TERRESTRIAL ANIMAL SPECIES SPECIALIST ASSESSMENT FOR THE PROPOSED PLETTENBERG BAY LAGOON RESIDENTIAL ESTATE

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Amber has over ten years' experience in environmental consulting and has managed projects across various sectors including mining, agriculture, forestry, renewable energy, housing, coastal and wetland recreational infrastructure. Most of these projects required lender finance and therefore met both in-country, lender, and sector specific requirements.

Amber completed the IFC lead and Swiss funded programme in Environmental and Social Risk Management course in 2018. The purpose of the course was to upskill Sub-Saharan African environmental consultants to increase the uptake of E&S standards by Financial Institutions.

Amber specialises in terrestrial vertebrate faunal assessments. She has conducted large scale faunal impact assessments that are to international lender's standards in Mozambique, Tanzania, Lesotho and Malawi. In South Africa her faunal impact assessments comply with the protocols for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity and follows the SANBI Species Environmental Assessment Guideline. Her specialist input goes beyond impact assessments and includes faunal opportunities and constraints assessments, Critical Habitat Assessments, Biodiversity related Management Plans and Biodiversity Monitoring Programmes.

Amber holds a BSc (Zoology and Ecology, Environment & Conservation) and BSc (Hons) in Ecology, Environment & Conservation from WITS University and an MPhil in Environmental Management from University of Cape Town. She was awarded the Denzil and Dorethy Carr Prize for her plant collection in 2006. Amber's honours focused on the landscape effects on Herpetofauna in Kruger National Park and her Master's thesis focused on the management of social and natural aspects of environmental systems with a dissertation in food security that investigated the complex food system of informal and formal distribution markets.

Tarryn Martin (Botanical Specialist and Report Review) (*Pri. Sci. Nat* 008745)
Tarryn has over ten years of experience working as a botanist, nine of which are in the environmental sector. She has worked as a specialist and project manager on projects within South Africa, Mozambique, Lesotho, Zambia, Tanzania, Cameroon, Swaziland and Malawi. The majority of these projects required lender finance and consequently met both in-country and lender requirements.

Tarryn has extensive experience writing botanical impact assessments, critical habitat assessments, biodiversity management plans, biodiversity monitoring plans and Environmental Impact Assessments to International Standards, especially to those of the International Finance Corporation (IFC). Her experience includes working on large mining projects such as the Kenmare Heavy Minerals Mine, where she monitored forest health, undertook botanical impact assessments for their expansion projects and designed biodiversity management and monitoring plans. She has also project managed Environmental Impact Assessments for graphite mines in northern Mozambique and has a good understanding of the Mozambique Environmental legislation and processes.

Tarryn holds a BSc (Botany and Zoology), a BSc (Hons) in African Vertebrate Biodiversity and an MSc with distinction in Botany from Rhodes University. Tarryn's Master's thesis examined the impact of fire on the recovery of C3 and C4 Panicoid and non-Panicoid grasses within the context of climate change for which she won the Junior Captain Scott-Medal (Plant Science) for producing the top MSc of 2010 from the South African Academy of Science and Art as well as an Award for Outstanding Academic Achievement in Range and Forage Science from the Grassland Society of Southern Africa.
Tarryn is a professional member of the South African Council for Natural Scientific Professionals (since 2014).

Declaration of Independence

Amber Jackson (Faunal Specialist and Report Author)

- I, Amber Jackson, declare that, in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Amended Environmental Impact Assessment Regulations, 2017;
- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this report are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

…….. ……

SIGNED DATE

Specialist Check List

The contents of this Terrestrial Animal Species Specialist Assessment Report complies with the legislated requirements as described in Section 3 of the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species (GN R. 1150 of 2020).

SPECIALIST REPORT REQUIREMENTS ACCORDING TO GN R. 1150			SECTION OF REPORT
3.1	In terms of Section 3 of the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species, a specialist report must contain, as a minimum, the following information:		
	3.1.1	Contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the assessment including a curriculum vitae;	Page 2 & 3; Appendix 1 & 2
	3.1.2	A signed statement of independence by the specialist;	Page 4
	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;	Section 1.3 and 2.3
	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;	Chapter 2
	3.1.5	A description of the mean density of observations/number of sample sites per unit area and the site inspection observations;	Section 2.3
	3.1.6	A description of the assumptions made and any uncertainties or gaps in knowledge or data;	Section 1.3
	3.1.7	Details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported	Section 4.3
	3.1.8	The online database name, hyperlink and record accession numbers for disseminated evidence of SCC found within the study area;	Section 2.3
	3.1.9	The location of areas not suitable for development and to be avoided during construction where relevant;	Chapter 5
	3.1.10	A discussion on the cumulative impacts;	Chapter 6
	3.1.11	Impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	Chapter 6
	3.1.12	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	Chapter 7
	3.1.13	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.	N/A
3.2	**A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.**		

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Acronyms

AOO	Area of Occupancy
ASL	Above sea level
BI	Biodiversity Importance
CI	Conservation Importance
CR	Critically Endangered
EAP	Environmental Assessment Practitioner
EN	Endangered
EOO	Extent of Occupancy
FI	Functional Integrity
ha	Hectare
IUCN	International Union for Conservation of Nature
km	kilometre
LC	Least Concern
m	meter
NT	Near-Threatened
QDS	Quarter Degree Square
RR	Receptor Resilience
SA	South Africa
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
SEI	Site Ecological Importance
TOPS	Threatened and Protected Species
VU	Vulnerable
WC	Western Cape

1. INTRODUCTION

1.1. Project Description

Biodiversity Africa has been appointed by the Environmental Assessment Practitioner (EAP), CapeEAPrac, to undertake a Terrestrial Animal Species Specialist Assessment for the proposed Plettenberg Bay Lagoon Residential Estate located on Erf 6503 within the Bitou Local Municipality, Western Cape Province (Figure 1.1).

The proposed residential estate will consist of the following:

- 9 x single residential (Residential Zone I) erven.
- 28 x group housing (Residential Zone I) erven.
- 40 x apartments (Residential Zone IV): 5 x general residential erven and 8 x apartments per erf.
- Communal open space with a club house and communal recreation space.
- Private Nature Reserve.

The proposed development will therefore consist of ±77 residential units.

The total area of Erf 6503 is approximately 18.5 ha in extent which has been divided into two portions: the western portion, which is characterised by disturbed vegetation that was historically used for grazing, and the eastern portion, which is characterised by dense intact thicket vegetation that abuts the Keurbooms Lagoon. The proposed development will be restricted to the western portion of Erf 6503 (i.e. the previously disturbed area).

Figure 1.2 illustrates the layout of the proposed development.

1.2. Objectives of this Faunal Assessment

The objectives of this Terrestrial Animal Species Specialist Assessment are as follows:

- Undertake a desktop assessment of the site to determine its sensitivity and terrestrial animal species (birds, amphibians, reptiles and mammals) of Conservation Concern (SCC) that could be present within the site.
- Assess the sensitivity of the site using the sensitivity analysis approach outlined in the Species Environmental Assessment Guideline (2020).
- For areas of moderate and high sensitivity, assess the impact that the construction of the infrastructure will have on terrestrial animal species.
- Where necessary, provide mitigation measures to reduce the impact of the infrastructure on the terrestrial animal species.
- Provide a specialist statement/opinion

1.3. Limitations and Assumptions

This report is based on current available information and, as a result, the following limitations and assumptions are implicit:

- Species of Conservation Concern (SCC) are difficult to find and may be difficult to identify, thus species described in this report do not comprise an exhaustive list. It is almost certain that additional SCCs are present.
- This report is based on the project description received from the client and assumes that the proposed development will be contained to the previously disturb western portion of the project area.
- This assessment does not include invertebrates (insects) that form part of the animal sensitivity theme in the DFFE Screening Report.
- Sampling could only be carried out at one stage in the annual or seasonal cycle. The survey was conducted in June 2023 (Winter). Despite the timing of the site visit, the information gathered was sufficient to determine the Site Ecological Importance (SEI) of the project area.

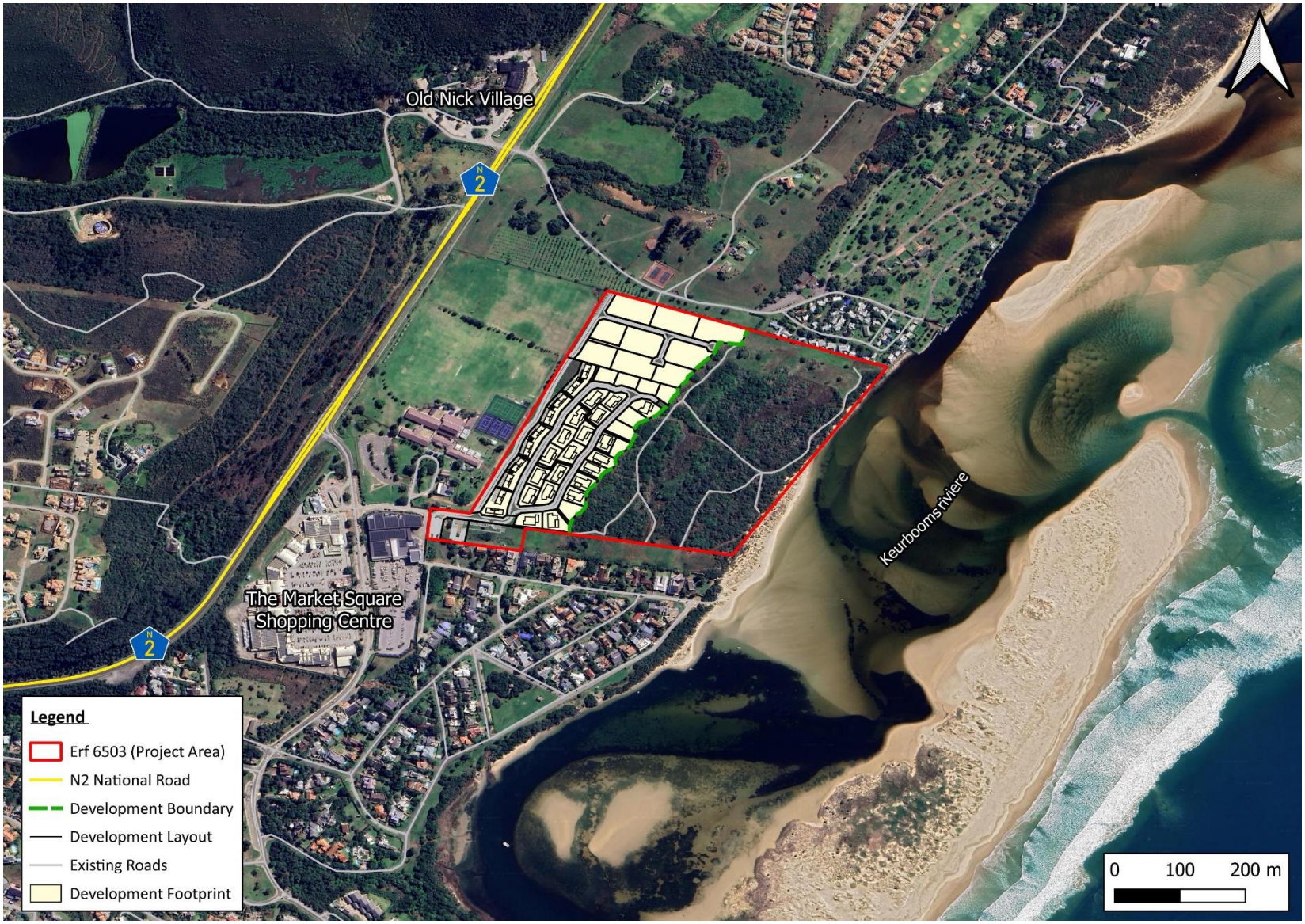

Figure 1.1: Locality map of the proposed residential estate.

