TERRESTRIAL PLANT SPECIES SPECIALIST ASSESSMENT REPORT FOR THE PROPOSED PLETTENBERG BAY LAGOON RESIDENTIAL ESTATE, WESTERN CAPE PROVINCE

Prepared for:

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Nicole is a Botanical Specialist with over 4 years' experience in South Africa and other African countries. Nicole obtained her BSc Honours in Botany (Environmental Management) from Nelson Mandela University (NMU) in December 2018. She also holds a BSc Degree in Environmental Management (Cum Laude) from NMU. Nicole has undertaken numerous Ecological Impact Assessments for a range of developments, including Wind Energy Facilities (WEFs), mines, powerlines, housing developments, roads, amongst others, ensuring that these specialist assessments are undertaken and prepared in accordance with the Protocols for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity (GN R. 320), Plant Species and Animal Species (GN R. 1150) whilst working closely with developers to ensure a development which is environmentally sustainable as well as financially and technically feasible.

Declaration of Independence

Nicole Dealtry (Botanical Specialist)

- I, Nicole Dealtry, 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 Plant Species Specialist Assessment Report complies with the legislated requirements as described in Section 4.3 of the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Plant Species (GN R. 1150 of 2020).

SPECIALIST REPORT REQUIREMENTS ACCORDING TO GN R. 1150			SECTION OF REPORT
3	In terms of Section 3 of the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Plant Species, a Terrestrial Plant Species Specialist Assessment 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 2 & 3
	3.1.2	A signed statement of independence by the specialist;	Page 3
	3.1.3	A statement of the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 1.3 & 2.3
	3.1.4	A description of the methodology used to undertake the site sensitivity verification and impact assessment and site inspection, including equipment and modelling used where relevant;	Chapter 2
	3.1.5	A description of the assumptions made and any uncertainties or gaps in knowledge or data	Section 1.3
	3.1.6	A description of the mean density of observations/number of samples sites per unit area of site inspection observations;	Section 2.3
	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 & Section 7.2
	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; and	Chapter 7
	3.1.13	a motivation must be provided if there were any development footprints identified as per paragraph 2.3.12 above that were identified as having “low” or “medium” terrestrial plant species sensitivity and were not considered appropriate.	Chapter 5
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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Glossary of Terms

Alien Invasive Species refers to an exotic species that can spread rapidly and displace native species causing damage to the environment

Biodiversity is the term that is used to describe the variety of life on Earth and is defined as "*the variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems*" (Secretariat of the Convention on Biological Diversity, 2005).

Habitat Fragmentation occurs when large expanses of habitat are transformed into smaller patches of discontinuous habitat units isolated from each other by transformed habitats such as farmland.

Natural Habitat refers to habitats composed of viable assemblages of plant and/or animal species of largely native origin and/or where human activity has not essentially modified an area's primary ecological function and species composition.

Project Area/site is defined as the erf or farm portion on which the development is proposed and for which this specialist assessment relates to.

Project area of influence (PAOI) refers to the broader area around the project area that may be indirectly impacted by project activities.

Sensitive Species are species that are sensitive to illegal harvesting. As such, their names are obscured and listed as "Sensitive species #". As per the best practice guideline that accompanies the protocol and screening tool, the name of the sensitive species may not appear in any BAR or EIA report, nor any specialist reports released into the public domain.

Species of Conservation Concern (SCC) includes all species that are assessed according the IUCN Red List Criteria as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Data Deficient (DD) or Near Threatened (NT), as well as 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] (SANBI, 2021).

Acronyms

AOO	Area of Occurrence
CARA	Conservation of Agricultural Resources Act
CI	Conservation Importance
CR	Critically Endangered
DFFE	Department of Forestry, Fisheries and Environment
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EN	Endangered
EOO	Extent of Occupancy
FI	Functional Integrity
GN	Government Notice
LC	Least Concern
MAR	Mean Annual Rainfall
NEMA	National Environmental Management Act
NEM:BA	National Environmental Management: Biodiversity Act
NT	Near Threatened
PAOI	Project Area of Influence
PNCO	Provincial Nature Conservation Ordinance
POSA	Plants of Southern Africa
RR	Receptor Resilience
SA	South Africa
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
SEI	Site Ecological Importance
VU	Vulnerable

1. INTRODUCTION

1.1. Project Description

Biodiversity Africa has been appointed by Cape EAPrac (the Environmental Assessment Practitioner (EAP) for this project) to undertake a Terrestrial Plant Species Specialist Assessment Report 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.
- 5 x general residential erven (Residential Zone IV), containing 8 x apartments per erf (i.e. 40 apartments).
- 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. Reporting Requirements

According to the Department of Fisheries, Forestry and Environment (DFFE) Screening Report generated for the project area, the relative Plant Species Theme Sensitivity of the project area is classified as medium due to the likely occurrence of eighteen (18) plant Species of Conservation Concern (SCC) (refer to Section 4.3). In terms of the Protocol for the Specialist Assessment and Minimum Reporting Content Requirements for Environmental Impacts on Terrestrial Plant Species (GN R. 1150), an Applicant intending to undertake an activity on a site identified by the Screening Tool as being of "medium sensitivity" for terrestrial plant species must submit either a Terrestrial Plant Specialist Assessment Report or a Terrestrial Plant Species Compliance Statement depending on the outcome of the site inspection.

Based on the findings of the site inspection, a full Terrestrial Plant Specialist Assessment, this report, has been compiled for the proposed project area.

Figure 1.1: Locality map of the proposed residential estate.

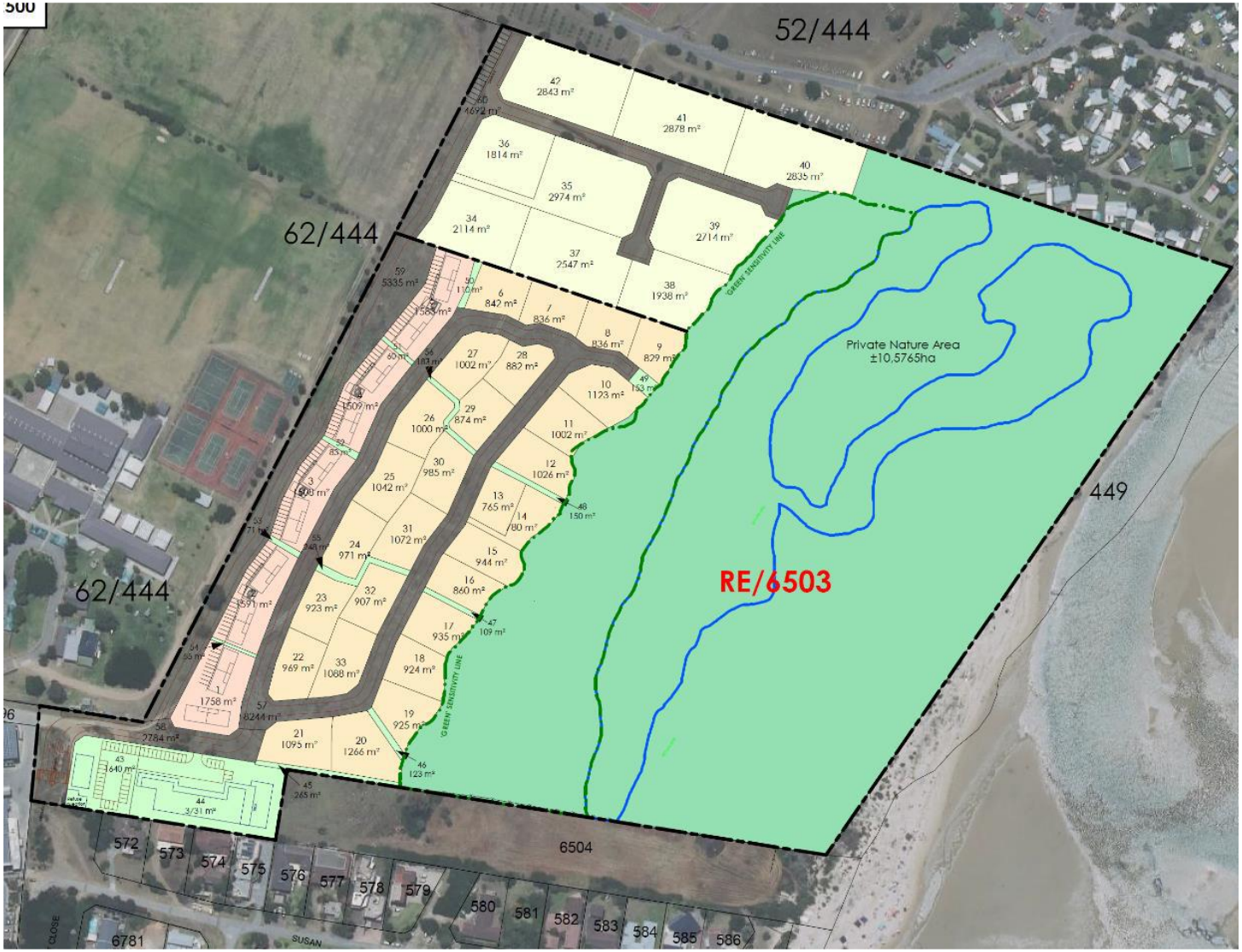


Figure 1.2: Layout of the proposed development on Erf 6503. The green shaded area, comprised of intact thicket, will not be developed.

1.3. Objectives

The objectives of this Terrestrial Plant Specialist Assessment are to:

- Undertake a desktop assessment of the site to determine the biophysical characteristics of the site, the vegetation types present and their threat status, and to identify plant Species of Conservation Concern (SCC) likely to occur on site based on their known distribution and habitat requirements. This information informs the selection of sample sites for the field survey.
- Undertake a field survey, to record the following information:
    - Vegetation types present.
    - Identification of plant species that are either protected (TOPS and PNCO) or considered threatened (Critically Endangered (CR), Endangered (EN), Vulnerable (VU)) on the Red List of South African Plants.
    - Assess the level of degradation/ecological status of the site (i.e. intact, near natural, transformed).
    - Determine current impacts and land use.
- Describe and map the vegetation types present and no-go areas.
- Identify alien plant species, assess the invasive potential, and recommend management procedures.
- Assess the sensitivity of the site using the Site Ecological Importance (SEI) methodology outlined in the Species Environmental Assessment Guideline (2021).
- Assess the impacts of the proposed development on the terrestrial plant species of the study site, including cumulative impacts.
- Provide mitigation measures and recommendations to reduce the potential impact on the terrestrial plant species of the study site.

1.4. Limitations and Assumptions

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

- This report is based on the project description received from the client on the 10th of July 2023 and assumes that the proposed development will be constrained to the previously disturb western portion of the project area.
- 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 possible that additional SCCs are present. However, every effort was made to identify SCC present on site during the field survey.
- Sampling could only be carried out at one stage in the annual or seasonal cycle. The survey was conducted in June which falls outside of the optimum survey period for the Fynbos and Albany Thicket Biome. However, it should be noted that a separate site visit was conducted in March by Dr David Hoare during which no threatened SCC were identified. All species observed were loaded onto iNaturalist and were factored into this report. It should be noted that most plant species recorded were identifiable to species level.
- This assessment includes vegetation and plants only. Separate reports have been prepared for the Terrestrial Biodiversity Theme and the Animal Species Theme, respectively.

- The assessment has been undertaken to meet the Protocol for the Specialist Assessment and Minimum Report Requirements for Environmental Impacts on Terrestrial Plant Species (GN. R 1150) and the Species Environmental Assessment Guidelines (2020).

2. METHODOLOGY

2.1. DFFE Screening Report

The DFFE Screening report identifies environmental sensitivities for the project area. This is based on available desktop data and requires that a suitably qualified specialist verify the findings. Of relevance to this report is the plant species theme (Table 2.1). Comment has been provided in the table below indicating how this theme has been assessed.

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

Theme	Sensitivity	Sensitivity Feature	Assessment
Plant Species Theme	**MEIDUM**	• *Lampranthus pauciflorus* • *Ruschia duthiae* • *Lebeckia gracilis* • *Leucospermum glabrum* • *Selago burchellii* • *Erica chloroloma* • *Erica glandulosa* subsp. *Fourcadei* • *Hermannia lavandulifolia* • Sensitive species 657 • Sensitive species 1032 • *Cotula myriophylloides* • *Acmadenia alternifolia* • *Muraltia knysnaensis* • Sensitive species 800 • *Erica glumiflora* • Sensitive species 500 • Sensitive species 763 • *Zostera capensis*	Prior to undertaking the field survey, a desktop assessment was undertaken to determine the distribution, habitat requirements, and likelihood of occurrence of the plant Species of Conservation Concern (SCC) identified within the Screening Report generated for the project area. A field survey was then undertaken to identify whether those species and/or their habitats were present within the project area.

2.2. Desktop Assessment

A desktop assessment was undertaken prior to the site visit to determine the biophysical characteristics of the project area, the vegetation types present and their threat status, and to identify additional plant Species of Conservation Concern (SCC) likely to occur on site based on their known distribution and habitat requirements. This information informs the selection of sample sites for the field survey. Key resources that were consulted during the desktop assessment include:

- The SA VEGMAP (SANBI, 2018).
- The Revised National List of Ecosystems that are Threatened and in need of Protection (DFFE, 2022).
- The Red List of Ecosystems (SANBI, 2021): Remnants spatial dataset.
- The Plants of Southern Africa (POSA) database.
- Red List of South African Plants.
- The Western Cape Provincial Nature and Environmental Conservation Ordinance No. 19 of 1974.
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004): Publication of Lists of Critically Endangered, Endangered, Vulnerable and Protected Species.
- NEM:BA: National List of Invasive Species in terms Sections 70(1), 71(3) And 71a.
- Conservation of Agriculture Resources Act 1983 (CARA) (Act No. 43 of 1983).
- iNaturalist.

2.3. Field Survey

A field survey was undertaken during Winter from the 21st to the 23rd of June 2023. Figure 2.1 indicates the sample sites and tracks recorded during the field survey.

The purpose of the botanical survey was to assess the site-specific botanical state of the Project Area of Influence (PAOI) by recording the species present (both indigenous and alien invasive species), identifying sensitive plant communities such as vegetation associated with rocky outcrops, riparian areas, or areas with Species of Conservation Concern (SCC), and identify the current land use.

The project area was walked, and sample points were analysed by determining the dominant species at each point, as well as any alien invasive species and potential SCC (Figure 2.1). A total of ten (10) sample points were assessed within the 18.5 ha project area. Each sample point was sampled until no new species were recorded. Vegetation communities were then described according to the dominant species recorded from each type, and these were mapped and assigned a sensitivity score.

All plant species recorded on site were uploaded onto iNaturalist: https://www.inaturalist.org/observations?place_id=any&user_id=nicole_wienand&verifiable=any.

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 OF THE PROJECT AREA

Abiotic and biophysical features such climate, geology, soil, and landform have a major influence of the distribution and structure of vegetation types occurring within a particular area. The project area occurs along the south coast of South Africa and falls within the eastern portion of the Fynbos Biome, but narrow strips of dune thicket (Albany Thicket Biome) develop within fire-protected dune slacks. This region is characterized by a warm and temperate climate with rainfall occurring throughout the year. This influences the vegetation types present and likely contributes to the ecotone observed between the Fynbos Biome and Thicket Biome. The Mean Annual Rainfall (MAR) for Plettenberg Bay is 663 mm and the average temperature is 16.9°C (Climate-data.org).

The Fynbos Biome occupies most of the Cape Fold Belt (both north-south and east-west mountain chains and wetter valleys) as well as the adjacent lowlands between the mountains and the Atlantic Ocean in the west and south, and between the mountains and the Indian Ocean in the south (Rebelo *et al*., 2006).

The regions supporting the Fynbos Biome, particularly around the Cape Fold Belt, have undergone extensive deformation and metamorphism to produce a mosaic of various geological substrates which has had a major influence on the evolution of the remarkable diversity of taxa and vegetation types within this biome. Sandstone, quartzite, granite, gneiss, shales, and also young limestone sediments are the most prominent rocks of the region (Rebelo *et al*., 2006).

The wide range of environmental conditions such as present and past rainfall, terrain type, and age of the landscape influence the weathering process of the underlying geologies resulting in large variations in soil types and soil associations that are characteristic of the Fynbos Biome. The soils within the project area consist of recently deposited aeolian (windblown) sands which are typically nutrient poor and shallow (Rebelo *et al*., 2006).

At a landscape level, fynbos is generally confined to flatter more extensive areas that are exposed to frequent fires while fire-safe habitats, such as dune slacks, develop small clumps of thicket. The elevation of the western portion of the project area is relatively flat sloping gently towards the east until approximately 150 m from the western boundary when the elevation decreases more considerably forming slacks until it flattens out upon reaching the lagoon (Figure 3.2). This change in elevation corresponds remarkably to the change in vegetation of the project area.

