

# Plants, Animals & Terrestrial Biodiversity Assessment

prepared in accordance with the  
*"Protocol for the Specialist Assessment and minimum report content  
requirements for environmental impacts on Plant Species, Animal Species,  
and Terrestrial Biodiversity"*

Erf 1058, Wilderness, George in the Western Cape Province



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# Plant Species, Animal Species and Terrestrial Biodiversity Assessment Report for Erf 1058, Wilderness, George in the Western Cape Province

29 April 2024

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# SPECIALIST DETAILS & DECLARATION

This report has been prepared in accordance with the "Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity", as promulgated in terms of Section 24 (5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998), published in GN. No. 320 dated 20 March 2020. It has been prepared independently of influence or prejudice by any parties.

The details of Specialists are as follows –

Specialist	Qualification and accreditation
Dr David Hoare (Pr.Sci.Nat.)	<ul style="list-style-type: none"><li>• PhD Botany</li><li>• SACNASP Reg. no. 400221/05 (Ecology, Botany)</li></ul>

## Declaration of independence:

David Hoare Consulting (Pty) Ltd in an independent consultant and hereby declare that it does not have any financial or other vested interest in the undertaking of the proposed activity, other than remuneration for the work performed in terms of the National Environmental Management Act, 1998 (Act 107 of 1998). In addition, remuneration for services provided by David Hoare Consulting (Pty) Ltd is not subjected to or based on approval of the proposed project by the relevant authorities responsible for authorising this proposed project.

## Disclosure:

David Hoare Consulting (Pty) Ltd undertake to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) and will provide the competent authority with access to all information at its disposal regarding the application, whether such information is favourable to the applicant or not.

Based on information provided to David Hoare Consulting (Pty) Ltd by the client and in addition to information obtained during the course of this study, David Hoare Consulting (Pty) Ltd present the results and conclusion within the associated document to the best of the author's professional judgement and in accordance with best practice.

e.



\_\_\_\_\_  
Dr David Hoare

29 April 2024  
Date

# TERMS OF REFERENCE

This report is prepared in compliance with the PROTOCOL FOR THE SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS FOR ENVIRONMENTAL IMPACTS ON TERRESTRIAL BIODIVERSITY, TERRESTRIAL PLANT SPECIES AND TERRESTRIAL ANIMAL SPECIES

This assessment follows the requirements of The Environmental Impact Assessment Regulations, as promulgated in terms of Section 24 (5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998), published in GN. No. 320 dated 20 March 2020 for Terrestrial Biodiversity, and in GN. No. 1150 dated 30 October 2020 for Terrestrial Plant Species and Terrestrial Animal Species. As per these Regulations, the approach for assessing sensitivity with respect to Terrestrial Plant Species and Terrestrial Animal Species is in accordance with guidelines described in the latest version of the "*Species Environmental Assessment Guideline*", available at <https://bgis.sanbi.org/>.

The assessment and minimum reporting requirements of these protocols are associated with a level of environmental sensitivity identified by the national web based environmental screening tool (screening tool). The screening tool can be accessed at:

<https://screening.environment.gov.za/screeningtool>.