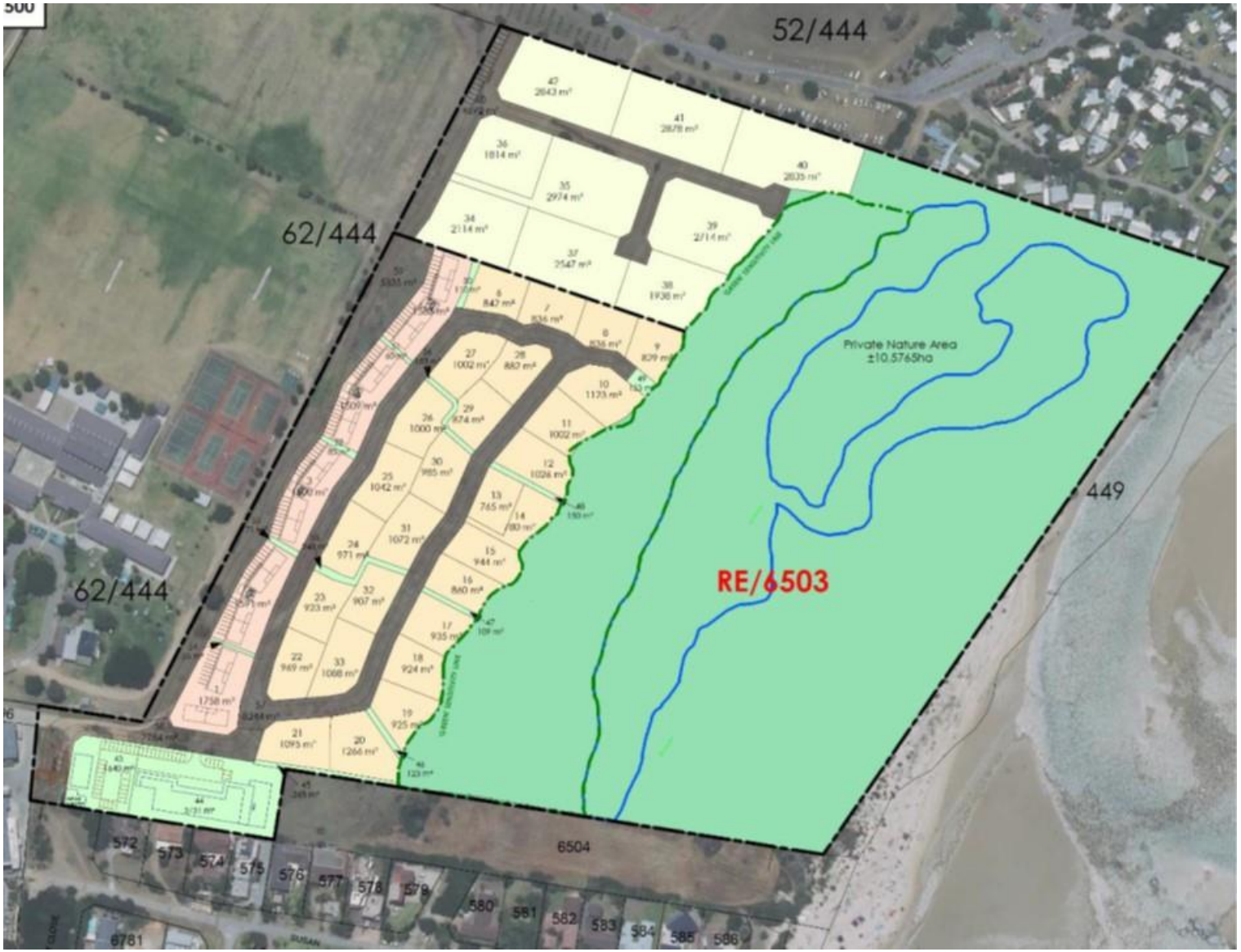

Figure 1.2: Layout of the proposed development on Erf 6503.

2. METHODOLOGY

2.1. DFFE Screening Report

The Department of Fisheries, Forestry and Environment (DFFE) Screening Report generated for the proposed project area identified seven bird species, one amphibian species and two mammal species that may utilise the project area (Table 2.1).

Table 2.1: Summary of DFFE screening report theme relevant to this study.

DFFE Sensitivity	Taxon	Feature(s)	Common Name	Threat Status
High	Aves	*Circus ranivorus*	Marsh Harrier	EN
High	Aves	*Circus maurus*	Black Harrier	EN
High	Aves	*Stephanoaetus coronatus*	Crowned Eagle	VU
High	Aves	*Hydroprogne caspia*	Caspian Tern	VU
High	Aves	*Neotis denhami*	Denham's Bustard	VU
High	Aves	*Bradypterus sylvaticus*	Knysna Warbler	VU
High	Aves	*Polemaetus bellicosus*	Martial Eagle	EN
Medium	Amphibia	*Afrixalus knysnae*	Knysna Spiny Frog	EN
Medium	Mammalia	*Chlorotalpa duthieae*	Duthie's Golden Mole	VU
Medium	Sensitive species 8	*Sensitive species 8*	Sensitive species 8	VU

2.2. Desktop Assessment

The known diversity of terrestrial vertebrate fauna in the project area was determined by a literature review. Species known from the region, or from adjacent regions whose preferred habitat(s) were known to occur within the study area, were also included. Literature sources included:

- Birds – SABAP2 (2023), Chittenden (2009);
- Amphibians –Du Preez & Carruthers (2017), FrogMap (FitzPatrick, 2023);
- Reptiles – Branch (1998), ReptileMap (FitzPatrick, 2023);
- Mammals – Stuart & Stuart (2015), MammalMap (FitzPatrick, 2023);
- iNaturalist (2023); and
- Western Cape Province State of Biodiversity (CapeNature, 2017).

To establish which of those species identified in the literature review are Species of Conservation Concern (SCC), the following sources were consulted:

- Atlas and Red List of Reptiles of South Africa, Lesotho and Swaziland (Bates *et al*., 2014)
- Atlas and Red List of Frogs of South Africa, Lesotho and Swaziland (Minter *et al*., 2004)
- Red List of Mammals of South Africa, Swaziland and Lesotho (Child, *et al.,* 2016)
- Red Data Book of Birds of South Africa, Lesotho and Swaziland (Taylor, *et al*., 2015)
- IUCN (2022)
- Western Cape Nature Conservation Laws Amendment Act, 2000
- NEM:BA (10 OF 2004) and TOPS
- CITES Appendix I and II

A species list was compiled for the site and the likelihood of occurrence assessed for SCC.

2.3. Field Survey

The purpose of the field survey was to verify the findings of the DFFE Screening Report and desktop assessment and to establish what habitats are available to fauna in the project area and if any faunal SCC occur. The field survey was undertaken in winter from the 21-23 June 2023. Figure 2.1 indicates the sample sites and tracks recorded during the field survey. During the field survey, the project area was walked, and faunal habitats established. Active searching was then conducted in various habitats present within the project area. Active searching for amphibians, reptiles, mammals and birds includes direct and indirect observation.

Direct observations were done by walking through the project area and recording species seen. In addition, refuge sites were targeted to search for specific species:

- Reptiles and terrestrial amphibians were targeted in microhabitats by lifting logs, peeling away bark and scraping through leaf litter.
- Amphibians were targeted at the water bodies where individuals were searched for along banks, within fringe vegetation and in the water itself.
- Binoculars were used to view bird's species from a distance without disturbing them. While walking the site, birds and mammals are often flushed from hiding and were recorded.

Indirect observation is the searching for evidence of faunal presence and includes spoor, skat, roadkill, skulls, quills, dens, burrows, hairs, scrapings and diggings. Evidence of SCC was uploaded onto iNaturalist (the hyperlink has not been pasted here due to the sensitivity of the species).

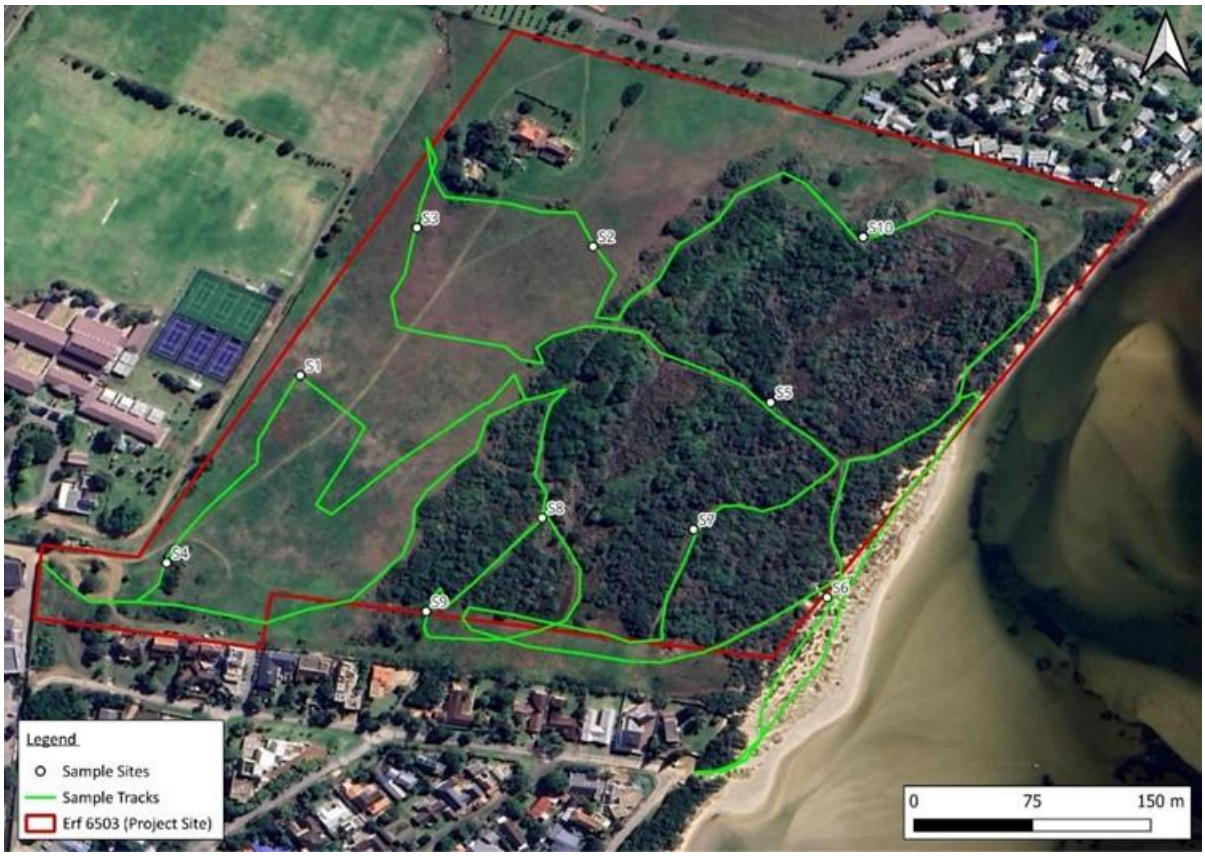

Figure 2.1: Map showing sample sites and tracks in relation to the project area.

2.4. Site Sensitivity Assessment

The Species Environmental Assessment Guideline (SANBI, 2020) was applied to assess the Site Ecological Importance (SEI) of the project area. The habitats and the Species of Conservation Concern (SCC) in the project area were assessed based on their conservation importance, functional integrity, and receptor resilience (Table 2.2). The combination of these resulted in a rating of SEI and interpretation of mitigation requirements based on the ratings.

The sensitivity map was developed using available spatial planning tools as well as by applying the SEI sensitivity based on the field survey.

Table 2.2: Criteria for establishing Site Ecological Importance and description of criteria.

Criteria	Description
Conservation Importance (CI)	*The importance of a site for supporting biodiversity features of conservation concern present e.g. populations of Threatened and Near-Threatened species (CR, EN, VU & NT), Rare, range-restricted species, globally significant populations of congregatory species, and areas of threatened ecosystem types, through predominantly natural processes.*
Functional Integrity (FI)	*A measure of the ecological condition of the impact receptor as determined by its remaining intact and functional area, its connectivity to other natural areas and the degree of current persistent ecological impacts.*
Biodiversity Importance (BI) is a function of Conservation Importance (CI) and the Functional Integrity (FI) of a receptor.	
Receptor Resilience (RR)	*The intrinsic capacity of the receptor to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention.*
Site Ecological Importance (SEI) is a function of Biodiversity Importance (BI) and Receptor Resilience (RR)	

2.5. Description of impact analysis methodology

The rating scale developed by Coastal and Environmental Services, in accordance with the requirements outlined in Appendix 1 of the NEMA EIA Regulations (2014 and subsequent 2017 & 2021 amendments), was applied to ensure a balanced and objective approach to the assessment of potential impacts associated with the proposed development. The criteria used to assess the potential impacts is outlined below.

Impact significance pre-mitigation

This rating scale adopts six key factors to determine the overall significance of the impact prior to mitigation:

1. **Nature of impact:** Defines whether the impact has a negative or positive effect on the receiving environment.
2. **Type of impact:** Defines whether the impact has a direct, indirect or cumulative effect on the environment.

3. **Duration:** Defines the relationship of the impact to temporal scales. The temporal scale defines the significance of the impact at various time scales as an indication of the duration of the impact. This may extend from the short-term (less than 5 years, equivalent to the construction phase) to permanent. Generally, the longer the impact occurs the greater the significance of any given impact.
4. **Extent:** Describes the relationship of the impact to spatial scales i.e. the physical extent of the impact. This may extend from the local area to an impact that crosses international boundaries. The wider the spatial scale the impact extends, the more significant the impact is considered to be.
5. **Probability:** Refers to the likelihood (risk or chance) of the impact occurring. While many impacts generally do occur, there is considerable uncertainty in terms of others. The scale varies from unlikely to definite, with the overall impact significance increasing as the likelihood increases.
6. **Severity or benefits:** The severity/beneficial scale is used in order to scientifically evaluate how severe negative impacts would be, or how beneficial positive impacts would be on the receiving environment. The severity of an impact can be evaluated prior and post mitigation to demonstrate the seriousness of the impact if it is not mitigated, as well as the effectiveness of the mitigation measures. The word 'mitigation' does not only refer to 'compensation', but also includes concepts of containment and remedy. For beneficial impacts, optimization refers to any measure that can enhance the benefits. Mitigation or optimisation should be practical, technically feasible and economically viable.

