceae	*Euphorbia triangularis* [e]	LC
Convolvulaceae	*Falkia repens* [a]	LC
Cyperaceae	*Ficinia albicans* [b]	LC
Moraceae	*Ficus burtt-davyi* [e]	LC
Iridaceae	**Freesia laxa* subsp. *laxa* [e]	LC
Agavaceae	*Furcraea foetida* (NEM:BA)[d]	NE
Rubiaceae	~*Galium amatymbicum* (ECE)	DDT
Asteraceae	*Gazania rigens* var. *rigens* [ab]	LC
Iridaceae	**Gladiolus ochroleucus* [adf]	LC
Apocynaceae	**Gomphocarpus physocarpus* [adfg]	LC
Proteaceae	*Grevillea robusta* (NEM:BA)[bd]	NE
Malvaceae	*Grewia occidentalis* var. *occidentalis* [abde]	LC
Melianthaceae	~*Greyia flanaganii* (ECE)	Rare
Celastraceae	*Gymnosporia heterophylla* [abd]	LC
Stilbaceae	**Halleria lucida* [bdg]	LC
Anacardiaceae	*Harpephyllum caffrum* [de]	LC
Asteraceae	*Helichrysum aureum* [b]	LC
Asteraceae	*Helichrysum cymosum* subsp. *cymosum* [abdg]	LC
Asteraceae	*Helichrysum mixtum* [abdf]	LC
Asteraceae	*Helichrysum nudifolium* var. *nudifolium* [f]	LC
Asteraceae	*Helichrysum odoratissimum* [bdfg]	LC
Malvaceae	*Hibiscus calyphyllus* [e]	LC
Asteraceae	*Hilliardiella capensis* [d]	LC
Sapindaceae	*Hippobromus pauciflorus* [de]	LC
Orobanchaceae	~*Hyobanche robusta*	EN
Poaceae	*Hyparrhenia hirta* [d]	LC
Acanthaceae	*Hypoestes aristata* var. *aristata* [e]	LC
Acanthaceae	*Hypoestes forskaolii* [d]	LC
Hypoxidaceae	*Hypoxis argentea* var. *argentea* [ad]	LC
Hypoxidaceae	*Hypoxis filiformis* [f]	LC
Poaceae	*Imperata cylindrica* [h]	LC
Convolvulaceae	*Ipomoea cairica* var. *cairica* [a]	LC
Poaceae	*Ischaemum fasciculatum* [bf]	LC
Isoetaceae	~*Isoetes wormaldii* (ECE)	CR
Pittosporaceae	**Pittosporum viridiflorum* [e]	LC
Plantaginaceae	~*Plantago laxiflora* (ECE)	DDT
Myrtaceae	*Psidium guajava* (NEM:BA)[abdfg]	NE
Rubiaceae	*Psychotria capensis* subsp. *capensis* var. *capensis* [de]	NE
Celastraceae	*Putterlickia verrucosa* [d]	LC
Vitaceae	*Rhoicissus tomentosa* [d]	LC
Vitaceae	*Rhoicissus tridentata* [ad]	LC
Fabaceae	*Rhynchosia caribaea* [g]	LC
Fabaceae	*Rhynchosia totta* var. *totta* [d]	LC
Euphorbiaceae	*Ricinus communis* (NEM:BA)[ad]	NE
Apocynaceae	~**Riocreuxia flanaganii* var. *flanaganii* (ECE)	Rare
Rosaceae	*Rubus rigidus* [ad]	LC
Ruscaceae	*Sansevieria hyacinthoides* [e]	LC
Orchidaceae	~**Satyrium princeps*	VU
Dipsacaceae	*Scabiosa columbaria* [f]	LC
Fabaceae	*Schotia latifolia* [e]	LC
Salicaceae	*Scolopia zeyheri* [deg]	LC
Rhamnaceae	*Scutia myrtina* [d]	LC
Anacardiaceae	~*Searsia albomarginata* (ECE)	CR
Anacardiaceae	*Searsia carnosula* [b]	LC
Anacardiaceae	*Searsia chirindensis* [e]	LC
Anacardiaceae	*Searsia dentata* [d]	LC
Anacardiaceae	*Searsia glauca* [d]	LC
Anacardiaceae	*Searsia incisa* var. *effusa* [bd]	LC
Anacardiaceae	*Searsia lucida* [abd]	LC
Anacardiaceae	*Searsia pallens* [bdg]	LC
Asteraceae	*Senecio deltoideus* [d]	LC
Asteraceae	*Senecio oxyriifolius* [a]	LC
Asteraceae	*Senecio pterophorus* [bd]	LC
Asteraceae	*Senecio purpureus* [bd]	LC
Fabaceae	*Senna bicapsularis* (NEM:BA)[d]	NE
Fabaceae	*Senna didymobotrya* (NEM:BA)[d]	NE
Amaryllidaceae	~**Sensitive Species X1* (ECE)	VU
Euphorbiaceae	~*Sensitive Species X2*	VU
Amaryllidaceae	~**Sensitive Species X3*	VU

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Pteridaceae	*Cheilanthes viridis* var. *viridis* [bd]	LC
Poaceae	*Chloris gayana* [d]	LC
Asteraceae	*Cirsium vulgare* (NEM:BA)[d]	NE
Ranunculaceae	*Clematis brachiata* [bd]	LC
Rosaceae	*Cliffortia linearifolia* [bf]	LC
Amaryllidaceae	~**Clivia miniata* var. *miniata*	VU
Euphorbiaceae	*Clutia pulchella* var. *pulchella* [e]	LC
Rubiaceae	*Coddia rudis* [b]	LC
Poaceae	*Cortaderia selloana* (NEM:BA)[f]	NE
Asteraceae	~*Cotula sericea*	Rare
Crassulaceae	*Crassula pellucida* subsp. *brachypetala* [ad]	LC
Amaryllidaceae	~**Crinum campanulatum* (ECE)	NT
Fabaceae	*Crotalaria obscura* [a]	LC
Asteraceae	~*Curio talinoides*	DDT
Araliaceae	*Cussonia spicata* [be]	LC
Poaceae	*Cymbopogon nardus* [abd]	LC
Apocynaceae	**Cynanchum ellipticum* [d]	LC
Cyperaceae	*Cyperus congestus* [a]	LC
Vitaceae	*Cyphostemma cirrhosum* subsp. *cirrhosum* [a]	LC
Amaryllidaceae	~**Cyrtanthus helictus* (ECE)	DDT
Dryopteridaceae	*Cyrtomium micropterum* [e]	LC
Euphorbiaceae	*Dalechampia capensis* [d]	LC
Aizoaceae	**Delosperma muiri* (ECE)[a]	LC
Iridaceae	**Dierama igneum* [bf]	LC
Iridaceae	~**Dietes bicolor*	Rare
Iridaceae	**Dietes grandiflora* [dg]	LC
Poaceae	*Digitaria eriantha* [bfg]	LC
Dioscoreaceae	~**Dioscorea sylvatica*	VU
Ebenaceae	*Diospyros dichrophylla* [abd]	LC
Ebenaceae	*Diospyros scabrida* var. *scabrida* [bd]	LC
Ebenaceae	*Diospyros simii* [ad]	LC
Ebenaceae	*Diospyros villosa* var. *villosa* [de]	LC
Orchidaceae	~**Disperis woodii*	VU
Malvaceae	*Dombeya burgessiae* [e]	LC
Cyperaceae	*Eleocharis limosa* [h]	LC
Iridaceae	**Ixia orientalis* [a]	LC
Scrophulariaceae	*Jamesbrittenia maritima* (ECE)[df]	LC
Oleaceae	*Jasminum angulare* [d]	LC
Juncaceae	*Juncus lomatophyllus* [h]	LC
Acanthaceae	~*Justicia bolusii* (ECE)	Rare
Achariaceae	*Kiggelaria africana* [d]	LC
Asphodelaceae	**Kniphofia uvaria* [a]	LC
Verbenaceae	*Lantana camara* (NEM:BA)[abcdeg]	NE
Celastraceae	*Lauridia tetragona* [e]	LC
Fabaceae	*Leucaena leucocephala* (NEM:BA)[d]	NE
Apiaceae	*Lichtensteinia interrupta* [d]	LC
Scrophulariaceae	*Limosella maior* [f]	LC
Linaceae	*Linum thunbergii* [bf]	LC
Lobeliaceae	*Lobelia flaccida* subsp. *flaccida* [abd]	LC
Lobeliaceae	*Lobelia tomentosa* [f]	LC
Fabaceae	*Lotononis umbellata* [f]	LC
Apocynaceae	**Marsdenia dregea* [d]	LC
Celastraceae	*Maytenus peduncularis* [e]	LC
Celastraceae	*Maytenus procumbens* [d]	LC
Celastraceae	*Maytenus undata* [d]	LC
Meliaceae	*Melia azedarach* (NEM:BA)[dg]	NE
Poaceae	*Melinis nerviglumis* [d]	LC
Poaceae	*Melinis repens* subsp. *repens* [b]	LC
Acanthaceae	~*Metarungia galpinii* (ECE)	EN
Lobeliaceae	*Monopsis unidentata* subsp. *unidentata* [b]	LC
Geraniaceae	*Monsonia emarginata* [ab]	LC
Geraniaceae	~*Monsonia galpinii* (ECE)	DDT
Iridaceae	~**Moraea maximiliani*	NT
Iridaceae	**Moraea stricta* [d]	LC
Celastraceae	*Mystroxylon aethiopicum* subsp. *aethiopicum* [e]	LC
Nephrolepidaceae	*Nephrolepis cordifolia* (NEM:BA)[bd]	NE
Asteraceae	*Nidorella auriculata* [d]	LC
Asteraceae	*Nidorella ivifolia* [abdg]	LC
Asteraceae	*Nidorella ulmifolia* [a]	LC
Ochnaceae	*Ochna serrulata* [d]	LC
Fabaceae	*Sesbania punicea* (NEM:BA)[ad]	NE
Poaceae	*Setaria sphacelata* var. *sphacelata* [d]	LC
Poaceae	*Setaria sphacelata* var. *torta* [df]	LC
Sapotaceae	**Sideroxylon inerme* subsp. *inerme* [abde]	LC
Solanaceae	*Solanum chrysotrichum* (NEM:BA)[bde]	NE
Solanaceae	*Solanum mauritianum* (NEM:BA)[abde]	NE
Zamiaceae	~*Stangeria eriopus*	VU
Poaceae	*Stenotaphrum secundatum* [ad]	LC
Strelitziaceae	**Strelitzia nicolai* [bde]	LC
Strelitziaceae	**Strelitzia reginae* subsp. *reginae* [be]	LC
Gesneriaceae	~**Streptocarpus formosus*	Rare
Gesneriaceae	~**Streptocarpus modestus* (ECE)	Rare
Asteraceae	*Symphyotrichum squamatum* [h]	NE
Asteraceae	*Tarchonanthus camphoratus* [ad]	LC
Bignoniaceae	*Tecomaria capensis* [d]	LC
Fabaceae	*Tephrosia capensis* var. *capensis* [af]	LC
Fabaceae	*Tephrosia grandiflora* [bdf]	LC
Fabaceae	*Tephrosia macropoda* var. *macropoda* [ad]	LC
Poaceae	*Themeda triandra* [bd]	LC
Acanthaceae	*Thunbergia alata* [d]	LC
Salicaceae	*Trimeria grandifolia* subsp. *grandifolia* [d]	LC
Salicaceae	*Trimeria trinervis* [d]	LC
Poaceae	*Tristachya leucothrix* [bd]	LC
Iridaceae	**Tritonia gladiolaris* [adf]	LC
Malvaceae	*Triumfetta rhomboidea* var. *rhomboidea* [d]	LC
Apocynaceae	**Tylophora cordata* [a]	LC
Typhaceae	*Typha capensis* [h]	LC
Fabaceae	~**Umtiza listeriana* (ECE)	VU
Fabaceae	*Vachellia karroo* [abdfg]	LC
Rutaceae	**Vepris lanceolata* [d]	LC
Fabaceae	*Vigna vexillata* var. *vexillata* [a]	LC
Lamiaceae	*Volkameria glabra* [d]	LC
Campanulaceae	*Wahlenbergia procumbens* [a]	LC
Iridaceae	**Watsonia pillansii* [bd]	LC
Asteraceae	*Xanthium strumarium* (NEM:BA)[d]	NE

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Zamiaceae	*~Encephalartos altensteinii* (ECE)	VU	Oleaceae	***Olea europaea* subsp. *cuspidata*** [d]	LC	Rutaceae	****Zanthoxylum capense*** [d]	LC
Zamiaceae	*~Encephalartos friderici-guilielmi*	NT	Asteraceae	***Osteospermum imbricatum* subsp. *imbricatum*** [f]	LC	Zosteraceae	*~Zostera capensis*	EN

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13. Appendix B: Disseminated Evidence of Observed SCC

This section contains information regarding the online database name, hyperlink, and record accession numbers for disseminated evidence of SCC found within the study area as required by the Protocol for the Specialist Assessment and Minimum Report Content Requirements For Environmental Impacts on Terrestrial Plant Species (GN 1150, 43855, 30 October 2020). Observations were uploaded to iNaturalist (https://www.inaturalist.org/home).

Note that many observations other than SCC were also uploaded to contribute toward the data repository of South African plant species.

Only selected species were uploaded and the list is not intended to be comprehensive. Sensitive species, as determined by the National Web Based Environmental Screening Tool, were not disseminated, and are not listed here since their identities will not be made public.

Taxon ID	Species	Common Name	Hyperlink
579105	*Adenopodia spicata*	Spiny Splinter-Bean	https://www.inaturalist.org/observations/314189755
528776	*Agathosma ovata*	False Buchu	https://www.inaturalist.org/observations/314189701
528776	*Agathosma ovata*	False Buchu	https://www.inaturalist.org/observations/314189703
75379	*Aloe maculata*	Soap Aloe	https://www.inaturalist.org/observations/314183965
158236	*Alysicarpus rugosus*		https://www.inaturalist.org/observations/314180352
158236	*Alysicarpus rugosus*		https://www.inaturalist.org/observations/314180359
75549	*Arctotheca prostrata*	Prostrate Capeweed	https://www.inaturalist.org/observations/314180326
568511	*Argyrolobium tomentosum*	Woolly Silverpod	https://www.inaturalist.org/observations/314189734
129401	*Aristea ecklonii*	Star Capeblue	https://www.inaturalist.org/observations/314189808
580255	*Aristea pusilla*		https://www.inaturalist.org/observations/314189719
127598	*Asparagus densiflorus*	Foxtail Asparagus	https://www.inaturalist.org/observations/314183998
283326	*Asparagus falcatus*	Sicklethorn	https://www.inaturalist.org/observations/314183911
567825	*Athanasia dentata*	Tooth Kanniedood	https://www.inaturalist.org/observations/314189746
581037	*Bergeranthus concavus*		https://www.inaturalist.org/observations/314180363
581037	*Bergeranthus concavus*		https://www.inaturalist.org/observations/314183993
581070	*Berkheya decurrens*		https://www.inaturalist.org/observations/314183850
581070	*Berkheya decurrens*		https://www.inaturalist.org/observations/314189708
581070	*Berkheya decurrens*		https://www.inaturalist.org/observations/314189767
58345	*Bolboschoenus maritimus*	Sea Clubrush	https://www.inaturalist.org/observations/314180318
58345	*Bolboschoenus maritimus*	Sea Clubrush	https://www.inaturalist.org/observations/314183893
567699	*Brachylaena discolor*	Coast Silver-Oak	https://www.inaturalist.org/observations/314180338
581458	*Buchnera dura*	Tough Blueheart	https://www.inaturalist.org/observations/314180276
534444	*Bulbine latifolia*	Waterglass Kopieva	https://www.inaturalist.org/observations/314180361
574130	*Bulbine narcissifolia*	Strapleaf Kopieva	https://www.inaturalist.org/observations/314184002
581577	*Bulbostylis contexta*		https://www.inaturalist.org/observations/314189688
320155	*Burchellia bubalina*	Wild Pomegranate	https://www.inaturalist.org/observations/314180262
320155	*Burchellia bubalina*	Wild Pomegranate	https://www.inaturalist.org/observations/314183906
320155	*Burchellia bubalina*	Wild Pomegranate	https://www.inaturalist.org/observations/314189661
581727	*Canthium spinosum*	Coastal Turkeyberry	https://www.inaturalist.org/observations/314183865
581727	*Canthium spinosum*	Coastal Turkeyberry	https://www.inaturalist.org/observations/314189757
337799	*Carissa bispinosa*	Num-Num	https://www.inaturalist.org/observations/314180341
581831	*Centella glabrata*	Smooth Capepurse	https://www.inaturalist.org/observations/314189689
581831	*Centella glabrata*	Smooth Capepurse	https://www.inaturalist.org/observations/314189737
469317	*Chaetachme aristata*	Snake Tree	https://www.inaturalist.org/observations/314183890
577770	*Chamaecrista comosa*	Trailing Dwarf Cassia	https://www.inaturalist.org/observations/314190320
400698	*Cheilanthes viridis*	Green Cliff Brake	https://www.inaturalist.org/observations/314189675
52989	*Cirsium vulgare*	Bull Thistle	https://www.inaturalist.org/observations/314190333
574070	*Cliffortia linearifolia*	Stream Caperose	https://www.inaturalist.org/observations/314189693
582500	*Coddia rudis*	Coddia	https://www.inaturalist.org/observations/314189706
598495	*Crassula pellucida brachypetala*		https://www.inaturalist.org/observations/314189795