Within 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 (Figure 3.1). Cape Seashore vegetation has established along the foredune which is exposed to salt spray.

The key ecological drivers maintaining ecosystem function, pattern and structure differ between Fynbos and Thicket. As mentioned above, fire is the main ecological driver determining the distribution of these ecosystems are landscape level. Fire is integral to the persistence of Fynbos ecosystems whereas thicket is resistant to fire. Where these ecosystems occur in a mosaic, fire helps to maintain the boundary between these vegetation types. Other major ecological drivers include edaphic conditions and underlying lithologies. Fynbos typically occurs in shallow, nutrient poor, well-drained soils while thicket tends to occur in deeper soils with higher nutrient content.

Figure 3.1: Photography illustrating the Secondary Grassy Fynbos on the flatter high lying areas in the western portion of the project area and dune thicket in the dune slacks within the eastern portion of the project area.

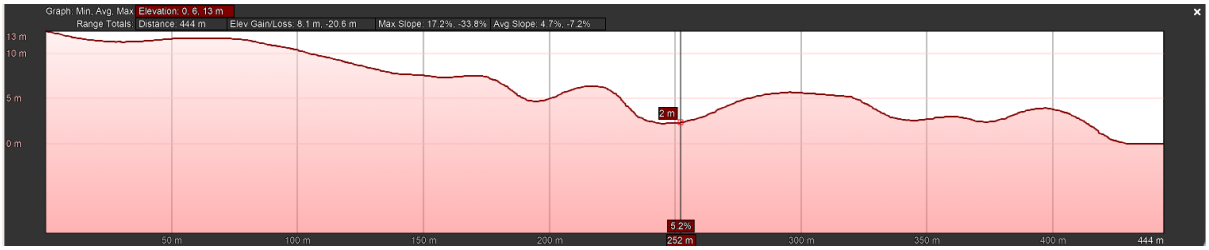


Figure 3.2: Elevation profile through the centre of the project area form the western boundary to the eastern boundary.

4. VEGETATION AND FLORISTICS

4.1. Vegetation of the Project Area

According to the South African Vegetation Map (SA VEGMAP) (SANBI, 2018), the project area is located within two (2) vegetation types, namely Garden Route Shale Fynbos and Goukamma Dune Thicket (Figure 4.1). Since the vegetation types provide habitat for the plant species that occur within the project area and because both the vegetation type and the species present are used to assess the SEI of the project area, a description of the vegetation types present have been included in this report as well as the Terrestrial Biodiversity Assessment Report.

Garden Route Shale Fynbos occurs on undulating hills and moderately undulating plains on coastal forelands in the Western Cape and Eastern Cape Provinces. In wetter areas this vegetation type is characterised by tall, dense proteoid and ericaceous fynbos whilst in drier areas it is characterised by graminoid fynbos or 'shrubby grassland' (Rebelo *et al*., 2006). Garden Route Shale Fynbos is classified as Endangered due to its narrow distribution and high rates of habitat loss over the past 28 years (DFFE, 2022). Only 44% (~248.5 ha) of the historical extent of this vegetation type remains and is considered poorly protected (SANBI, 2021).

Goukamma Dune Thicket occurs along moderately undulating coastal dunes from Victoria Bay near Wilderness to the Knysna Heads, with smaller areas occurring along the coast from Robberg Peninsula near Plettenberg Bay east towards Keurboomstrand. It is characterised by a mosaic of low to tall (1-5 m), dense thicket dominated by small trees and woody shrubs with abundant lianas, in a mosaic of low (1-2 m) asteraceous fynbos. Thicket clumps are best developed in fire-protected dune slacks which occasionally also supports coastal forest dominated by *Celtis africana, Ekebergia capensis*, and *Searsia chirindensis.* The fynbos shrubland occurs on upper dune slopes and crests where succulents may be common in more open areas (Grobler *et al*., 2018). Goukamma Dune Thicket is classified as Least Concern (LC) (SANBI, 2021).

Figure 4.1: SA VEGMAP (SANBI, 2018) of the project area.

Analysis of the Red List of Ecosystems (SANBI, 2021): Remnants spatial dataset indicates that both of these vegetation types are still present on site (Figure 4.2). However, analysis of Google Earth Satellite Imagery (Figure 4.3) and the findings of the site visit confirmed that the vegetation in the north-western half of the project area is no longer representative of Garden Route Shale Fynbos. This area appears to have been disturbed by prolonged mowing, the exclusion of fire, and historical grazing. The current vegetation, Secondary Grassy Fynbos, is characterised by an abundance of grass species such as *Digitaria eriantha, Eragrostis capensis, Heteropogon contortus, Imperata cylindrica, Melinis repens, Panicum maximum,* and *Setaria sphacelata* and fast growing, pioneer plant species mainly of the Asteraceae family including *Arctotheca prostrata, Artemisia afra, Cirsium vulgare, Felicia amoena, Helichrysum cymosum, H. foetidum, H. teretifolium, Hypochaeris glabra, Nidorella ivifolia, Stoebe plumosa*. Other common species included *Carpobrotus deliciosus, C. edulis, Chenopodium murale, Brunsvigia orientalis, Arctopus echinatus, Centella asiatica, Heliophila sp., Aspalathus spinosa, Indigofera verrucosa, Pelargonium alchemilloides, Pelargonium capitatum, Hypoxis sp., Hebenstretia integrifolia,* and *Plantago lanceolata* (See Figure 4.4 below).

Figure 4.2: Remaining Extent of threatened ecosystems within the project area (RLE (SANBI, 2021): Remnants spatial dataset).

Figure 4.3: Google Earth Satellite Image of the site from 2022 illustrating striations in the western portion of the site indicating historical clearance.

Figure 4.4: The Secondary Grassy Fynbos of the project area.

Goukamma Dune Thicket was confirmed to occur on site. This vegetation type was characterised by dense, low to tall (2-5 m) thicket dominated by woody trees such as *Searsia chirindensis, S. crenata, S. glauca, S. laevigata, Carissa bispinosa, C. macrocarpa, Tarchonanthus littoralis, Gymnosporia nemorosa, G. buxifolia, Maytenus procumbens, Mystroxylon aethiopicum, Putterlickia pyracantha, Pterocelastrus tricuspidatus, Diospyros dichrophylla, Euclea racemosa, Grewia occidentalis, Ekebergia capensis, Olea exasperata, Sideroxylon inerme*, and *Buddleja saligna* and an abundance of climbers such as *Rhoicissus digitata, Rhoicissus tridentata, Cynanchum obtusifolium, Asparagus spp*. and *Rhynchosia caribaea* (Figure 4.5). Alien invasive plant species, particularly of the Genus *Acacia*, were scattered throughout the project area but abundant in portions of the thicket vegetation. Due to the fragmentation of the remaining portion of Goukamma Dune Thicket caused by frequent access, as well as the presence of alien invasive plant species, this vegetation type within the site is considered near intact.

The ecotone between the Secondary Grassy Fynbos and the Goukamma Dune Thicket was abrupt and corresponds to the change in elevation of the project area (Figure 4.7).

Figure 4.5: The Goukamma Dune Thicket of the project area.

Figure 4.6: The contrast between the Secondary Grassy Fynbos and the Goukamma Dune Thicket of the project area.

Figure 4.7: Photograph illustrating the abrupt ecotone between the Secondary Grassy Fynbos and the Goukamma Dune Thicket of the project area.

A small strip of Cape Seashore Vegetation bordered the south-eastern boundary of the project area along the coastal dunes (Figure 4.8). Common species included *Metalasia muricata, Ursinia chrysanthemoides, U. paleacea Carpobrotus deliciosus, Ipomoea pes-caprae, Falkia repens, Crassula lanceolata, Tetragonia decumbens, Helichrysum asperum, Ficinia nodosa, Isolepis cernua, Isolepis marginata, Pycreus polystachyos, Chironia baccifera, Ehrharta villosa,* and *Thinopyrum distichum*. Cape Seashore Vegetation is classified as Least Concern (SANBI, 2021).

Figure 4.8: Cape Seashore Vegetation bordering the southeastern boundary of the project area.

The vegetation of the project area has been delineated and mapped in Figure 4.9 based on the observations from the field survey. It should be noted that two patches of transformed areas have been mapped. The transformed portion in the north-western corner consists of a homestead and garden whilst the transformed portion in the south-western corner consists of a gravel driveway and turning circle.

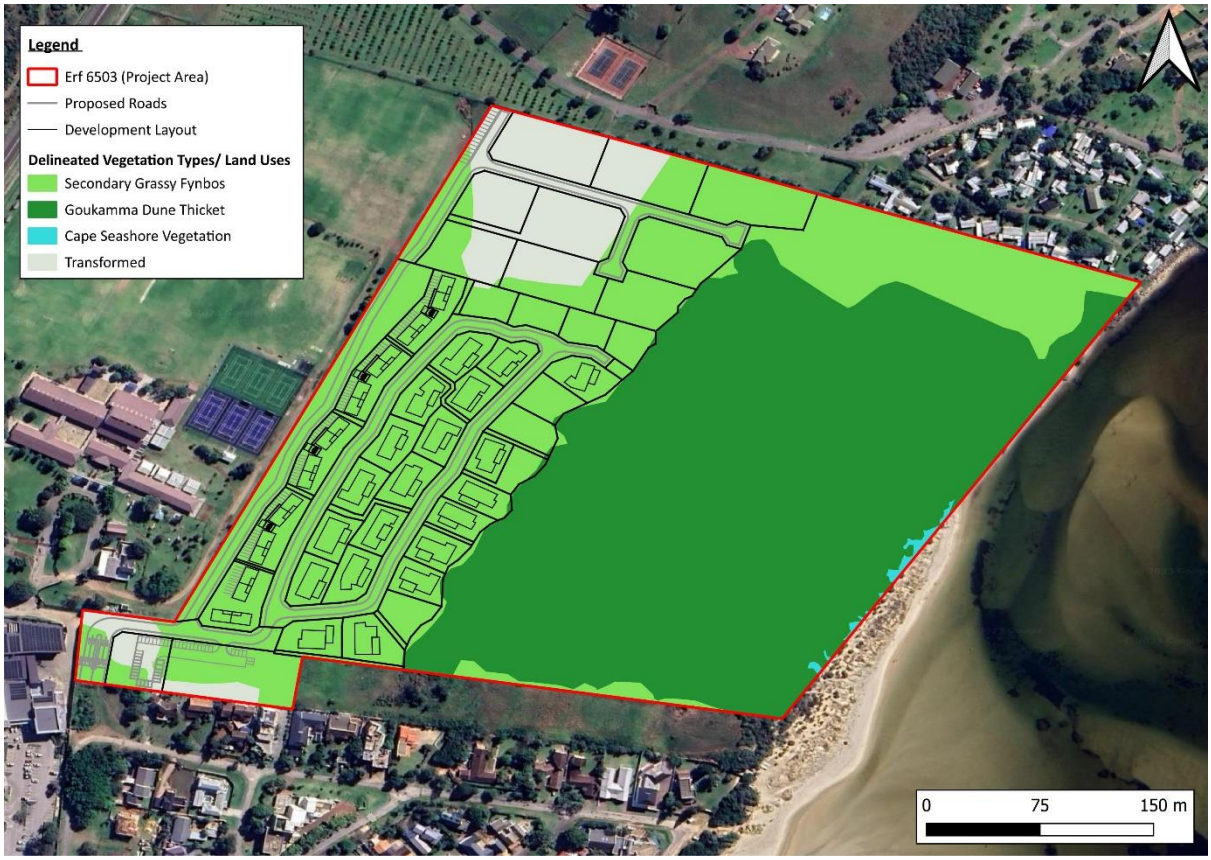


Figure 4.9: Vegetation types delineated and mapped based on field survey findings.

4.2. Floristics

A total of 147 plant species from 52 families were identified within the project area. The Asteraceae family was represented by the most species (18), followed by the Poaceae family (12) and the Scrophulariaceae family (8) (Table 4.1). Of the 146 plant species recorded, 21 are exotic plant species and not indigenous to South Africa. The remaining 126 indigenous plant species are all classified as Least Concern (LC). Of these 126 species, twelve (12) are listed as Schedule 4 species that will require permits for their removal and/or destruction prior to construction commencing (Table 4.2). Permit applications must be submitted, together with the Environmental Authorisation, to Cape Nature.

Refer to Appendix 1 for the full list of plant species recorded on site.

Table 4.1: List of the number of plant species per family recorded within the project area.

Acanthaceae	1	Iridaceae	2
Aizoaceae	5	Juncaceae	1
Amaranthaceae	1	Lamiaceae	4
Amaryllidaceae	1	Lobeliaceae	1
Anacardiaceae	5	Malvaceae	3
Apiaceae	3	Meliaceae	2
Apocynaceae	4	Menispermaceae	1
Araceae	2	Myricaceae	3
Araliaceae	1	Oleaceae	1
Asparagaceae	4	Plantaginaceae	1
Asphodelaceae	3	Poaceae	12
Asteraceae	18	Polygalaceae	3
Brassicaceae	1	Primulaceae	1
Celastraceae	7	Ranunculaceae	1
Convolvulaceae	3	Restionaceae	1
Crassulaceae	4	Rubiaceae	1
Cucurbitaceae	1	Ruscaceae	1
Cyperaceae	6	Rutaceae	1
Ebenaceae	2	Santalaceae	1
Euphorbiaceae	1	Sapotaceae	1
Fabaceae	7	Scrophulariaceae	8
Fumariaceae	1	Solanaceae	3
Gentianaceae	1	Theophrastaceae	2
Geraniaceae	2	Thymelaeaceae	1
Hyacinthaceae	3	Verbenaceae	1
Hypoxidaceae	1	Vitaceae	2

Table 4.2: Protected species recorded within the project area.

Family	Species	Red List Status	Protected in Terms of		
			Western Cape Nature Conservation Laws Amednment Act, 2000	NEM:BA 2007	List of Protected Trees (2021)
Aizoaceae	*Carpobrotus deliciosus*	LC	Schedule 4	-	-
Aizoaceae	*Carpobrotus edulis*	LC	Schedule 4	-	-
Aizoaceae	*Delosperma inconspicuum*	LC	Schedule 4	-	-

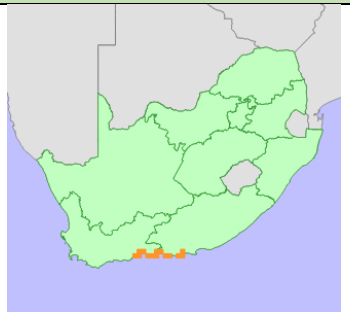
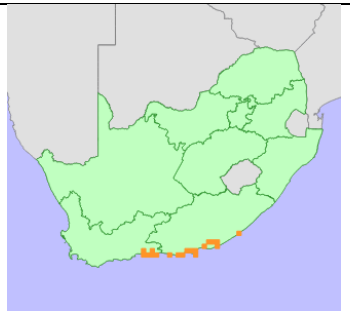
Family	Species	Red List Status	Protected in Terms of		
			Western Cape Nature Conservation Laws Amednment Act, 2000	NEM:BA 2007	List of Protected Trees (2021)
Aizoaceae	*Tetragonia decumbens*	LC	Schedule 4	-	-
Aizoaceae	*Tetragonia fruticosa*	LC	Schedule 4	-	-
Amaryllidaceae	*Brunsvigia orientalis*	LC	Schedule 4	-	-
Asphodelaceae	*Aloe arborescens*	LC	Schedule 4	-	-
Asphodelaceae	*Aloiampelos ciliaris*	LC	Schedule 4	-	-
Iridaceae	*Chasmanthe aethiopica*	LC	Schedule 4	-	-
Iridaceae	*Gladiolus gueinzii*	LC	Schedule 4	-	-
Rutaceae	*Agathosma apiculata*	LC	Schedule 4	-	-
Sapotaceae	*Sideroxylon inerme*	LC	-	-	Schedule A

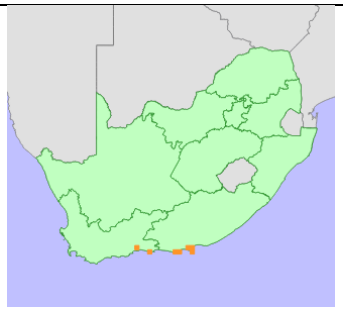
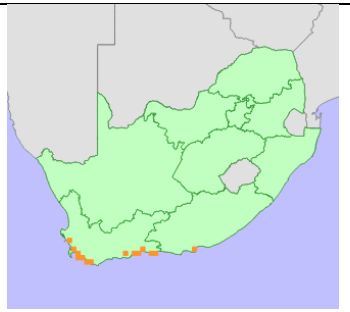
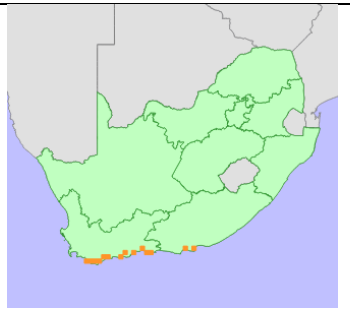
4.3. Species of Conservation Concern

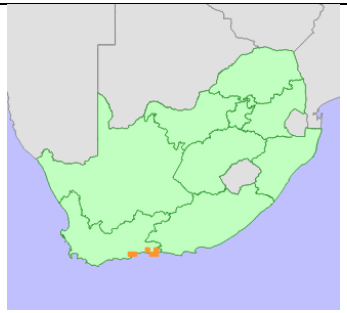
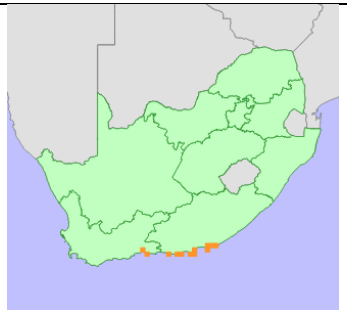
Table 4.3 below lists the floral SCC likely to occur within the project area. This list has been compiled based on records obtained from the Plants of Southern Africa (POSA) database, the list of common taxa for vegetation types occurring on site (Mucina *et al*., 2006), iNaturalist, and the Screening Report generated for the project area. Twenty-two (22) potential SCC were identified. However, only two (2) species have a high likelihood of occurrence within the Goukamma Dune Thicket of the project area, namely *Erica glandulosa* subsp. *Fourcadei* and *Erica glumiflora*, both classified as Vulnerable (VU). Five (5) SCC have a moderate likelihood of occurrence and the remainder of the SCC have a low to very low likelihood of occurrence on site.