For each impact, the duration, extent and probability are ranked and assigned a score. These scores are combined and used to determine the overall impact significance prior to mitigation. They must then be considered against the severity rating to determine the overall significance of an activity. This is because the severity of the impact is far more important than the other three criteria. The overall significance is either negative or positive (Criterion 1) and direct, indirect or cumulative (Criterion 2).

Table 2.3: Evaluation Criteria.

Duration (Temporal Scale)	
Short term	*Less than 5 years*
Medium term	*Between 5-20 years*
Long term	*Between 20 and 40 years (a generation) and from a human perspective also permanent*
Permanent	*Over 40 years and resulting in a permanent and lasting change that will always be there*
Extent (Spatial Scale)	
Localised	*At localised scale and a few hectares in extent*
Study Area	*The proposed site and its immediate environs*
Regional	*District and Provincial level*
National	*Country*
International	*Internationally*
Probability (Likelihood)	
Unlikely	*The likelihood of these impacts occurring is slight*
May Occur	*The likelihood of these impacts occurring is possible*
Probable	*The likelihood of these impacts occurring is probable*

Definite	*The likelihood is that this impact will definitely occur*	
Severity Scale	*Severity*	*Benefit*
Very Severe/ Beneficial	An irreversible and permanent change to the affected system(s) or party(ies) which cannot be mitigated.	A permanent and very substantial benefit to the affected system(s) or party(ies), with no real alternative to achieving this benefit.
Severe/ Beneficial	Long term impacts on the affected system(s) or party(ies) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming, or some combination of these.	A long-term impact and substantial benefit to the affected system(s) or party(ies). Alternative ways of achieving this benefit would be difficult, expensive or time consuming, or some combination of these.
Moderately severe/Beneficial	Medium to long term impacts on the affected system(s) or party (ies), which could be mitigated.	A medium to long term impact of real benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are equally difficult, expensive and time consuming (or some combination of these), as achieving them in this way.
Slight	Medium- or short-term impacts on the affected system(s) or party(ies). Mitigation is very easy, cheap, less time consuming or not necessary.	A short to medium term impact and negligible benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are easier, cheaper and quicker, or some combination of these.
No effect/don't or can't know	The system(s) or party(ies) is not affected by the proposed development.	In certain cases, it may not be possible to determine the severity of an impact.

** In certain cases, it may not be possible to determine the severity of an impact thus it may be determined: Don't know/Can't know.*

Table 2.4: Description of Overall Significance Rating

Significance Rate		***Description***
Don't Know		*In certain cases, it may not be possible to determine the significance of an impact. For example, the primary or secondary impacts on the social or natural environment given the available information.*
NO SIGNIFICANCE		*There are no primary or secondary effects at all that are important to scientists or the public.*
LOW NEGATIVE	***LOW POSITIVE***	*Impacts of low significance are typically acceptable impacts for which mitigation is desirable but not essential. The impact by itself is insufficient, even in combination with other low impacts, to prevent the development being approved. These impacts will result in negative medium to short term effects on the natural environment or on social systems.*

MODERATE NEGATIVE	**MODERATE POSITIVE**	*Impacts of moderate significance are impacts that require mitigation. The impact is insufficient by itself to prevent the implementation of the project but in conjunction with other impacts may prevent its implementation. These impacts will usually result in a negative medium to long-term effect on the natural environment or on social systems.*
HIGH NEGATIVE	***HIGH POSITIVE***	*Impacts that are rated as being high are serious impacts and may prevent the implementation of the project if no mitigation measures are implemented, or the impact is very difficult to mitigate. These impacts would be considered by society as constituting a major and usually long-term change to the environment or social systems and result in severe effects.*
VERY HIGH NEGATIVE	***VERY HIGH POSITIVE***	*Impacts that are rated as very high are very serious impact which may be sufficient by itself to prevent the implementation of the project. The impact may result in permanent change. Very often these impacts are unmitigable and usually result in very severe effects or very beneficial effects.*

Impact significance post-mitigation

Once mitigation measures are proposed, the following three factors are then considered to determine the overall significance of the impact after mitigation.

1. **Reversibility Scale**: This scale defines the degree to which an environment can be returned to its original/partially original state.
2. **Irreplaceable loss Scale:** This scale defines the degree of loss which an impact may cause.
3. **Mitigation potential Scale:** This scale defines the degree of difficulty of reversing and/or mitigating the various impacts ranges from very difficult to easily achievable. Both the practical feasibility of the measure, the potential cost and the potential effectiveness is taken into consideration when determining the appropriate degree of difficulty.

Table 2.5: Post-mitigation Evaluation Criteria

Reversibility	
Reversible	*The activity will lead to an impact that can be reversed provided appropriate mitigation measures are implemented.*
Irreversible	*The activity will lead to an impact that is permanent regardless of the implementation of mitigation measures.*
Irreplaceable loss	
Resource will not be lost	*The resource will not be lost/destroyed provided mitigation measures are implemented.*
Resource will be partly lost	*The resource will be partially destroyed even though mitigation measures are implemented.*
Resource will be lost	*The resource will be lost despite the implementation of mitigation measures.*
Mitigation potential	
Easily achievable	*The impact can be easily, effectively and cost effectively mitigated/reversed.*
Achievable	*The impact can be effectively mitigated/reversed without much difficulty or*

	cost.
Difficult	*The impact could be mitigated/reversed but there will be some difficultly in ensuring effectiveness and/or implementation, and significant costs.*
Very Difficult	*The impact could be mitigated/reversed but it would be very difficult to ensure effectiveness, technically very challenging and financially very costly.*

The following assumptions and limitations are inherent in the rating methodology:

- Value Judgements: Although this scale attempts to provide a balance and rigor to assessing the significance of impacts, the evaluation relies heavily on the values of the person making the judgment.
- Cumulative Impacts: These affect the significance ranking of an impact because it considers the impact in terms of both on-site and off-site sources. This is particularly problematic in terms of impacts beyond the scope of the proposed development. For this reason, it is important to consider impacts in terms of their cumulative nature.

Seasonality: Certain impacts will vary in significance based on seasonal change. Thus, it is difficult to provide a static assessment. Seasonality will need to be implicit in the temporal scale, with management measures being imposed accordingly (e.g. dust suppression measures being implemented during the dry season).

3. BIOPHYSICAL DESCRIPTION

3.1. Climate, Geology, Soil and Landform

Climate, geology, soil, and landform have a major influence on the habitat type and structure of a particular area.

The project area occurs along the south coast of South Africa within the Fynbos Biome and Albany Thicket Biome. This region is characterized by a warm and temperate climate with rainfall occurring throughout the year. The Mean Annual Rainfall (MAR) for Plettenberg Bay is 663 mm and the average temperature is 16.9°C (Climate-data.org).

The elevation from the western portion of the project area to the east is relatively flat for the first 150m sloping gently towards the east until the elevation decreases more considerably forming slacks until it flattens out upon reaching the lagoon. This change in elevation corresponds remarkably to the change in vegetation of the project area. The Secondary Grassy Fynbos is confined to the flatter, higher lying hilltop while the dense dune thicket is confined to the lower lying dune slacks. Wetland features are also present within the dune slacks. Cape Seashore vegetation has established along the foredune which is exposed to salt spray.

Fynbos typically occurs in shallow, nutrient poor, well-drained soils while thicket tends to occur in deeper soils with higher nutrient content. The soils within the project area consist of recently deposited aeolian (windblown) sands which are typically nutrient poor and shallow (Rebelo *et al*., 2006).

3.2. Habitat

Four habitats were identified within the project area (Figure 3.1, 3.7), namely:

- Secondary Grassy Fynbos,
- Goukamma Dune Thicket
- Dunes with Cape Seashore Vegetation
- Wetland features

The map includes two patches of transformed areas homestead (NW corner) and gravel driveway and turning circle (SW corner).

Figure 3.1: Habitats of the project area.

Secondary Grassy Fynbos is characterised by an abundance of grass species and fast growing, pioneer plant species (Figure 3.2).

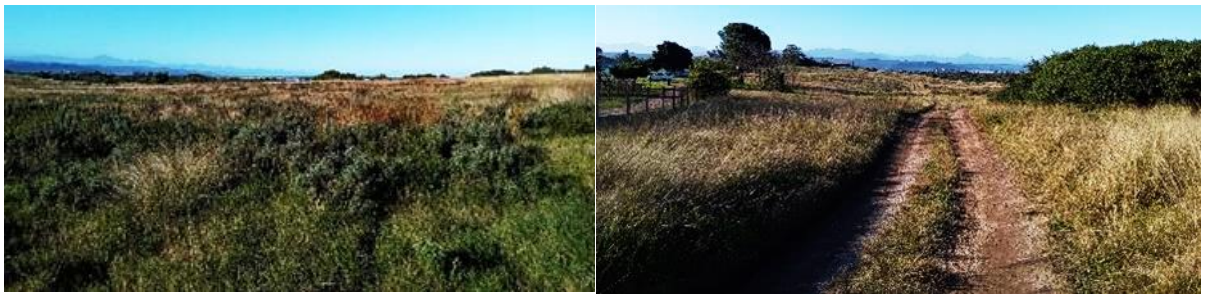

Figure 3.2: The Secondary Grassy Fynbos of the project area.

Goukamma Dune Thicket in the project area is characterised by dense, low to tall (2-5 m) thicket dominated by woody trees and an abundance of climbers (Figure 3.3). Alien invasive plant species, particularly of the Genus *Acacia*, were scattered throughout the project area but abundant in portions of the thicket vegetation.

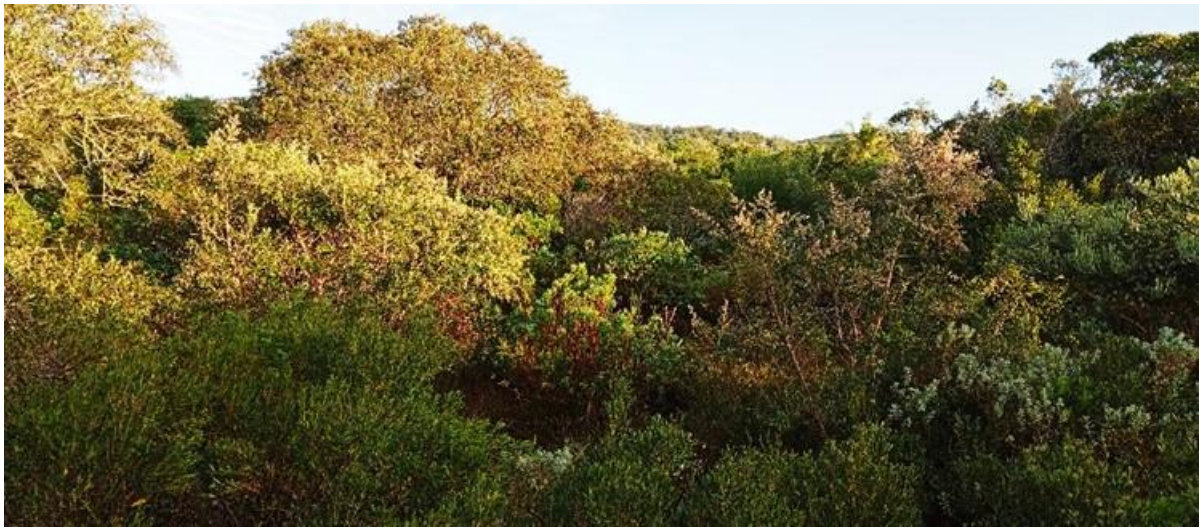

Figure 3.3: The Goukamma Dune Thicket of the project area.

Cape Seashore Vegetation (LC) bordered the southeastern boundary of the project area along the coastal dunes (Figure 3.4).

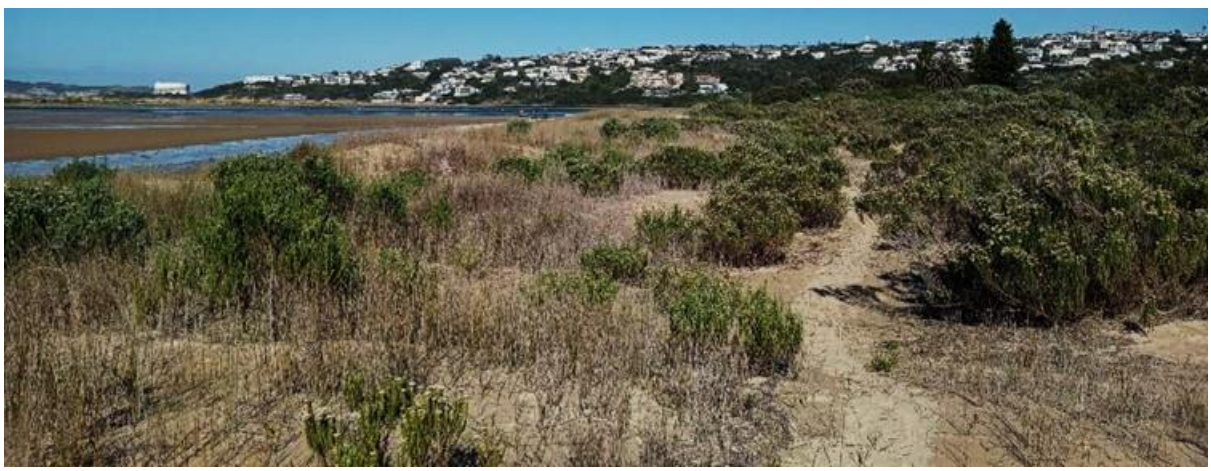

Figure 3.4: Cape Seashore Vegetation bordering the southeastern boundary of the project area.