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583057	*Crotalaria obscura*		https://www.inaturalist.org/observations/314180353
569355	*Cynanchum ellipticum*	Monkeyrope Buckhorn	https://www.inaturalist.org/observations/314190334
161425	*Cyperus congestus*	Purple Umbrella Sedge	https://www.inaturalist.org/observations/314180331
342746	*Cyperus dives*	Fig Sedge	https://www.inaturalist.org/observations/314189807
583330	*Cyphostemma cirrhosum*	Pucker Grape	https://www.inaturalist.org/observations/314180317
583424	*Dalechampia capensis*	Common Wildhop	https://www.inaturalist.org/observations/314183926
583537	*Delosperma muiri*		https://www.inaturalist.org/observations/314180370
583774	*Dierama igneum*	Fairy Bell	https://www.inaturalist.org/observations/314180234
583774	*Dierama igneum*	Fairy Bell	https://www.inaturalist.org/observations/314189677
291342	*Dietes grandiflora*	Large Fortnight Lily	https://www.inaturalist.org/observations/314183940
583890	*Diospyros scabrida*	Coastal Bladdernut	https://www.inaturalist.org/observations/314183919
583890	*Diospyros scabrida*	Coastal Bladdernut	https://www.inaturalist.org/observations/314183944
583891	*Diospyros simii*	Climbing Star-Apple	https://www.inaturalist.org/observations/314183867
583891	*Diospyros simii*	Climbing Star-Apple	https://www.inaturalist.org/observations/314183885
583892	*Diospyros villosa*	Hairy Star-Apple	https://www.inaturalist.org/observations/314183888
583892	*Diospyros villosa*	Hairy Star-Apple	https://www.inaturalist.org/observations/314183978
584442	*Eleocharis limosa*	Finger Rush	https://www.inaturalist.org/observations/314189725
468822	*Eragrostis capensis*	Cape Love Grass	https://www.inaturalist.org/observations/314189678
585062	*Erica orientalis*		https://www.inaturalist.org/observations/314189665
585363	*Eriosema salignum*	Brown Bonnets	https://www.inaturalist.org/observations/314180288
1588191	*Erythrina afra*	South African Coral Tree	https://www.inaturalist.org/observations/314180305
599235	*Euclea crispa*	Common Blue Guarri	https://www.inaturalist.org/observations/314189704
340548	*Eugenia capensis*	Dune Myrtle	https://www.inaturalist.org/observations/314180315
585624	*Euphorbia kraussiana*		https://www.inaturalist.org/observations/314183858
338321	*Euphorbia triangularis*	River Naboom	https://www.inaturalist.org/observations/314183937
338321	*Euphorbia triangularis*	River Naboom	https://www.inaturalist.org/observations/314189774
338321	*Euphorbia triangularis*	River Naboom	https://www.inaturalist.org/observations/314189779
570150	*Falkia repens*	Pink Ear	https://www.inaturalist.org/observations/314180323
585889	*Ficinia albicans*		https://www.inaturalist.org/observations/314180243
345417	*Freesia laxa*	Scarlet Kammetjie	https://www.inaturalist.org/observations/314189700
884843	*Gazania rigens*	Trailing Gazania	https://www.inaturalist.org/observations/314180325
586441	*Gladiolus ochroleucus*	Transkei Pypie	https://www.inaturalist.org/observations/314180371
586441	*Gladiolus ochroleucus*	Transkei Pypie	https://www.inaturalist.org/observations/314183981
281273	*Gomphocarpus physocarpus*	Balloonplant	https://www.inaturalist.org/observations/314189723
334567	*Grewia occidentalis*	Common Crossbery	https://www.inaturalist.org/observations/314183954
428293	*Gymnosporia heterophylla*	Common Spikethorn	https://www.inaturalist.org/observations/314180368
428293	*Gymnosporia heterophylla*	Common Spikethorn	https://www.inaturalist.org/observations/314189768
514036	*Helichrysum aureum*	Bright Yellow Everlasting	https://www.inaturalist.org/observations/314189672
586968	*Helichrysum mixtum*	Mixed Everlasting	https://www.inaturalist.org/observations/314180320
586968	*Helichrysum mixtum*	Mixed Everlasting	https://www.inaturalist.org/observations/314184007
586984	*Helichrysum odoratissimum*	Kooigoed Everlasting	https://www.inaturalist.org/observations/314180238
586984	*Helichrysum odoratissimum*	Kooigoed Everlasting	https://www.inaturalist.org/observations/314180311
586984	*Helichrysum odoratissimum*	Kooigoed Everlasting	https://www.inaturalist.org/observations/314184013
163760	*Hibiscus calyphyllus*	Large Yellow Wild Hibiscus	https://www.inaturalist.org/observations/314183925
587505	*Hilliardiella capensis*	Blue-Leaf Vernonia	https://www.inaturalist.org/observations/314189772
567695	*Hippobromus pauciflorus*	False Horsewood	https://www.inaturalist.org/observations/314183902
488320	*Hypericum lalandii*		https://www.inaturalist.org/observations/314189724
587693	*Hypoxis acuminata*	Spiral Stargrass	https://www.inaturalist.org/observations/314189784
571052	*Hypoxis argentea*	Small Yellow Stargrass	https://www.inaturalist.org/observations/314180358
587698	*Hypoxis filiformis*	Fine Stargrass	https://www.inaturalist.org/observations/314183945
83365	*Indigofera*	Indigos	https://www.inaturalist.org/observations/314180236
77494	*Ipomoea cairica*	Mile-A-Minute Vine	https://www.inaturalist.org/observations/314180314
587953	*Ischaemum fasciculatum*	Border Grass	https://www.inaturalist.org/observations/314180239
587953	*Ischaemum fasciculatum*	Border Grass	https://www.inaturalist.org/observations/314189696
587953	*Ischaemum fasciculatum*	Border Grass	https://www.inaturalist.org/observations/314189745
568708	*Ixia orientalis*	Eastern Kalossie	https://www.inaturalist.org/observations/314180329
588126	*Jamesbrittenia maritima*		https://www.inaturalist.org/observations/314189699
431163	*Jasminum angulare*	Angular Jasmine	https://www.inaturalist.org/observations/314189751
402870	*Juncus lomatophyllus*	Leafy Rush	https://www.inaturalist.org/observations/314183895
588764	*Lauridia tetragona*	Climbing Saffron	https://www.inaturalist.org/observations/314183857

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588764	*Lauridia tetragona*	Climbing Saffron	https://www.inaturalist.org/observations/314189804
589151	*Lichtensteinia interrupta*		https://www.inaturalist.org/observations/314189797
589195	*Limosella maior*	Large Mudwort	https://www.inaturalist.org/observations/314189721
589223	*Linum thunbergii*	Wild Flax	https://www.inaturalist.org/observations/314180266
589223	*Linum thunbergii*	Wild Flax	https://www.inaturalist.org/observations/314189715
589327	*Lobelia flaccida*	Floppy Lobelia	https://www.inaturalist.org/observations/314180256
567838	*Lobelia tomentosa*	Woolly Lobelia	https://www.inaturalist.org/observations/314189679
567336	*Lotononis umbellata*		https://www.inaturalist.org/observations/314189716
589697	*Maytenus peduncularis*	Blackwood Kokotree	https://www.inaturalist.org/observations/314189792
527443	*Maytenus procumbens*	Dune Kokotree	https://www.inaturalist.org/observations/314183949
589698	*Maytenus undata*	Common Kokotree	https://www.inaturalist.org/observations/314180250
578491	*Monopsis unidentata*	Wild Oneye	https://www.inaturalist.org/observations/314180252
590086	*Monsonia emarginata*	Rabas Dysentry-Herb	https://www.inaturalist.org/observations/314180247
590086	*Monsonia emarginata*	Rabas Dysentry-Herb	https://www.inaturalist.org/observations/314183991
567725	*Moraea stricta*		https://www.inaturalist.org/observations/314183847
567725	*Moraea stricta*		https://www.inaturalist.org/observations/314189782
600329	*Mystroxylon aethiopicum aethiopicum*	Cape Koobooberry	https://www.inaturalist.org/observations/314189710
590625	*Nidorella auriculata*		https://www.inaturalist.org/observations/314180273
590625	*Nidorella auriculata*		https://www.inaturalist.org/observations/314180309
590625	*Nidorella auriculata*		https://www.inaturalist.org/observations/314183973
590625	*Nidorella auriculata*		https://www.inaturalist.org/observations/314189653
847556	*Nidorella ulmifolia*	Ulm Vleiweed	https://www.inaturalist.org/observations/314184017
165763	*Ochna serrulata*	Small-Leaved Plane	https://www.inaturalist.org/observations/314180284
165763	*Ochna serrulata*	Small-Leaved Plane	https://www.inaturalist.org/observations/314189756
165763	*Ochna serrulata*	Small-Leaved Plane	https://www.inaturalist.org/observations/314189803
590992	*Osteospermum imbricatum*	Tile Boneseed	https://www.inaturalist.org/observations/314189750
591004	*Osteospermum polygaloides*	Common Boneseed	https://www.inaturalist.org/observations/314189738
591155	*Oxalis bifurca*	Why Sorrel	https://www.inaturalist.org/observations/314183849
567850	*Oxalis smithiana*	Windmill Sorrel	https://www.inaturalist.org/observations/314183975
558319	*Panicum deustum*	Broadleaf Panicum	https://www.inaturalist.org/observations/314180328
591431	*Passerina rigida*	Beach Gonna	https://www.inaturalist.org/observations/314189690
591479	*Pavetta revoluta*	Dune Bride's Bush	https://www.inaturalist.org/observations/314184000
431416	*Pavonia praemorsa*	Yellow Swampmallow	https://www.inaturalist.org/observations/314180332
568518	*Pelargonium alchemilloides*	Mantle Storksbill	https://www.inaturalist.org/observations/314180297
568518	*Pelargonium alchemilloides*	Mantle Storksbill	https://www.inaturalist.org/observations/314183960
166935	*Pittosporum viridiflorum*	Kersuurboom	https://www.inaturalist.org/observations/314183907
431505	*Psychotria capensis*	Black Bird-Berry	https://www.inaturalist.org/observations/314189667
431505	*Psychotria capensis*	Black Bird-Berry	https://www.inaturalist.org/observations/314189794
592777	*Putterlickia verrucosa*	False Forest Spike-Thorn	https://www.inaturalist.org/observations/314183882
566441	*Rhoicissus tomentosa*	Common Forest Grape	https://www.inaturalist.org/observations/314183928
428556	*Rhoicissus tridentata*	Bushman Grape	https://www.inaturalist.org/observations/314180292
428556	*Rhoicissus tridentata*	Bushman Grape	https://www.inaturalist.org/observations/314180344
138573	*Rhynchosia totta*	Carpet Snoutbean	https://www.inaturalist.org/observations/314189798
593374	*Rubus rigidus*	White Bramble	https://www.inaturalist.org/observations/314180302
593374	*Rubus rigidus*	White Bramble	https://www.inaturalist.org/observations/314184008
168423	*Sansevieria hyacinthoides*	Mother-In-Law's Tongue	https://www.inaturalist.org/observations/314189777
85047	*Scabiosa columbaria*	Small Scabious	https://www.inaturalist.org/observations/314189698
426624	*Schotia latifolia*	Forest Boerbean	https://www.inaturalist.org/observations/314183854
557693	*Scolopia zeyheri*	Thorn Pear	https://www.inaturalist.org/observations/314183953
557693	*Scolopia zeyheri*	Thorn Pear	https://www.inaturalist.org/observations/314189752
557693	*Scolopia zeyheri*	Thorn Pear	https://www.inaturalist.org/observations/314189765
593869	*Searsia carnosula*	False Nanaberry	https://www.inaturalist.org/observations/314189663
593873	*Searsia dentata*	Nana-Berry-Rhus	https://www.inaturalist.org/observations/314183869
593914	*Searsia rehmanniana*	Blunt-Leaved Currant-Rhus	https://www.inaturalist.org/observations/314189764
569542	*Senecio oxyriifolius*	Nasturtium Ragwort	https://www.inaturalist.org/observations/314180364
120011	*Sesbania drummondii*	Rattlebush	https://www.inaturalist.org/observations/314190340
79065	*Sesbania punicea*	Scarlet Sesbane	https://www.inaturalist.org/observations/314190323
601176	*Setaria sphacelata torta*	Small Creeping Foxtail	https://www.inaturalist.org/observations/314189743
1575695	*Stephanotis ernstmeyeri*		https://www.inaturalist.org/observations/314183967
135250	*Strelitzia nicolai*	Natal Wild Banana	https://www.inaturalist.org/observations/314189674

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49143	*Strelitzia reginae*	Common Bird-Of-Paradise Flower	https://www.inaturalist.org/observations/314183878
49143	*Strelitzia reginae*	Common Bird-Of-Paradise Flower	https://www.inaturalist.org/observations/314189709
49143	*Strelitzia reginae*	Common Bird-Of-Paradise Flower	https://www.inaturalist.org/observations/314189778
169489	*Symphyotrichum squamatum*	Saltmarsh Aster	https://www.inaturalist.org/observations/314183897
595162	*Tephrosia capensis*	Cape Hoarypea	https://www.inaturalist.org/observations/314183842
595162	*Tephrosia capensis*	Cape Hoarypea	https://www.inaturalist.org/observations/314189713
595162	*Tephrosia capensis*	Cape Hoarypea	https://www.inaturalist.org/observations/314189814
290064	*Tephrosia grandiflora*	Grand Hoarypea	https://www.inaturalist.org/observations/314189657
571314	*Tephrosia macropoda*	Largepod Hoarypea	https://www.inaturalist.org/observations/314183843
571314	*Tephrosia macropoda*	Largepod Hoarypea	https://www.inaturalist.org/observations/314189799
595427	*Thesium junceum*	Rush Rootthug	https://www.inaturalist.org/observations/314180235
595458	*Thesium pallidum*	Red Maseka	https://www.inaturalist.org/observations/314189806
132458	*Thunbergia alata*	Blackeyed Susan Vine	https://www.inaturalist.org/observations/314183939
559606	*Trimeria grandifolia*	Roundleaf Wild-Mulberry	https://www.inaturalist.org/observations/314183914
595715	*Trimeria trinervis*	Small-Leaved Trimeria	https://www.inaturalist.org/observations/314189763
595715	*Trimeria trinervis*	Small-Leaved Trimeria	https://www.inaturalist.org/observations/314189769
595724	*Tristachya leucothrix*	Hairy Trident Grass	https://www.inaturalist.org/observations/314189666
559956	*Tritonia gladiolaris*	Line Triton	https://www.inaturalist.org/observations/314189654
559956	*Tritonia gladiolaris*	Line Triton	https://www.inaturalist.org/observations/314189695
170044	*Triumfetta rhomboidea*	Chinese Bur	https://www.inaturalist.org/observations/314189783
170044	*Triumfetta rhomboidea*	Chinese Bur	https://www.inaturalist.org/observations/314189802
340338	*Vepris lanceolata*	White-Ironwood	https://www.inaturalist.org/observations/314189813
1194980	*Vincetoxicum cordatum*		https://www.inaturalist.org/observations/314180374
1194980	*Vincetoxicum cordatum*		https://www.inaturalist.org/observations/314183984
596042	*Volkameria glabra*	Cat's-Whiskers	https://www.inaturalist.org/observations/314189775
596042	*Volkameria glabra*	Cat's-Whiskers	https://www.inaturalist.org/observations/314190330
596156	*Wahlenbergia procumbens*	Creeping Capebell	https://www.inaturalist.org/observations/314180373
569006	*Watsonia pillansii*	Orange Watsonia	https://www.inaturalist.org/observations/314190308
362174	*Zanthoxylum capense*	Manhungwana	https://www.inaturalist.org/observations/314183862
362174	*Zanthoxylum capense*	Manhungwana	https://www.inaturalist.org/observations/314183916
362174	*Zanthoxylum capense*	Manhungwana	https://www.inaturalist.org/observations/314183969

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14. Appendix C: Animal Species List

The animal species list presented here includes all the species that were observed to occur on-site.

Descriptions of colours and symbols are given below:

Species highlighted in orange: Threatened (CR, EN, VU) animal species.

Small letters in "Community": Faunal habitat type in which the species was found:

- a: Artificially Cleared Areas
- b: Dense Forest Thicket & Riparian Strip
- c: Depression Wetlands (*Typha–Phragmites* Wetlands)
- d: Open Woodland–Grassland Mosaic
- e: Thicket–Grassland Mosaic
- f: Transformed / Invaded Habitats (*Lantana* & *V. karroo* Thickets)

Group	Order	Scientific Name	Common Name	IUCN	Community
Invertabrates	Odonata (Zygoptera)	*Chlorolestes tessellatus*	Forest Malachite	LC	b
Invertabrates	Odonata (Zygoptera)	*Lestes plagiatus*	Higland Spreadwing	LC	c
Invertabrates	Odonata (Zygoptera)	*Elattoneura glauca*	Common Threadtail	LC	b
Invertabrates	Odonata (Zygoptera)	*Ceriagrion glabrum*	Common Citril	LC	c
Invertabrates	Odonata (Zygoptera)	*Pseudagrion salisburyense*	Slate Sprite	LC	c
Invertabrates	Odonata (Zygoptera)	*Ischnura senegalensis*	Tropical Bluetail	LC	c
Invertabrates	Odonata (Zygoptera)	*Pseudagrion hageni*	Painted Sprite	LC	b
Invertabrates	Odonata (Zygoptera)	*Africallagma glaucum*	Swamp Bluet	LC	c
Invertabrates	Odonata (Anisoptera)	*Anax imperator*	Blue Emperor	LC	c
Invertabrates	Odonata (Anisoptera)	*Anax speratus*	Orange Emperor	LC	c
Invertabrates	Odonata (Anisoptera)	*Zosteraeschna minuscula*	Friendly Hawker	LC	bc
Invertabrates	Odonata (Anisoptera)	*Paragomphus cognatus*	Rock Hooktail	LC	b
Invertabrates	Odonata (Anisoptera)	*Orthetrum julia falsum*	Julia Skimmer	LC	bc
Invertabrates	Odonata (Anisoptera)	*Sympetrum fonscolombii*	Re-veined Darter	LC	bc
Invertabrates	Odonata (Anisoptera)	*Pantala flavescens*	Wandering Glider	LC	c
Invertabrates	Lepidoptera	*Danaus chrysippus orientis*	African Plain Tiger	LC	ac
Invertabrates	Lepidoptera	*Bicyclus safitza safitza*	Black-haired Bush Brown	LC	abf
Invertabrates	Lepidoptera	*Cassionympha cassius*	Rainforest Dull Brown	LC	bf
Invertabrates	Lepidoptera	*Pseudonumpha magus*	Silver-bottom Brown	LC	ad
Invertabrates	Lepidoptera	*Pseudonumpha varii varii*	Mountain Marsh Brown	LC	ce
Invertabrates	Lepidoptera	*Pseudacraea eurytus imitator*	False Wanderer	LC	b
Invertabrates	Lepidoptera	*Telchinia rahira rahira*	Marsh Telchinia	LC	cde
Invertabrates	Lepidoptera	*Pardopsis punctatissima*	Polka Dot	LC	b
Invertabrates	Lepidoptera	*Phalanta phalantha aethiopica*	African Leopard	LC	b
Invertabrates	Lepidoptera	*Charaxes varanes varanes*	Pearl Charaxes	LC	b
Invertabrates	Lepidoptera	*Hypolimnas anthedon wahlbergi*	Variable Diadem	LC	b
Invertabrates	Lepidoptera	*Junonia hierta cebrene*	African Yellow Pansy	LC	ade
Invertabrates	Lepidoptera	*Vanessa cardui*	Painted Lady	LC	acde
Invertabrates	Lepidoptera	*Hypolycaena philippus philippus*	Purple-brown Hairstreak	LC	b
Invertabrates	Lepidoptera	*Anthene amarah amarah*	Black-striped Ciliate Blue	LC	def
Invertabrates	Lepidoptera	*Leptotes pirithous pirithous*	Common Zebra Blue	LC	de
Invertabrates	Lepidoptera	*Lampides boeticus*	Pea Blue	LC	bd
Invertabrates	Lepidoptera	*Actizera lucida*	Rayed Blue	LC	e
Invertabrates	Lepidoptera	*Zizeeria knysna knysna*	African Grass Blue	LC	acde
Invertabrates	Lepidoptera	*Azanus jesous*	Topaz Babul Blue	LC	def
Invertabrates	Lepidoptera	*Eronia cleodora*	Vine-leaf Vagrant	LC	b
Invertabrates	Lepidoptera	*Colotis auxo auxo*	Sulphur Orange Tip	LC	b
Invertabrates	Lepidoptera	*Colotis antevippe gavisa*	Southern Red Tip	LC	b
Invertabrates	Lepidoptera	*Dixeia charina charina*	African Ant-heap White	LC	b
Invertabrates	Lepidoptera	*Pontia helice helice*	Meadow White	LC	ade
Invertabrates	Lepidoptera	*Colias electo electo*	African Clouded Yellow	LC	d
Invertabrates	Lepidoptera	*Papilio demodocus demodocus*	Citrus Swallowtail	LC	bf
Invertabrates	Lepidoptera	*Papilio nireus lyaeus*	Narrow Green-banded Swallowtail	LC	b
Invertabrates	Lepidoptera	*Apallaga mokeezi mokeezi*	Large Flat	LC	b
Invertabrates	Lepidoptera	*Eagris nottoana knysna*	Southern Rufous-winged Flat	LC	abcdef
Invertabrates	Lepidoptera	*Eretis umbra umbra*	Small Marbled Elf	LC	bde