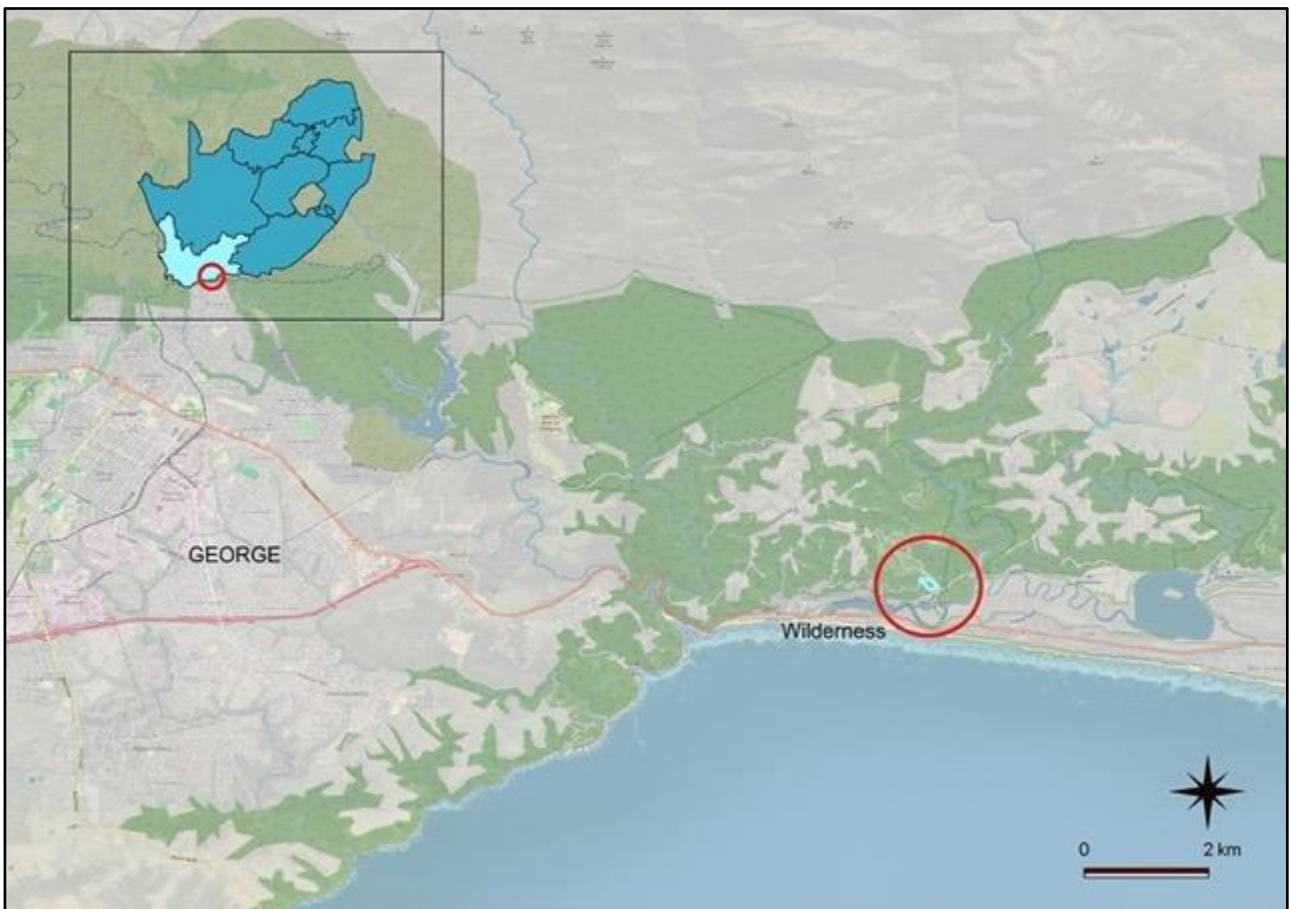
# INTRODUCTION

## Site location

The site is Erf 1058, Wilderness, George in the Western Cape Province. The site is adjacent to Whites Road, which is a gravel access road that travels from in Wilderness up to Wilderness Heights. The slope overlooks the Serpentine River, which is part of the Garden Route National Park, Wilderness Section. Refer to Figure 1 below for the general location.

The site is accessed from Whites Road on the northern side. The eastern, southern and western boundaries of the site are cadastral boundaries. Most of the wooded area shown in Figure 2 is a steep south-facing slope that stretches away in both directions from the site. The southern part of the site is a short distance from Waterside Road, which is a narrow tarred road that goes from Wilderness to Ebb and Flow.

The scope of this report is the entire property, part of which is planned to be developed. The entire site is 3.01 ha.