Wetland

The wetland occurs within the low-lying areas (<2m asl) of the dune slacks in between the Goukamma Dune Thicket. The wetland is large and is considered diverse and mostly intact (Confluent Environmental, 2023). Frogs were heard calling from this habitat and birds nest on and amongst the emergent vegetation.

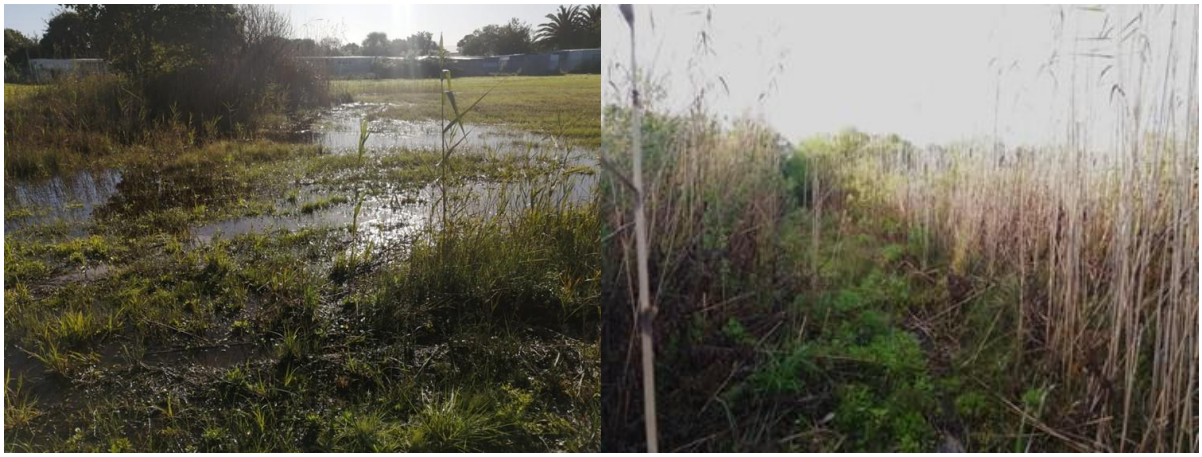

Figure 3.5: Wetland habitat within the project area.

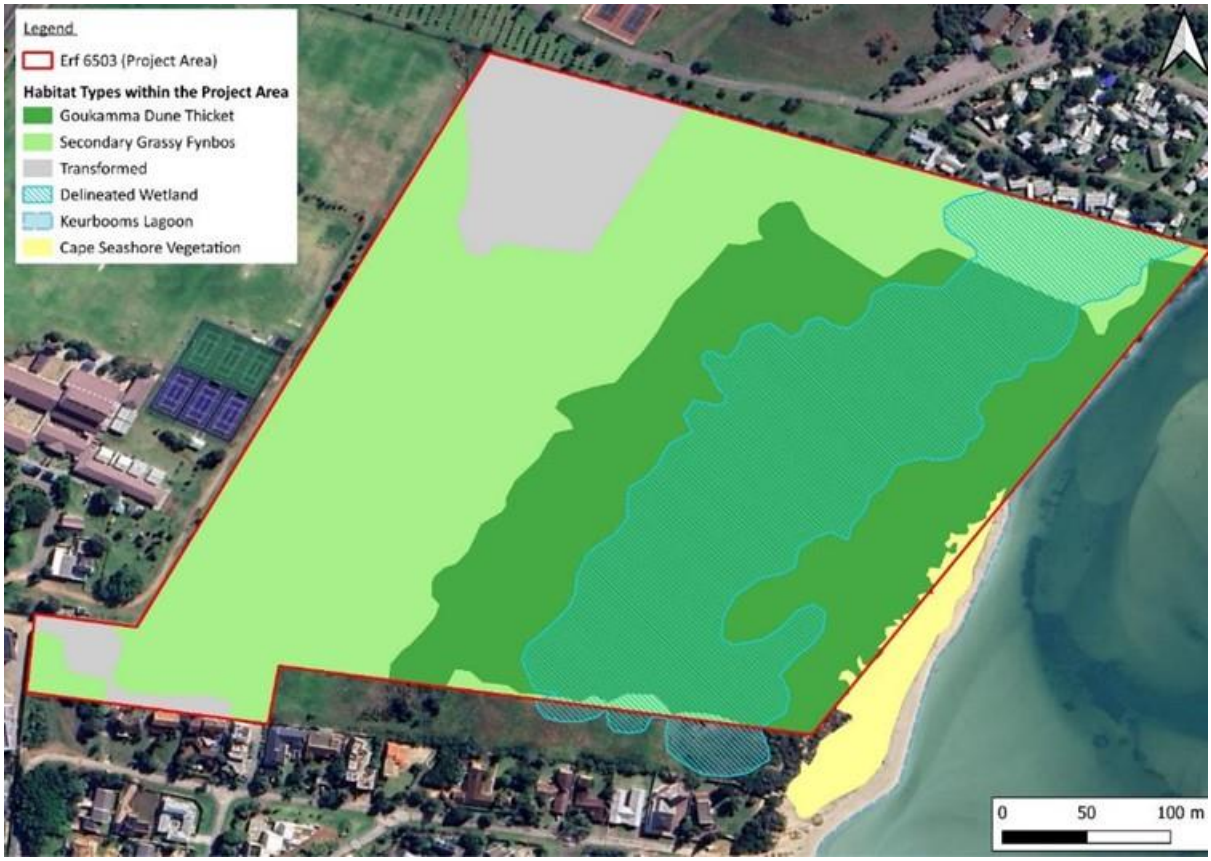

Figure 3.6: Faunal habitats available within the project area.

4. FAUNAL SPECIES OF THE PROJECT AREA

4.1. Fauna species distribution in relation to the project area

The Western Cape hosts approximately 62 amphibian species, 155 reptile species, 172 mammal species and 608 bird species (Birss, 2017; Shaw & Waller, 2017; Turner & Villiers, 2017). The project area is within or partly within the distribution range of approximately 19 amphibian species, 63 reptile species, 112 mammal species and 349 bird species (IUCN, 2022).

Of these, 10 amphibian species, 25 reptile species and 35 mammal species have been recorded within the same quarter degree square (QDS 3423AB) as the site and 298 bird species have been recorded with the same pentad (3400_2320) as the site (Figure 4.1) (FitzPatrick, 2023; iNaturalist 2023).

It is important to note that although an area may be within a species distribution the species may no longer inhabit the area or may not inhabit it permanently for example, the African Bush Elephant has a distribution which includes the project area, but these animals no longer occur outside of reserves and private game farms. Both the QDS[1] (16,331ha) and pentad[2] (7,083ha) may include habitat features that are not present within the project area or within the PAOI, therefore, a species may occur in the broader area where habitat is available but since its preferred habitat is not present in the project area it is unlikely to occur.

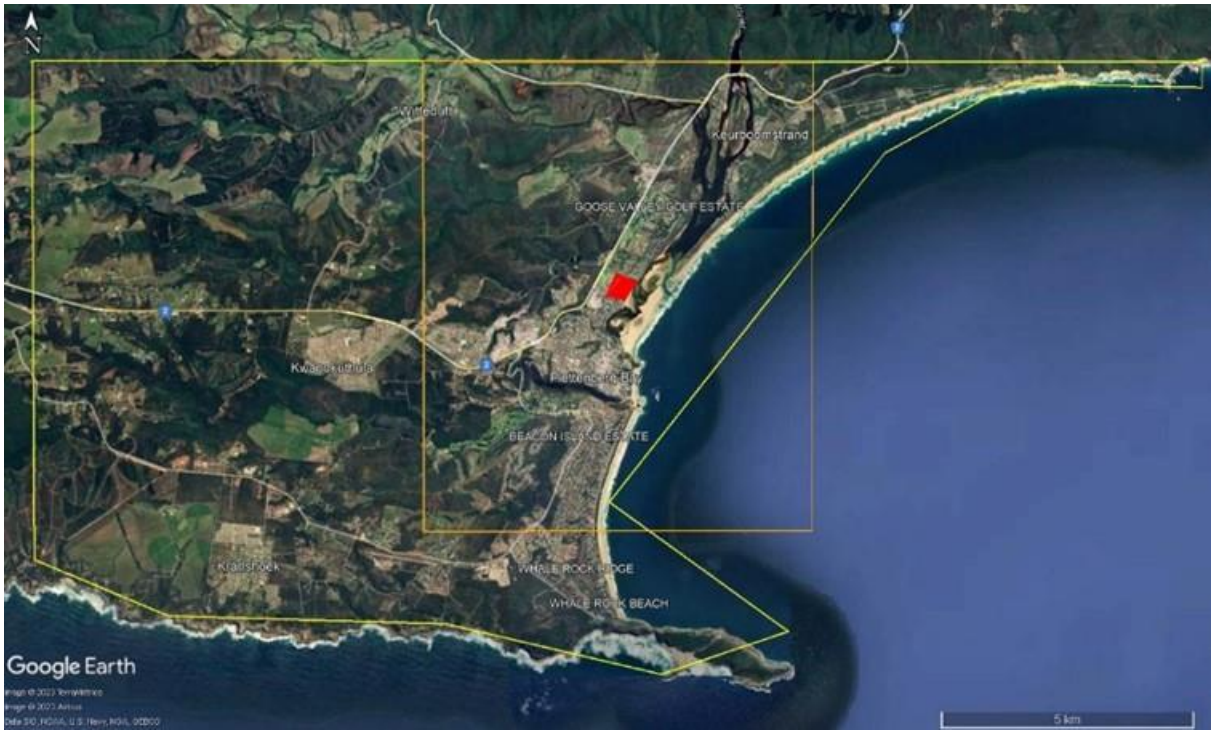

Figure 4.1: QDS 3423AB (yellow) and pentad 3400_2320 (orange) in relation to the project area (red).

[1] A spatial reference mapping system that divides longitude latitude square cells into smaller squares (quarters) for ease of locational reference, effectively, forming a system of geocodes.

[2] A spatial reference mapping system that creates a coordinate grid of 5-minute x 5-minute.

4.2. Fauna recorded during the field survey

The field survey recorded three amphibian species calls including the Bronze Caco (*Cacosternum nanum*), Cape Sand Frog (*Tomopterna delalandii*) and Clicking Stream Frog (*Strongylopus grayii*).

Three reptile species were recorded during the field survey including a Leopard Tortoise (*Stigmochelys pardalis*) shell from the Secondary Grassy Fynbos habitat, the Western Three-striped Skink (*Trachylepis occidentalis*) was recorded from the Goukamma Dune Thicket and a Common Dwarf Gecko (*Lygodactylus capensis*) was recorded from an isolated tree in a portion of wetland to the southwest.

Evidence of four mammal species were recorded during the field survey including the scat of a Mongoose species which was recorded from the road in the Thicket habitat and spoor of a Mongoose species and Genet species was recorded from the banks of the lagoon on the border of the thicket habitat. Two Rodent species skeletons were recorded from the western section of the thicket. Spoor of Sensitive Species 8 was recorded from a road in the Thicket and on the boarder of the Thicket to the Grassy Secondary Fynbos.

During the field survey 40 bird species were recorded. Only the Zitting Cisticola was recorded from the Secondary Grassy Fynbos and Common Waxbills from the Cape Seashore habitat. The majority of bird species were recorded from the Thicket Habitat, including, inter alia, African Dusky Fly Catcher, Fiscal Flycatcher, African Hoopoe, Bar-throated Apalis, Cape Batis, Cape Bulbul, Cape Canary, Cape Weaver, Greater Double-collared Sunbird, Red-faced Mousebird, Speckled Mousebird, Sombre Greenbul and White-browed Robin-chat. The Black Sparrowhawk was seen flying overhead and landed in the Thicket vegetation. Other birds seen flying overhead include the Hadeda Ibis, Sacred Ibis, Kelp Gull, Black Saw-wing, Laughing Dove, Red-eyed Dove, Cape Turtle Dove and Red-winged Starling. The Lagoon although not in the project area hosted African Black Oystercatcher, African Spoonbill, Giant Kingfisher, Great Egret, Egyptian Geese, White-breasted Cormorant and African Darter.