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Invertabrates	Lepidoptera	*Sarangesa phidyle*	Small Elfin	LC	b
Invertabrates	Lepidoptera	*Spialia ferax*	Striped Sandman	LC	bde
Invertabrates	Lepidoptera	*Pelopidas mathias mathias*	Black-branded Swift	LC	bc
Invertabrates	Lepidoptera	*Pelopidas thrax*	White-branded Swift	LC	abdef
Invertabrates	Lepidoptera	*Gegenes letterstedti*	Brown Dodger	LC	abcdef
Invertabrates	Collembola	*Podura spp.*	Springtails	LC	b
Invertabrates	Blattodea	*Deropeltis erytrocephala*		LC	bd
Invertabrates	Blattodea	*Oxyhaloa deusta*		LC	bd
Invertabrates	Blattodea	*Perisphaeria spp.*		LC	d
Invertabrates	Isoptera	*Macrotermes natalensis*	Large Fungus-growing Termite	LC	de
Invertabrates	Isoptera	*Trinervitermes*	Snouted harvester Termite	LC	de
Invertabrates	Orthoptera	*Conocephalus caudalis*	Meadow Katydid	LC	ad
Invertabrates	Orthoptera	*Orthoctha dasycnemsis*		LC	de
Invertabrates	Orthoptera	*Acrotylus spp.*	Burrowing Grasshopper	LC	bd
Invertabrates	Orthoptera	*Eyprepocneumis plorans*		LC	d
Invertabrates	Orthoptera	*Rhacitopsis spp.*		LC	de
Invertabrates	Hemiptera	*Gerridae spp.*	Pond Skater	LC	b
Invertabrates	Hemiptera	*Micronecta spp*	Water Boatmen	LC	b
Invertabrates	Hemiptera	*Anisops spp.*		LC	b
Invertabrates	Thysanoptera		Tube-tailed Thrips	LC	d
Invertabrates	Coleoptera	*Scarites rugosis*	Burrowing Ground Beetle	LC	b
Invertabrates	Coleoptera	*Dineutes spp.*	Whirligig beetles	LC	b
Invertabrates	Coleoptera	*Mausoleopsis amabilis*	White-spotted Fruit Chafer	LC	abd
Invertabrates	Coleoptera	*Monochelus nieuwoudtvillensis*	Large Barred monkey Beetle	LC	ad
Invertabrates	Coleoptera	*Cheilomenes lunata*	Lunate Ladybird	LC	d
Invertabrates	Coleoptera	*Lagria vulnerata*	Hairy Darkling Beetle	LC	ad
Invertabrates	Coleoptera	*Psorodes spp.*		LC	d
Invertabrates	Coleoptera	*Trigonopus spp.*		LC	d
Invertabrates	Coleoptera		Tumbling flower beetles	LC	ad
Invertabrates	Mecoptera	*Bittacus spp*	Hangingflies	LC	bce
Invertabrates	Diptera	*Nephrotoma spp.*	Crane Fly	LC	b
Invertabrates	Diptera	*Sphyracephala*	Stalk-eyed flies	LC	c
Invertabrates	Hymenoptera	*Zombrus spp*	Parasitic Wasp	LC	bd
Invertabrates	Hymenoptera	*Theronia spp*	Parasitic Wasp	LC	b
Invertabrates	Hymenoptera	*Crematogaster peringueyi*	Black Cocktail Ant	LC	bcd
Invertabrates	Hymenoptera	*Pheidole megacephala*	African Big-headed Ant	LC	b
Invertabrates	Hymenoptera	*Crematogaster castanea*	Red Cocktail Ant	LC	bcd
Invertabrates	Hymenoptera	*Camponotus maculatus*	Spotted Sugar Ant	LC	abde
Invertabrates	Hymenoptera	*Plectroctena mandibularis*	Ringbum Millipede Muncher Ant	LC	bd
Invertabrates	Hymenoptera	*Lepisiota capensis*	Small Black Sugar Ant	LC	d
Invertabrates	Hymenoptera	*Technomyrmex pallipes*	Pallid-footed Ant	LC	bde
Invertabrates	Hymenoptera	*Monomorium australe*	Southern timid ant	LC	d
Invertabrates	Hymenoptera	*Tapinoma arnoldi*	Arnold's Coconut Ant	LC	cdef
Invertabrates	Hymenoptera	*Solenopsis punctaticeps*	Cape fire ant	LC	abd
Invertabrates	Stylommatophora	*Cochlitoma zebra*	Zabra Agate Snail	LC	d
Invertabrates	Spirostreptidae	*Doratogonus annulipes*	Ringleg Black Milipede	LC	bdef
Invertabrates	Spirostreptidae	*Zinophora punctata*	Dotted Largespine Millipede	LC	b
Invertabrates	Decapoda	*Potamonautes danielsi*	Pondoland River Crab	LC	bc
Invertabrates	Araneae	*Agelena gaerdesi*	Funnel-web Spiders	LC	ad
Invertabrates	Araneae	*Cyclosa spp.*	garbage-line web spider	LC	bde
Invertabrates	Araneae	*Gasteracantha sanguinolenta*	Short-Wing Kite Spiders	LC	b
Invertabrates	Araneae	*Araneus spp.*		LC	b
Invertabrates	Araneae	*Caerostris corticosa*	Bare Legged Bark Spiders	LC	b
Invertabrates	Araneae	*Neoscona blondeli*	Blondeli's hairy field spider	LC	bde
Invertabrates	Araneae	*Neoscona aubfusca*	Common Hairy Field Spiders	LC	b
Invertabrates	Araneae	*Microlinyphia sterilis*	Black-and-White Liyphiid Spider	LC	be
Invertabrates	Araneae	*Vidole spp.*	Rock Weaver	LC	be
Invertabrates	Araneae	*Euprosthenopsis pulchella*	Nursery-Web Spiders	LC	acd
Invertabrates	Araneae	*Leucauge decorata*	Decorated Vlei Spider	LC	d
Invertabrates	Araneae	*Anelosimums nelsoni*	Comb-Foot Spiders / Cobweb Spiders	LC	bd
Invertabrates	Araneae	*Clubiona spp.*	Grass Sac Spiders	LC	d
Invertabrates	Araneae	*Tribellus minor*	Running Spiders	LC	ade
Invertabrates	Araneae	*Baryphas ahenus*	Jumping Spiders	LC	ade
Invertabrates	Araneae	*Evarcha spp.*	Jumping Spiders	LC	df
Invertabrates	Araneae	*Heliophanus demonstrativus*	Jumping Spiders	LC	de
Invertabrates	Araneae	*Hyllus brevitarsus*	Jumping Spiders	LC	b
Invertabrates	Araneae	*Diaea puncta*	Crab Spider	LC	d
Invertabrates	Araneae	*Monaeses spp.*	Tailed Grass Crab Spider	LC	d
Invertabrates	Araneae	*Thomisus australis*	Flower Crabspider	LC	d
Invertabrates	Araneae	*Thomisus stenningi*	Flower Crabspider	LC	d
Invertabrates	Araneae	*Hogna spenceri*	Wolf Spiders	LC	adef
Invertabrates	Araneae	*Pardosa crassipalpis*	Wolf Spiders	LC	d

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Mammalia	Primates	*Chlorocebus pygerythrus*	Vervet Monkey	LC	abd
Mammalia	Lagomorpha	*Lepus victoriae*	African Savannah Hare	LC	adf
Mammalia	Rodentia	*Cryptomys hottentotus*	Common Mole-rat	LC	abcd
Mammalia	Rodentia	*Georychus capensis*	Cape Mole-rat	LC	c
Mammalia	Rodentia	*Hystrix africaeaustralis*	Cape Porcupine	LC	bcdef
Mammalia	Rodentia	*Thryonomys swinderianus*	Greater Cane Rat	LC	c
Mammalia	Rodentia	*Desmodillus auricularis*	Cape Short-eared Gerbil	LC	cde
Mammalia	Rodentia	*Gerbilliscus brantsii*	Highveld Gerbil	LC	d
Mammalia	Rodentia	*Rhabdomys pumilio*	Four Striped Grass Mouse	LC	abcdef
Mammalia	Rodentia	*Otomys irroratus*	South African Vlei Rat	LC	c
Mammalia	Rodentia	*Mus musculus*	House Mouse	LC	a
Mammalia	Rodentia	*Rattus rattus*	House Rat	LC	a
Mammalia	Carnivora	*Herpestes pulverulentus*	Cape Grey Mongoose	LC	cdef
Mammalia	Carnivora	*Herpestes ichneumon*	Large Grey Mongoose	LC	be
Mammalia	Carnivora	*Cynictis penicillata*	Yellow Mongoose	LC	d
Mammalia	Carnivora	*Atilax Paludinosus*	Water Mongoose	LC	c
Mammalia	Carnivora	*Genetta tigrina*	Cape Genet	LC	bdef
Mammalia	Carnivora	*Genetta genetta*	Small-spotted Genet	LC	bde
Mammalia	Cetartiodactyla	*Raphicerus melanotis*	Cape Grysbok	LC	b
Mammalia	Cetartiodactyla	*Sylvicapra grimmia*	Common Duiker	LC	acdef
Aves		*Numida meleagris*	Helmeted Guineafowl	LC	ab
Aves		*Pavo cristatus*	Indian Peafowl		a
Aves		*Pternistis afer*	Red-necked Spurfowl	LC	cd
Aves		*Alopochen aegyptiaca*	Egyptian Goose	LC	a
Aves		*Anas undulata*	Yellow-billed Duck	LC	e
Aves		*Anas smithii*	Cape Shoveler	LC	a
Aves		*Threskiornis aethiopicus*	African Sacred Ibis	LC	a
Aves		*Bostrychia hagedash*	Hadada Ibis	LC	a
Aves		*Ardea melanochephala*	Black-headed Heron	LC	be
Aves		*Ardea cinerea*	Grey Heron	LC	e
Aves		*Pernis apivorus*	European Honey Buzzard	LC	d
Aves		*Polyboroides typus*	African Harrier-Hawk	LC	a
Aves		*Circus ranivorus*	African Marsh Harrier	VU	e
Aves		*Accipiter tachiro*	African Goshawk	LC	d
Aves		*Buteo buteo*	Common Buzzard	LC	ab
Aves		*Gallinula chloropus*	Common Moorhen	LC	a
Aves		*Burhinus vermiculatus*	Water Thick-knee	LC	a
Aves		*Burhinus capensis*	Spotted Thick-knee	LC	a
Aves		*Vanellus armatus*	Blacksmith Lapwing	LC	ae
Aves		*Vanellus melanopterus*	Black-winged Lapwing	LC	a
Aves		*Vanellus coronats*	Crowned Lapwing	LC	a
Aves		*Columba guinea*	Rock Pigeon	LC	a
Aves		*Streptopelia semitorquata*	Red-eyed Dove	LC	a
Aves		*Streptopelia capicola*	Cape Turtle Dove	LC	a
Aves		*Tauraco corythaix*	Knysna Turaco	LC	d
Aves		*Centropus burchellii*	Burchell's Coucal	LC	bce
Aves		*Bubo africanus*	Spotted Eagle-owl	LC	a
Aves		*Colius striatus*	Speckled Mousebird	LC	abdf
Aves		*Phoeniculus purpureus*	Green WOod Hoopoe	LC	cd
Aves		*Lophoceros alboterminatus*	Crowned Hornbill	LC	d
Aves		*Lybius torquatus*	Black-collared Barbet	LC	bcd
Aves		*Tricholaema leucomelas*	Acacia Pied Barbet	LC	cd
Aves		*Prodotiscus regulus*	Brown-backed Honeybird	LC	b
Aves		*Jynx ruficollis*	Red-throuted Wryneck	LC	acd
Aves		*Telphorus zeylonus*	Bokmakierie	LC	d
Aves		*Laniarius ferrugineus*	Southern Boubou	LC	bcdf
Aves		*Lanius collaris*	Southern Fiscal	LC	a
Aves		*Oriolus larvatus*	Black-headed Oriole	LC	d
Aves		*Corvus ablus*	Pied Crow	LC	a
Aves		*Pycnonotus tricolor*	Dark-capped bulbul	LC	abcd
Aves		*Andropadus importunus*	Sombre Greenbul	LC	d
Aves		*Ptyonoprogne fuligula*	Rock Martin	LC	a
Aves		*Hirundo albigularis*	White-throated Swallow	LC	a
Aves		*Acrocephalus gracilirostris*	Lesser Swamp Warbler	LC	e
Aves		*Acrocephalus baeticatus*	African Reed Warbler	LC	e
Aves		*Cisticola aberrans*	Lazy Cisticola	LC	bcf
Aves		*Cisticola fuvicapilla*	Neddicky	LC	bcf
Aves		*Cisticola tinniens*	Levaillant's Cisticola	LC	e
Aves		*Cisticola lais*	Wailing Cisticola	LC	b
Aves		*Prinnia maculosa*	Karoo Prinia	LC	bcf
Aves		*Prinnia subflava*	Tawny-flanked Prinia	LC	cd
Aves		*Apalis toracica*	Bar-throated Apalis	LC	cd

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Aves		*Zosterops virens*	Cape White-eye	LC	a
Aves		*Cossypha natalensis*	Red-capped Robin-Chat	LC	d
Aves		*Cercotrichas leucophrys*	White-browed Scrub Robin	LC	d
Aves		*Saxicola torquatus*	African Stonechat	LC	ab
Aves		*Melaenornis silens*	Fiscal Flycatcher	LC	abcf
Aves		*Chalcomitra amethystina*	Amethyst Sunbird	LC	cd
Aves		*Cinnyris afer*	Greater Double-collared Sunbird	LC	d
Aves		*Passer melanurus*	Cape Sparrow	LC	a
Aves		*Passer diffusus*	Soutern Grey-headed Sparrow	LC	ab
Aves		*Ploceus capensis*	Cape Weaver	LC	ad
Aves		*Ploceus velatus*	Southern Masked Weaver	LC	ae
Aves		*Euplectes orix*	Soutern Red Bishop	LC	e
Aves		*Vidua macroura*	Pin-tailed Whydah	LC	c
Aves		*Motacilla capensis*	Cape Wagtail	LC	a
Aves		*Macronyx capensis*	Cape Longclaw	LC	ab
Aves		*Crithagra scotops*	Forest Canary	LC	d
Aves		*Crythagra gularis*	Streaky-headed Seedeater	LC	bcd
Amphibians	Anura	*Sclerophrys capensis*	Raucous Toad	LC	cd
Amphibians	Anura	*Hyperolius marmoratus*	Painted Reed Frog	LC	c
Amphibians	Anura	*Semnodactylus wealii*	Rattling Frog	LC	c
Amphibians	Anura	*Amietia delalandii*	Common River Frog	LC	b
Amphibians	Anura	*Strongylopus fasciatus*	Striped Stream Frog	LC	c
Amphibians	Anura	*Strongylopus grayii*	Clicking Stream Frog	LC	bc
Reptiles	Reptilia	*Lygodactylus capensis*	Common Dwarf Gecko	LC	def
Reptiles	Reptilia	*Hemidactylus mabouia*	Moreau's Tropical House Gecko	LC	a

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15. Appendix D: Methodology Desktop Phase

This assessment was conducted according to the 2014 EIA Regulations, as amended on 7 April 2017, as well as according to the most up to date *Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa* (South African National Biodiversity Institute, 2020) and the *Ecosystem Environmental Assessment Guideline: Draft* (http://opus.sanbi.org/jspui/handle/20.500.12143/7624).

A desktop assessment was undertaken using an appropriate Geographic Information System (GIS) and the latest available spatial datasets, as well as relevant online biodiversity databases and/or literature (these are listed where applicable). The aim of this was to develop local digital cartographs and species lists/databases. The various subsections that follow expand upon this desktop assessment.

It must be noted that during the entirety of this project it was assumed that all third-party information used — e.g., GIS software and data, satellite imagery, mapping algorithms, etc. — was correct and accurate at the time of their use. The author of this report accepts no liability for any erroneous data or algorithms produced by any third-parties, or any subsequent products derived from such data.

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15.1. Ecologically Important Landscape Features: Custom GIS Mapping

The GIS was used together with the latest Google Earth satellite imagery to delineate and map observable landscape features in the proposed development site and surrounds. Specifically, attention was given to homogenous units that could easily be recognized. Some examples of such features include watercourses, plains and floodplains, hill- and mountain tops, and hill- and mountains slopes (if present and if sufficiently large and distinct from surrounding features), as well as areas that have distinctly recognizable vegetation features, such as the presence/absence of large trees and/or shrubs, and vegetation patches of differing colours — these likely represent distinct plant community types. However, while satellite imagery is highly useful, it nevertheless suffers from several issues. For example, these include the generation of areas where image stitching has resulted in different colours for the same features, or imagery that might not have a high enough resolution, among other things. For this reason ground truthing is required to validate and refine the results of such desktop analyses.