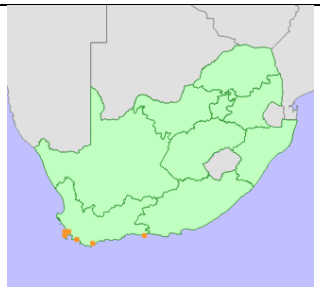
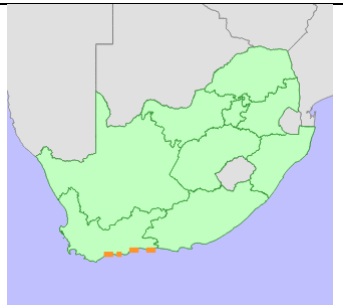
It should be noted that no threatened SCC were identified during the field survey. Refer to Appendix 1 for a full list of plant species recorded on site.

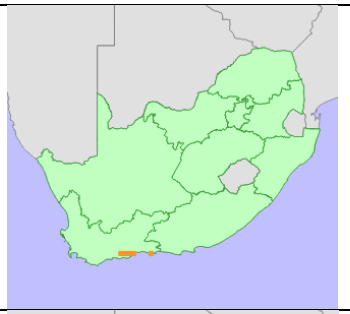
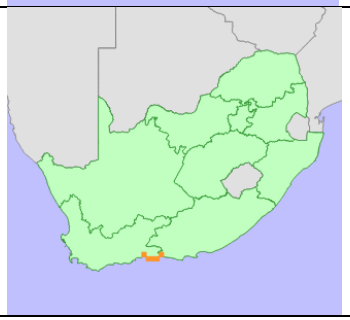
Table 4.3: List of plant Species of Conservation Concern likely to occur within the project area.

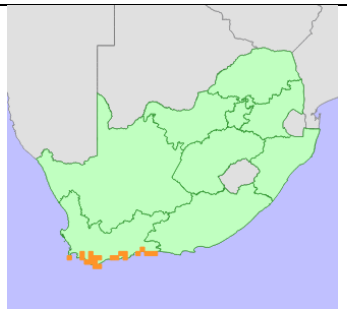
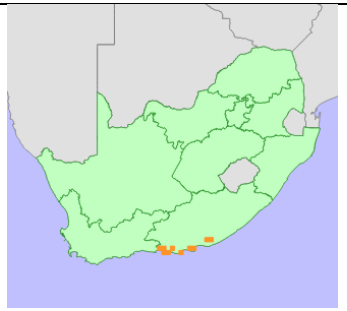
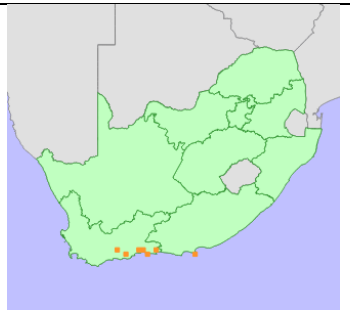
Family	Species	Red List Category	Habitat and occurrence	Distribution Map	Likelihood of Occurrence	Confirmed on Site (Y/N)
ERICACEAE	*Erica glandulosa subsp. fourcadei*	**VU B1ab(ii,iii,iv,v)**	This species is known from 8-12 severely fragmented subpopulations which are confined to a narrow coastal area between Mossel Bay and Cape St Francis (EOO 5225 km²). Its habitat includes coastal fynbos and thicket. Goukamma Dune Thicket is one of its major habitats (Vlok *et al*., 2012).		The project area contains the preferred habitat of this species (Goukamma Dune Thicket) and occurs within the known distribution of this species. The nearest recorded observation of this species is located approximately 8.8 km south west of the project area near Kranshoek. The likelihood of occurrence of this species within the Goukamma Dune Thicket is classified as **HIGH** and within the Secondary Grassy Fynbos is **LOW**.	NO
ERICACEAE	*Erica glumiflora*	**VU B1ab(i,ii,iii,iv,v)**	This species occurs on sandy coastal flats, dunes and low coastal hills within fynbos and thicket from Wilderness to East London, extending inland to Grahamstown (EOO <6740 km²). It is known from six locations, four of which are located within nature reserves. Goukamma Dune Thicket is one of its major habitats (Turner, 2008).		The nearest recorded observation of this species is within the Robberg Nature Reserve (approximately 8 km southeast of the project area). This species has a **HIGH** likelihood of occurrence within the Goukamma Dune Thicket and a LOW likelihood of occurrence within the Secondary Grassy Fynbos.	NO

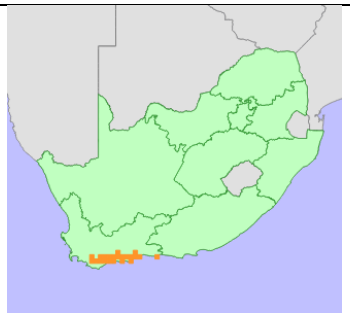
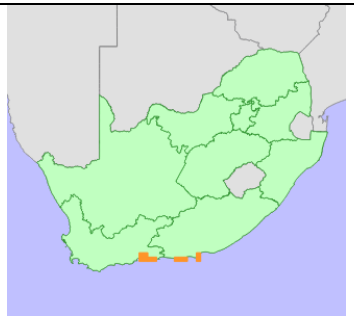
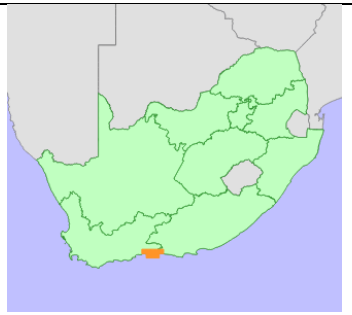
-	Sensitive species 657	**EN B2ab(iii,v)**	This species occurs in small, severely fragmented subpopulations from Great Brak River to Port Elizabeth. The total area of available habitat is less than 250 km^2. Its habitat includes coastal sands/flats within Humansdorp Shale Renosterveld, Algoa Sandstone Fynbos, Cape Seashore Vegetation, St Francis Dune Thicket, Sundays Mesic Thicket, Goukamma Dune Thicket (Snijman *et al*., 2007).		Although the project area does contain suitable habitat for this species, it has not been recorded within the project area or within the surrounding area (iNaturalist). As such, the likelihood of occurrence within the Goukamma Dune and the secondary Grassy Fynbos is **MODERATE.**	NO
-	*Sensitive species 500*	**EN C2a(i)**	This species occurs on lowland sandy flats, stabilised dunes and coastal rock promontories within Overberg Dune Strandveld, Agulhas Limestone Fynbos, Garden Route Granite Fynbos, Hangklip Sand Fynbos, Cape Flats Sand Fynbos, Atlantis Sand Fynbos, Knysna Sand Fynbos, St Francis Dune Thicket, Hartenbos Strandveld, Goukamma Dune Thicket. Its distribution stretches from the Cape Flats to Port Elizabeth where it is known from only 8-11 subpopulations. It is estimated that less than 1000 mature individuals remain (von Staden, 2012).		Although the project area contains suitable habitat for this species, it has not been recorded within the broader project area. The nearest observation of this species is within the Robberg Nature Reserve (iNaturalist). As such, the likelihood of occurrence within the Goukamma Dune Thicket is **MODERATE** but within the Secondary Grassy Fynbos is Low due to the previous history of disturbance.	NO
FABACEAE	*Lebeckia gracilis*	**EN B1ab(ii,iii,iv,v)**	The distribution of this species includes Port Elizabeth to Bredasdorp. It is thought to occur from 2 to 5 locations within an EOO of 4000 km^2. Its preferred habitat includes coastal fynbos in deep, sandy soils below 300 m. (Raimondo and Le Roux, 2008).		The project area contains one of the major habitats of this species (Goukamma Dune Thicket) and falls within its known distribution. However, this species has not been recorded within the project area or the broader Plettenberg Bay area (iNaturalist). As such, the likelihood of occurrence within Goukamma Dune Thicket is classified as	NO

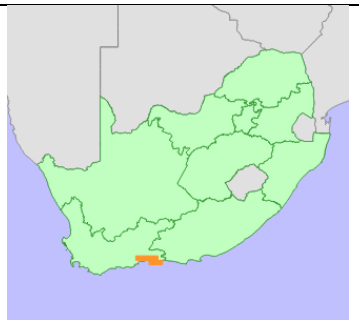
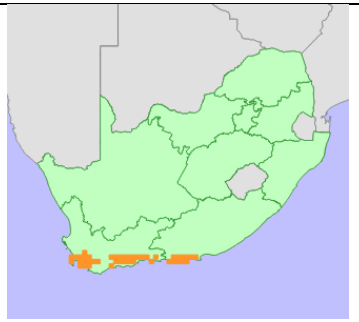
					MODERATE and within the Secondary Grassy Fynbos is **LOW**.	
POLYGALACEAE	*Muraltia knysnaensis*	**EN B1ab(ii,iii,iv,v)**	Between three and eight severely fragmented subpopulations remains on remnants of natural habitat which includes dry flats and hills within Sandstone Fynbos, Albertinia Sand Fynbos, Southern Cape Dune Fynbos, Knysna Sand Fynbos, Hartenbos Strandveld, and Goukamma Dune Thicket. Its distribution includes coastal lowlands between Mossel Bay and Keurbooms River (Helme *et al*., 2012).		The project area contains one of the major habitats of this species (Goukamma Dune Thicket) and falls within its known distribution. However, this species has not been recorded within the broader project area (iNaturalist). As such, the likelihood of occurrence within Goukamma Dune Thicket is classified as **MODERATE** and within the Secondary Grassy Fynbos is **LOW**.	NO
ERICACEAE	*Erica chloroloma*	**VU B1ab(ii,iii,iv,v) +2ab(ii,iii,iv,v)**	This species occurs within coastal dune fynbos and thicket from Wilderness to the Fish River Mouth (EOO <9225 km², AOO <800 km²). It is known from only 10-15 severely fragmented subpopulations (Turner and von Staden, 2012).		Although the project area contains the preferred habitat type of this species, it has not been recorded within the broader Plettenberg Bay area (iNaturalist & Red List of South African Plants). As such, the likelihood of occurrence within Goukamma Dune Thicket is classified as **MODERATE** and within the Secondary Grassy Fynbos is **LOW**.	NO

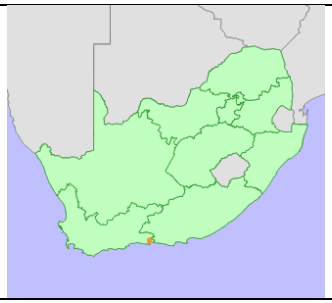
ASTERACEAE	*Cotula myriophylloides*	**CR B2ab(iii)**	This species is endemic to the Western Cape Province. Its distribution stretches from the Cape Peninsula to Plettenberg Bat but it is known from only two localised, isolated subpopulations (possibly three) which are severely fragmented (EOO 8786 km², AOO <1 km²). Its habitat includes submerged seasonal coastal pools, marshes and wet sand with still or slow moving brackish or freshwater within the Estuarine Functional Zone (Powell *et al*., 2013).		Although the project area contains suitable habitat for this species (submerged marshes and wet sand with still or brackish or freshwater within the Estuarine Functional Zone i.e., eastern half of the project area), based on its rarity and the lack of previous observations recorded on iNaturalist, the likelihood of occurrence is classified as **LOW**. However, if it is present, it will be constrained to seasonal coastal pools and since no development in these habitats is planned, this species will not be affected by project activities.	NO
AIZOACEAE	*Lampranthus pauciflorus*	**EN B1ab(ii,iii,iv,v)**	This species is endemic to the Western Cape Province. Its distribution includes Cape Infanta to Plettenberg Bay. It is known from only four remaining locations (EOO 1270 km²). It is threatened by ongoing coastal development which has resulted in habitat loss. Its habitat includes rocky coastal slopes and clayish hills in Strandveld, Blombos Strandveld, Overberg Dune Strandveld, Potberg Sandstone Fynbos, Garden Route Granite Fynbos, Albertinia Sand Fynbos, Knysna Sand Fynbos, Hartenbos Strandveld, Goukamma Dune Thicket (Klak and Raimondo, 2008).		The project area does not contain the preferred habitat of this species (rocky coastal slopes/ clayish hills). There are no records of this species within the broader area surrounding the project area. As such, the likelihood of occurrence is classified as **LOW**.	NO

ORCHIDACEAE	*Satyrium muticum*	**EN B1ab(iii,v) +2ab(iii,v); C2a(ii)**	This is a range restricted (EOO 971 km²) and very rare species known from four small, severely fragmented subpopulations. Its distribution includes Riversdale to Knysna and the northern slopes of the Langeberg Mountains. Its habitat includes relatively dry to moist slopes up to 200 m within Fynbos (von Staden, 2018).		The project area does not contain the preferred habitat of this species as the Fynbos vegetation has previously been cleared. Furthermore, the project area occurs outside of its known distribution. As such, the likelihood of occurrence is classified as **LOW**.	NO
PROTEACEAE	*Leucospermum glabrum*	**EN B1ab(iii,v)c(iv) +2ab(iii,v)c(iv); C2a(i)**	Only 14 severely fragmented populations are known and less than 1000 mature individuals have been recorded. This species occurs from the Outeniqua and the Tsitsikamma Mountains (EOO 1005 km², AOO 54 km²) where it occurs on wet south facing slopes in sandstone fynbos (Rebelo et al., 2005).		The project area does not contain suitable habitat for this species (wet south facing slopes in sandstone fynbos). As such, the likelihood of occurrence is **LOW**.	NO
AIZOACEAE	*Ruschia duthiae*	**VU**	A highly range-restricted (EOO 191 km²), but locally still fairly common species. It is known from fewer than 10 locations. Its habitat includes gentle north-facing sandstone or shale slopes with grassy fynbos (Garden Route Shale Fynbos, Knysna Sand Fynbos) from Sedgefield to Natures Valley (Helme *et al*., 2016).		The project area does not contain the preferred habitat of this species as the Fynbos vegetation has previously been cleared. The species has not been recorded within the broader project area. As such, the likelihood of occurrence is classified as **LOW**.	NO