**Figure 1: Location of the site (within red circle).**





**Figure 2: Aerial image of the site and surrounding areas.**

## Identified Theme Sensitivities

A sensitivity screening report from the DEA Online Screening Tool was requested in the application category: Transformation of land | Indigenous vegetation. The DEA Screening Tool report for the area, dated 12/05/2023, indicates the following ecological sensitivities:

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Animal Species Theme		X		
Plant Species Theme			X	
Terrestrial Biodiversity Theme	X			

### **Animal Species theme**

Sensitivity features are indicated as follows:

Sensitivity	Feature(s)
High	Aves-Circus ranivorus
High	Aves-Stephanoaetus coronatus
High	Aves-Bradypterus sylvaticus
High	Aves-Polemaetus bellicosus
Medium	Amphibia-Afrixalus knysnae
Medium	Insecta-Aloeides thyra orientis

Medium	Mammalia-Chlorotalpa duthieae
Medium	Sensitive species 8
Medium	Invertebrate-Aneuryphymus montanus

### **Plant Species theme**

Sensitivity features are indicated as follows:

Sensitivity	Feature(s)
Medium	Lampranthus fergusoniae
Medium	Lampranthus pauciflorus
Medium	Lebeckia gracilis
Medium	Leucospermum glabrum
Medium	Wahlenbergia polyantha
Medium	Selago burchellii
Medium	Selago villicaulis
Medium	Sensitive species 1081
Medium	Sensitive species 419
Medium	Erica chloroloma
Medium	Erica glandulosa subsp. fourcadei
Medium	Hermannia lavandulifolia
Medium	Sensitive species 657
Medium	Sensitive species 1024
Medium	Sensitive species 1032
Medium	Cotula myriophylloides
Medium	Agathosma muirii
Medium	Muraltia knysnaensis
Medium	Nanobubon hypogaeum
Medium	Sensitive species 800
Medium	Erica glumiflora
Medium	Sensitive species 500
Medium	Sensitive species 763
Medium	Diosma passerinoides
Medium	Zostera capensis

### **Terrestrial Biodiversity theme**

Sensitivity features are indicated as follows:

Sensitivity	Feature(s)
Very High	Critical biodiversity area 1
Very High	Ecological support area 2
Very High	FEPA Subcatchments
Very High	Strategic Water Source Areas
Very High	Critically Endangered ecosystem_Garden Route Granite Fynbos

# PROPOSED DEVELOPMENT

The proposed development is to construct a main dwelling on site close to Whites Road, as well as several smaller units scattered within the upper part of the site (Figure 3).

## Project Area of Influence (PAOI)

Anticipated impacts will mostly occur during the construction phase. These impacts are not expected to extend beyond the boundaries of the development area, although downslope erosion is a potential concern due to steep slopes, and secondary impacts are possible. The PAOI is therefore treated here as the development footprint within which direct impacts will occur (Figure 3), as well as all areas downslope.