4.3. Faunal species of conservation concern

Faunal Species of Conservation Concern (SCC) are those listed as threatened (Critically Endangered (CR), Endangered (EN), Vulnerable (VU)), near-threatened and/or are endemic or range restricted. The DFFE Screening Report identified seven bird SCC, one amphibian species and two mammal species (Table 2.1). The likelihood of occurrence is assessed in Table 4.1 below.

The Knysna Leaf Folding Frog (*Afrixalus knysnae),* which is listed as endangered (EN) and endemic to the Western Cape, has a moderate likelihood of occurring in the project area.

The two vulnerable mammal SCC, Sensitive Species 8 has a high likelihood of occurrence within the Dune Thicket habitat and Duthie's Golden Mole *(Chloroalkane duthieae*) has a high likelihood of occurrence within both the Dune Thicket and Grassy Fynbos.

The endangered Black Harrier (*Circus maurus*) and Marsh Harrier (*Circus ranivorus*) as well as the vulnerable Knysna Warbler (*Bradypterus sylvaticus*) have a high likelihood of occurrence within the Dune Thicket habitat. The Caspian Tern (*Hydroprogne caspia*) has a low likelihood of occurrence within both the Grassy Fynbos and the Goukamma Dune Thicket but a high likelihood of occurrence within the Cape Seashore Vegetation. The Martial Eagle (*Polemaetus bellicosus*), Crowned Eagle

(*Stephanoaetus coronatus*), and Denham's Bustard (*Neotis denhami*) have a low likelihood of occurrence in the project area.

Table 4.1: Faunal SCC with a distribution that includes the project area and the likelihood of occurrence within the project area.

*The Species Environmental Assessment Guideline (SANBI, 2020) specifies the likelihood of occurrence as Low, Moderate and High. For the purpose of this assessment Low=Unlikely to occur, Moderate=Possible occurrence and High = Probable occurrence.

Species	Threat Status (Child et al., 2016)	Distribution includes or partly includes the project area	Preferred habitat available in project area	Species records SABAP2/ FrogMAP/ MammalMAP	Likelihood of Occurrence in project area*	Justification
Black Harrier *Circus maurus*	EN	✓	✓	✓	**High**	The project area falls within the known distribution range of this species, suitable, preferred habitat (Thicket) is present and there are records of this species within the broader project area. As such, the likelihood of occurrence is high.
Marsh Harrier *Circus ranivorus*	EN	✓	✓	✓	**High**	The project area falls within the known distribution range of this species, suitable, preferred habitat (Thicket) is present and there are records of this species within the broader project area. As such, the likelihood of occurrence is high.
Knysna Warbler *Bradypterus sylvaticus*	VU	✓	✓	✓	**High**	The project area falls within the known distribution range of this species, suitable, preferred habitat (Thicket) is present and there are records of this species within the broader project area. As such, the likelihood of occurrence is high.
Duthie's Golden Mole *Chloroalkane duthieae*	VU	✓	✓	✓	**High**	The project area falls within the known distribution range of this species, and it has been recorded within the broader project area. its preferred habitat type, Forest, is not present in the project area and no shallow subsurface tunnels were observes in the project area, only Mole-rat mounds. This species is tolerant of transformed areas and due to the cryptic nature of this species which makes it difficult to find is has a high likelihood of occurrence within the project.
Sensitive species 8	VU	✓	✓	✓	**High**	The project area falls within the known distribution range of this species, its preferred habitat type is present and this species has been recorded within broader project area. Spoor was observed in the thicket habitat. The likelihood of occurrence within the project area is high.

Caspian Tern *Hydroprogne caspia*	VU	✓	X	✓	**Low**	Although the project area falls within the known distribution this species and it has been recorded within the broader project area, the project area does not contain the preferred habitat of this species. As such, the likelihood of occurrence in the project area is low, however, it may utilise the Keurboom River adjacent to the project area.
Knysna Spiny Frog *Afrixalus knysnae*	EN	✓	✓	X	**Moderate**	The project area falls within the known distribution range of this species and its preferred habitat type is present. However, this species is only known from four locations and was not observed in the project area during the field survey. The likelihood of occurrence within the project area cannot be ruled out and is considered moderate.
Crowned Eagle *Stephanoaetus coronatus*	VU	✓	X	✓	**Low**	Although the project area falls within the known distribution this species and it has been recorded within the broader project area, the project area DOES NOT contain the preferred habitat for this species to breed. If present, this species may use the project area for foraging. As such, the likelihood of occurrence is low.
Denham's Bustard *Neotis denhami*	VU	✓	✓	X	**Low**	Although the project area falls within the known distribution this species and the project area contains its preferred habitat, this species has not been recorded within the broader project area. As such, the likelihood of occurrence is low.
Martial Eagle *Polemaetus bellicosus*	EN	✓	X	✓	**Low**	Although the project area falls within the known distribution this species and it has been recorded within the broader project area, the project area DOES NOT contain the preferred habitat for this species to breed. If present, this species may use the project area for foraging. As such, the likelihood of occurrence is low.

5. OVERALL SITE ECOLOGICAL IMPORTANCE

The SEI of the project area Goukamma Dune Thicket, Wetland and Cape Seashore habitat to faunal SCC was determined to be HIGH. The overall SEI of the project area Secondary Grassy Fynbos to faunal SCC was determined to be MEDIUM (Table 5.1 & Figure 5.1).

Table 5.1: SEI of the project area to faunal SCC with a high likelihood of occurrence.

Habitat / Species	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity importance	Receptor Resilience	SEI
Thicket	**High**	**Medium**	**Medium**	**Low**	**HIGH**
	High likelihood of occurrence of four vulnerable species the Species 8, Duthie's Golden Mole, Knysna Warbler And Black Harrier.	Medium (9ha) intact patch of remaining thicket surrounded by residential developments only offering narrow corridors.		Species has a low likelihood of remaining on site during the disturbance and impact and has a low likelihood of returning to site once the disturbance has been removed.	
Secondary Grassy Fynbos	**High**	**Low**	**Medium**	**Medium**	**MEDIUM**
	High likelihood of the Duthie's Golden Mole (*Chlorotalpa* duthieae) listed as VU occurring in the project area.	Grassy Fynbos (7.9 ha) has been disturbed and has little habitat connectivity.		Species has a low likelihood of remaining on site during the disturbance and impact and has a medium likelihood of returning to site once the disturbance has been removed.	
Wetland	**High**	**Medium**	**Medium**	**Low**	**HIGH**
	High likelihood of occurrence of one endangered species occurring in the project area, the Marsh Harrier.	Medium sized Wetland is well vegetated in the lower lying areas providing habitat with minor current negative ecological impacts.		Species has a medium likelihood of remaining on site during the disturbance and impact and has a low likelihood of returning to site once the disturbance has been removed.	
Cape Seashore habitat and Estuary	**High**	**High**	**High**	**Medium**	**HIGH**
	High likelihood of the Caspian Tern listed as VU occurring in the project area.	Small area (<2 ha) of intact Cape Seashore Vegetation (LC). Narrow corridors of good habitat connectivity. Minor current negative ecological impacts.		Species has a medium likelihood of remaining on site during the disturbance and impact and has a medium likelihood of returning to site once the disturbance has been removed.	

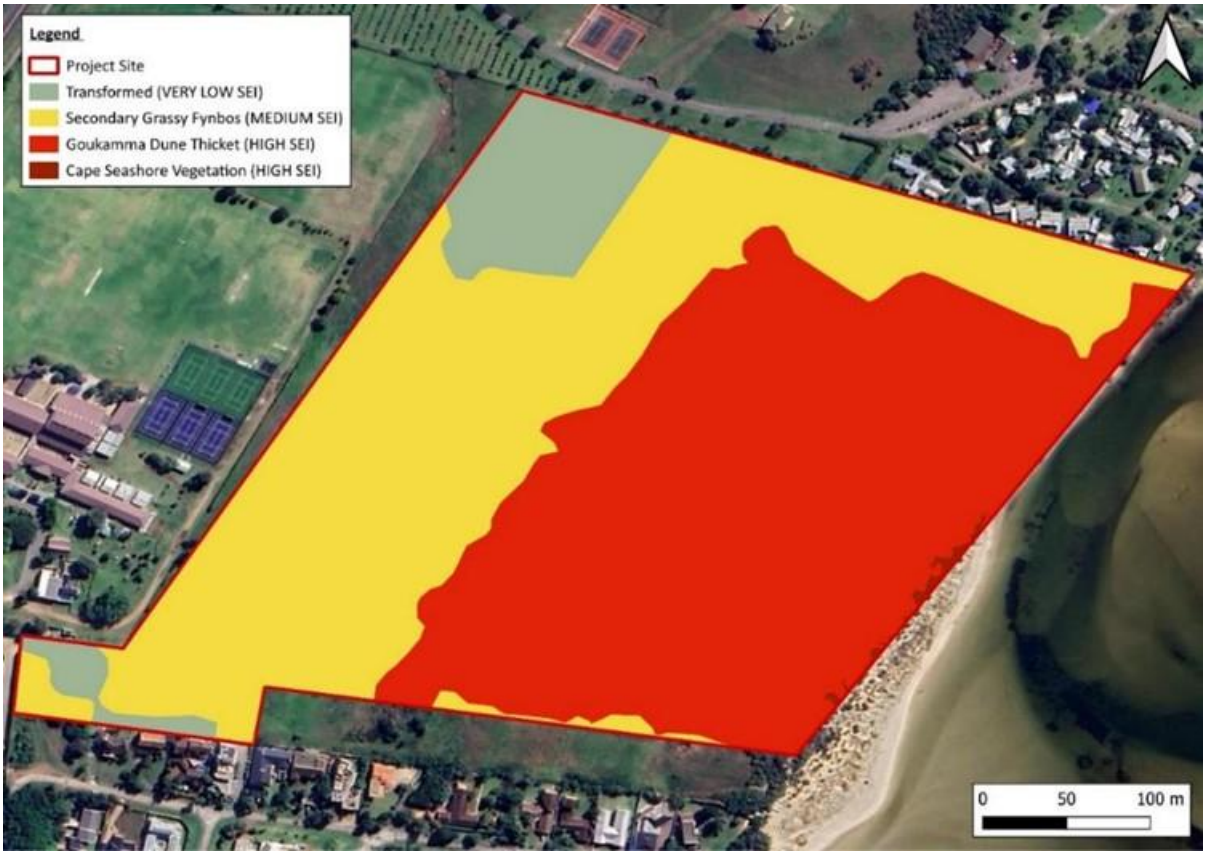

Figure 5.1: SEI of the project area to faunal species of conservation concern.

In terms of the guidelines for interpreting SEI in the context of the proposed development activities (SANBI, 2020), the following applies for areas of high and medium SEI:

Table 5.2: Outcome of the SEI of the project area to faunal SCC on the proposed project.

SEI	Guideline	Proposed project
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*	The development must not be located within the Goukamma Dune Thicket, Cape Seashore and Wetland Habitat.
MEDIUM	*Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities*	Development within the Secondary Grassy Fynbos is permissible.

6. IMPACT ASSESSMENT

6.1. Identification of Potential Impacts

The clearing of vegetation and earthworks for the construction and operational aspects of the proposed project could result in the following impacts:

- The direct and permanent loss of faunal habitat.
- The direct loss of faunal SCC.
- Faunal mortality due to roadkill and persecution.
- Disturbance to faunal species due to construction and operation activities that generate noise, dust, vibrations and lighting. This disturbance may cause faunal species to leave the area or disrupt foraging and/or breeding behaviour of those that remain.

These are presented in detail in Table 6.1 below.