-	Sensitive species 800	**VU B1ab(iii)**	Although previously common, this species only remains in small, isolated subpopulations within natural vegetation. Its distribution extends from the Cape Peninsula to Knysna (EOO 16 700 km²) where it occurs in limestone and clay loam soil within fynbos, renosterveld and thicket on coastal lowlands. Goukamma Dune Thicket is recognised as one of this species major habitats (Vlok *et al*., 2008).		This species has been recorded approximately 3.7 km south of the project area. However, the soils within the study area are mainly unconsolidated beach sand and not clay loam or limestone. As such, the likelihood of occurrence is classified as **LOW**.	NO
IRIDACEAE	*Gladiolus huttonii*	**VU B1ab(i,ii,iii,iv,v)**	This occurs from East London to Grahamstown to Pletternberg Bay (EOO 8458 km²) and is known from only 17 historical subpopulations. Its preferred habitat includes sandy loam, clay or moderately fertile soils derived from the Witterberg slopes, within the coastal plain. Its major habitat types include Humansdorp Shale Renosterveld, Algoa Sandstone Fynbos, Garden Route Shale Fynbos, Suurberg Shale Fynbos, Eastern Coastal Shale Band Vegetation, and St Francis Dune Thicket (Raimondo and Vlok, 2008).		The project area no longer contains the preferred, intact natural habitat of this species (Garden Route Shale Fynbos). Furthermore, the nearest observation of this species was recorded in Natures Valley, 18.6 km northeast of the project area. As such, the likelihood of occurrence is classified as **LOW**.	NO
-	Sensitive species 763	**VU A2c**	This species occurs in dry coastal Renosterveld and grassy places in coastal forest. Goukamma Dune Thicket is one of its major habitat types. Its distribution extends from Riversdale to Port St Johns (Vlok and Raimondo, 2006).		Although the project area contains suitable habitat for this species (Goukamma Dune Thicket), this species has not been recorded within or near to the project area. The nearest observation of this species recorded on iNaturalist is in George, approximately 83 km west of the project area. As such, the likelihood of occurrence is classified as **LOW**.	NO

MALVACEAE	*Hermannia lavandulifolia*	**VU A2c**	Previously a widespread and common species which is declining due to ongoing habitat loss. It is endemic to the Western Cape Province where it occurs from Worcester to the Overberg and extends along the southern Cape coastal lowlands as far east as Plettenberg Bay. Its preferred habitat includes clay slopes in Renosterveld and Valley Thicket (von Staden, 2018).		The project area does not contain the preferred habitat of this species (clay slopes). The substrate of the project area consists of unconsolidated coastal sands. Furthermore, the nearest record of this species on iNaturalist is located just outside of Knysna, approximately 32 km west of the project area. As such, the likelihood of occurrence is classified as **LOW**.	NO
-	Sensitive species 1032	**VU C2a(i)**	The distribution ion of this species extends from Wilderness to Port Alfred (EOO 11 072 km²) where is occurs in open places amongst bushes on fixed dunes close to the shoreline at 0-150 m. Goukamma Dune Thicket is one of the major habitats of this species. Only seven subpopulations have been identified however, it is thought that at least seven to ten more unidentified subpopulations remain (von Staden *et al.,* 2011).		Although the project area contains suitable habitat for this species, this species has not been recorded within the broader Plettenberg Bay area (iNaturalist and the Red List of South African Plants). As such, the likelihood of occurrence is **LOW**.	NO
RUTACEAE	*Acmadenia alternifolia*	**VU B1ab(ii,iii,iv)+2ab(ii,iii,iv)**	This distribution of this species extends from Knynsa to Plettenberg Bay, and possibly Nature's Valley (EOO 466 km²). Only 5-9 locations are known. Its preferred habitat includes coastal headlands and steep slopes, exposed positions on dry coastal cliffs within South Outeniqua Sandstone Fynbos, Garden Route Shale Fynbos, and Goukamma Dune Thicket (Raimondo *et al*., 2012).		The nearest observation of this species is near to the Robberg Nature Reserve, approximately 6.4 km south of the project area. The project area is relatively flat, sloping gently towards the wetland in the centre of the site. Based on the lack of preferred habitat (steep slopes, exposed positions on dry coastal cliffs) the likelihood of occurrence on site is **LOW**.	NO

SCROPHULARIACEAE	*Selago burchellii*	**VU** **B1ab(ii,iii,iv,v)**	This species occurs within Garden Route Shale Fynbos, Southern Cape Dune Fynbos, and Knysna Sand Fynbos on coastal slopes and flats from George to Plettenberg Bay (EOO 2700 km²). It is known from only six locations (Raimondo, 2007).		The project area no longer contains the preferred, intact natural habitat of this species (Garden Route Shale Fynbos). The nearest observation of this species was recorded approximately 6 km south of the project area near to the Robberg Nature Reserve. As such, the likelihood of occurrence is classified as **LOW**.	NO
PROTEACEAE	*Protea coronata*	**NT** **A2c+3c+4c**	The distribution of this species extends from the Cape Peninsula to Kouga. It occurs on heavy clay soils in fynbos and renosterveld within high rainfall areas from 200-750 m (Rebelo et al., 2006).		The project area no longer contains the preferred, intact natural habitat of this species (Garden Route Shale Fynbos). Furthermore, the soil of the project area is sandy and not heavy clay which is the preferred substrate of this species. This species has not been recorded within the broader project area (iNaturalist) As such, the likelihood of occurrence is classified as **LOW**.	NO
ORCHIDACEAE	*Pterygodium newdigateae*	**CR** **(Possibly Extinct)**	This species has not been recorded since 1923. Although several searches over many years have been conducted within the area it is presumed to have occurred (Plettenberg Bay), it has not been found in the wild and it is thought it is likely extinct. Its habitat includes stony slopes near sea level within Sandstone Fynbos (von Staden, 2016).		The project area does not contain the preferred habitat of this species (stony slopes within Sandstone Fynbos). Based on the lack of suitable habitat as well as the lack of historical records, the likelihood of occurrence is classified as **VERY LOW**.	NO

ORCHIDACEAE	*Disa newdigateae*	**CR** **(Possibly Extinct)**	This species is known from only one subpopulation near the Crags in Plettenberg Bay where it was recorded between 1895 and 1931. However, it has not been recorded since, despite numerous searches over the years, and is thought to be extinct. Its habitat includes stony slopes near the coast within Sandstone Fynbos (von Staden, 2012).		The project area does not contain the preferred habitat of this species (stony slopes within Sandstone Fynbos). Based on the lack of suitable habitat as well as the lack of historical records, the likelihood of occurrence is classified as **VERY LOW**.	NO

4.4. Alien Invasive Species

Alien Invasive Plant (AIP) species are defined as non-native or exotic plant species that occur outside of their natural geographic range. These species are introduced by humans, either accidentally or intentionally, often establishing and spreading and causing damage to ecosystems, natural habitats, and species. It should be noted that not all introduced alien species are invasive and not all invasive species are necessarily alien. The National Environmental Management: Biodiversity Act (NEM:BA) (Act No. 10 of 2004) defines 'Invasive Alien Plant Species' as any species whose establishment and spread outside of its natural distribution range:

(a) Threatens ecosystems, habitats or other species or has a demonstrable potential to threaten ecosystems, habitats, or other species; and
(b) May result in economic or environmental harm or harm to human health.

AIP species are characterised by their rapid reproduction and spread in new environments due to their (i) highly competitive growth rates that allow them to outcompete local indigenous species, (ii) their resistance to local diseases, and (iii) their lack of natural enemies in new environments. AIPs are globally considered as one of the greatest threats to the environment, biodiversity, ecosystem integrity and the economy. As such, it is important to manage and control their establishment and spread.

Twenty-one (21) exotic plant species were recorded during the site visit. Of the 21 exotic plant species recorded, eleven (11) species are classified as alien invasive plant species (Table 4.4). In South Africa, there are two laws governing the control, eradication, purchasing and trading of Alien Invasive Plant (AIP) species, namely the Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983) and the National Environmental Management: Biodiversity Act (NEM:BA) (Act No. 10 0f 2004). These are outlined in Section 4.3.1 and 4.3.2 below. All landowners have a responsibility and legal obligation to control AIPs on their land.

Table 4.4: Alien plant species recorded during the site visit.

FAMILY	SPECIES	COMMON NAME	CARA CATEGORY	NEM:BA CATEGORY
Amaranthaceae	*Chenopodium murale*	Nettle-leaved Goosefoot	-	-
Anacardiaceae	*Schinus terebinthifolius*	Brazilian Pepper	3	-
Asparagaceae	*Yucca aloifolia*	Aloe Yucca	-	-
Asteraceae	*Cirsium vulgare*	Bull Thistle	1	1b
Asteraceae	*Hypochaeris glabra*	Smooth Cat's Ear	-	-
Crassulaceae	*Bryophyllum delagoense*	Mother of Thousands	1	1b
Euphorbiaceae	*Ricinus communis*	Castor Bean	2	-
Fabaceae	*Acacia cyclops*	Rooikrans	2	1b
Fabaceae	*Acacia melanoxylon*	Australian Blackwood	2	2
Fabaceae	*Acacia saligna*	Port Jackson	2	1b
Fumariaceae	*Fumaria muralis*	Common Ramping-Fumitory	-	-
Lamiaceae	*Westringia fruticosa*	Coastal Rosemary	-	-

Meliaceae	*Melia azedarach*	Chinaberry	3	-
Myrtaceae	*Psidium guajava*	Common Guava	2	-
Poaceae	*Setaria sphacelata*	African Bristlegrass	-	-
Poaceae	*Thinopyrum distichum*	Coastal Wheatgrass	-	-
Primulaceae	*Anagallis arvensis*	Bird's Eye	-	-
Scrophulariaceae	*Myoporum insulare*	Australian Ngaio	-	-
Scrophulariaceae	*Myoporum laetum*	Ngaio	-	-
Solanaceae	*Cestrum laevigatum*	Inkberry	1	1b
Verbenaceae	*Lantana camara*	Common Lantana	1	1b

4.4.1. The Conservation of Agricultural Resources Act (Act No. 43 of 1983)

The Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983) was promulgated in 1984 and amended in 1985 and again in 2001. The Act intends to provide for control over the utilization of the natural agricultural resources of the Republic, to promote the conservation of the soil, the water sources, and the vegetation, and the combating of weeds and invader plants. CARA includes a list of 198 species which are classified as weeds or invader plants according to three categories:

- **Category 1**: Invader plants must be removed & destroyed immediately. No trade in these plants.
- **Category 2**: Invader plants may be grown under controlled conditions in permitted zones. No trade in these plants.
- **Category 3**: Invader plants may no longer be propagated or sold. Existing plants do not need to be removed.

4.4.2. The National Environmental Management: Biodiversity Act (NEM:BA) (Act No. 10 0f 2004)

The Alien and Invasive Species Lists (2020) published under the National Environmental Management: Biodiversity Act (NEM:BA) (Act No. 10 of 2004) includes a list of 383 plant species which are assigned to one of four categories:

- **Category 1a:** Invasive Species that must be <u>combatted</u> or <u>eradicated</u>. A person in control of a Category 1a Listed Invasive Species must:
    - Immediately take steps to combat or eradicate listed invasive species.
    - Allow authorised officials to inspect the property to monitor, assist with or implement the combatting or eradication of the listed invasive species.
    - If an Invasive Species Management Programme has been developed, a person must combat or eradicate the listed invasive species in accordance with such a programme.
- **Category 1b:** Invasive Species must be <u>controlled</u>.
    - If an Invasive Species Management Programme has been developed, a person must control the listed invasive species in accordance with such a programme.
    - A property owner must allow an authorised official to inspect a property to monitor, assist with or implement the control of listed invasive species or compliance with the Invasive Species Management Programme.

- The Minister may require any person to develop a Category 1b Control Plan for one or more Category 1b species, which plan must be submitted to the Minister for approval, and such Control Plan must include the following:
    (a) species identification;
    (b) extent of invasion;
    (c) control measures to be used;
    (d) an action plan or schedule including time-frames for the clearing of each species;
    (e) whether or not any species can be utilised as biomass; and
    (f) any other information which the Minister may require

- **Category 2:** Invasive Species require a permit to carry out a restricted activity within a specified area.
    - No person may carry out a restricted activity in respect of Category 2 Invasive Species without a permit.
    - A person in Control of a Category 2 Listed Invasive Species, or a person in possession of a permit, must ensure that the specimens of the species do not spread outside of the land or the area specified in the permit.
    - Any species listed as Category 2 that occurs outside of an area specified in a permit must be considered to be a Category 1b Listed Invasive Species and must be managed as such.
    - Any person or organ of state must ensure that Category 2 Listed Invasive Species do not spread outside of the land over which they have control or the specified area on such land where any restricted activity is authorised in respect of any Listed Invasive Plant Species.
- **Category 3:** Category 3 listed invasive species are subject to certain exemptions in terms of section 70 (1)(a) of the NEMBA Act, which applies to the listing of alien invasive species.
    - Any plant species identified as Category 3 Listed Invasive Species that occurs in riparian areas must be considered to be a Category 1b Listed Invasive Species and must be managed as such.

It should be noted that the NEM:BA regulations which became law on the 1st of October 2014 supersede the CARA regulations. However, CARA has not been repealed yet by an updated Act and therefore, both pieces of legislation are in force. Notwithstanding, in the event of conflict between NEM:BA and any other national legislation, section 8(1)(a) specifically states that NEM:BA prevails where it concerns the management of biodiversity (CapeNature, 2022).

It is recommended that an Alien Management Plan is compiled and implemented for all phases of the proposed development. All alien plant species listed in terms of CARA and NEM:BA should be removed as per the recommendations outlined in the Working for Water Program.

5. SITE ECOLOGICAL IMPORTANCE

The Species Environmental Assessment Guideline (SANBI, 2020) was applied to assess the Site Ecological Importance (SEI) of the project area (refer to Section 2.4 above).

Based on the combination of Biodiversity Importance (BI) and Receptor Resilience (RR), the SEI of the Goukamma Dune Thicket was determined to be HIGH. The SEI of the Secondary Grassy Fynbos was determined to be LOW and the SEI of both the Cape Seashore Vegetation and the transformed portions of the project area were determined to be VERY LOW. Table 5.1 indicates the criteria used to determine the SEI.

In terms of the Guidelines for interpreting SEI in the context of the proposed development activities the following applies:

For areas of **HIGH SEI**: "*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*". In the context of this project, the developer should avoid locating infrastructure within this vegetation type. Low impact walkways through the Thicket, using existing paths, would be acceptable but houses and associated infrastructure is not acceptable.

For areas of **LOW SEI**: "*Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities*". In the context of this project, development within this area is permissible.

For areas of **VERY LOW SEI**: "*Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required*". In the context of this project, development within this area is permissible.

Table 5.1: Sensitivity assessment for each vegetation type within the project area.