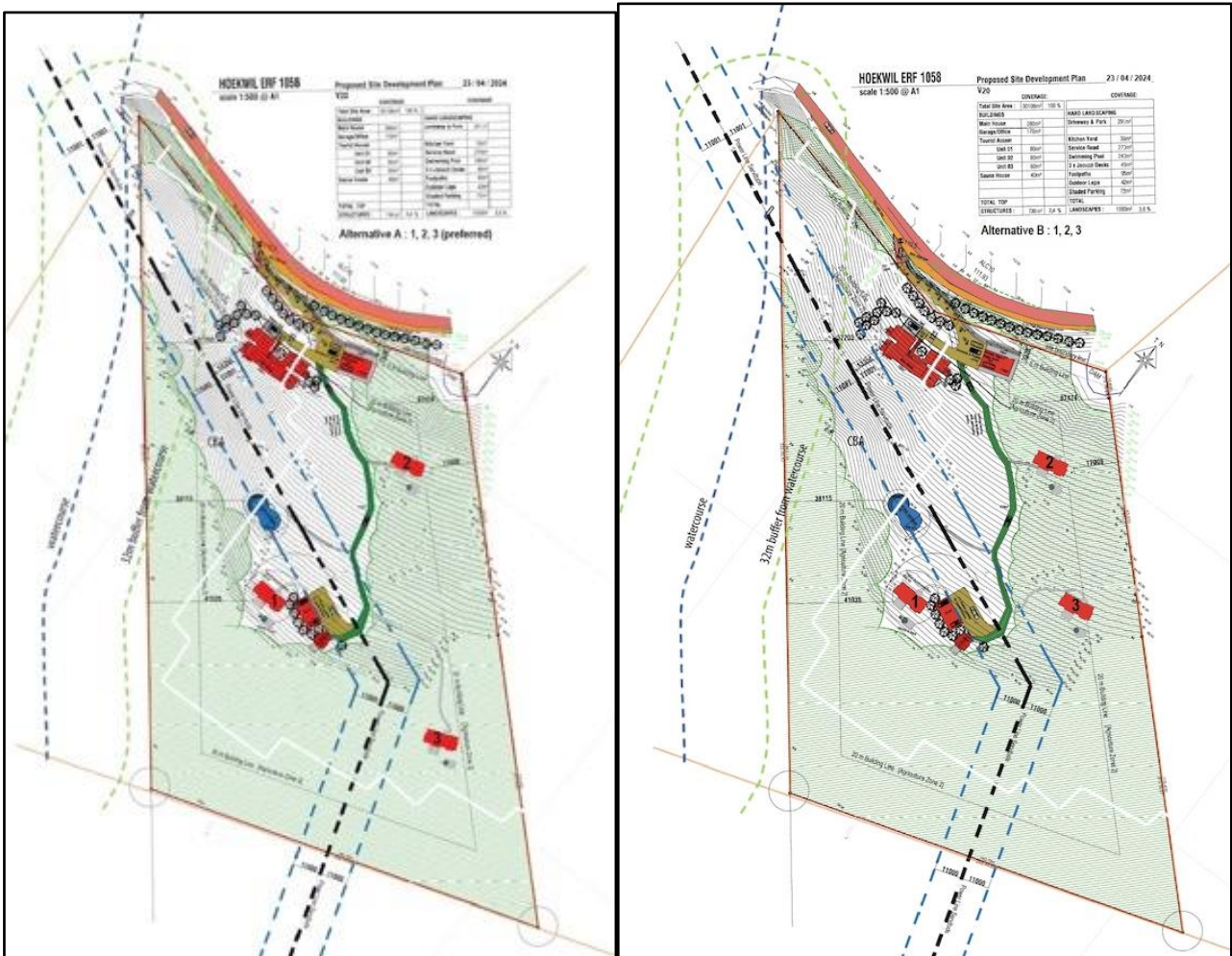


Figure 3: Proposed development, Alternative A (left) and Alternative B (right).