Table 6.1: Assessment of impacts associated with the construction, operation and decommissioning of the proposed project

POTENTIAL ISSUES	SOURCE OF ISSUE	NATURE	TYPE	CONSEQUENCE OF IMPACT	EXTENT OF IMPACT	DURATION OF IMPACT	PROBABILITY OF IMPACT	REVERSIBILITY	IRREPLACEABLE LOSS	MITIGATION POTENTIAL	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE OF IMPACT WITH MITIGATION
CONSTRUCTION PHASE													
Loss of Faunal Habitat	The project will result in the permanent loss of Secondary Grassy Fynbos. The vegetation and soil provides habitat to faunal species that depend on it for shelter, breeding and foraging. The significance of this loss will be High to those faunal species.	Negative	Direct	Moderate	Localised	Permanent	Definite	Reversible	Resource could be partially lost	Difficult	MODERATE-	• The Goukamma Dune Thicket, Cape Seashore and Wetland Habitat must be declared a No-go. • Construction vehicles and machinery must not encroach into adjacent habitat and must remain within the footprint of the project. • A stormwater management plan must be compiled and implemented and ensure that the wetland downslope is not impacted on. This plan must include measures to prevent erosion.	MODERATE-
Loss of Faunal Species of Conservation Concern	The SEI of the Secondary Grassy Fynbos to Duthie's Golden Mole (VU) is considered medium should it occur. If it does occur it will likely move into adjacent habitat e.g., garden and Thicket habitat once earthworks commence. The Sensitive Species 8, Duthie's Golden Mole, Knysna Warbler, Marsh Harrier and Black Harrier have a high likelihood of occurrence in the Goukamma Dune Thicket and Wetland Habitat. The proposed project avoids this habitat.	Negative	Direct	Moderate	Study Area	Short Term	May Occur	Reversible	Resource could be partially lost	Achievable	MODERATE -	• A clause must be included in contracts for ALL personnel working on site stating that: "*no wild animals will be hunted, killed, poisoned or captured. No wild animals will be imported into, exported from or transported in or through the province. No wild animals will be sold, bought, donated and no person associated with the development will be in possession of any live wild animal, carcass or anything manufactured from the carcass*." A clause relating to fines, possible dismissal and legal prosecution must be included should any of the above transgressions occur for SCC. • The Goukamma Dune Thicket and Wetland Habitat must be declared a No-go area.	MODERATE-
Disturbance to faunal species	Faunal species may be disturbed during construction due to increased noise levels and vibrations from construction machinery. Night lighting disrupts nocturnal faunal species activities and may attract them to the construction site. Faunal Species that vacate the immediate area, may return following completion of construction or new individuals or species may inhabit the area.	Negative	Direct	Moderate	Localised	Short Term	Definite	Reversible	Resource could be partially lost	Difficult	MODERATE-	• Slow moving species, such as tortoises that may be in harms way during construction, must be moved and placed out of harm's way in habitat immediately adjacent to the project area within the reserve. • All night lighting must be minimised and if required, only down lighting must be used and placed as low as practical and low light emitting bulbs (LED's). • Vehicles and machinery must meet best practice standards as this will minimise noise and vibrations. • Staff and contractors' vehicles must comply with speed limits of maximum of 40km/hr. • Project must start and be completed within the minimum timeframe. i.e. may not be started and left incomplete.	LOW -

POTENTIAL ISSUES	SOURCE OF ISSUE	NATURE	TYPE	CONSEQUENCE OF IMPACT	EXTENT OF IMPACT	DURATION OF IMPACT	PROBABILITY OF IMPACT	REVERSIBILITY	IRREPLACEABLE LOSS	MITIGATION POTENTIAL	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE OF IMPACT WITH MITIGATION
Mortality of faunal species	Faunal species and individuals susceptible to mortality during the clearing of vegetation and soil compacting are those that will not move away during the initial disturbance, this includes slow moving species (tortoises), hibernating species (depending on the time of year) and immobile individuals such as infant birds and rodents. The increase in vehicles entering and exiting the area increases the chance of roadkill, especially at night. Persecution of faunal species perceived as dangerous are often killed out of fear e.g., snakes.	Negative	Direct	Moderate	Localised	Permanent	May Occur	Reversible	Resource could be partially lost	Achievable	MODERATE-	• ECO (or relevant person) to walk ahead of clearing construction machinery and move slow moving species, e.g. tortoises, out of harms way and into suitable neighbouring habitat. • A snake handler should be on call to provide removal and relocation service should any snakes be found on site or entering neighbouring homes. • Speed restrictions of 40km/hr must be adhered to for all vehicles to reduce the impact of killed fauna on the project roads.	LOW -
OPERATIONAL PHASE													
Disturbance to faunal species	Faunal species will be disturbed during operation. The use of the housing estate will create increased noise levels and vibrations. Any night lighting may disrupt nocturnal faunal species activities and even attract them to the site.	Negative	Direct	Moderate	Localised	Permanent	Definite	Reversible	Resource could be partially lost	Difficult	MODERATE-	• No lights must be placed on the exterior wall facing the thicket habitat. Should general lighting inside the estate be used, only down lighting must be used and placed as low as practical and low light emitting bulbs (LED's). • Vehicles and machinery must meet best practice standards as this will minimise noise and vibrations. • Staff and contractors' vehicles must comply with speed limits of maximum of 40km/hr	LOW-
DECOMMISSIONING PHASE													
Disturbance to faunal species	As with the construction phase, the decommissioning phase will also require heavy machinery and the disruption of faunal habitat. Impacts will therefore be similar to that of the construction phase	Negative	Direct	Moderate	Localised	Short Term	Definite	Reversible	Resource could be partially lost	Difficult	MODERATE-	• All night lighting must be minimised and if required, only down lighting must be used and placed as low as practical and low light emitting bulbs (LED's). • Vehicles and machinery must meet best practice standards as this will minimise noise and vibrations. • Staff and contractors' vehicles must comply with speed limits of maximum of 40km/hr • Decommissioning must start and be completed within the minimum timeframe. i.e. may not be started and left incomplete.	LOW -

7. CONCLUSIONS

The proposed project area is located along the Keurboom River and is surrounded by urban development. The western portion of the project area offers Secondary Grassy Fynbos to faunal species and the eastern portion offers Goukamma Dune Thicket with Wetland Habitat. The Dune Thicket and Wetland habitat hosted the greatest number of mammal, amphibian, reptile and bird species. The development has been designed to avoid the Goukamma Dune Thicket and Wetland Habitat and has only been placed in the Secondary Grassy Fynbos.

The DFFE Screening Report identified seven bird SCC, one amphibian species and two mammal species.

- Sensitive Species 8 (VU), Duthie's Golden Mole *(Chloroalkane duthieae*) (VU), Black Harrier (*Circus maurus*) (EN) and Knysna Warbler (*Bradypterus sylvaticus*) (VU) have a high likelihood of occurrence within the Dune Thicket habitat of the project area.
- Duthie's Golden Mole *(Chloroalkane duthieae*) (VU), has a high likelihood of occurrence within the Secondary Grassy Fynbos habitat of the project area.
- Marsh Harrier (*Circus ranivorus*) (EN) and Knysna Leaf Folding Frog (*Afrixalus knysnae*) (EN) have a high and medium likelihood of occurrence, respectively, within the Wetland habitat of the project area.
- The Caspian Tern (*Hydroprogne caspia*) has a high likelihood of occurrence within the Cape Seashore habitat.
- The Martial Eagle (*Polemaetus bellicosus*), Crowned Eagle (*Stephanoaetus coronatus*), and Denham's Bustard (*Neotis denhami*) have a low likelihood of occurrence in the project area.

The Site Ecological Importance (SEI) of the Goukamma Dune Thicket, Cape Seashore and Wetland Habitat to faunal Species of Conservation Concern (SCC) was found to be HIGH, while the Secondary Grassy Fynbos was found to be MEDIUM.

Four sources of impacts were identified for the project including the direct and permanent loss of faunal habitat, potential loss of faunal SCC, faunal mortality due to roadkill and persecution and disturbance to faunal species due to construction and operation activities. Six impacts are rated as Moderate significance prior to construction. If the mitigation measures specified in this report are implemented and adhered to, the significance of four of those impacts can be reduced to low. Two impacts will remain moderate.

Areas of HIGH SEI have been avoided and development within areas of MEDIUM SEI is permissible provided the management measures identified in Chapter 6 are implemented and adhered to.

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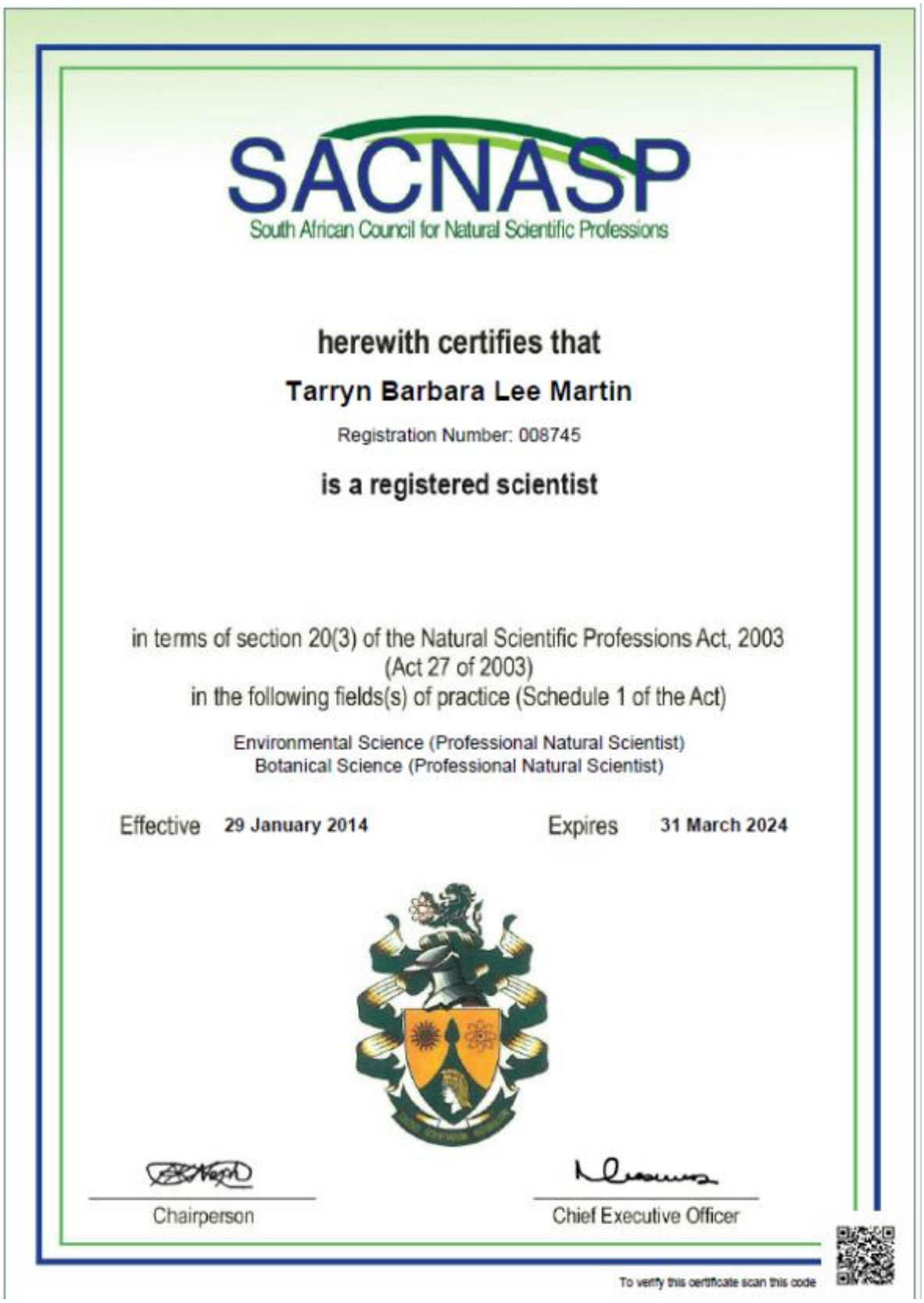
APPENDIX 1: PROOF OF SACNASP REGISTRATION AND HIGHEST QUALIFICATION



SACNASP
South African Council for Natural Scientific Professions

herewith certifies that

Tarryn Barbara Lee Martin

Registration Number: 008745

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following fields(s) of practice (Schedule 1 of the Act)

Environmental Science (Professional Natural Scientist)
Botanical Science (Professional Natural Scientist)