Habitat / Species	Conservation Importance (CI)	Functional Integrity (FI)	BI	Receptor Resilience	SEI
Secondary Grassy Fynbos	**LOW** **Fulfilling Criteria** 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. **Justification** Although this vegetation type supports indigenous plant species, it is secondary in nature as there is evidence of clearing and disturbance for more than 10 years. No SCC or range restricted species were identified within this vegetation type and no SCC or range restricted species are highly likely to occur here.	**MEDIUM** **Fulfilling Criteria** 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. **Justification** This vegetation type covers approximately 7.9 ha of the project area and although previously disturbed, still provides some habitat connectivity. This vegetation type has been disturbed by previous clearing, mowing and the exclusion of fire (an important ecological driver in fynbos ecosystems).	**LOW**	**MEDIUM** **Fulfilling Criteria** 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. **Justification** Receptor resilience refers to the capacity of the receptor to return to its current state but is also linked to the proposed development. In this case, the receptor resilience refers to the ability of the Secondary Grassy Fynbos to return to its current state if the proposed development of the residential estate is decommissioned and the vegetation is allowed to recover with limited or no human intervention. The majority of the species are pioneer plant species which are likely to return to site within 10 years.	**LOW**
Goukamma Dune Thicket	**HIGH** **Fulfilling Criteria** Confirmed or highly likely occurrence of CR, EN, VU	**MEDIUM** **Fulfilling Criteria** Medium (> 5 ha but < 20 ha) semi-intact area for any conservation status of	**MEDIUM**	LOW **Fulfilling Criteria** 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	**HIGH**

Habitat / Species	Conservation Importance (CI)	Functional Integrity (FI)	BI	Receptor Resilience	SEI
	species that have a global EOO of > 10 km2. IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A. **Justification** More than 50% of the receptor contains natural habitat with the potential to support SCC. Highly likely occurrence of two VU species, namely *Erica glandulosa* subsp. *Fourcadei* and *Erica glumiflora,* that have a global EOO of > 10 km^2 and are listed under Criterion B.	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. **Justification** Medium (9ha) intact area of Goukamma Dune Thicket with a conservation status of Least Concern (LC). Only narrow corridors of good habitat connectivity as this patch of remaining thicket is not connected to other patches due to the surrounding residential developments. Minor ecological impacts such as access by civilians and vehicles which has caused some fragmentation of intact patches.		original species composition and functionality of the receptor functionality, or species that have a low likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed. **Justification** An excerpt from Hall *et al* (2003) states the following: "*It is generally believed that thicket will not recover after massive disturbance. While intact thicket has high stabilityand resilience (Cowling 1984, Everard 1987), evidence available to date (e.g. Stuart-Hill 1991, Moolman and Cowling 1994) indicates that it is likely that areas cleared of thicket will follow the non-equilibrium model of community dynamics (DeAngelis 1987) rather than develop through to a stable climax state comparable to the intact thicket found prior to disturbance. A number of ecologists have shown that there is little or no regeneration of thicket through the establishment of seedlings (Aucamp and Tainton 1984, Stuart-Hill and Danckwerts 1988, Stuart-Hill 1991, Moolman and Cowling 1994)*". The study conducted by Hall *et al* (2003) on the recovery of thicket in a revegetated limestone mine found that even after 16 years and active restoration, the vegetation had a low similarity to the historical thicket community with only	

Habitat / Species	Conservation Importance (CI)	Functional Integrity (FI)	BI	Receptor Resilience	SEI
				46% of the species being mature thicket species. Based on these findings, receptor resilience for thicket is typically low.	
Cape Seashore Vegetation	**MEDIUM** **Fulfilling Criteria** > 50% of receptor contains natural habitat with potential to support SCC. **Justification** Although no threatened SCC have been recorded or are highly likely to occur within this vegetation type, more than 50% of the receptor contains natural habitat with the potential to support SCC.	**LOW** **Fulfilling Criteria** Small (> 1 ha but < 5 ha) area. **Justification** Small area (<2 ha) of intact Cape Seashore Vegetation (LC). Narrow corridors of good habitat connectivity. Minor current negative ecological impacts.	**LOW**	**HIGH** **Fulfilling Criteria** Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a high likelihood of returning to a site once the disturbance or impact has been removed. **Justification** This vegetation type is characterised by fast growing pioneer plant species which are likely to recover and reestablish within 5-10 years with minimal restoration effort.	**VERY LOW**
Transformed Habitat	**VERY LOW** **Fulfilling Criteria** No confirmed and highly unlikely populations of SCC. No confirmed and highly unlikely populations of range-restricted species. No natural habitat remaining. **Justification**	**LOW** **Fulfilling Criteria** 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.	**VERY LOW**	**VERY HIGH** **Fulfilling Criteria** Habitat that can recover rapidly (~ less than 5 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a very high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a very high likelihood of returning to	**VERY LOW**

Habitat / Species	Conservation Importance (CI)	Functional Integrity (FI)	BI	Receptor Resilience	SEI
	This habitat has been cleared and transformed. Very few indigenous species except for fast growing weedy species or garden plants. No SCC recorded or likely to occur.	Several minor and major current negative ecological impacts. **Justification** Small area (<2 ha) with almost no habitat connectivity but migrations still possible some modified habitat.		a site once the disturbance or impact has been removed. **Justification** The majority of the species in this habitat type are fast growing weedy species or planted garden plants. As such, this habitat will be able to recover rapidly (~ less than 5 years to restore > 75% of the original species).	

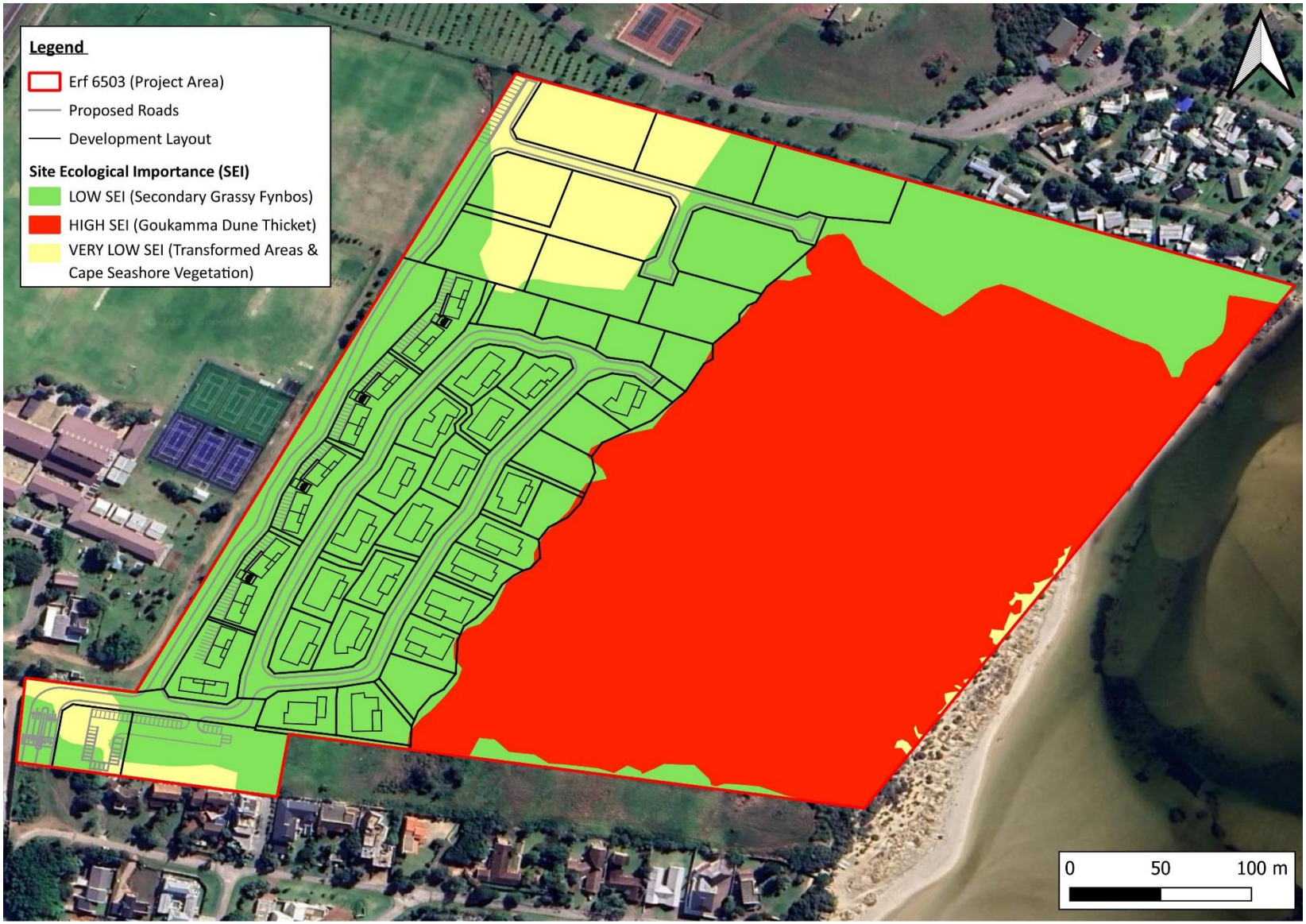


Figure 5.1: Botanical sensitivity map for the project area based on data gathered from the field survey and the desktop assessment.

6. IMPACT IDENTIFICATION AND ASSESSMENT

The proposed development could result in the following impacts:

- Loss of Secondary Grassy Fynbos (Construction Phase)
- Loss of Goukamma Dune Thicket (Construction Phase)
- Loss of Plant Species of Conservation Concern (SCC) (Construction Phase)
- Habitat loss and fragmentation (Construction Phase)
- Infestation of Alien Plant Species (all phases)
- Loss of indigenous vegetation due to increased access by residents (Operational Phase)
- Loss of reestablished indigenous vegetation (Decommissioning Phase)

The significance of these impacts has been assessed in Table 6.1 below and mitigation measures to reduce the significance of the impacts have also been identified.

Table 6.1: Identification and assessment of impacts associated with the proposed residential estate.

Potential Issue	Alternative	Source of Issue	Nature & Type	Duration	Extent	Probability	Severity (Significance before mitigation)	Mitigation Measures	Reversibility	Irreplaceable Loss	Mitigation Potential	Severity (Significance after mitigation)
CONSTRUCTION PHASE												
Impact 1: Loss of Secondary Grassy Fynbos	Preferred	The clearance of vegetation for the construction of the proposed residential estate will result in the permanent loss of approximately 7.7 ha of Secondary Grassy Fynbos. Although this vegetation type is secondary in nature, it still supports a number of indigenous plant species some of which are protected.	Direct (-)	Permanent	Localised	Definite	**Moderate (-)**	• Vegetation clearance must be strictly limited to that which is necessary for the construction of the proposed residential estate and associated infrastructure. • Construction vehicles and machinery must not encroach into identified 'no-go' areas (e.g. Goukamma Dune Thicket) or areas outside of the project footprint. • Topsoil (20 cm, where possible) must be collected and stored in areas of low (preferrable) and medium sensitivity and used to rehabilitate impacted areas that are no longer required during the operational phase (e.g. laydown areas). • Protected species should be translocated into surrounding undeveloped areas (on the same property) or rehabilitated areas. • No Alien Invasive Plant Species should be used for rehabilitation purposes. • Employees must be prohibited from making open fires during the construction phase. • Employees must be prohibited from collecting plants. It is recommended that spot checks of pockets and bags are done on a regular basis to ensure that no unlawful harvesting of plant species is occurring. • Basal plant cover must be maintained where possible to reduce the possibility of soil erosion. • Where excavation is required, topsoil should be removed and managed for use during rehabilitation. Topsoil often contains a large seedbank which can aid in the restoration of impact areas.	Reversible	Resource will be partly lost	Achievable	**LOW (-)**

Potential Issue	Alternative	Source of Issue	Nature & Type	Duration	Extent	Probability	Severity (Significance before mitigation)	Mitigation Measures	Reversibility	Irreplaceable Loss	Mitigation Potential	Severity (Significance after mitigation)
	Cumulative	There are no other known developments affecting Secondary Grassy Fynbos within the broader project area. As such, the cumulative impacts associated with the loss of this vegetation type cannot be assessed.	**N/A**									
	No-go	If the project did not proceed, the Secondary Grassy Fynbos vegetation would remain intact with limited impacts, such as mowing, occurring. The no-go alternative is thus low.	Existing (-)	Long-term	Localised	Probable	**LOW (-)**	N/A	**N/A**			
Impact 2: Loss of Goukamma Dune Thicket	Preferred Alternative	Although the development footprint has been confined to the previously disturbed western portion of the project area (i.e. Secondary Grassy Fynbos), encroachment of construction activities into the Goukamma Dune Thicket vegetation would constitute a high negative impact due to the high SEI of this vegetation type. Furthermore, due to the topography of the site, unmanaged erosion and stormwater during the construction phase could result in excess runoff and sediment deposition in the Goukamma Dune Thicket. This could impact the abiotic factors influencing the vegetation structure and species composition. However, if the mitigation measures are implemented and adhered to, the dune thicket vegetation is unlikely to impacted and therefore the significance post mitigation is negligible.	Direct (-)	Permanent	Localised	May Occur	**HIGH (-)**	• Delineate the construction footprint to prevent encroachment of construction activities into intact Goukamma Dune Thicket. • If boardwalks/walkways are required, these must follow existing pathways through the thicket vegetation. These pathways cannot be made wider and no thicket vegetation must be cleared to accommodate the construction or erection of boardwalks/walkways unless appropriate authorisation has been obtained. • Implement an Alien Invasive Management Plan/Method Statement and remove alien invasive plant species within the Goukamma Dune Thicket to increase the habitat available for indigenous plant species. • No AIP species may be used for landscaping in residents gardens or common areas. • Design and implement a Stormwater Management Plan. • Design and implement an Erosion Method Statement. • Erect signs and/or notice boards informing construction staff of no-go areas or areas of high sensitivity. • Regular toolbox talks should be presented to inform construction staff of no-go areas or areas of high sensitivity.	Irreversible	Resource will be lost	Achievable	**Negligible**

Potential Issue	Alternative	Source of Issue	Nature & Type	Duration	Extent	Probability	Severity (Significance before mitigation)	Mitigation Measures	Reversibility	Irreplaceable Loss	Mitigation Potential	Severity (Significance after mitigation)
	Cumulative	Portions of Goukamma Dune Thicket (LC) have already been lost along the coastline surrounding the project area due to residential development and urban expansion. As such, encroachment of construction activities into the Goukamma Dune Thicket would contribute to the cumulative loss of this vegetation type within the broader area.	Cumulative (-)	Permanent	Regional	May Occur	**High (-)**	It is difficult to implement mitigation measures specific to the cumulative impacts as the applicant only has jurisdiction over their development and not over other developments or activities in the area. However, it is imperative that the applicant implement the mitigation measures listed above for the direct impacts.	Irreversible	Resource will be lost	Achievable	**LOW (-)**
	No-Go	If the project did not proceed, there would be no potential encroachment of construction activities. However, existing impacts associated with access by the public and the infestation of alien invasive species would persist. As such, the no-go impact is classified as moderate.	Existing (-)	Long-term	Localised	Definite	**MODERATE (-)**	N/A	**N/A**			

Potential Issue	Alternative	Source of Issue	Nature & Type	Duration	Extent	Probability	Severity (Significance before mitigation)	Mitigation Measures	Reversibility	Irreplaceable Loss	Mitigation Potential	Severity (Significance after mitigation)
Impact 3: Loss of Plant Species of Conservation Concern (SCC)	Preferred Alternative	Only two Vulnerable (VU) species have a high likelihood of occurrence within the Goukamma Dune Thicket, namely *Erica glandulosa* subsp. *Fourcadei* and *Erica glumiflora.* However, development has been designed to avoid this sensitive vegetation type and has instead been restricted to the previously disturbed Secondary Grassy Fynbos of the project area. Provided no development occurs within the Goukamma Dune Thicket, if these species are present they will not be affected by construction activities and the impact is therefore negligible.	Direct (-)	Permanent	Localised	Unlikely	**Negligible**	• Vegetation clearance must be strictly limited that that which is necessary for the construction of the proposed residential estate and associated infrastructure. • Construction vehicles and machinery must not encroach into identified 'no-go' areas or areas outside of the project footprint. • Protected species should be translocated into surrounding undeveloped areas (on the same property) or rehabilitated areas. • Permits must be obtained prior to the translocation/removal of protected SCC. • Should any threatened SCC be identified prior to or during vegetation clearance, infrastructure should be repositioned to avoid these individuals. If this is not possible, permits for the translocation of these species must be obtained and species should be translocated to the same habitat type on the same property. • Employees must be prohibited from collecting plants. It is recommended that spot checks of pockets and bags are done on a regular basis to ensure that no unlawful harvesting of plant species is occurring.	Irreversible	Resource could be partly lost	Achievable	**Negligible**
	Cumulative	The proposed development is unlikely to impact on SCC and therefore will not contribute to the cumulative loss of SCC within the area. As such, the cumulative impact is negligible.	**Negligible**					**N/A**				**Negligible**
	No-Go	If the project did not proceed, the vegetation would remain intact with limited impacts occurring and no SCC will be lost.	**Negligible**					**N/A**				

Potential Issue	Alternative	Source of Issue	Nature & Type	Duration	Extent	Probability	Severity (Significance before mitigation)	Mitigation Measures	Reversibility	Irreplaceable Loss	Mitigation Potential	Severity (Significance after mitigation)
Impact 4: Habitat loss and fragmentation	Preferred Alternative	Fragmentation is one of the most important impacts on vegetation as it creates breaks in previously continuous vegetation, causing a reduction in the gene pool and a decrease in species richness and diversity. This impact occurs when more and more areas are cleared, resulting in the isolation of functional ecosystems, which results in reduced biodiversity and reduced movement due to the absence of ecological corridors. Habitat loss and fragmentation has already occurred due to the construction of surrounding residential developments and frequent access by the public which has caused breaks in the previously intact Goukamma Dune of the project area. If development proceeds, this will result in the further loss of habitat connectivity and isolation of the intact Goukamma Dune Thicket within the project area.	Direct (-)	Permanent	Localised	Definite	**LOW (-)**	Mitigation measures listed under impact 1 and 2 must be implemented.	Irreversible	Resource will be partly lost	Achievable	**LOW (-)**
	Cumulative	Habitat fragmentation has already occurred due to the construction of surrounding residential developments and frequent access by the public which has caused breaks in the previously intact Goukamma Dune of the project area. Vegetation clearance will therefore contribute to the cumulative habitat loss and fragmentation.	Cumulative (-)	Long-Term	Regional	Definite	**LOW (-)**	It is difficult to implement mitigation measures specific to the cumulative impacts as the applicant only has jurisdiction over their development and not over other developments or activities in the area. However, it is imperative that the applicant implement the mitigation measures listed above for the direct impacts.	Irreversible	Resource will be partly lost	Achievable	LOW (-)