15.2. Ecologically Important Landscape Features: Existing Data

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

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15.2.1. Red List of Ecosystems for South Africa

The Red List of Ecosystems (RLE; http://bgis.sanbi.org/Projects/Detail/1233/) for South Africa is a dataset containing the historical/potential extent, as well as the remaining remnants, of each ecosystem type. This represents a revision of the "List of terrestrial ecosystems that are threatened or in need of protection" published in December 2011. Ecosystems are categorised into one of four classes representing their risk of collapse, namely Critically Endangered (CR), Endangered (EN), Vulnerable (VU), or Least Concern (LC). The units of assessment for the RLE are the vegetation types of VegMap (see section 15.3.2).

15.2.2. National Biodiversity Assessment 2018

The National Biodiversity Assessment 2018 (NBA) (Skowno et al., 2019) assessed the state of South Africa's biodiversity based on the best available science to understand temporal trends, and informs policy and decision-making across a range of sectors. The NBA deals with three biodiversity components: 1) genetics, 2) species, and 3) ecosystems. The NBA also assesses biodiversity and ecosystems across terrestrial, freshwater, estuarine, and marine environments. The two headline indicators assessed in the NBA are:

- **Ecosystem Threat Status**: An indicator of ecosystem wellbeing. This concerns the amount of change regarding ecosystem structure, function, and/or composition, based on the proportion of the original extent of each ecosystem type still currently in good ecological condition. Specifically, ecosystem threat levels are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT), or Least Concern (LC).
- **Ecosystem Protection Level**: An indicator of how well ecosystems are adequately protected or under-protected. Specifically, ecosystems protection levels are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on biodiversity targets for each ecosystem type included within one or more protected areas. So-called "under-protected ecosystems" include NP, PP, or MP ecosystem types.

15.2.3. Protected Areas

National Protected Areas Expansion Strategy (NPAES; SANBI, 2010): NPAES provides spatial information on areas that are suitable for terrestrial ecosystem protection. These present the best opportunities for meeting ecosystem-specific protected area targets set out in the NPAES and were designed with strong emphasis on climate change resilience and requirements for protecting freshwater ecosystems. NPAES focus areas are large, intact, and unfragmented, and are therefore highly important for biodiversity, climate resilience, and freshwater protection. Note that these areas are not necessarily future protected area boundaries — often times only a portion of a particular focus area would be required to meet protected area targets. Moreover, they do not replace fine scale planning. Such planning might identify many different priority sites based on local requirements, constraints, and opportunities.

15.2.4. Hydrological Features: Strategic Water Source Areas

Strategic Water Source Areas (SWSAs) represent 10% of South Africa's land area that provides a disproportionate 50% of the country's water runoff. The localities of SWSAs are crucial for planning and managing water resources, including the ecosystems that support water quality and quantity (SWSAs extend into Lesotho and eSwatini).

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15.2.5. Hydrological Features: National Freshwater Ecosystem Priority Area Status

South African river systems are categorised based on ecological criteria (such as ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to better conserve aquatic ecosystems, and are represented by Freshwater Ecosystem Priority Areas (FEPAs) (Nel et al., 2011). FEPAs are intended to support conservation and are intended to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act's (NEM:BA) biodiversity goals.

15.2.6. Biodiversity Spatial Plan

Biodiversity Spatial Plans classify areas based on their contribution towards provincial conservation targets. Various land use types are classified according to their biodiversity and environmental importance as follows:

- **Critical Biodiversity Areas** (CBAs): areas that are required to meet biodiversity targets for species, ecosystems, or ecological processes and infrastructure. CBAs are of high biodiversity and ecological value and must be kept in a natural or near-natural state, with no further loss of habitat or species. Moreover, degraded areas should be rehabilitated to natural or near-natural conditions, and only low-impact, biodiversity-sensitive land uses are appropriate. Examples are areas required to meet biodiversity pattern (e.g. species and ecosystems) targets, Critically Endangered (CR) ecosystems, all areas required to meet ecological infrastructure targets, and critical corridors that maintain landscape connectivity. Two subtypes are distinguished:
    - CBA Irreplaceable (CBA 1): Areas that are critical for meeting biodiversity targets and thresholds, and which are required to ensure the persistence of viable species populations and ecosystem functionality.
    - CBA Optimal (CBA 2): Areas which represent the best localities, from a potentially larger selection of available planning units, that are optimally located to meet conservation targets, as well as other criteria.
- **Ecological Support Areas** (ESAs): the ecological functioning and sustainability of CBAs require support from additional areas, namely ESAs. Although ESAs are not essential for meeting biodiversity targets, they are nevertheless important for supporting PAs or CBAs. ESAs are often crucial for delivering ecosystem services. For terrestrial and aquatic environments, such areas are functional, but not necessarily pristine and natural. However, they are required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within CBAs, and also contribute significantly to the maintenance of ecological infrastructure. Two subtypes are distinguished:
    - ESA 1: Areas that might still be functional, and could be natural, near-natural, or moderately degraded.
    - ESA 2: Areas that are severely degraded or have no natural cover remaining and therefore require restoration.
- **Other Natural Areas** (ONAs): Some areas have not been identified as a priority in the current biodiversity spatial plan. However, they retain most of their natural character, and still perform many biodiversity and ecological infrastructure functions. Therefore, they are an important part of the natural ecosystem. It is desirable that ONAs, where possible, are managed or utilized to minimize habitat and species loss, and that ecosystem functionality through strategic landscape planning is ensured.
- **Severely Modified to No Natural Remaining** (NNR): These areas have been severely modified by human activity. They are no longer natural and do not contribute to biodiversity targets. However, these areas may still provide

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limited biodiversity and ecological infrastructure functions (and could potentially be useful for restoration/rehabilitation endeavours).

- **Protected Areas** (PAs): Areas that are formally protected by law in terms of the NEM:PAA. This includes gazetted private Nature Reserves and Protected Environments.

15.3. Botanical Assessment

The flora of the region was assessed both floristically (species identity) and compositionally (community assembly patterns).

15.3.1. Species Identities

Various reasons exist why the flora of a region cannot be fully catalogued within a limited timeframe (or even an extended timeframe; specifically see section 1.5). Therefore, the following data sources were used to obtain historical distribution records to develop a comprehensive list of plant species potentially occurring within the proposed development site and broader region:

- **Botanical Database of Southern Africa** (BODATSA; also often referred to as POSA [Plants of southern Africa]): this is an electronic database hosted by the South African National Biodiversity Institute (SANBI) that provides herbarium records collected in the region (http://posa.sanbi.org/). Records were specifically extracted from a very large area surrounding the actual proposed development site.
- **The Red List of South African Plants** (Raimondo et al., 2009): this online database (http://redlist.sanbi.org/) provides the most current national status of South Africa's vascular plant species. This was used to assess SCC[1], which are taxa (in this case plant species) that have a significant conservation importance for preserving South Africa's high biological diversity. SCC have a high conservation importance in terms of preserving South Africa's high floristic diversity, and include threatened species (CR, EN, and VU), as well as NT or DD, and also includes range-restricted species which are not declining and are nationally listed as "Rare" or "Extremely Rare" (also referred to in some Red Lists as Critically Rare; see Figure 18) (South African National Biodiversity Institute, 2020). Note that SANBI divides the IUCN category DD into "Data Deficient: Insufficient Information (DDD)", and "Data Deficient: Taxonomically Problematic (DDT)". When SCC occur in a proposed development site or PAOI, the proposed activities could impact them and result in significant biodiversity loss — the loss of SCC populations might either increase the extinction risk of the respective species, or might even contribute toward their extinction. As such, it is very important to note that a permit must be obtained from the relevant local authorities to destroy or relocate any SCC (or even protected species).
- **iNaturalist**: this is a comprehensive online platform (https://www.inaturalist.org/) to which numerous citizen scientists contribute distribution records of biodiversity, mostly in the form of photos. Although many of the users

[1] Note that all South African plants have been assessed (i.e., assigned a red list category, or "redlisted") by the Red List of South African Plants. Therefore, using the terms "redlist" or "red list" specifically for Threatened or other conservation concern species is not accurate (even though it remains popular). The term "Species of Conservation Concern" (or SCC) is preferable, or "Threatened" where applicable.

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are not professional botanists, various recognized botanical experts from across the globe assist in accurate species identification, and the platform is therefore an invaluable source of information regarding biodiversity. Nevertheless, to ensure a higher data reliability (i.e., only relevant/accurate records), the following parameters were used to extract records for this project: Quality Grade = "Research"; Identifications = "most agree"; Captive / Cultivated = "no". Records were specifically extracted from a very large area surrounding the actual proposed development site. However, to minimize redundancy, and to provide the most likely set of plant species that might occur on site, the retrieved geospatial records were filtered by the vegetation types underlying the proposed development site (as mapped by VegMap; see section 15.3.2).

- **National Web Based Environmental Screening Tool**: a geographically based, web-enabled governmental application (https://screening.environment.gov.za/screeningtool/#/pages/welcome) which allows a proponent intending on submitting an application for environmental authorisation in terms of the Environmental Impact Assessment (EIA) Regulations 2014, as amended, to screen their proposed development site for environmental sensitivity. Of specific interest for this report are the potential presences of so-called "sensitive plant species" that might occur in the proposed development site and surrounds, as well as any terrestrial biodiversity features listed as having a "Very High" sensitivity rating.

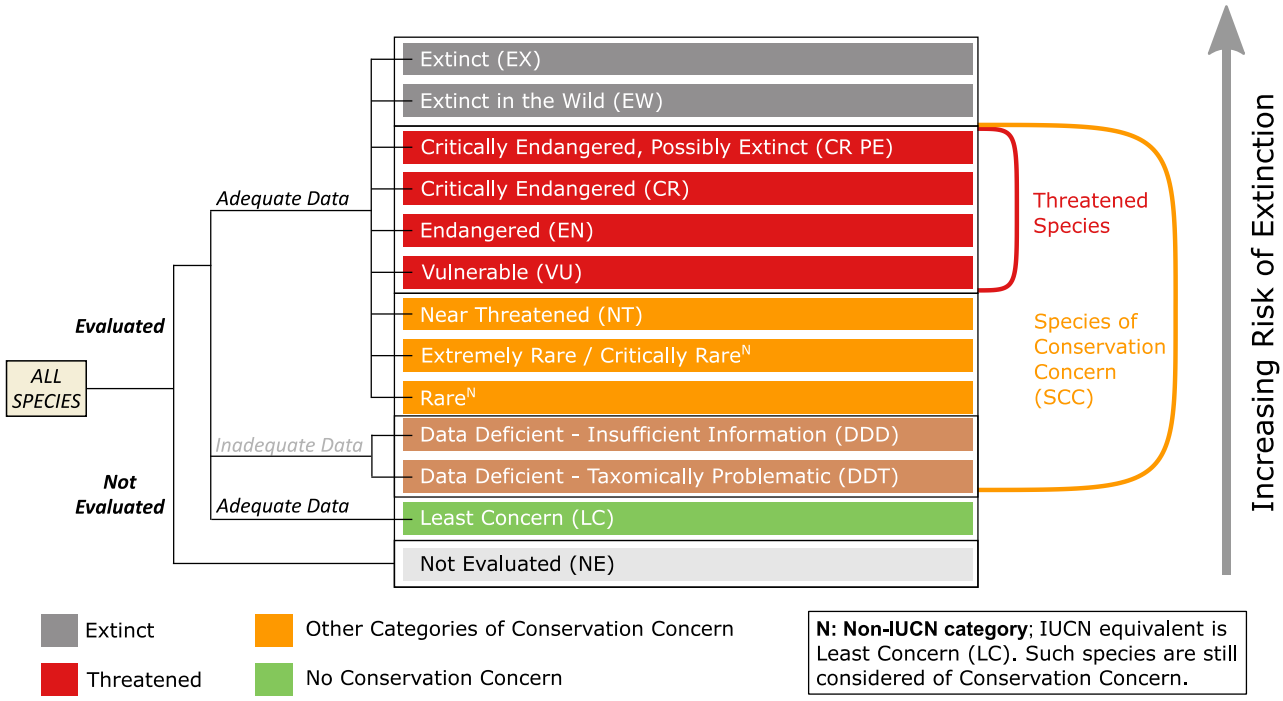

Figure 18: Red List and SCC categories used in this report as originally delineated according to SANBI's Red List of South African Plants (http://redlist.sanbi.org/redcat.php), and recently updated in the *Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa* (South African National Biodiversity Institute, 2020).

Although not explicitly required by the relevant gazetted protocols, protected plant species were also surveyed for and included in this project. The lists obtained from the aforementioned databases were used to identify such protected plant species. These species are protected by NEM:BA, as well as other provincial legislation (see section 1.6). Briefly, no person may sell, buy, transport, destroy, or harvest a protected plant without a permit from the relevant authority.

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Finally, the lists obtained from these databases were used to identify invasive alien plant species (IAPs) that are listed in the NEM:BA A&IS Regulations. IAPs can dominate, and even replace, native flora. Therefore, they have the ability to completely transform the structure, composition, and functioning of ecosystems. IAPs must be controlled, and preferably eradicated, by means of an eradication and monitoring program (see below for details).

15.3.1.a) NEM:BA Alien and Invasive Species Regulations

The NEM:BA A&IS Regulations is the most current legislation regarding IAPs. The list of Alien Invasive Species was first published in August 2014 in terms of NEM:BA, with subsequent updates. The Alien and Invasive Species Regulations were published in the Government Gazette No. 44182, 24th of February 2021. The legislation requires the removal and/or control of Category 1a and 1b IAPs. In addition, unless authorised in terms of the National Water Act, no land user may allow Category 2 IAPs to occur within 30 meters of the 1:50 year flood line of a river, stream, spring, natural channel in which water flows regularly or intermittently, lake, dam, or wetland. Category 3 IAPs are also prohibited from occurring close to a watercourse.

The NEM:BA A&IS Regulations categories are, briefly, as follows:

- **Category 1a**: Invasive species requiring compulsory control. All specimens must be removed and destroyed, and the species must be eradicated from the environment. No permits will be issued.
- **Category 1b**: Invasive species requiring compulsory control as part of an invasive species control program. All specimens must be removed and destroyed. Since these IAPs can have a high invasive potential, infestations may qualify for a government sponsored invasive species management program. No permits will be issued.
- **Category 2**: Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy, or accept as a gift any Category 2 IAPs. No permits will be issued for Category 2 plants to exist in riparian zones.
- **Category 3**: Invasive species regulated by activity. An individual plant permit is required to undertake restricted activities such as importing, possessing, growing, breeding, moving, selling, buying, or accepting as a gift any Category 3 IAPs. No permits will be issued for Category 3 plants to exist in riparian zones.

According to the NEM:BA A&IS Regulations, any person in control of a Category 1b IAPs must immediately:

- Notify the competent authority in writing; and
- Take steps to manage the listed invasive species in compliance with:
    - Section 75 of NEM:BA;
    - The relevant invasive species management program developed in terms of regulation 4; and
- Any directive issued in terms of section 73(3) of NEM:BA.

15.3.2. Community Composition: Vegetation Types

The vegetation types (and their conservation statuses) of the proposed development site, as well as the broader regions surrounding the proposed development site, were verified using the South African National Vegetation Map, or simply "VegMap" (Dayaram et al., 2018; Mucina & Rutherford, 2006; South African National Biodiversity Institute, 2018) and the Red List of Ecosystems (see section 15.2.1). The latest version of VegMap was consulted for any updates of the

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respective regions. Although vegetation descriptions given in this report are as per VegMap 2006, these units were cross-validated with VegMap 2018 to inspect their respective extents.

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15.4. Faunal Assessment Details

A list of mammal and herpetofauna species predicted to occur in the region, and their respective likelihood of occurrence within the study area, was generated based on known distributions and habitat suitability from online and literature sources such as MammalMap, ReptileMap, FrogMap, and the ReptileAtlas, as well as field guides such as Skinner & Chimimba (2005), Apps (ed. 2012), Stuart & Stuart (1998), Bates *et al* (2014), Minter *et al.* (2004), Branch (2009), and Du Preez and Carruthers (2009). The literature study focussed on querying online databases to generate species lists for the relevant Quarter Degree Squares (QDS).

The predicted list is typically heavily influenced by factors other than distribution or biome type. Factors such as habitat suitability, current land use, current levels of disturbance, and structural integrity of the habitats all influence the potential for predicted species to occur in the vicinity of the study area. A high likelihood thus exists that not all mammal species known to occur within the region will be located within the study area and surrounding areas. Therefore, a 'Likelihood of Occurrence' (LOO) and a 'Species of Conservation Concern' review was applied to any potential omissions in the data set. For the LOO analysis, a full summary of Red List faunal species, as well as other SCC, is tabulated, with a LOO applied.

The LOO is be based upon available spatial imagery, and more specifically:

- Habitat suitability;
- Overlap with known distributions;
- Rarity of the species; and
- Current Impacts.

Mammal distribution data were obtained from the following sources:

- The Mammals of the Southern African Subregion (Skinner & Chimimba, 2005);
- The 2016 Red List of Mammals of South Africa, Lesotho and Swaziland (www.ewt.org.za) (EWT, 2016);
- Animal Demography Unit (ADU) - MammalMap Category (MammalMap, 2017) (mammalmap.adu.org.za);
- Stuarts' Field Guide to Mammals of Southern Africa – Including Angola, Zambia & Malawi (Suart & Stuart, 2015)
- A Field Guide to the Tracks and Signs of Southern, Central and East African Wildlife (Stuart & Stuart, 2013).
- Smither's Mammals of Southern Africa (Apps, ed. 2012)

Herpetofauna distribution and species data were obtained from the following sources:

- South African Reptile Conservation Assessment (SARCA) (sarca.adu.org);
- A Guide to the Reptiles of Southern Africa (Alexander & Marais, 2007);
- Field guide to Snakes and other Reptiles of Southern Africa (Branch, 1998);
- Atlas and Red list of Reptiles of South Africa, Lesotho and Swaziland (Bates et al.,
- 2014);
- A Complete Guide to the Frogs of Southern Africa (du Preez & Carruthers, 2009);

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- Animal Demography Unit (ADU) - FrogMAP (frogmap.adu.org.za);
- Atlas and Red Data Book of Frogs of South Africa, Lesotho and Swaziland (Mintner et
- al., 2004); and
- Ensuring a future for South Africa's frogs (Measey, 2011).

16. Appendix E: Methodology Fieldwork Phase

Briefly, the field surveys aimed to investigate the following on-site aspects:

- The occurrence of SCC and protected species;
- The specific vegetation types (identification, classification, and delineation); and
- The specific habitat/community types (classification and delineation).