Effective **29 January 2014** Expires **31 March 2024**

Chairperson

Chief Executive Officer

To verify this certificate scan this code

RHODES UNIVERSITY

THIS IS TO CERTIFY THAT

TARRYN BARBARA LEE MARTIN

WAS THIS DAY AT A CONGREGATION OF THE UNIVERSITY
ADMITTED TO THE DEGREE OF

MASTER OF SCIENCE

IN

BOTANY

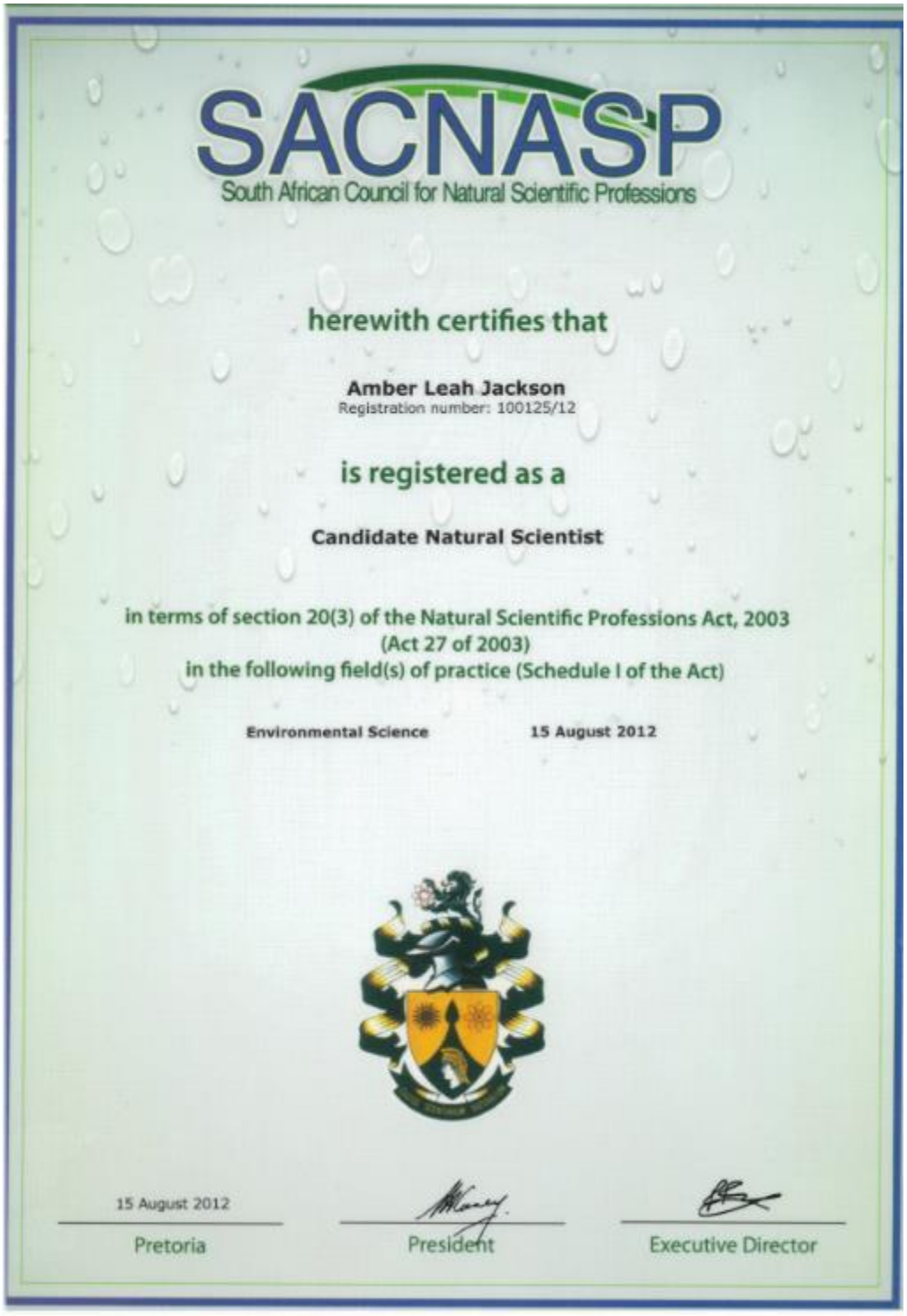
WITH DISTINCTION

VICE CHANCELLOR

DEAN OF THE FACULTY OF SCIENCE

REGISTRAR

GRAHAMSTOWN
10 APRIL 2010



SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Amber Leah Jackson
Registration number: 100125/12

is registered as a

Candidate Natural Scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice (Schedule I of the Act)

Environmental Science **15 August 2012**

15 August 2012
Pretoria

President

Executive Director

University of Cape Town • iYunivesithi yaseKapa • Universiteit van Kaapstad

we certify that

Amber Leah Jackson

was admitted to the degree of

Master of Philosophy

in Environmental Management

on 9 June 2011

Vice-Chancellor

Registrar

APPENDIX 2: CV

CONTACT DETAILS

Name	**Tarryn Martin**
Name of Company	**Biodiversity Africa**
Designation	Director
Profession	Botanical Specialist and Environmental Manager
E-mail	tarryn@biodiversityafrica.com
Office number	+27 (0)71 332 3994
Education	2010: Master of Science with distinction (Botany) 2004: Bachelor of Science (Hons) in African Terrestrial Vertebrate Biodiversity 2003: Bachelor of Science
Nationality	**South African**
Professional Body	**SACNASP**: South African Council for Natural Scientific Profession: Professional Natural Scientist (400018/14) **SAAB**: Member of the South African Association of Botanists **IAIASa**: Member of the International Association for Impact Assessments South Africa Member of Golden Key International Honour Society
Key areas of expertise	• Biodiversity Surveys and Impact Assessments • Environmental Impact Assessments • Critical Habitat Assessments • Biodiversity Management and Monitoring Plans

PROFILE

Tarryn has over ten years of experience working as a botanist, nine of which are in the environmental sector. She has worked as a specialist and project manager on projects within South Africa, Mozambique, Lesotho, Zambia, Tanzania, Cameroon and Malawi.

She has extensive experience writing botanical impact assessments, critical habitat assessments, biodiversity management plans, biodiversity monitoring plans and Environmental Impact Assessments to International Standards, especially to those of the International Finance Corporation (IFC). Her experience includes working on large mining projects such as the Kenmare Heavy Minerals Mine, where she monitored forest health, undertook botanical impact assessments for their expansion projects and designed biodiversity management and monitoring plans. She has also project managed Environmental Impact Assessments for graphite mines in northern Mozambique and has a good understanding of the Mozambique Environmental legislation and processes.

Tarryn holds a BSc (Botany and Zoology), a BSc (Hons) in African Vertebrate Biodiversity and an MSc with distinction in Botany from Rhodes University. Tarryn's Master's thesis examined the impact of fire on the recovery of C_3 and C_4 Panicoid and non-Panicoid grasses within the context of climate change for which she won the Junior Captain Scott-Medal (Plant Science) for producing the top MSc of 2010 from the South African Academy of Science and Art as well as an Award for Outstanding Academic Achievement in Range and Forage Science from the Grassland Society of Southern Africa. Tarryn is a professional member of the South African

Council for Natural Scientific Professionals (since 2014).

EMPLOYMENT EXPERIENCE

Director and Botanical Specialist, Biodiversity Africa

July 2021 - present

- Botanical and ecological assessments for local and international EIAs in Southern Africa
- Identifying and mapping vegetation communities and sensitive areas
- Designing and implementing biodiversity management and monitoring plans
- Designing rehabilitation plans
- Designing alien management plans
- Critical Habitat Assessments
- Large ESIA studies
- Managing budgets

Principal Environmental Consultant, Branch Manager and Botanical Specialist, Coastal and Environmental Services

May 2012-June 2021

- Botanical and ecological assessments for local and international EIAs in Southern Africa
- Identifying and mapping vegetation communities and sensitive areas
- Designing and implementing biodiversity management and monitoring plans
- Designing rehabilitation and biodiversity offset plans
- Designing alien management plans
- Critical Habitat Assessments
- Large ESIA studies
- Managing budgets
- Cape Town branch manager
- Coordinating specialists and site visits

Accounts Manager, Green Route DMC

October 2011- January 2012

- Project and staff co-ordination
- Managing large budgets for incentive and conference groups travelling to southern Africa
- Creating tailor-made programs for clients
- Negotiating rates with vendors and assisting with the ground management of inbound groups to ensure client satisfaction.

Camp Administrator and Project Co-ordinator, Windsor Mountain International Summer Camp, USA

April 2011 - September 2012

- Co-ordinated staff and camper travel arrangements, main camp events and assisted with marketing the camp to prospective families.

Freelance Project Manager, Green Route DMC

November 2010 - April 2011

- Project and staff co-ordination
- Managing large budgets for incentive and conference groups travelling to southern Africa
- Creating tailor-made programs for clients
- Negotiating rates with vendors and assisting with the ground management of inbound groups to ensure client satisfaction.

Camp Counselor, Windsor Mountain Summer Camp, USA

June 2010 - October 2010

NERC Research Assistant, Botany Department, Rhodes University, Grahamstown in collaboration with Sheffield University, Sheffield, England

April 2009 - May 2010

- Set up and maintained experiments within a common garden plot experiment
- collected, collated and entered data
- Assisted with the analysis of the data and writing of journal articles

Head Demonstrator, Botany Department, Rhodes University

March 2007 - October 2008

Operations Assistant, Green Route DMC

September 2005 - February 2007

- Project and staff co-ordination
- Managing large budgets for incentive and conference groups travelling to southern Africa
- Creating tailor-made programs for clients
- Negotiating rates with vendors and assisting with the ground management of inbound groups to ensure client satisfaction

PUBLICATIONS

- Ripley, B.; Visser, V.; Christin, PA.; Archibald, S.; Martin, T and Osborne, C. Fire ecology of C_3 and C_4 grasses depends on evolutionary history and frequency of burning but not photosynthetic type. *Ecology.* 96 (10): 2679-2691. 2015
- Taylor, S.; Ripley, B.S.; Martin, T.; De Wet, L-A.; Woodward, F.I.; Osborne, C.P. Physiological advantages of C_4 grasses in the field: a comparative experiment demonstrating the importance of drought. *Global Change Biology*. 20 (6): 1992-2003. 2014
- Ripley, B; Donald, G; Osborne, C; Abraham, T and Martin, T. Experimental investigation of fire ecology in the C3 and C4 subspecies of *Alloteropsis semialata. Journal of Ecology.* 98 (5): 1196 - 1203. 2010
- South African Association of Botanists (SAAB) conference, Grahamstown. Title: Responses of C3 and C4 Panicoid and non-Panicoid grasses to fire. January 2010
- South African Association of Botanists (SAAB) conference, Drakensberg. Title: Photosynthetic and Evolutionary determinants of the response of selected C3 and C4 (NADP-ME) grasses to fire. January 2008

COURSES

- Rhodes University and CES, Grahamstown
- EIA Short Course 2012
- Fynbos identification course, Kirstenbosch, 2015.
- Photography Short Course, Cape Town School of Photography, 2015.
- Using Organized Reasoning to Improve Environmental Impact Assessment, 2018, International IAIA conference, Durban

CONSULTING EXPERIENCE

International Projects

- 2020 – 2021: Project manager for the 2Africa subsea cable ESIA in Mozambique.
- 2020 – 2021: Project manager for the Category B EIA for the Wihinana Graphite Mine, Cabo delgado, Mozambique
- 2020 – 2021: Project manager for the category B exploration ESIA for Sofala Heavy Minerals Mine, Inhambane, Mozambique
- 2020: Critical Habitat Assessment for a graphite mine in Cabo Delgado, Mozambique. This assessment was to IFC standards.

- 2020: Analysed the botanical dataset for Lurio Green Resources and provided comment on the findings and gaps.
- 2020: Biodiversity Management Plan and Monitoring Plan for mine at Pilivilli in Nampula Province, Mozambique. This assessment was to IFC standards.
- 2019: Botanical Assessment for a cocoa plantation, Tanzania. This assessment was to IFC standards.
- 2019: Critical Habitat Assessment, Biodiversity Management Plan and Ecosystem Services Assessment for JCM Solar Farm in Cameroon. This assessment was to IFC standards.
- 2019: Undertook the Kenmare Road and Infrastructure Botanical Baseline Survey and Impact Assessment for an infrastructure corridor that will link the existing mine at Moma to the new proposed mine at Pillivilli in Nampula Province, Mozambique. This assessment was to IFC standards.
- 2012 – Present: Kenmare Terrestrial Monitoring Program Project Manager and Specialist Survey, Nampula Province, Mozambique.
- 2018: Conducted a field survey and wrote a botanical report to IFC standards for the proposed Balama Graphite Mine Environmental and Social Impact Assessment (ESIA) in Cabo Delgado Province, Mozambique.
- 2018: Co-authored the critical habitat assessment chapter for the proposed Kenmare Pilivilli Heavy Minerals Mine.
- 2018: Authored the Conservation Efforts chapter for the Kenmare Pilivilli Heavy Minerals Mine.
- 2017-2018: Co-authored and analysed data for the Kenmare Bioregional Survey of *Icuria dunensis* (species trigger for critical habitat) in Nampula Province, Mozambique. This was for a mining project that needed to be IFC compliant.
- 2017: Conducted a field survey and wrote a botanical report to IFC standards for the proposed Ancuabe Graphite Mine Environmental and Social Impact Assessment (ESIA) in Cabo Delgado Province, Mozambique.
- 2017-2018: Managed the Suni Resources Montepuez Graphite Mine Environmental Impact Assessment. This included the management of ten specialists, the co-ordination of their field surveys, regular client liaison and the writing of the Environmental Impact Assessment Report which summarised the specialists findings, assessed the impacts of the proposed mine on the environment and provided mitigation measures to reduce the impact.
  I was also the lead botanist for this baseline survey and impact assessment and undertook the required field work and analysed the data and wrote the report.
- 2017: Undertook the botanical baseline survey and impact assessment for the proposed Kenmare Pilivili Heavy Mineral Mine in Nampula Province, Mozambique. This was to IFC Standards.
- 2017: Ecological Survey for the Megaruma Mining Limitada Ruby Mine Exploration License, Cabo Delgado, Mozambique.
- 2016: Undertook the botanical baseline survey and impact assessment, wrote an alien invasive management plan and co-authored the biodeiveristy monitoring plan for this farm. The project was located in Zambezia Province, Mozambique.
- 2015-2016: Conducted the Triton Minerals Nicanda Hills Graphite Mine Botanical Survey and Impact Assessment. Was also the project manager and specialist co-ordinator for this project. The project was located in Cabo Delgado Province, Mozambique.
- 2015: Was part of the team that undertook a Critical Habitat Assessment for the Nhangonzo Coastal Stream site at Inhassora in Mozambique that Sasol intend to establish drill pads at. This project needed to meet the IFC standards.
- 2014: Lurio Green Resources Wood Chip Mill and Medium Density Fibre-board Plant, Project Manager and Ecological Specialist, Nampula Province, Mozambique. 2014-2015.
- 2013-2014: LHDA Botanical Survey, Baseline and Impact assessment, Lesotho.
- 2014: Biotherm Solar Voltaic Ecological Assessment, Zambia.
- 2013-2014: Lurio Green Resources Plantation Botanical Assessment, Vegetation and Sensitivity Mapping, Specialist Co-ordination, Nampula Province, Mozambique.