Potential Issue	Alternative	Source of Issue	Nature & Type	Duration	Extent	Probability	Severity (Significance before mitigation)	Mitigation Measures	Reversibility	Irreplaceable Loss	Mitigation Potential	Severity (Significance after mitigation)
	No-Go	If the project does not go ahead, habitat fragmentation is still likely to occur due to frequent access by the public. The impact associated with this will be low.	Existing (-)	Long-Term	Localised	Definite	**Negligible**	**N/A**				
Impact 5: Infestation of Alien Plant Species	Preferred Alternative	The removal of existing natural vegetation creates 'open' habitats which favours the establishment of undesirable vegetation in areas that are typically very difficult to eradicate and could pose a threat to surrounding ecosystems. Alien invasive species are already present on site. If unmanaged, these species could spread exacerbating the infestation of these species.	Direct (-)	Long-Term	Localised	May Occur	**MODERATE (-)**	• The site must be checked regularly for the presence of alien invasive species. • All alien invasive species, that establish as a result of project activities, must be removed and disposed of as per the Working for Water Guidelines. • An Alien Invasive Management Plan/Method Statement must be compiled and implemented for all phases of the proposed development.	Reversible	Resource will not be lost	Achievable	**LOW (-)**
	Cumulative	Scattered alien invasive plant species are already present on site and within the surrounding area. If unmanaged, these species could spread, contributing to the cumulative establishment of alien invasive plant species and the displacement of indigenous plant species within the broader area.	Cumulative (-)	Long-Term	Regional	May Occur	**MODERATE (-)**	It is difficult to implement mitigation measures specific to the cumulative impacts as the applicant only has jurisdiction over their development and not over other developments or activities in the area. However, it is imperative that the applicant implement the mitigation measures listed above for the direct impacts.	Reversible	Resource will not be lost	Achievable	**LOW (-)**
	No-Go	Alien invasive plant species have already established on site. Under the no-go alternative these species are likely to continue multiplying if left unchecked. The current no-go alternative is thus rated as moderate negative.	Existing (-)	Long-Term	Localised	Definite	**MODERATE (-)**	**N/A**				
OPERATIONAL PHASE												

Potential Issue	Alternative	Source of Issue	Nature & Type	Duration	Extent	Probability	Severity (Significance before mitigation)	Mitigation Measures	Reversibility	Irreplaceable Loss	Mitigation Potential	Severity (Significance after mitigation)
Impact 6: Loss of indigenous vegetation due to increased access by residents	Preferred	During the operational phase, increased access from the residential development to the beach could cause disturbance and degradation of the intact indigenous vegetation (Goukamma Dune Thicket and Cape Seashore Vegetation) of the project area. As such, it is important that residents are informed of the sensitivity of the vegetation surrounding the proposed residential development by placing information boards at access points.	Direct (-)	Long-Term	Localised	May Occur	**MODERATE (-)**	• Residents should be made aware of the sensitivity of the Goukamma Dune Thicket and the foredune which supports Cape Seashore Vegetation through the erection of notice boards at strategic access points to and from the beach. • Access should be restricted to existing pathways and the most direct paths used. Pathways must be demarcated using environmentally friendly markers and paths off the main path, that should not be used by residents, should be cordoned off to prevent people accidentally using these. • No pruning or clearing of the Goukamma Dune Thicket is permitted unless the relevant permits have been obtained. •	Irreversible	Resource could be partly lost	Achievable	**LOW (-)**
	Cumulative	Portions of Goukamma Dune Thicket (LC) and Cape Seashore Vegetation have already been lost along the coastline surrounding the project area due to residential development and urban expansion. As such, the further loss of indigenous vegetation would contribute to the cumulative loss of these vegetation types within the broader area.	Cumulative (-)	Long-Term	Regional	May Occur	**MODERATE (-)**	It is difficult to implement mitigation measures specific to the cumulative impacts as the applicant only has jurisdiction over their development and not over other developments or activities in the area. However, it is imperative that the applicant implement the mitigation measures listed above for the direct impacts.	Irreversible	Resource could be partly lost	Achievable	**LOW (-)**
	No-Go	If the project did not proceed, existing impacts associated with access by the public and the infestation of alien invasive species would persist. As such, the no-go impact is classified as low.	Existing (-)	Long-term	Localised	Definite	**LOW (-)**	**N/A**				

Potential Issue	Alternative	Source of Issue	Nature & Type	Duration	Extent	Probability	Severity (Significance before mitigation)	Mitigation Measures	Reversibility	Irreplaceable Loss	Mitigation Potential	Severity (Significance after mitigation)
Impact 7: Infestation of Alien Plant Species	Preferred	Failure to rehabilitate and monitor the establishment of alien plant species during the Construction (and Operation Phase) could lead to the spread and infestation of Alien Plant Species during the Operational Phase. Alien plant species often outcompete indigenous vegetation. Therefore, their establishment and spread could result in the loss of indigenous plant species.	Direct (-)	Long-Term	Localised	May Occur	**MODERATE (-)**	Mitigation measures listed under impact 6 must be implemented.	Reversible	Resource will not be lost	Achievable	**LOW (-)**
	Cumulative	Alien invasive plant species have already established within the surrounding area. Therefore, should the operation of the proposed development lead to the further establishment of alien invasive species in the project area, the invasion by alien plant species could be exacerbated.	Cumulative (-)	Long-Term	Regional	May Occur	**MODERATE (-)**	It is difficult to implement mitigation measures specific to the cumulative impacts as the applicant only has jurisdiction over their development and not over other developments or activities in the area. However, it is imperative that the applicant implement the mitigation measures listed above for the direct impacts.	Reversible	Resource will not be lost	Achievable	**LOW (-)**
	No-Go	Alien Invasive Plant Species have already established within the project area. Under the no-go alternative these species are likely to continue multiplying if left unchecked. The current no-go alternative is therefore classified as moderate.	Existing (-)	Long-Term	Localised	Definite	**MODERATE (-)**	**N/A**				
DECOMMISSIONING PHASE												

Potential Issue	Alternative	Source of Issue	Nature & Type	Duration	Extent	Probability	Severity (Significance before mitigation)	Mitigation Measures	Reversibility	Irreplaceable Loss	Mitigation Potential	Severity (Significance after mitigation)
Impact 8: Loss of re-established Indigenous Vegetation	Preferred	It is unlikely that the residential development will be decommissioned as these types of developments usually exist in perpetuity. However, in the unlikely event that it is decommissioned, the residential estate and associated infrastructure will likely disrupt some indigenous vegetation that has re-established around the areas that were disturbed during the construction phase. However, the loss of vegetation is likely to be limited given the development footprint of the houses and the limited space available for the re-establishment of vegetation.	Direct (-)	Short-Term	Localised	Probable	**LOW (-)**	• Refer to the mitigation measures identified for impact 1 and 2 above.	Reversible	Resource could be partly lost	Achievable	**LOW (-)**
	Cumulative	Indigenous vegetation has already been lost within the surrounding area due to residential development and urban expansion. As such, should the decommissioning phase lead to the loss of indigenous vegetation, this would contribute to the cumulative loss of indigenous vegetation within the broader area. However, given the development footprint of the houses and the limited space available for the re-establishment of vegetation, the cumulative impact is likely to be low.	Cumulative (-)	Long-Term	Regional	Probable	**LOW (-)**	It is difficult to implement mitigation measures specific to the cumulative impacts as the applicant only has jurisdiction over their development and not over other developments or activities in the area. However, it is imperative that the applicant implement the mitigation measures listed above for the direct impacts.	Reversible	Resource could be partly lost	Achievable	**LOW (-)**
	No-Go	If the proposed development does not proceed, there would be no decommissioning required and therefore no loss of indigenous vegetation.	**N/A**									

7. CONCLUSIONS

7.1. Conclusions

Three vegetation types, and one land use, were identified within the project area, namely:

- Goukamma Dune Thicket (LC)
- Cape Seashore Vegetation (LC)
- Secondary Grassy Fynbos (LC)
- Transformed habitat (N/A)

147 plant species from 52 families were recorded within the project area. Of the 147 plant species recorded, 21 are exotic plant species and not indigenous to South Africa. The remaining 126 indigenous plant species are all classified as Least Concern (LC) although there are 12 species listed as protected that will require permits for their removal and/or destruction.

No threatened SCC were identified within the project area, however two (2) species have a high likelihood of occurrence within the Goukamma Dune Thicket of the project area, namely *Erica glandulosa* subsp. *Fourcadei* and *Erica glumiflora*, both classified as Vulnerable (VU). Since the development has been purposefully designed to avoid the thicket, these two species, if present, will not be affected by project activities.

A total of 8 impacts were identified for the project, 5 of which are associated with the construction phase, 2 of which is associated with the operational phase, and 1 of which is associated with the decommissioning phase. Of the 8 impacts identified, 1 impact is classified as high, 4 are classified as medium, 2 are classified as low, and 1 is classified as negligible prior to mitigation. If the mitigation measures specified in this report are implemented and adhered to, the significance of 6 impacts can be reduced to low and 2 can be reduced to negligible.

The Screening Report classifies the relative Plant Species Theme Sensitivity of the whole project area as medium due to the likely occurrence of eighteen (18) plant Species of Conservation Concern (SCC). The Plant Species Theme in the screening report does not account for the vegetation type present but rather focuses on the SCC likely to occur. However, to assess the sensitivity of the project area, the SEI needs to be assessed and this is done for the vegetation type with the SCC being a function of the SEI assessment. It is for this reason that vegetation types and SCC are assessed within this report in order to provide comment on the sensitivity of the Plant Species Theme.

Based on the SEI assessment, Goukamma Dune Thicket was determined to have a HIGH sensitivity due to the high likelihood of occurrence of two (2) VU species which contributes to the conservation importance, coupled with the functional integrity and low receptor resilience of the vegetation type. In contrast, the SEI of the Secondary Grassy Fynbos was determined to be LOW and the SEI of both the Cape Seashore Vegetation and the transformed portions of the project area were determined to be VERY LOW.

For areas of **HIGH SEI** the following guidelines apply: "*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*". In the context of this project, the developer has avoided locating housing infrastructure within this vegetation type. Low impact walkways through the Thicket, using existing paths, are acceptable provided the recommended mitigation measures are implemented.

For areas of **LOW SEI**: "*Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities*". In the context of this project, development within this area is acceptable.

For areas of **VERY LOW SEI**: "*Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required*". In the context of this project, development within this area is acceptable.

7.2. Conditions of the EMPr, EA and Monitoring Required

All the mitigation measures listed for each of the identified impacts must be incorporated into the EMPr and implemented during the relevant phases of the development (refer to Chapter 6). Specific mitigation measures and recommendations that must be incorporated into the Environmental Authorisation (EA), if granted, include:

- All necessary plant permits must be obtained prior to the commencement of any construction activities. Species requiring permits include:
    - *Carpobrotus edulis*
    - *Delosperma inconspicuum*
    - *Tetragonia decumbens*
    - *Tetragonia fruticosa*
    - *Carpobrotus deliciosus*
    - *Brunsvigia orientalis*
    - *Aloe arborescens*
    - *Aloiampelos ciliaris*
    - *Chasmanthe aethiopica*
    - *Gladiolus gueinzii*
    - *Sideroxylon inerme*
    - *Agathosma apiculata*
- If present, protected species should be translocated into surrounding undeveloped areas (on the same property) or rehabilitated areas.
- No Alien Invasive Plant species must be used fore rehabilitation or landscaping.
- Implement an Alien Invasive Management Plan/Method Statement and remove alien invasive plant species for the Goukamma Dune Thicket to increase the habitat available for indigenous plant species.
- Design and implement a Stormwater Management Plan.
- Design and implement an Erosion Method Statement.
- Limit the number of construction workers and access within the thicket and foredune area.

- Should any threatened SCC be identified prior to, or during, vegetation clearance, infrastructure should be repositioned to avoid these individuals. If this is not possible, permits for the translocation of these species must be obtained and species should be translocated to the same habitat type on the same property.
- An Alien Invasive Management Plan/Method Statement must be compiled and implemented for all phases of the proposed development.
- If boardwalks/walkways are required, these must follow existing pathways through the thicket vegetation. These pathways cannot be made wider and no thicket vegetation must be cleared to accommodate the construction or erection of boardwalks/walkways unless the appropriate authorisation has been obtained.
- Erect signs and/or notice boards informing construction staff of no-go areas or areas of high sensitivity.
- Residents should be made aware of the sensitivity of the Goukamma Dune Thicket and the foredune which supports Cape Seashore Vegetation through the erection of notice boards at strategic access points to and from the beach.

7.3. Ecological Statement and Opinion of the Specialist

As per the preferred project layout received from the Client, the specialist agrees that development should be confined to the western half of the project area which contains Secondary Grassy Fynbos (LOW SEI). The specialist agrees with the avoidance mitigation measure employed by the developer which is to avoid development within areas of high sensitivity (i.e., the Goukamma Dune Thicket). If boardwalks/walkways are required in the Goukamma Dune Thicket, these should follow existing pathways/vehicle tracks which have already been cleared and must be clearly demarcated using environmentally friendly material. Existing paths that must be avoided by residents must be cordoned off where appropriate with “no Entry” signs placed at the junctions. Although the SEI of Cape Seashore Vegetation is classified as LOW, the development within the coastal foredune area should be avoided due to the dynamic nature of the coastal zone.

Provided the recommendations and mitigation measures identified in this report are implemented and adhered to, the specialist is of the opinion that the development can proceed.

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APPENDIX 1: PLANT SPECIES RECORDED WITHIN THE PROJECT AREA

Family	Species	Common Name	Red List Status	Vegetation Type	Protected in Terms of		
					Western Cape Nature Conservation Laws Amednment Act, 2000	NEM:BA 2007	List of Protected Trees (2021)
Acanthaceae	*Hypoestes forskaolii*	White Ribbon Flower	LC	Secondary Grassy Fynbos	-	-	-
Aizoaceae	*Carpobrotus deliciosus*	Delicious Sourfig	LC	Secondary Grassy Fynbos / Cape Seashore Vegetation	Schedule 4	-	-
Aizoaceae	*Carpobrotus edulis*	Rankvy	LC	Secondary Grassy Fynbos / Cape Seashore Vegetation	Schedule 4	-	-
Aizoaceae	*Delosperma inconspicuum*	White Gardenroute Sheepfig	LC	Thicket	Schedule 4	-	-
Aizoaceae	*Tetragonia decumbens*	Coast Seacoral	LC	Cape Seashore Vegetation	Schedule 4	-	-
Aizoaceae	*Tetragonia fruticosa*	Klimopkinkelbossie	LC	Thicket	Schedule 4	-	-
Amaranthaceae	*Chenopodium murale*	Nettle-leaved Goosefoot	NE	Secondary Grassy Fynbos	-	-	-
Amaryllidaceae	*Brunsvigia orientalis*	Koningskandelaar	LC	Secondary Grassy Fynbos	Schedule 4	-	-
Anacardiaceae	*Schinus terebinthifolius*	Brazilian Pepper	NE	Thicket	-	-	-
Anacardiaceae	*Searsia chirindensis*	Red Currant	LC	Thicket	-	-	-
Anacardiaceae	*Searsia crenata*	Dune Crowberry	LC	Thicket	-	-	-

Family	Species	Common Name	Red List Status	Vegetation Type	Protected in Terms of		
					Western Cape Nature Conservation Laws Amednment Act, 2000	NEM:BA 2007	List of Protected Trees (2021)
Anacardiaceae	*Searsia glauca*	Blue Kuni-bush	LC	Thicket	-	-	-
Anacardiaceae	*Searsia laevigata*	Dune Currant	LC	Thicket	-	-	-
Apiaceae	*Arctopus echinatus*	Bear's Foot	LC	Secondary Grassy Fynbos	-	-	-
Apiaceae	*Centella asiatica*	Waternael	LC	Secondary Grassy Fynbos	-	-	-
Apiaceae	*Notobubon laevigatum*	Common Blisterbush	LC	Thicket	-	-	-
Apocynaceae	*Carissa bispinosa*	Num-num	LC	Thicket	-	-	-
Apocynaceae	*Carissa macrocarpa*	Big Num-num	LC	Thicket	-	-	-
Apocynaceae	*Cynanchum obtusifolium*	Bostou	LC	Thicket	-	-	-
Apocynaceae	*Gomphocarpus physocarpus*	Balloon Cottonbush	LC	Thicket	-	-	-
Araceae	*Zantedeschia aethiopica*	Arum Lily	LC	Thicket/ Wetland	-	-	-
Araliaceae	*Hydrocotyle verticillata*	Whorled Pennywort	LC	Thicket	-	-	-
Arecaceae	*Phoenix reclinata*	Wild Date Palm	LC	Thicket	-	-	-
Asparagaceae	*Asparagus aethiopicus*	Haakdoring	LC	Thicket	-	-	-
Asparagaceae	*Asparagus africanus*	Katdoring	LC	Thicket	-	-	-
Asparagaceae	*Asparagus asparagoides*	Cape Smilax	LC	Thicket	-	-	-
Asparagaceae	*Yucca aloifolia*	Aloe Yucca	NE	Secondary Grassy Fynbos /Thicket border	-	-	-
Asphodelaceae	*Aloe ferox*	Cape Aloe	LC	Secondary Grassy Fynbos	-	-	-