16.1. Flora

16.1.1. General Botanical Assessment Details

Surveying was done within specifically targeted areas that were perceived as ecologically distinct and/or sensitive based on the results obtained from the desktop assessment of plant community types (sections 15.1 and 15.2). This was to optimize coverage and to perform a rapid, but efficient, vegetation and ecological assessment at each survey area.

The botanical assessment was conducted by surveying fixed-point plots of sufficient size within each community type, which were also supplemented with timed meanders (South African National Biodiversity Institute, 2020) within the respective community types. The combination of single fixed-point plots, supplemented with timed random meanders, are highly efficient for conducting floristic analyses. This allows plant species coverages and SCC occurrences to be rapidly estimated, as well as the compilation of adequate plant species lists, thereby giving a prompt indication of botanical diversity. Other useful observations were also recorded within each community type, examples of which include ecological condition and current impacts (examples of which could include the presence of invasive alien plant species, livestock grazing, degree of erosion, etc.), general vegetation density and physiognomic characteristics, habitat notes, and the presence of any sensitive features (e.g., wetlands, seepages, and drainage lines) where applicable. Finally, any opportunistic observations were also made while surveying.

Various field guides and identification manuals were used for plant identification, as well as other relevant literature regarding the ecology of the region (Boon, 2010; Bromilow, 2010; Coates Palgrave, 2005; Fish et al., 2015; Henderson, 2020; Johnson et al., 2015; Manning, 2007; Manning & Goldblatt, 2012; Pooley, 2005; Van Oudtshoorn, 2012; A. E. van Wyk & Van Wyk, 2013; B.-E. Van Wyk & Smith, 2010; Whitehouse, 2021), and are listed in section 11.

16.1.2. Comparing Plant Community Type Similarities

The concept of "unique species", or more accurately, species that are not shared, relates directly to community compositional changes — that is, beta diversity — and is important for conservation purposes. Specifically, the beta diversity of specific areas can differ between each other in the components of turnover and nestedness (Baselga, 2010b, 2010a, 2013). A high species turnover would indicate that species are replaced on going from one area to another, whereas a low turnover (also termed high nestedness) would indicate that species assemblages are subsets of each other, or a larger

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community, when going from one area to another. The implication of this is that conservation efforts should ideally prioritise areas with a high number of unique biodiversity (thus representing high turnover compared to other areas); in other words, areas with a high number of unique species should be prioritised. This maximizes and optimizes conservation efforts. Although genetic diversity is still lost whenever an area is destroyed, conserving areas of highest turnover is a step towards minimizing the potential for local species extinction. Conversely, when high levels of nestedness are present — i.e., many species are shared between different communities — then it buffers and mitigates against losses, since the loss of one community does not represent a loss of many unique species.

Following from the concept of shared species versus "not shared" species, dissimilarity metrics can be calculated for communities which can then be used to determine how similar or dissimilar two communities are compared with each other. The three variables of dissimilarity, turnover, and nestedness have an easy and straightforward relationship, namely: Dissimilarity = Turnover + Nestedness. The level of similarity between two plant community types is determined by the number of species that are shared between them, as well as the number of species that are unique to each (i.e., species that are not shared between the communities).

Dissimilarity calculations in this report were performed as given by Baselga. Presence-absence values were used in accordance with the Jaccard similarity index. Analyses were specifically conducted within the R Statistical Software platform.

16.1.3. Sensitivities: Terrestrial Plant Species Sensitivity Criteria

The protocol for the *Specialist Assessment And Minimum Report Content Requirements For Environmental Impacts On Terrestrial Plant Species* (Gazette 43855 No. 1150) provides various criteria that define the plant species sensitivity categories Very High, High, Medium, and Low. These are provided below, together with relevant notes where applicable.

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Sensitivity	Criteria	Notes
Very High	• Critical Habitat for range restricted species of conservation concern that have a global range of less than 10 km^2. • SCC listed on the IUCN Red List of Threatened Species or on South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable according the IUCN Red List 3.1. Categories and Criteria or listed as Nationally Rare • Species aggregations that represent ≥1% of the global population size of a species, over a season, and during one or more key stages of its life cycle. • The number of mature individuals that ranks the site among the largest 10 aggregations known for the species.	These areas are irreplaceable in terms of SCC.
High	• Confirmed habitat for SCC. • SCC listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable according the IUCN Red List 3.1. Categories and Criteria.	These areas are unsuitable for development due to a very likely impact on SCC.
Medium	• Suspected habitat for SCC based either on there being records for this species collected in the past, prior to 2002, or being a natural area included in a habitat suitability model. • SCC listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable according the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare.	(None given)
Low	• Areas where no natural habitat remains. • Natural areas where there is no suspected occurrence of SCC.	(None given)

16.2. Fauna

Surveys were done within specifically targeted areas that were perceived as ecologically distinct and/or sensitive based on the results obtained from the desktop assessment of plant community- and distinct landscape/geomorphological types. This was to optimize coverage and to perform a rapid, but efficient, faunal habitat and ecological assessment at each survey area.

The equipment used during surveying included a Canon EOS D7 MarkII DSLR camera with an EFS Canon 18-55mm lens (as well as a Canon EFS 150 – 300mm zoom lens), a Garmin E-Trex Touch GPS (accuracy: 4 - 5 m), Leica 10x42 Ultravid HD-Plus Binoculars to scan for any useful observations, 24MP Prime Low Glow Bushnell CameraTraps/FieldCamers, and Aluminium 23X7.5X9cm Serman Traps for small mammal sampling.

16.2.1. Mammal Assessment

Likelihood of Occurrence

There is always a high likelihood that not all mammal species known to occur within the study area and surrounds will be located during a survey. Therefore, a "Likelihood of Occurrence" (LOO) and a "Species of Conservation Consideration Review" (SCCR) was applied to any potential omissions in the data set. For the LOO analysis, a full summary of Red List mammals (IUCN, 2017), as well as other SCCR was tabulated, with a LOO applied. The relevant species of special

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consideration were addressed separately based on the data collected during fieldwork, in the context of development and the effects on the species (both ecologically and spatially).

Likelihood of Occurrences are based upon:

- Habitat suitability;
- Overlap with known distributions;
- Rarity of the species; and
- Current Impacts.

Spoor Tracking

Spoor tracking enabled detailed sampling of mammalian species without the need for trapping or direct observation. All spoor, including footprints, den sites, burrows, hairs, scrapings, and diggings were recorded and documented by detailed geo-referenced photography. Spoor tracking was performed during general fieldwork, during specific timed spoor tracking drives/transects, and at carefully chosen locations such as roads and other areas with highly trackable substrates. In addition, all camera trap sites (see below) were subjected to spoor tracking.

Direct Observations

All mammals observed during the sampling period were recorded, as well as their geographic coordinates and surrounding habitat. This data was used to supplement the overall habitat analysis to give context to the area. Animals were encountered through driving, normal routine movement through the study area, and active searching of refugia.

Camera trapping

The use of camera trapping has long been considered as a valuable ecological census tool in the field of African Mammalogy and this method was a primary focus of the field study. Camera traps were placed strategically along game paths, near water points, access roads and areas that indicated signs of animal activity. The camera traps were left on site for a sufficient period. Cameras were set to record whenever triggered by sufficient movement. A total of 17 cameras were deployed.

Sherman Trapping

Sherman trapping was done for three trap nights. Trap lines were deployed and traps were placed on the ground and baited with a mixture of peanut butter, olive oil, oats and marmite. A total of 50 traps were deployed. The distance between each trap varied between 15 and 25 meters and was dependent on the transition between habitats and signs of small mammal activity. Captured animals were moved from the traps into clear plastic bags, identified, photographed and then released unharmed. The specific period of sampling is regarded as a moderately acceptable period for sampling.

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16.2.2. Herpetofaunal Assessment:

Due to the limited time available for the field survey, no trapping was performed in order to maximise prime active searching time by eliminating the need to install, service, and dismantle the traps. Instead, the survey aimed to focus on intensive active searching.

Active Searching

Reptiles were searched for on foot within the study area. Specific habitat types were selected beforehand, where active sampling was intentionally focused (point samples). The habitats of these point samples were also described and photographed. Active searching for reptiles occurred for approximately 30 minutes per point sample and involved:

- Photographing active reptiles from a distance with a telephoto lens (300 m telephoto lens);
- Lifting up and searching under debris, rocks, or logs (rocks and logs were always returned to their original positions);
- Scanning for any signs of reptiles such as shed skins, the positive identification of which was taken as an observation of that species; and
- Catching observed reptiles by hand. All captured reptiles were photographed and released unharmed.

Opportunistic Sampling

Reptiles, especially snakes, are incredibly elusive and difficult to observe. Consequently, all possible opportunities to observe reptiles were taken in order to augment the standard sampling procedures described above.

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16.2.3. Sensitivities: Terrestrial Animal Species Sensitivity Criteria

The protocol for the *Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species* (Gazette 43855 No. 1150) provides various criteria that define the animal species sensitivity categories Very High, High, Medium, and Low. These are provided below, together with relevant notes where applicable.

Sensitivity	Criteria	Notes
Very High	• Critical Habitat for range restricted species of conservation concern that have a global range of less than 10 km^2. • SCC listed on the IUCN Red List of Threatened Species or on South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable according the IUCN Red List 3.1. Categories and Criteria or listed as Nationally Rare • Species aggregations that represent ≥1% of the global population size of a species, over a season, and during one or more key stages of its life cycle. • The number of mature individuals that ranks the site among the largest 10 aggregations known for the species.	These areas are irreplaceable in terms of SCC.
High	• Confirmed habitat for SCC. • SCC, listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable, according the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare.	These areas are unsuitable for development due to a very likely impact on SCC.
Medium	• Suspected habitat for SCC based either on there being records for this species collected in the past, prior to 2002, or being a natural area included in a habitat suitability model. • SCC listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable according the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare.	(None given)
Low	• Areas where no natural habitat remains. • Natural areas where there is no suspected occurrence of SCC.	(None given)

16.3. Sensitivities: Terrestrial Site Ecological Importance (SEI)

The most current site sensitivity methodology, namely the Site Ecological Importance (SEI), was followed here, as proposed by the *Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa* (South African National Biodiversity Institute, 2020).

The different community types within the Project Area were delineated and identified based on field observations and satellite imagery (also see section 15.1). These plant community types were assigned SEI categories based on various factors, such as ecological integrity, conservation value, functionality, ecosystem processes, and the presence/absence of SCC, among other things.

Specifically, SEI is a function of two factors (Figure 19): 1) The Biodiversity Importance (BI) of the receptor (e.g., SCC, the vegetation/fauna community, or habitat type) and Receptor Resilience (RR; the resilience of the receptor to impacts). BI is in turn a function of Conservation Importance (CI; the importance of a site for supporting biodiversity features of

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conservation concern that are present) and the Functional Integrity (FI; the receptors' current ability to maintain its structure and functions, compared to its known or predicted state under ideal conditions) of the receptor.

BI and SEI are both calculated using respective risk matrices (Figure 20). BI, FI, and RR categories are all circumscribed by various criteria (see Table 14, Table 15, and Table 16). The various criteria per category may be applied in combination or in isolation. See Figure 20 for guidelines on interpreting the resulting SEI categories. SEI is usually evaluated per plant community type / vegetation type.

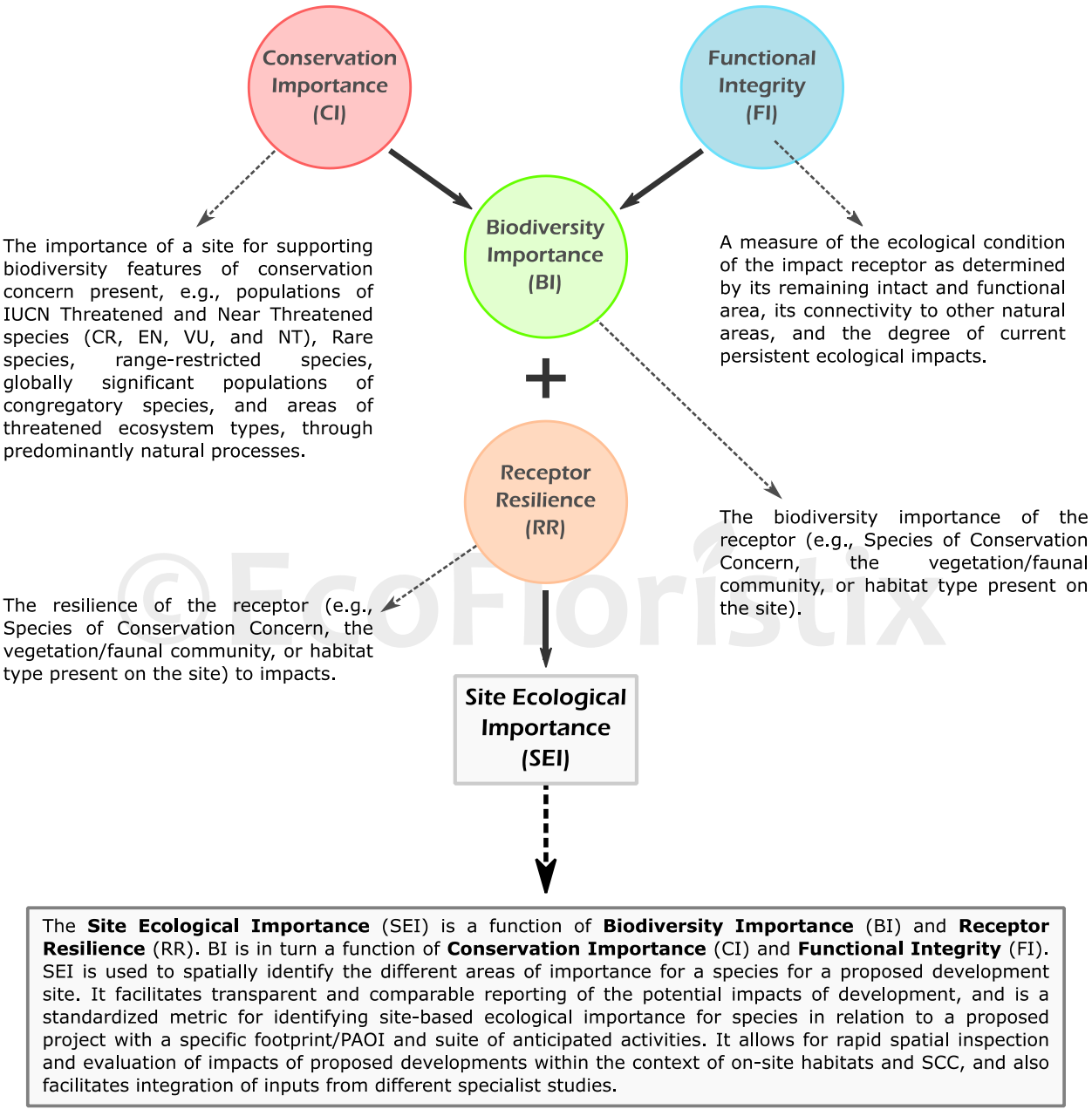

Figure 19: Details on the factors that contribute to the Site Ecological Importance value. Also see Figure 20.

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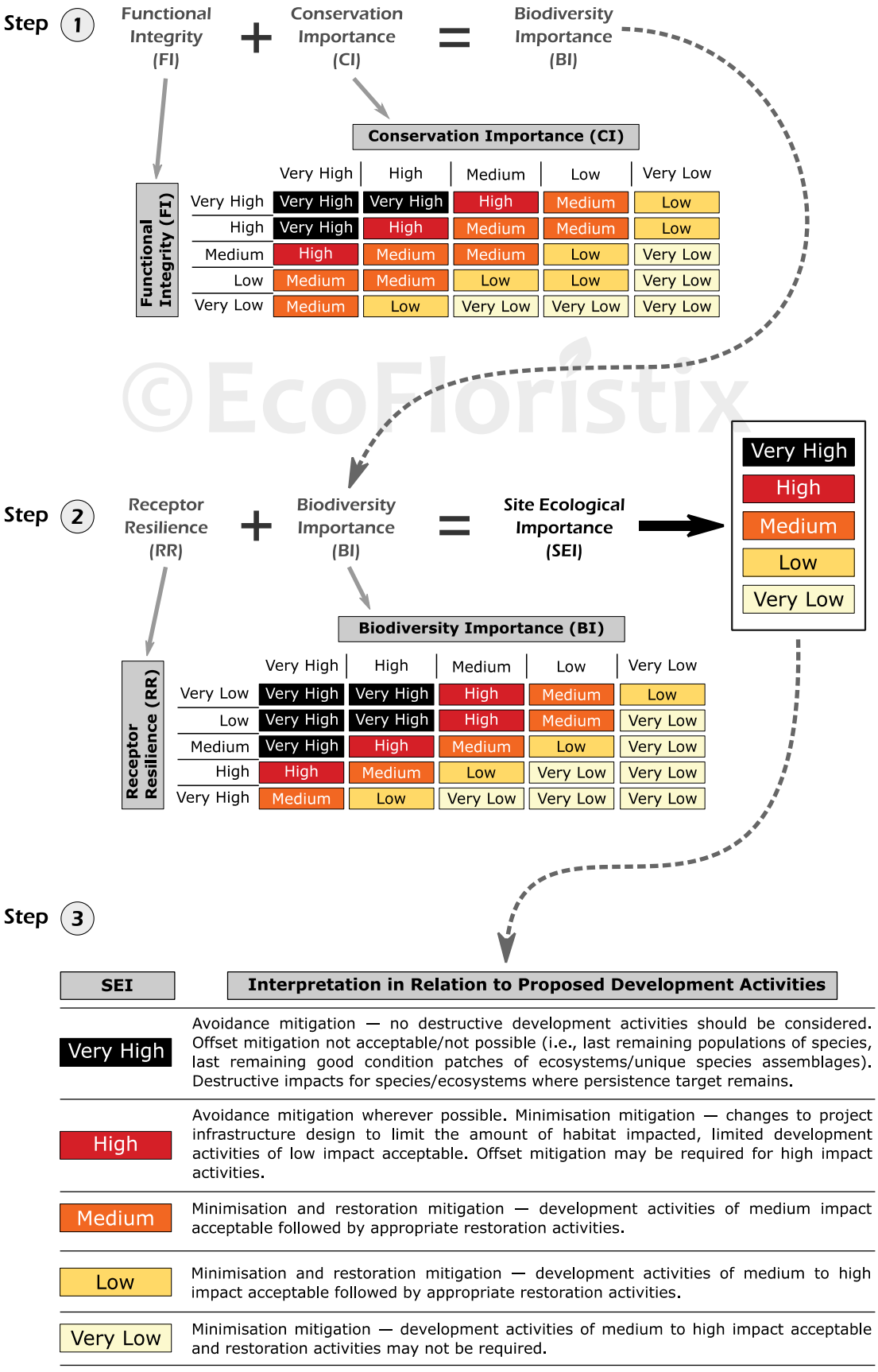

SEI	Interpretation in Relation to Proposed Development Activities
Very High	Avoidance mitigation — no destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e., last remaining populations of species, last remaining good condition patches of ecosystems/unique 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.