- 2013: Syrah Resources Botanical Baseline Survey and Ecological Assessment., Cabo Delgado Mozambique.
- 2013-2014: Baobab Mining Ecological Baseline Survey and Impact Assessment, Tete, Mozambique.

South African Projects

- 2021 - Present: Project Manager for the Sturdee Energy Solar PV facility, Western Cape
- 2021: Ecological Assessment for the Sturdee Energy Solar PV facility, Western Cape
- 2021: Rehabilitation plan for a housing development (Hope Village)
- 2020: Ecological Assessment for the Eskom Juno-Gromis Powerline deviation, Western Cape
- 2020: Project Manager for the Basic Assessment for SANSA development at Matjiesfontein (Western Cape). Project received authorization in 2021.
- 2020: Ecological Assessment for construction of satellite antennae, Matjiesfontein, Western Cape
- 2019: Ecological Assessment for a wind farm EIA, Kleinzee, Northern Cape
- 2019: Ecological Assessment for two housing developments in Zeerust, North West Province
- 2019: Botanical Assessment in Retreat, Cape Town for the DRDLR land claim.
- 2019: Cape Agulhas Municipality Botanical Assessment for the expansion of industrial zone, Western Cape, South Africa, 2019.
- 2018: Ecological Assessment for the construction of a farm dam in Greyton, Western Cape.
- 2018: Conducted the Ecological Survey for a housing development in Noordhoek, Cape Town
- 2018: Conducted the field survey and developed an alien invasive management plan for the Swartland Municipality, Western Cape.
- 2017: Undertook the field survey and co-authored a coastal dune study that assesses the impacts associated with the proposed rezoning and subdivision of Farm Bookram No. 30 to develop a resort.
- 2017: Project managed and co-authored a risk assessment for the use of Marram Grass to stabilise dunes in the City of Cape Town.
- 2015-2016: iGas Saldanha to Ankerlig Biodiversity Assessment Project Manager, Saldanha.
- 2015: Innowind Ukomoleza Wind Energy Facility Alien Invasive Management Plan, Eastern Cape Province, South Africa.
- 2015: Savannah Nxuba Wind Energy Facility Powerline Ecological Assessment, ground truthing and permit applications, Eastern Cape South Africa.
- 2014: Cob Bay botanical groundtruthing assessment, Eastern Cape, South Africa.
- 2013-2016: Dassiesridge Wind Energy Facility Project Manager, Eastern Cape, South Africa.
- 2013: Harvestvale botanical groundtruthing assessment, Eastern Cape, South Africa.
- 2012: Tsitsikamma Wind Energy Facility Community Power Line Ecological Assessment, Eastern Cape, South Africa.
- 2012: Golden Valley Wind Energy Facility Power Line Ecological Assessment, Eastern Cape, South Africa.
- 2012: Middleton Wind Energy Facility Ecological Assessment and Project Management, Eastern Cape, South Africa.
- 2012: Mossel Bay Power Line Ecological Assessment, Western Cape, South Africa.
- 2012: Groundtruthing the turbine sites for the Waainek Wind Energy Facility, Eastern Cape, South Africa.
- 2012: Toliara Mineral Sands Rehabilitation and Offset Strategy Report, Madagascar.

CONTACT DETAILS

Name	**Amber Jackson**
Name of Company	**Biodiversity Africa**
Designation	Director
Profession	Faunal Specialist and Environmental Manager
E-mail	amber@biodiversityafrica.com
Office number	+27 (0)78 340 6295
Education	2011 M. Phil Environmental Management (University of Cape Town) 2008 BSc (Hons) Ecology, Environment and Conservation (University of the Witwatersrand) 2007 BSc 'Ecology, Environment and Conservation' and Zoology (WITS)
Nationality	**South African**
Professional Body	**SACNASP**: South African Council for Natural Scientific Profession (100125/12) **ZSSA**: Zoological Society of Southern Africa **HAA**: Herpetological Association of Southern Africa **IAIASa**: Member of the International Association for Impact Assessments South Africa
Key areas of expertise	• Biodiversity Surveys and Impact Assessments • Environmental Impact Assessments • Critical Habitat Assessments • Biodiversity Management and Monitoring Plans

PROFILE

Amber has over ten years' experience in environmental consulting and has managed projects across various sectors including mining, agriculture, forestry, renewable energy, housing, coastal and wetland recreational infrastructure. Most of these projects required lender finance and therefore met both in-country, lender and sector specific requirements.

Amber completed the IFC lead and Swiss funded programme in Environmental and Social Risk Management course in 2018. The purpose of the course was to upskill Sub-Saharan African environmental consultants to increase the uptake of E&S standards by Financial Institutions.

Amber specialises in terrestrial vertebrate faunal assessments. She has conducted large scale faunal impact assessments that are to international lender's standards in Mozambique, Tanzania, Lesotho and Malawi. In South Africa her faunal impact assessments comply with the protocols for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity and follows the SANBI Species Environmental Assessment Guideline. Her specialist input goes beyond impact assessments and includes faunal opportunities and constraints assessments, Critical Habitat Assessments, Biodiversity related Management Plans and Biodiversity Monitoring Programmes.

Amber holds a BSc (Zoology and Ecology, Environment & Conservation) and BSc (Hons) in Ecology, Environment & Conservation from WITS University and an MPhil in Environmental Management from University of Cape Town. Amber's honours focused on the landscape effects on Herpetofauna in Kruger National Park and her Master's thesis focused on the management of social and natural aspects of environmental systems with a dissertation in food security that investigated the complex food system of informal and formal distribution markets

EMPLOYMENT EXPERIENCE

Director and Faunal Specialist, Biodiversity Africa

July 2021 - present

- Faunal assessments for local and international EIAs in Southern Africa
- Identifying and mapping habitats and sensitive areas
- Designing and implementing biodiversity management and monitoring plans
- Critical Habitat Assessments
- Large ESIA studies

- Managing budgets

Principal Environmental Consultant and Faunal,
Coastal and Environmental Services
September 2011-June 2021

- Faunal and ecological assessments for local and international EIAs in Southern Africa
- Identifying and mapping habitat and sensitive areas
- Designing and implementing biodiversity management and monitoring plans
- Critical Habitat Assessments
- Large ESIA studies
- Coordinating specialists and site visits
- Faunal Impact Assessment
- Project Management, including budgets, deliverables and timelines.
- Environmental Impact Assessments and Basic Assessments project
- Environmental Control Officer
- Public/client/authority liaison
- Mentoring and training of junior staff

COURSES

- **Herpetological Association of Southern Africa Conference- Cape St Frances** September 2019
- **International Finance Corporation Environmental and Social Risk Management (ESRM) Program** January – November 2018
- **IAIA WC EMP Implementation Workshop** 27 February 2018
- **IAIAsa National Annual Conference** August 2017
  Goudini Spa, Rawsonville.
- **Biodiversity & Business Indaba, NBBN** April 2017
  Theme: Moving Forward Together (Partnerships & Collaborations)
- **Snake Awareness, Identification and Handling course, Cape Reptile Institute (CRI)** November 2016
- **Coaching Skills programme, Kim Coach** November 2016
- **Western Cape Biodiversity Information Event, IAIAsa** May 2016
  Theme: Biodiversity offsets & the launch of a Biodiversity Information Tool
- **Photography Short Course** 2015.
  Cape Town School of Photography,
- **Mainstreaming Biodiversity into Business: WHAT, WHY, WHEN and HOW** June 2014 Hosted by Dr Marie Parramon Gurney on behalf of the NBBN at the Rhodes Business School
- **IAIAsa National Annual Conference** September 2013
  Thaba'Nchu Sun, Bloemfontein
- **St Johns Life first aid course** July 2012

CONSULTING EXPERIENCE

International Projects

- 2018-Crooks Brothers Post EIA Work- Environmental and Social EMPr, Policies, E&S Management Plans and Monitoring Programmes
- 2018-Triton Ancuabe Graphite Mine (ESHIA), Mozambique. IFC Standards.
- 2016-Bankable Feasibility Study of Simandou Infrastructure Project – Port and Railway Summary of critical habitat, biodiversity offset plan and monitoring and evaluation plan.
- 2016-Lurio Green Resources Forestry Projects ESIA project upgrade to Lender standards including IFC, EIB, FSC and AfDB.
- 2014-Green Resources Woodchip and MDF plant (EPDA).

- 2014-Niassa Green Resources Forestry Projects ESIA to Lender standards including IFC, EIB, FSC and AfDB.
- 2020-Kenmare Faunal Biodiversity Management Plan, Mozambique.
- 2020-Kenmare Faunal Monitoring Pogramme (year 1)- Baseline, Mozambique.
- 2019-Kenmare addendum ESIA Faunal Impact Assessment, Mozambique.
- 2019-Kenmare infrastructure corridor ESIA Faunal Impact Assessment, Mozambique.
- 2019/20-Olam Cocoa Plantation Faunal Impact Assessment, Tanzania.
- 2019-JCM Solar Voltaic project Faunal desktop critical habitat assessment, Cameroon.
- 2018-Suni Resources Balama Graphite Mine Project Faunal Impact Assessment, Mozambique.
- 2017/18-Battery Minerals Montepuez Graphite Mine Project Faunal Impact Assessment, Mozambique.
- 2017-Triton Minerals Nicanda Hills Graphite Mine Project Faunal Impact Assessment, Mozambique.
- 2017-Sasol Biodiversity Assessment, Mozambique.
- 2014-Lesotho Highlands Water Project Faunal Impact Assessment, Lesotho.
- 2012-Malawi Monazite mine Projects (ESIA) EMP ecological management contribution
- Liberia Palm bay & Butow (ESIA)
- PGS Seismic Project (ESIA), Mozambique.

South African Projects

- 2018-Port St Johns Second Beach Coastal Infrastructure Project - E&S Risk Assessment
- 2015-Blouberg Development Initiative- E&S Risk Assessment
- 2019-Boulders Powerline BA Faunal desktop impact assessment, WC, SA.
- 2019-Ramotshere housing development BA Faunal desktop impact assessment, NW, SA.
- 2019-Cape Agulhas Municipality Industrial development faunal impact assessment, WC, SA.
- 2019-SANSA Solar PV BA Faunal desktop impact assessment, WC, SA.
- 2019-Wisson Coal to Urea Faunal desktop assessment, Mpumalanga.
- 2019-Assessment Boschendal Estate Faunal Opportunities and Constraints, WC, SA.
- 2019-Ganspan-Pan Wetland Reserve Recreational and Tourist Development Avifaunal Impact Assessment, NC, SA.
- 2018-City of Johannesburg Municipal Reserve Proclamation for Linksfield Ridge and Northcliff Hill Faunal Assessment, South Africa.
- 2017-Augrabies falls hydro-electric project Hydro-SA Faunal Impact Assessment.
- Port St Johns Second Beach Coastal Infrastructure Project (EIA), South Africa.
- Woodbridge Island Revetment checklist.
- Belmont Valley Golf Course and Makana Residential Estate (EIA)
- Belton Farm Eco Estate (BA).
- Ramotshere housing development (BA).
- G7 Brandvalley Wind Energy Project (EIA)
- G7 Rietkloof Wind Energy Project (EIA)
- G7 Brandvalley Powerlines (BA)
- G7 Rietkloof Powerlines (BA)
- Boschendal wine estate Hydro-electric schemes (BA, 24G and WULA)
- Mossel Bay Wind Energy Project (EIA)
- Mossel Bay Powerline (BA) 132kV interconnection
- Inyanda Farm Wind Energy (EIA)
- Middleton Wind Energy (EIA)
- Peddie Wind Energy (EIA)
- Cookhouse Wind Energy Project (EIA)

- Haverfontein Wind Energy Project (EIA)
- Plan 8 Wind Energy Project (EIA)
- Brakkefontein Wind Energy Project (EIA)
- Grassridge Wind Energy Project (EIA) (Coega)
- St Lucia Wind Energy Project (EIA)
- ACSA ECO CT (Lead ECO)
- Enel Paleisheuwel Solar farm (Lead ECO)
- NRA Caledon road upgrade ECO
- Solar Capital DeAar Solar farm annual audits
- Eskom Pinotage substation WUL offset compliance