Family	Species	Common Name	Red List Status	Vegetation Type	Protected in Terms of		
					Western Cape Nature Conservation Laws Amednment Act, 2000	NEM:BA 2007	List of Protected Trees (2021)
				/Thicket border			
Asphodelaceae	*Aloe arborescens*	Krantz Aloe	LC	Secondary Grassy Fynbos /Thicket border	Schedule 4	-	-
Asphodelaceae	*Aloiampelos ciliaris*	Climbing Aloe	LC	Secondary Grassy Fynbos /Thicket border	Schedule 4	-	-
Asteraceae	*Arctotheca prostrata*	Prostrate Capeweed	LC	Secondary Grassy Fynbos	-	-	-
Asteraceae	*Artemisia afra*	African Wormwood	LC	Secondary Grassy Fynbos	-	-	-
Asteraceae	*Cirsium vulgare*	Bull Thistle	NE	Secondary Grassy Fynbos and Thicket	-	-	-
Asteraceae	*Felicia amoena*	Soft Felicia	LC	Secondary Grassy Fynbos	-	-	-
Asteraceae	*Felicia echinata*	Dune Felicia	LC	Thicket	-	-	-
Asteraceae	*Helichrysum asperum*	Rough Everlasting	LC	Cape Seashore Vegetation	-	-	-
Asteraceae	*Helichrysum cymosum*	Fume Everlasting	LC	Secondary Grassy Fynbos	-	-	-
Asteraceae	*Helichrysum foetidum*	Vleisewejaartjie	LC	Secondary Grassy Fynbos	-	-	-
Asteraceae	*Helichrysum teretifolium*	Needle Everlasting	LC	Secondary Grassy Fynbos	-	-	-

Family	Species	Common Name	Red List Status	Vegetation Type	Protected in Terms of		
					Western Cape Nature Conservation Laws Amednment Act, 2000	NEM:BA 2007	List of Protected Trees (2021)
Asteraceae	*Hypochaeris glabra*	Smooth Cat's Ear	NE	Secondary Grassy Fynbos	-	-	-
Asteraceae	*Metalasia muricata*	Blombos	LC	Thicket/Cape Seashore Vegetation	-	-	-
Asteraceae	*Nidorella ivifolia*	Bakbesembossie	LC	Secondary Grassy Fynbos	-	-	-
Asteraceae	*Osteospermum moniliferum*	Bietou	LC	Thicket	-	-	-
Asteraceae	*Senecio burchellii*	Kill Ragwort	LC	Cape Seashore Vegetation	-	-	-
Asteraceae	*Stoebe plumosa*	Slangbos	LC	Secondary Grassy Fynbos	-	-	-
Asteraceae	*Tarchonanthus littoralis*	Coastal Camphor Bush	LC	Thicket	-	-	-
Asteraceae	*Ursinia chrysanthemoides*	Coral Ursinia	LC	Cape Seashore Vegetation	-	-	-
Asteraceae	*Ursinia paleacea*	Geelmagriet	LC	Cape Seashore Vegetation	-	-	-
Brassicaceae	*Heliophila subulata*		LC	Thicket/Secondary Grassy Fynbos/ Cape Seashore Vegetation	-	-	-
Celastraceae	*Gymnosporia nemorosa*	White Forest Spike-thorn	LC	Thicket	-	-	-
Celastraceae	*Gymnosporia buxifolia*	Common Spikethorn	LC	Thicket	-	-	-

Family	Species	Common Name	Red List Status	Vegetation Type	Protected in Terms of		
					Western Cape Nature Conservation Laws Amednment Act, 2000	NEM:BA 2007	List of Protected Trees (2021)
Celastraceae	*Lauridia tetragona*	Climbing Saffron	LC	Thicket	-	-	-
Celastraceae	*Maytenus procumbens*	Dune Koko Tree	LC	Thicket	-	-	-
Celastraceae	*Mystroxylon aethiopicum*	Kooboo-berry	LC	Thicket	-	-	-
Celastraceae	*Putterlickia pyracantha*	False Spike-thorn	LC	Thicket	-	-	-
Celastraceae	*Pterocelastrus tricuspidatus*	Candlewood	LC	Thicket	-	-	-
Convolvulaceae	*Convolvulus sagittatus*	Bobbejaantou	LC	Thicket	-	-	-
Convolvulaceae	*Ipomoea pes-caprae*	Beach Morning Glory	LC	Cape Seashore Vegetation	-	-	-
Convolvulaceae	*Falkia repens*	Oortjies	LC	Cape Seashore Vegetation	-	-	-
Crassulaceae	*Bryophyllum delagoense*	Mother of Thousands	NE	Secondary Grassy Fynbos	-	-	-
Crassulaceae	*Crassula lanceolata*	Spear Stonecrop	LC	Cape Seashore Vegetation	-	-	-
Crassulaceae	*Crassula expansa*	Fine Stonecrop	LC	Thicket/ Cape Seashore Vegetation	-	-	-
Crassulaceae	*Crassula multicava*	Skaduplakkie	LC	Secondary Grassy Fynbos/Thicket border	-	-	-
Cucurbitaceae	*Kedrostis nana*	Ystervarkpatats	LC	Thicket	-	-	-
Cyperaceae	*Cyperus brevis*		LC	Secondary Grassy Fynbos	-	-	-
Cyperaceae	*Ficinia nodosa*	Vleibiesie	LC	Cape Seashore Vegetation	-	-	-

Family	Species	Common Name	Red List Status	Vegetation Type	Protected in Terms of		
					Western Cape Nature Conservation Laws Amednment Act, 2000	NEM:BA 2007	List of Protected Trees (2021)
Cyperaceae	*Isolepis cernua*	Leshomokxoane	LC	Cape Seashore Vegetation	-	-	-
Cyperaceae	*Isolepis marginata*	Common Annual Clubrush	LC	Secondary Grassy Fynbos/ Thicket	-	-	-
Cyperaceae	*Pycreus polystachyos*	Bunchy Flat-Sedge	LC	Thicket/ Cape Seashore Vegetation	-	-	-
Cyperaceae	*Schoenus nigricans*	Black Bog-Rush	LC	Thicket	-	-	-
Ebenaceae	*Diospyros dichrophylla*	Poison Star-apple	LC	Thicket	-	-	-
Ebenaceae	*Euclea racemosa*	Dune Gwarrie	LC	Thicket	-	-	-
Euphorbiaceae	*Ricinus communis*	Castor Bean	NE	Secondary Grassy Fynbos/ Thicket	-	-	-
Fabaceae	*Acacia cyclops*	Rooikrans	NE	Thicket	-	-	-
Fabaceae	*Acacia melanoxylon*	Australian Blackwood	NE	Thicket	-	-	-
Fabaceae	*Acacia saligna*	Port Jackson	NE	Thicket	-	-	-
Fabaceae	*Aspalathus spinosa*	Spiny Capegorse	LC	Secondary Grassy Fynbos	-	-	-
Fabaceae	*Indigofera verrucosa*	Warty Indigo	LC	Secondary Grassy Fynbos	-	-	-
Fabaceae	*Rhynchosia caribaea*			Thicket	-	-	-
Fabaceae	*Virgilia divaricata*	Pink Keurboom	LC	Secondary Grassy	-	-	-

Family	Species	Common Name	Red List Status	Vegetation Type	Protected in Terms of		
					Western Cape Nature Conservation Laws Amednment Act, 2000	NEM:BA 2007	List of Protected Trees (2021)
				Fynbos/Thicket			
Fumariaceae	*Fumaria muralis*	Common Ramping-Fumitory	NE	Secondary Grassy Fynbos	-	-	-
Gentianaceae	*Chironia baccifera*	Christmas Berry	LC	Thicket/ Cape Seashore Vegetation	-	-	-
Geraniaceae	*Pelargonium alchemilloides*	Pink Trailing Pelargonium	LC	Secondary Grassy Fynbos	-	-	-
Geraniaceae	*Pelargonium capitatum*	Kusmalva	LC	Secondary Grassy Fynbos	-	-	-
Hyacinthaceae	*Albuca flaccida*	Slime Soldier-in-a-Box	LC	Secondary Grassy Fynbos	-	-	-
Hyacinthaceae	*Albuca setosa*	Soldier-in-the-box	LC	Secondary Grassy Fynbos	-	-	-
Hyacinthaceae	*Drimia capensis*	Maerman	LC	Secondary Grassy Fynbos	-	-	-
Hypoxidaceae	*Hypoxis sp.*	Small Silver Star-flower	LC	Secondary Grassy Fynbos	-	-	-
Iridaceae	*Chasmanthe aethiopica*	Cobra Lily	LC	Thicket/ Secondary Grassy Fynbos	Schedule 4	-	-
Iridaceae	*Gladiolus gueinzii*	Coastal Gladiolus	LC	Thicket	Schedule 4	-	-
Juncaceae	*Juncus kraussii*	Matting Rush	LC	Thicket	-	-	-
Lamiaceae	*Leonotis ocymifolia*	Minaret Flower	LC	Secondary Grassy Fynbos	-	-	-
Lamiaceae	*Plectranthus neochilus*	Lobster Flower	LC	Secondary Grassy Fynbos	-	-	-

Family	Species	Common Name	Red List Status	Vegetation Type	Protected in Terms of		
					Western Cape Nature Conservation Laws Amednment Act, 2000	NEM:BA 2007	List of Protected Trees (2021)
Lamiaceae	*Salvia aurea*	Bruinsalie	LC	Cape Seashore Vegetation	-	-	-
Lamiaceae	*Westringia fruticosa*	Coastal Rosemary	NE	Thicket/ Cape Seashore Vegetation	-	-	-
Lobeliaceae	*Lobelia anceps*	Punakuru	LC	Secondary Grassy Fynbos	-	-	-
Malvaceae	*Abutilon sonneratianum*	Wild Hibiscus	LC	Thicket	-	-	-
Malvaceae	*Dombeya burgessiae*	Pink Dombeya	LC	Secondary Grassy Fynbos	-	-	-
Malvaceae	*Grewia occidentalis*	Cross-berry	LC	Thicket	-	-	-
Meliaceae	*Ekebergia capensis*	Cape Ash	LC	Thicket	-	-	-
Meliaceae	*Melia azedarach*	Chinaberry	NE	Secondary Grassy Fynbos	-	-	-
Menispermaceae	*Cissampelos capensis*	Davidjieswortel	LC	Secondary Grassy Fynbos	-	-	-
Myricaceae	*Morella cordifolia*	Dune Waxberry	LC	Thicket	-	-	-
Myricaceae	*Morella quercifolia*	Maagpynbossie	LC	Thicket	-	-	-
Myrtaceae	*Psidium guajava*	Common Guava	NE	Thicket	-	-	-
Oleaceae	*Olea exasperata*	Dune Olive	LC	Thicket	-	-	-
Plantaginaceae	*Plantago lanceolata*	Ribwort Plantain	LC	Secondary Grassy Fynbos	-	-	-
Poaceae	*Digitaria eriantha*	Woolly Finger Grass	LC	Secondary Grassy Fynbos	-	-	-
Poaceae	*Eragrostis capensis*	Hartjiegras	LC	Secondary Grassy Fynbos	-	-	-
Poaceae	*Ehrharta villosa*	Pipe Grass	LC	Cape Seashore Vegetation	-	-	-

Family	Species	Common Name	Red List Status	Vegetation Type	Protected in Terms of		
					Western Cape Nature Conservation Laws Amednment Act, 2000	NEM:BA 2007	List of Protected Trees (2021)
Poaceae	*Heteropogon contortus*	Spear Grass	LC	Secondary Grassy Fynbos	-	-	-
Poaceae	*Imperata cylindrica*	Cotton-wool Grass	LC	Secondary Grassy Fynbos	-	-	-
Poaceae	*Melinis repens*	Natal Grass	LC	Secondary Grassy Fynbos	-	-	-
Poaceae	*Panicum maximum*	Guinea Grass	LC	Secondary Grassy Fynbos	-	-	-
Poaceae	*Phragmites australis*	Fluitjiesriet	LC	Thicket/Wetland	-	-	-
Poaceae	*Setaria sphacelata*	African Bristlegrass	NE	Secondary Grassy Fynbos	-	-	-
Poaceae	*Sporobolus virginicus*	Brakgras	LC	Cape Seashore Vegetation	-	-	-
Poaceae	*Stenotaphrum secundatum*	Buffelsgras	LC	Secondary Grassy Fynbos	-	-	-
Poaceae	*Thinopyrum distichum*	Coastal Wheatgrass	NE	Cape Seashore Vegetation	-	-	-
Polygalaceae	*Persicaria decipiens*	Persicaria decipiens	LC	Thicket	-	-	-
Polygalaceae	*Polygala myrtifolia*	September Bush	LC	Thicket	-	-	-
Polygalaceae	*Polygala virgata*	Purple Broom	LC	Thicket	-	-	-
Primulaceae	*Anagallis arvensis*	Bird's Eye	NE	Secondary Grassy Fynbos	-	-	-
Ranunculaceae	*Anemone vesicatoria*	Common Burnleaf	LC	Thicket	-	-	-
Restionaceae	*Restio eleocharis*	Katstertriet	LC	Cape Seashore Vegetation	-	-	-
Rubiaceae	*Rubia petiolaris*	Kleefgras	LC	Thicket	-	-	-

Family	Species	Common Name	Red List Status	Vegetation Type	Protected in Terms of		
					Western Cape Nature Conservation Laws Amednment Act, 2000	NEM:BA 2007	List of Protected Trees (2021)
Ruscaceae	*Eriospermum capense*	Bobbejaanoor	LC	Secondary Grassy Fynbos	-	-	-
Rutaceae	*Agathosma apiculata*	Knoffelboegoe	LC	Thicket	Schedule 4	-	-
Santalaceae	*Colpoon compressum*	Coastal Tannin-bush	LC	Thicket	-	-	-
Sapotaceae	*Sideroxylon inerme*	White Milkwood	LC	Thicket	-	-	Schedule A
Scrophulariaceae	*Buddleja saligna*	False Olive	LC	Thicket	-	-	-
Scrophulariaceae	*Chaenostoma cordatum*	Bacopa	LC	Thicket	-	-	-
Scrophulariaceae	*Dischisma ciliatum*	Kleinkatstert	LC	Thicket	-	-	-
Scrophulariaceae	*Hebenstretia integrifolia*	Summer Slugwor	LC	Secondary Grassy Fynbos	-	-	-
Scrophulariaceae	*Manulea sp.*			Secondary Grassy Fynbos	-	-	-
Scrophulariaceae	*Myoporum insulare*	Australian Ngaio	NE	Thicket	-	-	-
Scrophulariaceae	*Myoporum laetum*	Ngaio	NE	Thicket	-	-	-
Scrophulariaceae	*Selago corymbosa*	Bitterblombos	LC	Secondary Grassy Fynbos/ Thicket	-	-	-
Solanaceae	*Cestrum laevigatum*	Inkberry	NE	Thicket	-	-	-
Solanaceae	*Solanum africanum*	Dronkbessie	LC	Thicket	-	-	-
Solanaceae	*Solanum linnaeanum*	Bitter Apple	LC	Secondary Grassy Fynbos/ Thicket	-	-	-
Theophrastaceae	*Samolus porosus*	Water Pimpernel	LC	Thicket	-	-	-
Theophrastaceae	*Samolus valerandi*	Brook Weed	LC	Secondary Grassy Fynbos	-	-	-

Family	Species	Common Name	Red List Status	Vegetation Type	Protected in Terms of		
					Western Cape Nature Conservation Laws Amednment Act, 2000	NEM:BA 2007	List of Protected Trees (2021)
Thymelaeaceae	*Passerina corymbosa*	Common Cluster-flower Gonna	LC	Thicket	-	-	-
Verbenaceae	*Lantana camara*	Common Lantana	NE	Thicket	-	-	-
Vitaceae	*Rhoicissus digitata*	Baboon Grape	LC	Thicket	-	-	-
Vitaceae	*Rhoicissus tridentata*	Common Forest Grape	LC	Thicket	-	-	-

* LC= Least Concern; NE= Not Evaluated

APPENDIX 2: PROOF OF SACNASP REGISTRATION AND HIGHEST QUALIFICATION

SACNASP
South African Council for Natural Scientific Professions

herewith certifies that

Nicole Nadine Wienand

Registration Number: 130289

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 (Certificated Natural Scientist)
Botanical Science (Professional Natural Scientist)

Effective 3 March 2021 Expires 31 March 2024

Chairperson

Chief Executive Officer

To verify this certificate scan this code

NELSON MANDELA
UNIVERSITY

This is to certify that, all the requirements
having been met, the degree

Bachelor of Science Honours in Botany

with all the associated rights and privileges,
was conferred upon

Nicole Nadine Wienand
ID no.: 9501170150088

at a congregation of the Nelson Mandela University on
13 December 2018

Certificate no.: 20185249

Vice-Chancellor

Registrar

00008632

APPENDIX 3: CV

CONTACT DETAILS

Name	**Nicole Dealtry (née Wienand)**
Name of Company	Biodiversity Africa
Designation	Senior Botanist
Professional Affiliations	SACNASP Pri. Sci. Nat. Botany Reg No. 130289 IAIAsa Membership No. 6176 SAAB: Member of the South African Association of Botanists
E-mail	nicole@biodiversityafrica.com
Contact Number	+27 (0)81 044 1925
Education	April 2018: Bachelor of Science (BSc) Bontany and Geology December 2018: Bachelor of Science (BSc) Honours (Hons) Botany
Nationality	South African
Key areas of expertise	➢ Ecological Impact Assessments ➢ Botanical Micro-siting ➢ GIS Mapping

PROFILE

Nicole (SACNASP Pri. Sci. Nat. Botany Reg No. 130289) is a Botanical Specialist with over 4 years' experience. Nicole obtained her BSc Honours in Botany (Environmental Management) from Nelson Mandela University (NMU) in December 2018. She also holds a BSc Degree in Environmental Management (Cum Laude) from NMU. Nicole has undertaken numerous Ecological Impact Assessments for a range of developments, including Wind Energy Facilities (WEFs), mines, powerlines, housing developments, roads, amongst others, ensuring that these specialist assessments are undertaken and prepared in accordance with the Protocols for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity (GN R. 320), Plant Species and Animal Species (GN R. 1150) whilst working closely with developers to ensure a development which is environmentally sustainable as well as financially and technically feasible. Nicole also has experience with conducting specialist assessments in other African countries, including Sierra Leone and Mozambique.