Figure 20: Calculations, scores, process, and guidelines for calculating and interpreting Site Ecological Importance (SEI) categories.

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Table 14: Details regarding Conservation importance (CI) categories.

Conservation Importance	Fulfilling criteria
Very high	• Confirmed or highly likely occurrence of CR, EN, VU, or Extremely Rare or Critically Rare species that have a global EOO of < 10 km^2. • Any area of natural habitat of a CR ecosystem type or large area or > 0.1% of the total ecosystem type extent of natural habitat of EN ecosystem type. • Globally significant populations of congregatory species (> 10% of global population).
High	• Confirmed or highly likely occurrence of CR, EN, or 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. • Small area (> 0.01% but < 0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type or large area (> 0.1%) of natural habitat of VU ecosystem type. • Presence of Rare species. • Globally significant populations of congregatory species (> 1% but < 10% of global population).
Medium	• Confirmed or highly likely occurrence of populations of NT species, threatened species (CR, EN, VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals. • Any area of natural habitat of threatened ecosystem type with status of VU. • Presence of range-restricted species. • > 50% of receptor contains natural habitat with potential to support SCC.
Low	• No confirmed or highly likely populations of SCC. • No confirmed or highly likely populations of range-restricted species. • < 50% of receptor contains natural habitat with limited potential to support SCC.
Very Low	• No confirmed and highly unlikely populations of SCC. • No confirmed and highly unlikely populations of range-restricted species. • No natural habitat remaining.

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Table 15: Details regarding Functional Integrity (FI) categories.

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

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Table 16: Details regarding Receptor Resilience (RR) categories.

Receptor Resilience	Fulfilling criteria
Very high	• Habitat that can recover rapidly (~ less than 5 years) to restore > 75% of the original species composition and 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 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 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 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.

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16.4. Impact Assessment Methodology

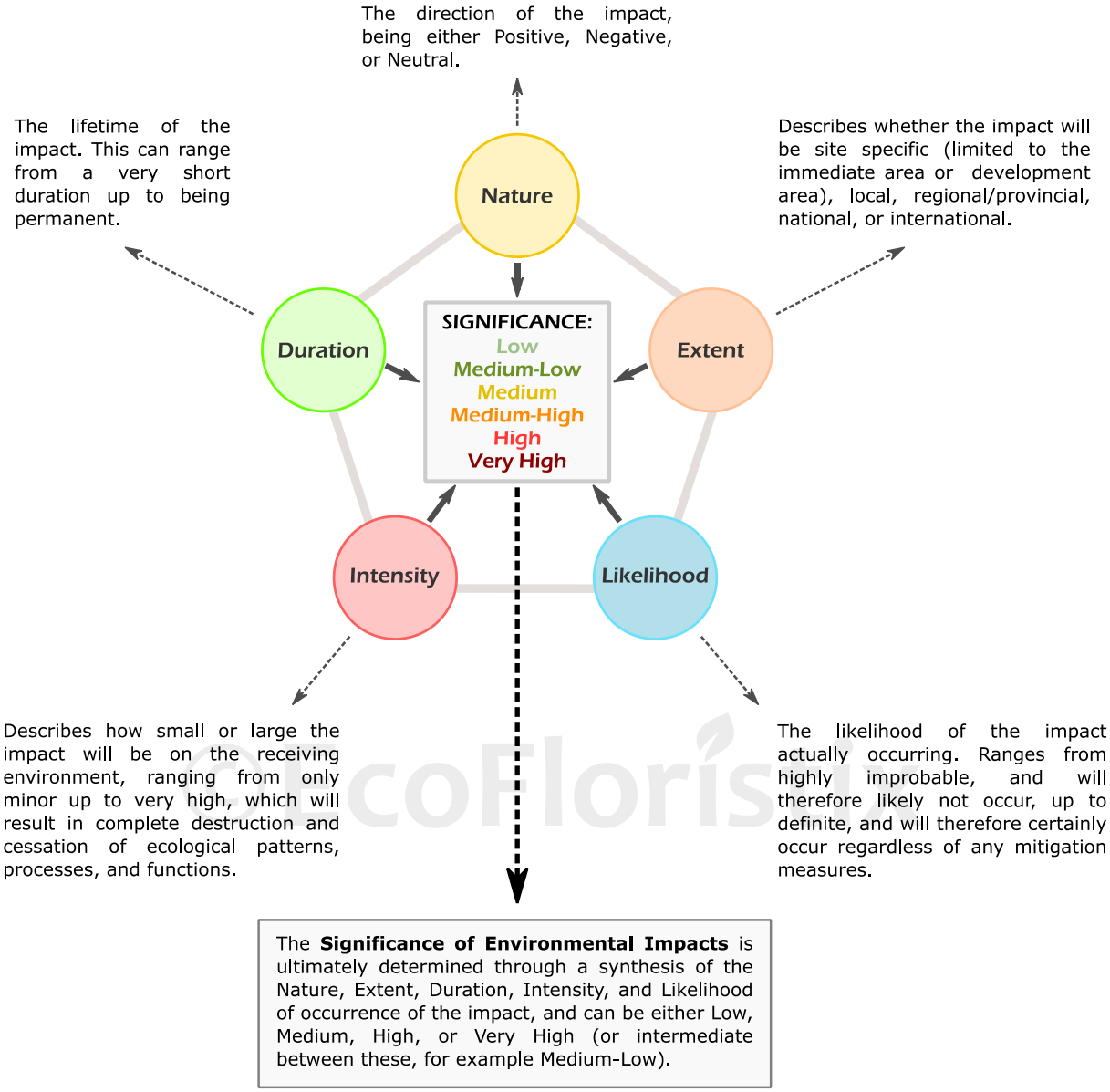

Figure 21: Details on the factors that contribute to Significance of Environmental Impacts values.

The Significance of Environmental Impacts was used to assess the impacts and risks associated with the proposed activities. The "Significance" of an environmental impact is a combination of the consequence and likelihood of an impact occurring (DFFE, 2023). The following factors must at least be considered as part of the process of assessing the significance of a negative impact on biodiversity (Figure 21):

- **Consequence** of an impact: a combination of the intensity, extent, and duration of the impact.
    - **Intensity / Magnitude** (severity) of the impact: the intensity of an ecological impact is given at a defined (usually spatial) scale.

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- **Extent** of the impact: the scale of expected impacts as a proportion or range of a given biodiversity feature. The greater the extent, the greater the consequence, and the more significant the impact.
- **Duration** of the impact: how long the impact will last, from short-term to permanent, where permanent is a period of thirty years and above (unless the receiving environment justifies a shorter consideration of permanent). The longer the duration, the greater the consequence, and the more significant the impact.

- **Likelihood** (or probability) of the occurrence of the impact: The more likely the impact, the greater the certainty of the impact significance.

Thus, the Significance of Environmental Impacts is primarily a function of 1) the present environmental aspects that are to be impacted on, 2) the likelihood of an impact occurring, and 3) the consequence of such an impact occurring before, and after, implementation of proposed mitigation measures.

In addition, the "nature" of the impact can be negative, neutral, or positive; this adds additional context to the significance values.

Implicitly considered is the degree to which impacts can be managed/mitigated, reversed, and/or may cause irreplaceable loss of resources.

16.5. The Mitigation Hierarchy

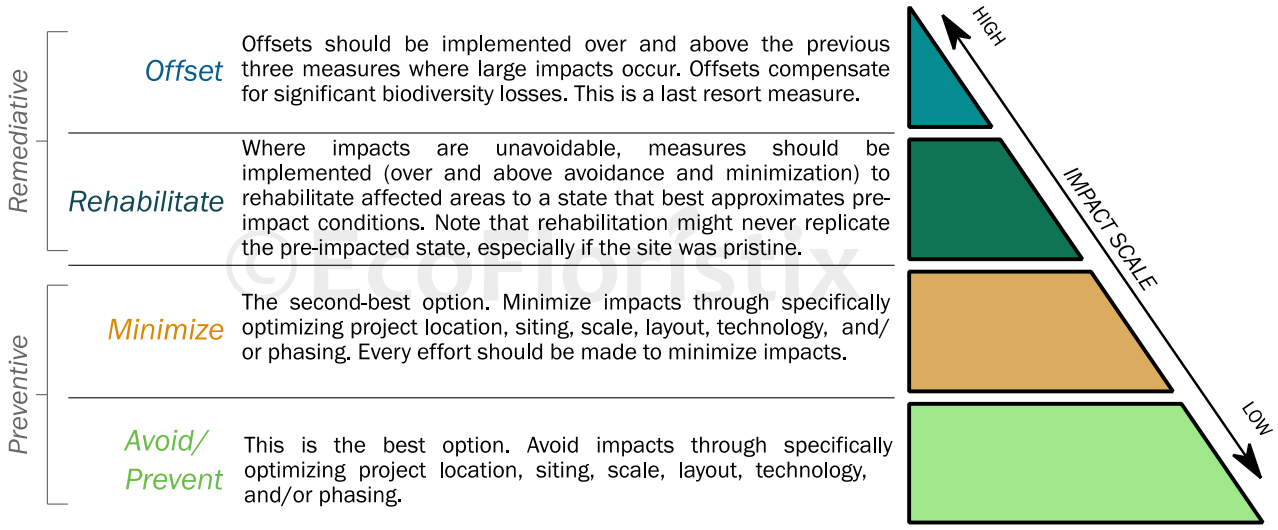

Figure 22: The Mitigation Hierarchy.

The mitigation hierarchy (Figure 22) is a fundamental and internationally recognized framework in environmental management, designed to systematically address and limit the negative impacts of human activities on biodiversity and ecosystems. It is a guiding principle that ensures a strategic and proactive approach to environmental impact assessment and management. The hierarchy prioritizes actions, starting with those that offer the greatest environmental benefit and least risk, and progressively moves towards less desirable options when the preferred ones are not entirely achievable. In essence, it encourages the consideration of alternatives that avoid significant impacts.

The hierarchy consists of four sequential steps:

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1. **Avoidance/Prevention:** This is the most crucial and preferred step. It focuses on preventing impacts from occurring in the first place. This can be achieved through careful project planning, strategic site selection to bypass sensitive areas, or by redesigning project components to eliminate potential harm entirely. Effective avoidance at the earliest stages of a project's lifecycle, often during feasibility and conceptual design, can significantly reduce the need for subsequent, more costly, and often less effective mitigation measures.

2. **Minimization/Reduction:** Where complete avoidance is not feasible, the next step involves minimizing or reducing the intensity, duration, timing, and/or extent of unavoidable impacts. This requires implementing measures to lessen the severity of the anticipated harm. Examples include adopting less impactful construction methods, restricting the operational footprint of a development, or implementing seasonal restrictions on activities to avoid sensitive periods for wildlife (e.g., breeding seasons). Minimization often involves adaptive management, where the effectiveness of measures is monitored, and adjustments are made as needed to further reduce impacts.

3. **Restoration/Rehabilitation:** This comes into play after impacts have occurred, and is the start of remediative processes. It focuses on actively restoring or rehabilitating degraded ecosystems and habitats to a former or desired state. Rehabilitation typically aims to re-establish basic ecological functions and productivity, while restoration strives to achieve a fully functioning ecosystem comparable to the original, pre-impact condition. This can involve measures such as re-vegetating disturbed areas with indigenous species, restoring hydrological flows in altered wetlands, or remediating contaminated soils. The goal is to repair the damage as much as possible on-site, bringing the affected area back to an ecologically viable state.

4. **Offsetting/Compensation:** As the last resort, when significant residual impacts remain after all reasonable avoidance, minimization, and restoration measures have been implemented, offsetting (also known as compensation) is considered. This involves providing measurable conservation gains elsewhere to compensate for the unavoidable loss of biodiversity or ecosystem services. Offsets should ideally target the same type of biodiversity or ecosystem services that have been impacted. Examples include the establishment of new protected areas, the restoration of degraded habitats off-site, or funding long-term conservation programmes that directly benefit the impacted species or ecosystems. In South Africa, the concept of biodiversity offsets aims to ensure that they genuinely contribute to "no net loss" or even a "net positive gain" for biodiversity, recognizing that offsets are complex and require robust monitoring and long-term commitment.

The effective application of the mitigation hierarchy is crucial for achieving sustainable development outcomes. It promotes a transparent and accountable approach to environmental management. It guides decision-making towards minimizing ecological footprints and ensures that biodiversity considerations are integrated throughout a project's lifecycle.

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17. Appendix F: Notes on SCC and Protected Species

This section includes relevant definitions and regulations pertaining to SCC and protected plant species as determined by national legislation. Briefly, a permit is required to perform any restricted activity, as defined by NEM:BA, on specimens of any SCC or protected plant species, whether such specimens are living or dead. Note: this is NOT an exhaustive account of NEM:BA.

17.1. National Environmental Management: Biodiversity Act, 2004 (Act No. 10, 2004, Vol. 467, No. 26436)

NEM:BA Definition of "specimen" (Chapter 1, Definitions):

a) any living or dead animal, plant or other organism;

b) a seed, egg, gamete or propagule or part of an animal, plant or other organism capable of propagation or reproduction or in any way transferring genetic traits;

c) any derivative of any animal, plant or other organism; or any goods which-

   i. contain a derivative of an animal, plant or other organism; or

   ii. from an accompanying document, from the packaging or mark or label, or from any other indications, appear to be or to contain any derivative of an animal, plant or other organism.

NEM:BA Definition of "restricted activity" (Chapter 1, Definitions):

(a) in relation to a specimen of a listed threatened or protected species, means-

i. hunting, catching, capturing or killing any living specimen of a listed threatened or protected species by any means, method or device whatsoever, including searching, pursuing, driving, lying in wait, luring, alluring, discharging a missile or injuring with intent to hunt, catch, capture or kill any such specimen;
ii. gathering, collecting or plucking any specimen of a listed threatened or protected species;
iii. picking parts of, or cutting, chopping off, uprooting, damaging or destroying, any specimen of a listed threatened or protected species;
iv. importing into the Republic, including introducing from the sea, any specimen of a listed threatened or protected species;
v. exporting from the Republic, including re-exporting from the Republic, any specimen of a listed threatened or protected species;
vi. having in possession or exercising physical control over any specimen of a listed threatened or protected species;
vii. growing, breeding or in any other way propagating any specimen of a listed threatened or protected species, or causing it to multiply;
viii. conveying, moving or otherwise translocating any specimen of a listed threatened or protected species;
ix. selling or otherwise trading in, buying, receiving, giving, donating or accepting as a gift, or in any way acquiring or disposing of any specimen of a listed threatened or protected species; or
x. any other prescribed activity which involves a specimen of a listed threatened or protected species

Restricted activities involving listed threatened or protected species, Part 2, 57:

(1) A person may not carry out a restricted activity involving a specimen of a listed threatened or protected species without a permit issued in terms of Chapter 7 (Permits).

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17.2. National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004): Threatened or Protected Species Regulations

"**Biodiversity Act**" means the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), including any amendment thereof;

"**protected species**" means any species listed as protected in terms of section 56(1)(d) of the Biodiversity Act;

"**threatened species**" means an indigenous species listed as critically endangered, endangered or vulnerable species in terms of section 56(1)(a), (b) and (c) of the Biodiversity Act;

Chapter 2 (Permit System for Listed Threatened or Protected Species), Part 1 Application for permits: Carrying out a restricted activity

4. (1) A person may carry out a restricted activity involving a specimen of a listed threatened or protected species, only if he or she is the holder of a permit issued-

a) in terms of section 57(1) of the Biodiversity Act;
b) in accordance with Chapter 7 of the Biodiversity Act, and
c) in accordance with these Regulations;

unless the Minister has exempted the carrying out of such restricted activity involving such specimen in terms of section 57(4) of the Biodiversity Act.