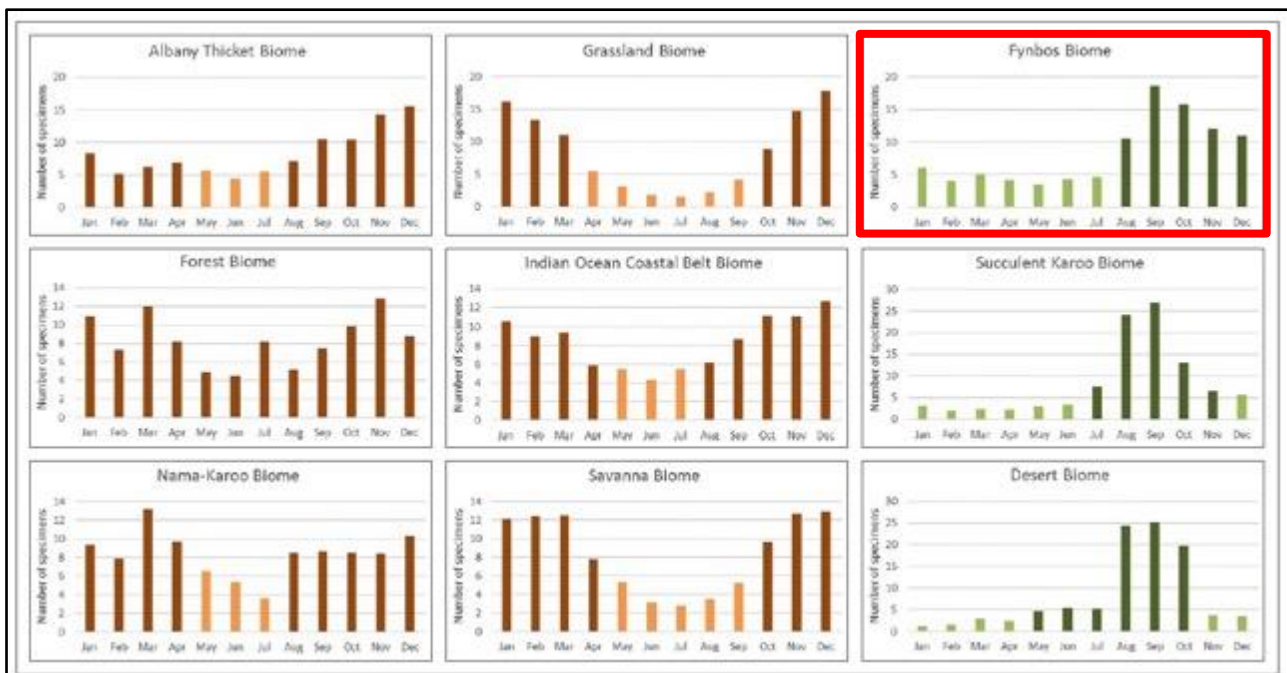
# ASSESSMENT METHODOLOGY

The detailed methodology followed as well as the sources of data and information used as part of this assessment is described below.

## Survey timing

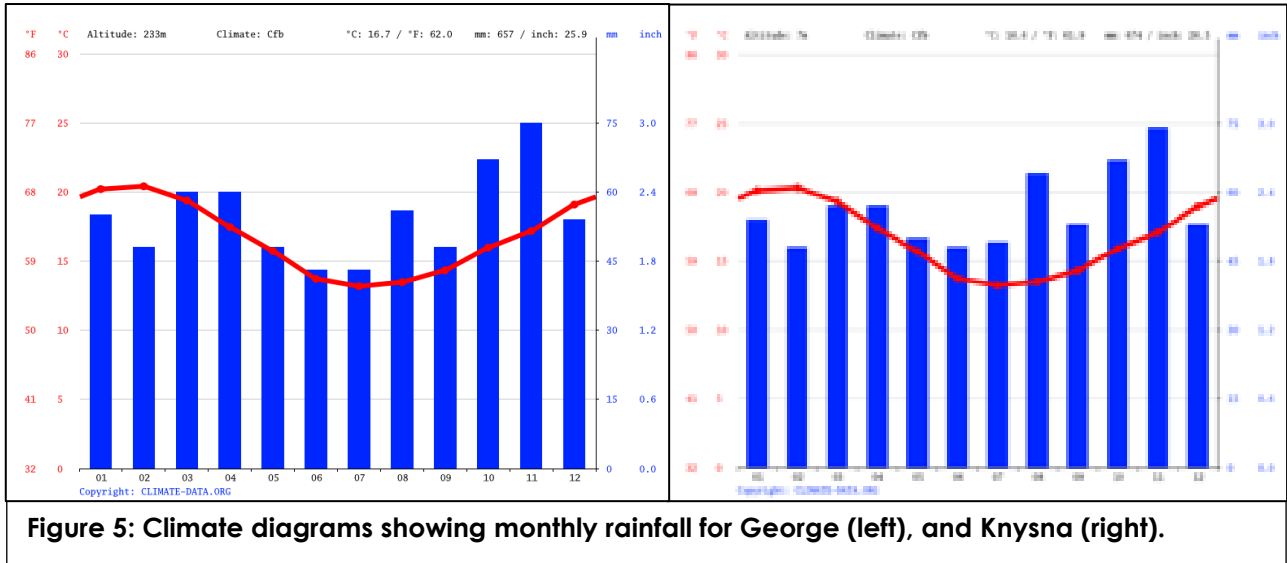
The study commenced as a desktop-study followed by site-specific field study, including on-site field surveys on 19 December 2023, and 4 and 11 January 2024.