EMPLOYMENT EXPERIENCE

Botanical Specialist, Biodiversity Africa

March 2023 – present

- Botanical and Ecological Impact Assessments
- Alien Management Plans
- GIS Mapping

Environmental Consultant and Botanical Specialist, Coastal and Environmental Services (CES)

07 January 2019 – February 2023

- Ecological Impact Assessments
- Botanical Micro-siting
- GIS Mapping
- Basic Assessments
- Public Participation
- Environmental Auditing/Compliance Monitoring
- Environmental Management Programmes (EMPr)

ACADEMIC QUALIFICATIONS

Nelson Mandela University, Port Elizabeth

BSc Honours Botany (Environmental Management)

2018

Nelson Mandela Metropolitan University, Port Elizabeth

BSc Environmental Sciences

2015-2017

CONSULTING EXPERIENCE

Basic Assessments

- Basic Assessment Report (BAR) for the proposed Duyker Island Prospecting Right, North West Province (Role: Assistant Report Writer).
- Basic Assessment Report (BAR) for the proposed Fairview Sand Mine near Port Alfred, Eastern Cape Province (Role: Report Writer).
- Basic Assessment Report (BAR) for the proposed Kareekrans Boerdery Agricultural Development near Kirkwood, Eastern Cape Province (Role: Report Writer).
- Basic Assessment Report (BAR) for the proposed Sitrusrand Dwarsleegte Farm Citrus Development near Kirkwood, Eastern Cape Province (Role: Report Writer).
- Basic Assessment Report (BAR) for the Proposed Private Jetty in Bushman's Estuary near Kenton-On-Sea, within the Eastern Cape Province (Role: Report Writer).

Ecological Impact Assessments and Related Work

- ZMY Steel Traders (Pty) Ltd., Steel Recycling Plant, Zone 5 of the Coega SEZ, Eastern Cape Province (Role: Ecological Specialist and Ecological Chapter Writer).
- Ecological Impact Assessment for the proposed Kareekrans Boerdery Agricultural Development near Kirkwood Eastern Cape Province (Role: Botanical specialist and Lead Report Writer).
- Ecological Impact Assessment for the proposed Sitrusrand Dwarsleegte Farm Citrus Development near Kirkwood, Eastern Cape Province – Ecological Impact Assessment and Report Writing (Role: Botanical Specialist and Lead Report Writer).
- Ecological Impact Assessment for the proposed Uitsig Boerdery Trust Citrus Development near Kirkwood, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Ground Truthing Survey for Aloe bowiea on Portion 2 of Farm 683 for the proposed Uitsig Boerdery Trust Citrus Development near Kirkwood, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Mosselbankfontein Coastal Dune and Ecological Impact Assessment near Witsand, Western Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Mangrove Forest Survey for the Kenmare Biodiversity Management Plan, Topuito, Mozambique (Role: Botanical Specialist and Lead Report Writer).
- Ecological Impact Assessment for the proposed Refele Village Sports Facility, Mount Fletcher, Elundini Local Municipality, Eastern Cape Province of South Africa (Role: Lead Report Writer).
- Ecological Impact Assessment for the proposed Hamburg Quarry Expansion, R72, Ngqushwa Local Municipality (Role: Lead Report Writer).
- Ecological Opinion and Site Sensitivity Report for the proposed Woodlands Dairy 22kV Overhead Line near Humandsdorp, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Ecological Impact Assessment Report for the proposed Edendale Quarry, R56, Matatiele Local Municipality, Eastern Cape Province (Role: Report Writer).
- Ecological Impact Assessment for the proposed TWFT Piggery near Tsitsikamma, Koukama Local Municipality, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Ecological Impact Assessment for the proposed Oudtshoorn Cemetery Expansion, Oudtshoorn Local Municipality, Western Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Tyolomnqa River Estuary Situation Assessment (Role: Assistant Report Writer).
- Ecological Opinion Letter for the Proposed Umsobomvu Infrastructure Development, Eastern and Northern Cape Provinces (DEFF Reference Number: 14/12/16/3/3/1/2040) (Role: Report Writer).
- Ecological Opinion Letter for the Proposed Coleskop Infrastructure Development, Eastern and Northern Cape Provinces (DEFF Reference Number: 14/12/16/3/3/1/2039) (Role: Report Writer).
- Quinera Estuary Draft Situation Assessment Report (Role: Report Writer).
- Ecological Impact Assessment for the Proposed Umoyilanga 132 kV Overhead Line in the Sundays River Valley Local Municipality and the Nelson Mandela Bay Municipality, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).

- Ecological Impact Assessment for the Proposed Umoyilanga Ancillary Infrastructure near Uitenhage, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Ecological Impact Assessment Report for the proposed Marine Servitude Project, Zone 10, Coega SEZ, Eastern Cape Province, South Africa (Role: Botanical Specialist and Lead Report Writer).
- Botanical Micro-siting Report for the proposed Umoyilanga 132 kV Overhead Line in the Sundays River Valley Local Municipality and the Nelson Mandela Bay Municipality, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Botanical Micrositing Report for the Proposed Dassiesridge (Umoyilanga) Wind Energy Facility near Uitenhage, Nelson Mandela Bay Municipality and Sundays River Valley Local Municipality, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Ecological Screening Report for the Proposed Hlaziya 400-132 kV Powerline Project (the MTS Integration Project) from close to Jeffrey's Bay to Grassridge, near the Coega Sez, Eastern Cape Province (Role: Lead Report Writer).
- Ecological Impact Assessment for the proposed Umsobomvu Substation, Concrete Tower Manufacturing Facilities and Temporary Laydown Area, situated in the Umsobomvu Local Municipality (Northern Cape Province) and the Inxuba Yethemba Local Municipality (Eastern Cape Province) (Role: Botanical Specialist and Lead Report Writer).
- Botanical Micro-siting Report for the Eskom Infrastructure MTS situated in the Umsobomvu Local Municipality (Northern Cape Province) (Role: Botanical Specialist and Lead Report Writer).
- Botanical Micro-siting Report for the Proposed Coleskop Wind Energy Facility situated in the Umsobomvu Local Municipality (Northern Cape Province) and the Inxuba Yethemba Local Municipality (Eastern Cape Province) (Role: Botanical Specialist and Lead Report Writer).
- Botanical Micro-siting Report for the Proposed Umsobomvu Wind Energy Facility situated in the Umsobomvu Local Municipality (Northern Cape Province) and the Inxuba Yethemba Local Municipality (Eastern Cape Province) (Role: Botanical Specialist and Lead Report Writer).
- Ecological Impact Assessment for the Proposed Ganspan Pering 132 kV Overhead Line near Pampierstand, North West and Northern Cape Provinces (Role: Botanical Specialist and Lead Report Writer).
- Botanical Micro-Siting Investigation for the R342 Road Upgrade Between Paterson And Addo, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Terrestrial Biodiversity Compliance Statement for the proposed Stedin College, Walmer, Nelson Mandela Bay Municipality, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Ecological Impact Assessment Report for a proposed Hippo Enclosure on Glen Boyd Farm, Makana Local Municipality, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Ecological Impact Assessment for the Proposed Senqu Rural Water Supply Scheme, Joe Gqabi District Municipality, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Environmental Management Site Specification for the Rehabilitation of Land within the Coastal Dune System Impacted by the Zone 10 Services Project, Coega SEZ, Eastern Cape Province (Role: Site Visit and Assistant Report Writer).
- Botanical Assessment Report for the proposed Agricultural Development on the Remainder of Erf 60845, Zone 1, East London Industrial Development

Zone, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Botanical Impact Assessment for the proposed FG Gold Limited Baomahun Gold Project, Sierra Leone (Role: Botanical Specialist and Lead Report Writer).
- Biodiversity Management Plan for the proposed FG Gold Limited Baomahun Gold Project, Sierra Leone (Role: Lead Report Writer).
- Ecological Baseline Assessment for the proposed Jeffreys Bay Eco-Estate, Eastern Cape Province (Role: Botanical Specialist and Co-Author).
- Ecological Impact Assessment for the proposed Mulilo Newcastle Wind Energy Facility, KwaZulu-Natal Province (Role: Botanical Specialist and Assistant Report Writer).
- Ecological Impact Assessment for the proposed Ngxwabangu Wind Energy Facility and Grid Connection near Cofimvaba, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Ecological Impact Assessment for the proposed Umoyilanga Buffer Yard, Site Camp and Site Camp Access Road near Uitenhage, Nelson Mandela Bay Municipality and Sundays River Valley Local Municipality, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Terrestrial Biodiversity Compliance Statement for the proposed Reverse Osmosis Plant for the Matla Power Station near Kriel, Mpumalanga Province (Role: Lead Report Writer).
- Ecological Impact Assessment for the proposed Great Kei Ancillary Infrastructure located near Komga, Eastern Cape Province.

Environmental Auditing

- Khayamnandi Extension on Erven 114, 609, 590 and 24337, Bethelsdorp, within the Nelson Mandela Bay Municipality;
- Aberdeen Bulk Water Supply Phase 2, Dr Beyers Naude Local Municipality, Eastern Cape Province, South Africa;
- The Milkwoods Integrated Residential Development, Remainder Erf 1953, Victoria Drive, Walmer, Nelson Mandela Bay Municipality, Eastern Cape Province;
- Fishwater Flats Wastewater Treatment Works Refurbishment, Nelson Mandela Bay Municipality, Eastern Cape Province;
- The Refurbishment of the Kwanobuhle Wastewater Treatment Plant, Nelson Mandela Bay Municipality, Eastern Cape Province, South Africa; and
- Driftsands Sewer Collector Augmentation (Phase Ii), Within the Nelson Mandela Bay Municipality, Eastern Cape Province.

Geographical Information Systems (GIS) Mapping

- ZMY Steel Traders – Basic Assessment Report and Biophysical Mapping.
- Duyker Island – Prospecting Area Mapping & Biophysical Mapping.
- Fairview Sand Mine near Port Alfred, Eastern Cape Province – Biophysical and Layout Mapping.
- St Francis Coastal Protection Scheme – Kromme Estuary Functional Zone Mapping; Biophysical Mapping; and Sand Source Area Mapping.
- Kareekrans Boerdery Agricultural Development – Biophysical and Layout Mapping.
- Sitrusrand Dwarsleegte Farm Citrus Development – Biophysical and Layout Mapping.
- Marine Intake and Outfall Infrastructure Servitude Project, Zone 10, Coega SEZ, Eastern Cape Province, South Africa – Biophysical and Layout Mapping.

- Proposed Private Jetty in Bushman's Estuary near Kenton-On-Sea, within the Eastern Cape Province – Biophysical and Layout Mapping.
- Proposed Woodlands Dairy 22kV Overhead Line near Humandsdorp, Eastern Cape Province – Biophysical and Layout Mapping.
- Tyolomnqa River Estuary Situation Assessment – Biophysical and Layout Mapping.
- Hamburg Quarry Expansion, R72, Ngqushwa Local Municipality – Biophysical and Layout Mapping.
- Refele Village Sports Facility, Mount Fletcher, Elundini Local Municipality, Eastern Cape Province of South Africa – Biophysical and Layout Mapping.
- The proposed Woodlands Dairy 22kV Overhead Line near Humandsdorp, Eastern Cape Province – Biophysical and Layout Mapping.
- Ecological Impact Assessment Report for the proposed Edendale Quarry, R56, Matatiele Local Municipality, Eastern Cape Province – Biophysical and Layout Mapping.
- The proposed TWFT Piggery near Tsitsikamma, Koukama Local Municipality, Eastern Cape Province – Biophysical and Layout Mapping.
- Tyolomnqa River Estuary Situation Assessment – Biophysical and Layout Mapping.
- Quinera Estuary Draft Situation Assessment Report – Biophysical and Layout Mapping.
- The Proposed Umoyilanga 132 kV Overhead Line in the Sundays River Valley Local Municipality and the Nelson Mandela Bay Municipality, Eastern Cape Province – Biophysical and Layout Mapping.
- The Proposed Umoyilanga Ancillary Infrastructure near Uitenhage, Eastern Cape Province – Biophysical and Layout Mapping.
- Proposed Hlaziya 400-132 kV Powerline Project (the MTS Integration Project) from close to Jeffrey's Bay to Grassridge, near the Coega Sez, Eastern Cape Province - Biophysical and Layout Mapping.
- Proposed Umsobomvu Substation, Concrete Tower Manufacturing Facilities and Temporary Laydown Area, situated in the Umsobomvu Local Municipality (Northern Cape Province) and the Inxuba Yethemba Local Municipality (Eastern Cape Province) - Biophysical and Layout Mapping.
- Eskom Infrastructure MTS situated in the Umsobomvu Local Municipality (Northern Cape Province) - Biophysical and Layout Mapping.
- Botanical Micro-siting Investigation for the Proposed Umsobomvu Wind Energy Facility situated in the Umsobomvu Local Municipality (Northern Cape Province) and the Inxuba Yethemba Local Municipality (Eastern Cape Province) - Biophysical and Layout Mapping.
- Proposed Ganspan Pering 132 kV Overhead Line near Pampierstand, North West and Northern Cape Provinces - Biophysical and Layout Mapping.
- The proposed Agricultural Development on the Remainder of Erf 60845, Zone 1, East London Industrial Development Zone, Eastern Cape Province - Biophysical and Layout Mapping.
- The proposed Reverse Osmosis Plant for the Matla Power Station near Kriel, Mpumalanga Province - Biophysical and Layout Mapping.

Public Participation process

- Duyker Island Prospecting Right, North West Province St Francis Coastal Protection Scheme.
- Fairview Sand Mine near Port Alfred, Eastern Cape Province.
- Kareekrans Boerdery Agricultural Development near Kirkwood Eastern Cape Province,

- Proposed Coastal Protection Scheme, St Francis Bay, Kouga Local Municipality, Eastern Cape Province; and
- Sitrusrand Dwarsleegte Farm Citrus Development near Kirkwood, Eastern Cape Province.
- Marine Intake and Outfall Infrastructure Servitude Project, Zone 10, Coega SEZ, Eastern Cape Province, South Africa.
- Proposed Hlaziya 400-132 kV Powerline Project (the MTS Integration Project) from close to Jeffrey's Bay to Grassridge, near the Coega Sez, Eastern Cape Province.

Social Auditing

- Malawi Millennium Development Trust – Resettlement Action Plan Implementation Auditing.