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18. Appendix G: Abbreviated Curriculum Vitae of the Specialists

Personal Details (Lead Author):

- Name: Dr. Jan-Hendrik Keet
- Address: Somerset West, Western Cape, 7130
- Cell: 071 451 4853
- Email: info@ecofloristix.co.za
- Date of Birth: 07 November 1988
- Website: https://ecofloristix.co.za/

Expertise and Experience:

- Current: Botanical & Terrestrial Biodiversity Specialist Consultant (EcoFloristix Specialist Botanical Surveys)
- Current: Freelance Academic/Technical Editor, Proof-reader, and Dissertation Specialist
- Previous: Post-Doctoral Researcher — Mathematical Biosciences Hub (Department of Mathematics), Stellenbosch University
- Previous: Post-Doctoral Researcher — DST NRF Centre of Excellence for Invasion Biology (Department of Botany and Zoology), Stellenbosch University
- Specialization: Botany, Ecology, Biogeography, Invasive Plant Species, and Invasion Biology
- Years of experience: > 10 years
- Published in various, high-impact, national and international scientific journals

Skills and Competencies:

- Botany and Ecology
- Invasive Species Biology (PhD in Botany [Stellenbosch University] with a focus on Invasive Alien Plant Species and their environmental impacts)
- Plant Biogeography
- Plant Identification and Taxonomy
- Vegetation Surveys and Mapping
- Biodiversity Informatics
- Biological Sciences
- Soil Microbiome Composition, Function, and Chemistry
- Geographic Information Systems (*GISB1500S, NQF level 5*)
- Research Data Management and Data Visualization
- Statistical Computing Methods (*R Statistical Computing Expert*)
- Experimental Design and Analysis

Global Scientific Influence:

- Citations >650
- Global Publication Reads >9000
- Scopus h-index 11
- Google Scholar h-index 11
- Google Scholar i10-index 12

Tertiary Education:

- 2015 – 2019: Stellenbosch University, Stellenbosch, South Africa. Doctor of Philosophy (Botany)
- 2013 – 2014: University of the Free State, Bloemfontein, South Africa. Magister Scientiae (Botany)
- 2012: University of the Free State, Bloemfontein, South Africa. Bachelor of Science Honours (Botany) - *cum laude*

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- 2009 – 2011: University of the Free State, Bloemfontein, South Africa. Bachelor of Science (Chemistry with Physics and Biology) - *cum laude*

Employment History:

- 2015 – present: Botanical Specialist
- 2021 – present: Freelance Academic/Technical Editor, Proof-reader, and Dissertation Specialist
- 2019 – 2021: Post-Doctoral Researcher – Centre for Invasion Biology (Department of Botany and Zoology), Stellenbosch University
- 2011: Part-time demonstrator. Department of Plant Sciences, University of the Free State, Bloemfontein, South Africa
- 2010: Part-time lab assistant. Department of Chemistry, University of the Free State, Bloemfontein, South Africa
- 2007 – 2009: Shop Manager. Christian Tees, Brandwag Centre, Bloemfontein

Memberships, Certifications, and Short Courses:

- SACNASP: Professional Natural Scientist (No.: 121678)
- South African Association of Botanists (SAAB) Ordinary Member (No.: 821)
- SAGIC Invasive Species Consultant (Cape Town, South Africa), March 2016
- GIS Intermediate (NQF level 5): Hydrological modelling and terrain analysis using digital elevation models (University of the Free State, South Africa), 2014
- Project Management (Stellenbosch University), 2023
- Good Laboratory Practice seminar presented by Merck Millipore South Africa, 2012
- Laboratory Safety seminar presented by Merck Millipore South Africa, 2012
- Golden Key International Honour Society (Membership No.: 7564025), 2012

Selected Peer-reviewed Scientific Publications and Book Chapters (a full list is available on request)**:**

- **Keet J-H** & Hui C (2025) One-hectare fine-scale dataset of a fynbos plant community in the Cape Floristic Region. *Data in Brief*, https://doi.org/10.1016/j.dib.2025.111334
- Yannelli F, **Keet J-H**, Kritzinger-Klopper S, Le Roux JJ (2025) Legacy effects of an invasive legume more strongly impact bacterial than plant communities in a Mediterranean-type ecosystem. *Journal of Environmental Management* 373:123802, https://doi.org/10.1016/j.jenvman.2024.123802
- **Keet J-H**, Ellis AG, Hui C, Le Roux (2023) Responses of soil bacterial communities to invasive Australian *Acacia* species over large spatial scales. In: Richardson DM, Le Roux JJ, & Marchante E (Eds.) *Wattles: Australian Acacia Species Around the World*, CAB International, https://www.cabidigitallibrary.org/doi/10.1079/9781800622197.0000.
- **Keet J-H**, Datta A, Foxcroft LC, Kumschick S, Wilson JRU, Nichols GR, Richardson DM (2022) Assessing the level of compliance with alien plant regulations in a large African protected area. *Biological Invasions* 24: 3831 – 3844, https://doi.org/10.1007/s10530-022-02883-7.
- Warrington S, Ellis AG, **Keet J-H**, Le Roux JJ (2022) How does familiarity in rhizobial interactions impact the performance of invasive and native legumes? *Neobiota* 72: 129 – 156, https://neobiota.pensoft.net/article/79620/.
- **Keet J-H** & Richardson, DM (2022) A rapid survey of naturalized and invasive eucalypt species in southwestern Limpopo, South Africa. *South African Journal of Botany* 144: 339 – 346, https://doi.org/10.1016/j.sajb.2021.09.008.
- Novoa A, Foxcroft LC, **Keet J-H**, Pyšek P, Le Roux JJ (2021) The invasive cactus *Opuntia stricta* creates fertility islands in African savannas and benefits from those created by native trees. Scientific Reports 11: 20748, https://www.nature.com/articles/s41598-021-99857-x.
- **Keet J-H**, Ellis AG, Hui C, Novoa A, Le Roux JJ (2021) Impacts of invasive Australian acacias on soil bacterial community composition, microbial enzymatic activities, and nutrient availability in fynbos soils. *Microbial Ecology* 82: 704 – 721, http://dx.doi.org/10.1007/s00248-021-01683-1.
- **Keet J-H**, Robertson MP, Richardson DM (2020) *Alnus glutinosa* (Betulaceae) in South Africa: invasive potential and management options. *South African Journal of Botany* 135: 280 – 293, https://doi.org/10.1016/j.sajb.2020.09.009.

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- Wilson JRU, Datta A, Hirsch H, **Keet J-H**, Mbobo T, Nkuna KV, Nsikani MM, Pyšek P, Richardson DM, Zengeya TA, Kumschick S (2020) Is invasion science moving towards agreed standards? The influence of selected frameworks. *NeoBiota*, 62: 569 – 590, https://doi.org/10.3897/neobiota.62.53243.
- Novoa A, **Keet J-H**, Lechuga-Lago Y, Pyšek P, Le Roux JJ (2020) Urbanization and *Carpobrotus edulis* invasion alter the diversity and composition of soil bacterial communities in coastal areas. FEMS Microbiology Ecology 96(7): fiaa106, https://doi.org/10.1093/femsec/fiaa106.
- Le Roux JJ, Leishman MR, Cinantya AP, Gufu GD, Hirsch H, **Keet J-H**, Manea A, Saul W-C, Tabassum S, Warrington S, Yannelli FA, Ossola A (2020) Plant biodiversity in the face of global change. *Current Biology* 30: R371 – R392, https://doi.org/10.1016/j.cub.2020.02.066.
- Hirsch H, Allsopp MH, Canavan S, Cheek M, Geerts S, Geldenhuys CJ, Harding G, Hurley BP, Jones W, **Keet J-H**, Klein H, Ruwanza S, van Wilgen BW, Wingfield MJ, Richardson DM (2019) *Eucalyptus camaldulensis* in South Africa – past, present, future. *Transactions of the Royal Society of South Africa* 75(1): 1 – 22, https://doi.org/10.1080/0035919X.2019.1669732.
- Le Roux JJ, Hui C, Castillo ML, Iriondo, JM, **Keet J-H**, Khapugin, AA, Médail F, Rejmánek M, Theron G, Yannelli FA, Hirsch H (2019) Recent anthropogenic plant extinctions differ in biodiversity hotspots and coldspots. *Current Biology* 29(17): 2912 – 2918, https://doi.org/10.1016/j.cub.2019.07.063.
- **Keet J-H**, Ellis AG, Hui C, Le Roux JJ (2019) Strong spatial and temporal turnover of soil bacterial communities in South Africa's hyperdiverse fynbos biome. *Soil Biology and Biochemistry* 136: 107541, https://doi.org/10.1016/j.soilbio.2019.107541.
- Le Roux JJ, Ellis AG, Van Zyl L-M, Hosking ND, **Keet J-H**, Yannelli F (2018) Importance of soil legacy effects and successful mutualistic interactions during Australian acacia invasions in nutrient-poor environments. *Journal of Ecology* 106(5): 2071 – 2081, https://doi.org/10.1111/1365-2745.1296.
- **Keet J-H**, Ellis AG, Hui C, Le Roux JJ (2017) Legume–rhizobium symbiotic promiscuity and effectiveness do not affect plant invasiveness. *Annals of Botany* 119(8): 1319 – 1331, https://doi.org/10.1093/aob/mcx028.
- Le Roux JJ, **Keet J-H**, Mutiti B, Ellis AG (2017) Cultivation may not dramatically alter rhizobial community diversity or structure associated with rooibos tea (*Aspalathus linearis* Burm.f.) in South Africa. *South African Journal of Botany* 110: 87-96, https://doi.org/10.1016/j.sajb.2017.01.014.
- Le Roux JJ, Hui C, **Keet J-H**, Ellis AG (2017) Co-introduction vs ecological fitting as pathways to the establishment of effective mutualisms during biological invasions. *New Phytologist* 215(4): 1354 – 1360, https://doi.org/10.1111/nph.14593.
- Nsikani M, Novoa A, Van Wilgen B, **Keet J-H**, Gaertner M (2017) *Acacia saligna*'s soil legacy effects persist up to ten years after clearing: Implications for ecological restoration. *Austral Ecology* 42(8): 880 – 889, https://doi.org/10.1111/aec.12515.
- **Keet J-H**, Cindi D, Du Preez PJ (2016) Assessing the invasiveness of *Berberis aristata* and *B. julianae* (Berberidaceae) in South Africa: management options and legal recommendations. *South African Journal of Botany* 105: 288 – 298, https://doi.org/10.1016/j.sajb.2016.04.012.

Selected Conferences (a full list is available on request):

- 46th South African Association of Botanists conference (Qwa-Qwa, South Africa), January 2020, ***Alnus glutinosa* (L.) Gaertn. [Black Alder]: *an emerging invader in South Africa***
- International Association for Food Protection (IAFP; Louisville, Kentucky, USA), July 2019.
- Ecological Society of America Conference, (New Orleans, Louisiana, USA), August 2018 **Invasive legumes dramatically impact soil bacterial community structures but not function**
- Legumes for Life Workshop (Stellenbosch, South Africa), May 2018 **Legume-rhizobium symbiotic promiscuity and effectiveness do not affect plant invasiveness**
- Fynbos Forum Conference (Swellendam, South Africa), July 2017 **Assessing the impacts of invasive legumes on soil conditions and microbial community composition in a biodiversity hotspot**
- 43rd South African Association of Botanists Conference (Cape Town, South Africa), January 2017, **Legume-rhizobium symbiotic promiscuity and effectiveness do not affect plant invasiveness** *Best PhD presentation*
- 43rd Annual Research Symposium on the Management of Biological Invasions Conference (Worcester, South Africa), May 2016, **Legume-rhizobium symbiotic promiscuity does not determine plant invasiveness**
- Evolutionary dynamics of tree invasions: drivers, dimensions, and implications for management (Stellenbosch, South Africa), November 2015

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- Neobiota: 8th International Conference on Biological Invasions (Antalya, Turkey), November 2014, **Assessing the threat and potential for management of Berberis spp. (Berberidaceae) in South Africa**
- 42nd Annual Symposium on the Management of Invasive Alien Plants (Karridene Beach Hotel, Durban, South Africa)
- XXth Association for the Taxonomic Study of the Flora of Tropical Africa International Conference (Stellenbosch, South Africa), January 2014
- 41st Annual Symposium on the Management of Invasive Alien Plants (Cape St. Francis, South Africa), May 2013

Selected EIAs and other works (a full list is available on request)**:**

- Plant Species and Terrestrial Biodiversity Compliance Statement for an industrial development on Farm RE/37/168, Fisantekraal, Western Cape (September 2025). Report prepared for Doug Jeffrey Environmental. Reference: PR.25.002.
- Terrestrial Biodiversity Impact Assessment / Plant Species Impact Assessment for the clearing of vegetation on Portion 20 of Farm 323, Ceres (Koelefontein), Western Cape Province (August 2025). Report prepared for Doug Jeffrey Environmental. Reference: PR.25.010.
- Plant Species and Terrestrial Biodiversity Impact assessment for the proposed clearing of vegetation for a proposed access road and house on Portion 124 of Farm 559 Hangklip, Betty's Bay, Western Cape (August 2025). Report prepared for Ohana Environmental. Reference: PR.25.011.
- Botanical survey to identify Saldanha Limestone Strandveld on farms Yzerfontein 560 (partly), Tygerfontein 564, Coffee Fontein 563, Plot 2717, and the green corridors within Yzerfontein, Western Cape (August 2025). Report prepared for Jos de Villiers Belleggings Trust. Reference: PR.25.030.
- Terrestrial Biodiversity Impact Assessment / Plant Species Impact Assessment for a Proposed Green Technology and Industrial Development on the remainder of Erf 277, Atlantis, Cape Town, Western Cape Province (June 2025). Report prepared for Ohana Environmental. Reference: IA.25.012.
- Invasive Alien Plant Species Management Framework for the East London Industrial Development Zone (IDZ), East London, Eastern Cape Province, South Africa (June 2025). Report prepared for AGES. Reference: PR.25.017.
- Terrestrial Desktop Sensitivity for a Prospecting Right Application on Farm 622 for Uranium ore in the Namaqualand Magisterial District in the Northern Cape Province, South Africa (May 2025). Report prepared for Greenmined Environmental. Reference: PR.24.016.
- Terrestrial Desktop Sensitivity for a Proposed Prospecting Right On Farm Kamaggas no. 200, Drie Rivier No. 268, Polly's Kloof No. 267, Sannagas No. 269, and Klipfontein no. 266, for Uranium Ore in the Northern Cape Province, South Africa (May 2025). Report prepared for Greenmined Environmental. Reference: PR.24.018.
- Terrestrial Desktop Sensitivity for a Prospecting Right Application for Targeted Blocks on Farms Tusschen In 143, Aardvark 164, Steenbok 165, and Gifkop 166 near Steinkopf, Northern Cape Province, South Africa (May 2025). Report prepared for Greenmined Environmental. Reference: IA.25.006.
- Terrestrial Biodiversity Impact Assessment / Plant Species Impact Assessment for an industrial development on the proposed expansion of the bulk water pipeline on Portion 1 of Farm La Parisa No. 888, Paarl, Western Cape Province (May 2025). Report prepared for Doug Jeffrey Environmental. Reference: IA.25.003.
- Plant Species and Terrestrial Biodiversity Compliance Statement for illegal repairs to an old road through a watercourse and the removal of material from a water impoundment dam near Infanta, Western Cape (April 2025). Report prepared for EarthGrace. Reference: IA.25.016.
- Invasive Alien Species Risk Analysis Review of the Canetsfontein Wine Farm I&AS Risk Assessment Report (November 2024). Report prepared for Earthguard Consulting.
- (November 2024). Report prepared for Doug Jeffrey Environmental.
- Terrestrial Biodiversity and Plant Species Compliance Statement for a mining permit application project on Bonne Esperance Farm 83 near Tulbagh in the Western Cape Province (November 2024). Report prepared for Greenmined Environmental. Reference: IA.24.023.
- Section 24G Botanical Assessment for the construction of two unlawful dams on Farm 497 Portion 3 Weltevreden, Western Cape Province. Report prepared for Doug Jeffery Environmental (November 2024). Report prepared for Doug Jeffrey Environmental. Reference: IA.24.021.
- Invasive Alien Species Risk Analysis Review of the Canetsfontein Wine Farm I&AS Risk Assessment Report (November 2024). Report prepared for Earthguard Consulting.

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- N6 Galway City (Ireland) Ring Road Environmental Impact Assessment Report: Assistance with Data Analysis, Modelling, and Validation (July 2024 – January 2025). In collaboration with Scott Cawley, Ireland.
- Terrestrial Biodiversity and Plant Species Compliance Statement for a mining permit application project on Bonne Esperance Farm 83 near Tulbagh in the Western Cape Province (November 2024). Report prepared for Greenmined Environmental. Reference: IA.24.023.
- Invasive Alien Species Risk Analysis Review of the Canetsfontein Wine Farm I&AS Risk Assessment Report (November 2024). Report prepared for Earthguard Consulting.
- Plant and Terrestrial Biodiversity Assessment for a Mining Permit Extension application for the mining site Norrabees near Henkries, Northern Cape Province (May 2024). Report prepared for Site Plan Consulting. Reference: IA.24.010A.
- Plant and Terrestrial Biodiversity Assessment for a Mining Permit Application for the mining site Spodumene Kop near Henkries, Northern Cape Province (May 2024). Report prepared for Site Plan Consulting. Reference: IA.24.010B
- Terrestrial Biodiversity (Fauna, Flora and Terrestrial Biodiversity) study and impact Report for the Grid Connection Solution for the Proposed Onderstepoort Solar 1 and 2 Facilities Near Boshoek in the North West Province. In collaboration with Nkurenkuru Ecology and Biodiversity (PTY) Ltd. (April 2024). Report prepared for Atlantic Energy Partners.
- Specialist Invasive Alien Plant Species Assessment. (March 2024). Report prepared for Mpact Corrugated. Reference: IA.24.006.
- Terrestrial Biodiversity (Fauna, Flora, and Ecological EIA Phase Assessment) Report for the Proposed Kingston Solar PV Energy Facility Near Bothaville, Free State Province. In collaboration with Nkurenkuru Ecology and Biodiversity (PTY) Ltd. (March 2024). Report prepared for Atlantic Energy Partners.
- Terrestrial Biodiversity (Fauna, Flora, and Ecological EIA Phase Assessment) Report for the Proposed Crecy Photovoltaic Solar 4 Energy Facility and Associated Infrastructure near Mookgopong, Limpopo Province. In collaboration with Nkurenkuru Ecology and Biodiversity (PTY) Ltd. (February 2024). Report prepared for Atlantic Energy Partners.
- Plant and Terrestrial Biodiversity Assessment for a Solar Photovoltaic Facility near Northam, Limpopo. In collaboration with Nkurenkuru Ecology and Biodiversity (PTY) Ltd. (November 2023). Report prepared for Atlantic Energy Partners.
- Botanical Impact Assessment for a proposed rerouting of a sewer pipeline on Erf 5076, Khayalethu, Knysna, Western Cape. In collaboration with Keep Rooted (PTY) Ltd. (October 2023). Report prepared for Ohana Environmental. Reference: IA.23.015.
- Screening report for a proposed Solar PV plant near Boshoek, Northwest Province. In collaboration with Nkurenkuru Ecology and Biodiversity (PTY) Ltd. (September 2023). Report prepared for Atlantic Energy Partners.
- Plant and Terrestrial Biodiversity Assessment for a Powerline Corridor near Boshoek, Northwest Province. In collaboration with Nkurenkuru Ecology and Biodiversity (PTY) Ltd. (September 2023). Report prepared for Atlantic Energy Partners.
- Botanical Assessment and Motivation for a Mining Stockpile Area within a non-CBA zone on Farm Steinkopf no. 22 near Steinkopf, Northern Cape. (August 2023). Report prepared for Greenmined Environmental. Reference: IA.23.010.
- Botanical Impact Assessment: Development of portion 223 of Farm 559, Betty's Bay, Western Cape. (July 2023). Report prepared for Ohana Environmental. Reference: IA.23.007.
- Botanical Study and Assessment for a Housing Development, 2023. Proposed development of the development of Erf 397, Suiderstrand, Western Cape. Report prepared for RMS Environmental.
- Botanical Study and Assessment for a Mining Permit Application, 2023. Proposed development of a dolerite mine near Beaufort West, Western Cape. Report prepared for Greenmined Environmental (Pty) Ltd.
- In collaboration with Nkurenkuru Ecology and Biodiversity, 2022. Full Botanical Assessment for the proposed development of wind energy facilities south of Bethal, Mpumalanga Province.
- In collaboration with Nkurenkuru Ecology and Biodiversity, 2021. Application (Expansion of mining footprint), and Final Basic Assessment and Environmental Management Plan for the proposed sand mine expansion on Portion 4 of the Farm Zandberg Fontein 97, Western Cape Province.
- In collaboration with Nkurenkuru Ecology and Biodiversity, 2021. Proposed development of wind energy facilities on the farms Brussels, Driepoort (664-1 and 664-2), Kameelfontein, Lisbon, Nazareth, and Zwartkrans, near Vryburg, Northwest Province.

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- In collaboration with Nkurenkuru Ecology and Biodiversity, 2021. Botanical Study and Assessment: Proposed development of wind energy facilities on the farm Kluitjieskraal, Loeriesfontein, Northern Cape Province.
- In collaboration with Nkurenkuru Ecology and Biodiversity, 2021. Botanical Study and Assessment: Proposed development of an access road to the authorised Sutherland 1 and Rietrug wind energy facilities near Sutherland.
- Specialist Botanical Assessment Report: Assessment of Damage and Rehabilitation Costs for Unauthorised Driving of a 4x4 Vehicle in the Big Bay Open Space System, Cape Town. Prepared for Hannes, Pretorius, Bock & Bryant Attorneys.
- In collaboration with Nkurenkuru Ecology and Biodiversity, 2019. Mining Permit, Final Basic Assessment & Environmental Management Plan for the proposed mining of Sillimanite, Aggregate and Stone Gravel on the Farm Koenabib 43, Northern Cape Province. Botanical Study and Assessment Report. Unpublished report prepared by Nkurenkuru Ecology and Biodiversity for GreenMined Environmental. Version 1.0, 30 January 2020
- In collaboration with Nkurenkuru Ecology and Biodiversity, 2019. Mining Permit, Final Basic Assessment & Environmental Management Plan for the proposed mining of Sillimanite on the Farm Wortel 42, Northern Cape Province. Botanical Study and Assessment Report. Unpublished report prepared by Nkurenkuru Ecology and Biodiversity for GreenMined Environmental. Version 1.0, 30 January 2020
- Specialist Invasive Alien Plant Species Report: Prepared for: Mpact Corrugated, Kuils River (Western Cape), July 2019
- Proposed Township development, Country view, Gauteng: Biodiversity Impact Assessment (Flora) – Specialist Report prepared for Zone Land Solutions (PTY) Ltd, July 2015
- Colenso Anthracite Coal Mining and Power Station Project: Biodiversity Impact Assessment (Flora) – Specialist Report prepared for Zone Land Solutions (PTY) Ltd, July 2015

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- Address: 3 Jock Meiring Street, Park West, Bloemfontein, 9301
- Cell: 084 207 3454
- Email: gabotha11@gmail.com
- Date of Birth: 11 April 1986

Expertise and Experience:

- Research Project Management
- Botanical researcher in projects involving the description of terrestrial and coastal ecosystems.
- Broad expertise in the ecology and conservation of grasslands, savannahs, karroid wetland, and aquatic ecosystems.
- Ecological and Biodiversity assessments for developmental purposes (BAR, EIA), with extensive knowledge and experience in the renewable energy field (Refer to Work Experiences and References)
- Over 3 years of avifaunal monitoring and assessment experience.
- Mapping and Infield delineation of wetlands, riparian zones and aquatic habitats (according to methods stipulated by DWA, 2008) within various South African provinces of KwaZulu-Natal, Mpumalanga, Free State, Gauteng and Northern Cape Province for inventory and management purposes.
- Wetland and aquatic buffer allocations according to industry best practice guidelines.
- Working knowledge of environmental planning policies, regulatory frameworks, and legislation
- Identification and assessment of potential environmental impacts and benefits.
- Assessment of various wetland ecosystems to highlight potential impacts, within current and proposed landscape settings, and recommend appropriate mitigation and offsets based on assessing wetland ecosystem service delivery (functions) and ecological health/integrity.
- Development of practical and achievable mitigation measures and management plans and evaluation of risk to execution

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- Qualitative and Quantitative Research
- Experienced in field research and monitoring
- Working knowledge of GIS applications and analysis of satellite imagery data
- Completed projects in several Provinces of South Africa and include a number of projects located in sensitive and ecological unique regions

Tertiary Education:

- 2015: Currently completing a M.Sc. degree in Botany (Vegetation Ecology), University of the Free State, Bloemfontein, RSA.
- 2009: B.Sc. Hons in Botany (Vegetation Ecology), University of the Free State, Bloemfontein, RSA.
- 2008: B.Sc. in Zoology and Botany, University of the Free State, University of the Free State, Bloemfontein, RSA

Employment History:

- December 2017 – Current: Nkurenkuru Ecology and Biodiversity (Pty) Ltd
- 2016 – November 2017: ECO-CARE Consultancy
- 2015 - 2016: Ecologist, Savannah Environmental (Pty) Ltd
- 2013 – 2014: Working as ecologist on a freelance basis, involved in part-time and contractual positions for the following companies:
    - Enviroworks (Pty) Ltd
    - GreenMined (Pty) Ltd
    - Eco-Care Consultancy (Pty) Ltd
    - Enviro-Niche Consulting (Pty) Ltd
    - Savannah Environmental (Pty) Ltd
    - Esicongweni Environmental Services (EES) cc
- 2010 - 2012: Enviroworks (Pty) Ltd

Memberships, Certifications, and Short Courses:

- SACNASP: Professional Natural Scientist (No.: 400502/14)

Selected Peer-reviewed Scientific Publications and Book Chapters (a full list is available on request)**:**

- **Botha, G.A**. & Du Preez, P.J. (2015) A description of the wetland and riparian vegetation of the Nxamasere palaeo-river's backflooded section, Okavango Delta, Botswana. *South African Journal of Botany*, 98:172-173.

Selected Conferences (a full list is available on request)**:**

- Botha, G.A. 2015. **A description of the wetland and riparian vegetation of the Nxamasere palaeo-river's backflooded section, Okavango Delta, Botswana**. 41st Annual Congress of South African Association of Botanists (SAAB). Tshipise, 11-15 Jan. 2015.
- Botha, G.A. 2014. **A description of the vegetation of the Nxamasere floodplain, Okavango Delta, Botswana**. 10st Annual University of Johannesburg (UJ) Postgraduate Botany Symposium. Johannesburg, 28 Oct. 2014

Selected EIAs and other works (a full list is available on request)**:**

Date Completed	Project Description	Type of Assessment/Study	Client
2019	Sirius Three Solar PV Facility near Upington, Northern Cape	Ecological Assessment (Basic Assessment)	Aurora Power Solutions
2019	Sirius Four Solar PV Facility near Upington, Northern Cape	Ecological Assessment (Basic Assessment)	Aurora Power Solutions

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2019	Lichtenburg 1 100MW Solar PV Facility, Lichtenburg, North-West Province	Ecological Assessment (Scoping and EIA Phase Assessments)	Atlantic Renewable Energy Partners
2019	Lichtenburg 2 100MW Solar PV Facility, Lichtenburg, North-West Province	Ecological Assessment (Scoping and EIA Phase Assessments)	Atlantic Renewable Energy Partners
2019	Lichtenburg 3 100MW Solar PV Facility, Lichtenburg, North-West Province	Ecological Assessment (Scoping and EIA Phase Assessments)	Atlantic Renewable Energy Partners
2019	Moeding Solar PV Facility near Vryburg, North-West Province	Ecological Assessment (Basic Assessment)	Moeding Solar
2019	Expansion of the Raumix Aliwal North Quarry, Eastern Cape Province	Fauna and Flora Pre-Construction Walk-Through Assessment	GreenMined
2018	Kruisvallei Hydroelectric 22kV Overhead Power Line, Clarens, Free State Province	Faunal and Flora Rescue and Protection Plan	Zevobuzz
2018	Kruisvallei Hydroelectric 22kV Overhead Power Line, Clarens, Free State Province	Fauna and Flora Pre-Construction Walk-Through Assessment	Zevobuzz
2018	Proposed Kruisvallei Hydroelectric Power Generation Scheme in the Ash River, Free State Province	Ecological Assessment (Basic Assessment)	Zevobuzz
2018	Proposed Zonnebloem Switching Station (132/22kV) and 2X Loop-in Loop-out Power Lines (132kV), Mpumalanga Province	Ecological Assessment (Basic Assessment)	Eskom
2018	Clayville Thermal Plant within the Clayville Industrial Area, Gauteng Province	Ecological Comments Letter	Savannah Environmental
2018	Iziduli Emoyeni Wind Farm near Bedford, Eastern Cape Province	Ecological Assessment (Re-assessment)	Emoyeni Wid Farm Renewable Energy
2018	Msenge Wind Farm near Bedford, Eastern Cape Province	Ecological Assessment (Re-assessment)	Amakhala Emoyeni Renewable Energy
2017	H2 Energy Power Station near Kwamhlanga, Mpumalanga Province	Ecological Assessment (Scoping and EIA phase assessments)	Eskom
2017	Karusa Wind Farm (Phase 1 of the Hidden Valley Wind Energy Facility near Sutherland, Northern Cape Province)	Ecological Assessment (Re-assessment)	ACED Renewables Hidden Valley
2017	Soetwater Wind Farm (Phase 2 of the Hidden Valley Wind Energy Facility near Sutherland, Northern Cape Province)	Ecological Assessment (Re-assessment)	ACED Renewables Hidden Valley
2017	S24G for the unlawful commencement or continuation of activities within a watercourse, Honeydew, Gauteng Province	Ecological Assessment	Savannah Environmental
2016 - 2017	Noupoort CSP Facility near Noupoort, Northern Cape Province	Ecological Assessment (Scoping and EIA phase assessments)	Cresco
2016	Buffels Solar 2 PV Facility near Orkney, North West Province	Ecological Assessment (Scoping and EIA phase assessments)	Kabi Solar
2016	Buffels Solar 1 PV Facility near Orkney, North West Province	Ecological Assessment (Scoping and EIA phase assessments)	Kabi Solar
2016	132kV Power Line and On-Site Substation for the Authorised Golden Valley II Wind Energy Facility near Bedford, Eastern Cape Province	Ecological Assessment (Basic Assessment)	Terra Wind Energy
2016	Kalahari CSP Facility: 132kV Ferrum–Kalahari–UNTU & 132kV Kathu IPP–Kathu 1 Overhead Power Lines, Kathu, Northern Cape Province	Fauna and Flora Pre-Construction Walk-Through Assessment	Kathu Solar Park
2016	Kalahari CSP Facility: Access Roads, Kathu, Northern Cape Province	Fauna and Flora Pre-Construction Walk-Through Assessment	Kathu Solar Park
2016	Karoshoek Solar Valley Development – Additional CSP Facility including tower infrastructure associated with authorised CSP Site 2 near Upington, Northern Cape Province	Ecological Assessment (Scoping Assessment)	Emvelo

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2016	Karoshoek Solar Valley Development –Ilanga CSP 7 and 8 Facilities near Upington, Northern Cape Province	Ecological Assessment (Scoping Assessment)	Emvelo
2016	Karoshoek Solar Valley Development –Ilanga CSP 9 Facility near Upington, Northern Cape Province	Ecological Assessment (Scoping Assessment)	Emvelo
2016	Lehae Training Academy and Fire Station, Gauteng Province	Ecological Assessment	Savannah Environmental
2016	Metal Industrial Cluster and Associated Infrastructure near Kuruman, Northern Cape Province	Ecological Assessment (Scoping Assessment)	Northern Cape Department of Economic Development and Tourism
2016	Semonkong Wind Energy Facility near Semonkong, Maseru District, Lesotho	Ecological Pre-Feasibility Study	Savannah Environmental
2015 - 2016	Orkney Solar PV Facility near Orkney, North West Province	Ecological Assessment (Scoping and EIA phase assessments)	Genesis Eco-Energy
2015 - 2016	Woodhouse 1 and Woodhouse 2 PV Facilities near Vryburg, North West Province	Ecological Assessment (Scoping and EIA phase assessments)	Genesis Eco-Energy
2015	CAMCO Clean Energy 100kW PV Solar Facility, Thaba Eco Lodge near Johannesburg, Gauteng Province	Ecological Assessment (Basic Assessment)	CAMCO Clean Energy
2015	CAMCO Clean Energy 100kW PV Solar Facility, Thaba Eco Lodge near Johannesburg, Gauteng Province	Ecological Assessment (Basic Assessment)	CAMCO Clean Energy
2015	Sirius 1 Solar PV Project near Upington, Northern Cape Province	Fauna and Flora Pre-Construction Walk-Through Assessment	Aurora Power Solutions
2015	Sirius 2 Solar PV Project near Upington, Northern Cape Province	Fauna and Flora Pre-Construction Walk-Through Assessment	Aurora Power Solutions
2015	Sirius 1 Solar PV Project near Upington, Northern Cape Province	Invasive Plant Management Plan	Aurora Power Solutions
2015	Sirius 2 Solar PV Project near Upington, Northern Cape Province	Invasive Plant Management Plan	Aurora Power Solutions
2015	Sirius 1 Solar PV Project near Upington, Northern Cape Province	Plant Rehabilitation Management Plan	Aurora Power Solutions
2015	Sirius Phase 2 Solar PV Project near Upington, Northern Cape Province	Plant Rehabilitation Management Plan	Aurora Power Solutions
2015	Sirius 1 Solar PV Project near Upington, Northern Cape Province	Plant Rescue and Protection Plan	Aurora Power Solutions
2015	Sirius Phase 2 Solar PV Project near Upington, Northern Cape Province	Plant Rescue and Protection Plan	Aurora Power Solutions
2015	Expansion of the existing Komsberg Main Transmission Substation near Sutherland, Northern Cape Province	Ecological Assessment (Basic Assessment)	ESKOM
2015	Karusa Wind Farm near Sutherland, Northern Cape Province)	Invasive Plant Management Plan	ACED Renewables Hidden Valley
2015	Proposed Karusa Facility Substation and Ancillaries near Sutherland, Northern Cape Province	Ecological Assessment (Basic Assessment)	ACED Renewables Hidden Valley
2015	Eskom Karusa Switching Station and 132kV Double Circuit Overhead Power Line near Sutherland, Northern Cape Province	Ecological Assessment (Basic Assessment)	ESKOM
2015	Karusa Wind Farm near Sutherland, Northern Cape Province)	Plant Search and Rescue and Rehabilitation Management Plan	ACED Renewables Hidden Valley
2015	Karusa Wind Energy Facility near Sutherland, Northern Cape Province	Fauna and Flora Pre-Construction Walk-Through Assessment	ACED Renewables Hidden Valley
2015	Soetwater Facility Substation, 132kV Overhead Power Line and Ancillaries, near Sutherland, Northern Cape Province	Ecological Assessment (Basic Assessment)	ACED Renewables Hidden Valley
2015	Soetwater Wind Farm near Sutherland, Northern Cape Province)	Invasive Plant Management Plan	ACED Renewables Hidden Valley

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2015	Soetwater Wind Energy Facility near Sutherland, Northern Cape Province	Fauna and Flora Pre-Construction Walk-Through Assessment	ACED Renewables Hidden Valley
2015	Soetwater Wind Farm near Sutherland, Northern Cape Province	Plant Search and Rescue and Rehabilitation Management Plan	ACED Renewables Hidden Valley
2015	Expansion of the existing Scottburgh quarry near Amandawe, KwaZulu-Natal	Botanical Assessment (for EIA)	GreenMined Environmental
2015	Expansion of the existing AFRIMAT quarry near Hluhluwe, KwaZulu-Natal	Botanical Assessment (for EIA)	GreenMined Environmental
2014	Tshepong 5MW PV facility within Harmony Gold's mining rights areas, Odendaalsrus	Ecological Assessment (Basic Assessment)	BBEnergy
2014	Nyala 5MW PV facility within Harmony Gold's mining rights areas, Odendaalsrus	Ecological Assessment (Basic Assessment)	BBEnergy
2014	Eland 5MW PV facility within Harmony Gold's mining rights areas, Odendaalsrus	Ecological Assessment (Basic Assessment)	BBEnergy
2014	Transalloys circulating fluidised bed power station near Emalahleni, Mpumalanga Province	Ecological Assessment (for EIA)	Trans-Alloys
2014	Umbani circulating fluidised bed power station near Kriel, Mpumalanga Province	Ecological Assessment (Scoping and EIA)	Eskom
2014	Gihon 75MW Solar Farm: Bela-Bela, Limpopo Province	Ecological Assessment (for EIA)	NETWORX Renewables
2014	Steelpoort Integration Project & Steelpoort to Wolwekraal 400kV Power Line	Fauna and Flora Pre-Construction Walk-Through Assessment	Eskom
2014	Audit of protected *Acacia erioloba* trees within the Assmang Wrenchville housing development footprint area	Botanical Audit	Eco-Care Consultancy
2014	Rehabilitation of the N1 National Road between Sydenham and Glen Lyon	Peer review of the ecological report	EKO Environmental
2014	Rehabilitation of the N6 National Road between Onze Rust and Bloemfontein	Peer review of the ecological report	EKO Environmental
2011	Illegally ploughed land on the Farm Wolwekop 2353, Bloemfontein	Vegetation Rehabilitation Plan	EnviroWorks
2011	Rocks Farm chicken broiler houses	Botanical Assessment (for EIA)	EnviroWorks
2011	Botshabelo 132 kV line	Ecological Assessment (for EIA)	CENTLEC
2011	De Aar Freight Transport Hub	Ecological Scoping and Feasibility Study	EnviroWorks
2011	The proposed establishment of the Tugela Ridge Eco Estate on the farm Kruisfontein, Bergville	Ecological Assessment (for EIA)	EnviroWorks
2010 - 2011	National long-haul optic fibre infrastructure network project, Bloemfontein to Beaufort West	Vegetation Rehabilitation Plan for illegally cleared areas	NEOTEL
2010 - 2011	National long-haul optic fibre infrastructure network project, Bloemfontein to Beaufort West	Invasive Plant Management Plan	NEOTEL
2010 - 2011	National long-haul optic fibre infrastructure network project, Bloemfontein to Beaufort West	Protected and Endangered Species Walk-Through Survey	NEOTEL
2011	Optic Fibre Infrastructure Network, Swartland Municipality	Botanical Assessment (for EIA) - Assisted Dr. Dave McDonald	Dark Fibre Africa
2011	Optic Fibre Infrastructure Network, City of Cape Town Municipality	Botanical Assessment (for EIA) - Assisted Dr. Dave McDonald	Dark Fibre Africa
2010	Construction of an icon at the southernmost tip of Africa, Agulhas National Park	Botanical Assessment (for EIA)	SANPARKS
2010	New boardwalk from Suiderstrand Gravel Road to Rasperpunt, Agulhas National Park	Botanical Assessment (for EIA)	SANPARKS
2010	Farm development for academic purposes (Maluti FET College) on the Farm Rosedale 107, Harrismith	Ecological Assessment (Screening and Feasibility Study)	Agri Development Solutions
2010	Basic Assessment: Barcelona 88/11kV substation and 88kV loop-in lines	Botanical Assessment (for EIA)	Eskom Distribution

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2011	Illegally ploughed land on the Farm Wolwekop 2353, Bloemfontein	Vegetation Rehabilitation Plan	EnviroWorks

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