The site is within the Fynbos Biome, which is shown as having mostly an early summer rainfall season (Figure 4). A more accurate indication of rainfall seasonality, which drives most ecological processes, is shown in Figure 5 for specific rainfall stations, which shows that George has peak rainfall from August to December, with another peak from January to April, and Knysna with a similar pattern. This rainfall pattern matches the pattern for the Forest Biome more closely than for the Fynbos Biome (as shown in Figure 4).



**Figure 4: Recommended survey periods for different biomes (Species Environmental Assessment Guidelines). The site is within the Fynbos Biome.**

The timing of the survey in December and January is therefore optimal in terms of assessing the flora and vegetation of the site. The overall condition of the vegetation was possible to be determined with a high degree of confidence.



## Field survey approach

The study commenced as a desktop-study followed by a site-specific field study. During the field survey of habitats on site, the entire property was assessed on foot. Field surveys included both meander searches of general areas, and active searching in habitats that were considered to be suitable for specific groups or species. Meander surveys were undertaken with no time restrictions - the objective was to comprehensively examine all natural areas. A hand-held Garmin GPSMap 64s was used to record a track within which observations were made (Figure 6). Digital photographs were taken of features and habitats on site, as well as of all plant species that were seen. All plant and animal species recorded were uploaded to the iNaturalist website (<https://www.inaturalist.org>) and are accessible by viewing the observations for the site (use the Explore menu, zoom and pan until the desired study area is within the browser window, click the button "Redo search in map", and all observations for that area will be shown and listed).

Aerial imagery from Google Earth was used to identify and assess habitats on site. This included historical imagery that may show information not visible in any single dated image. Patterns identified from satellite imagery were verified on the ground. Digital photographs were taken at locations where features of interest were observed. During the field survey, particular attention was paid to ensuring that all habitat variability was covered physically on the ground.



Figure 6: GPS track log of areas walked in the course of undertaking this assessment.

## Sources of information

### **Regional Vegetation**

- Broad vegetation types occurring on site were obtained from Mucina and Rutherford (2006), with updates according to the SANBI BGIS website (<http://bgis.sanbi.org>), as follows:
  - Mucina, L. and Rutherford, M.C. (editors) 2006. Vegetation map of South Africa, Lesotho and Swaziland: an illustrated guide. Strelitzia 19, South African National Biodiversity Institute, Pretoria.
  - South African National Biodiversity Institute 2018 Final Vegetation Map of South Africa, Lesotho and Swaziland [Vector] 2018. Available from the Biodiversity GIS website, downloaded on 23 September 2021.
- The description of each vegetation type includes a list of plant species that may be expected to occur within the particular vegetation type.

### **Threatened Ecosystems**

- The conservation status of the vegetation types were obtained from Mucina and Rutherford (2006) and the National List of Ecosystems that are Threatened and in need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004).

### **Regional plans**

- Information from the National Protected Areas Expansion Strategy was consulted for possible inclusion of the site into a protected area in future (<http://bgis.sanbi.org>).
- The 2017 Western Cape Biodiversity Spatial Plan (WCBSPP) Maps were consulted for inclusion of any parts of the site into any Critical Biodiversity Areas or Ecological Support Areas (CapeNature. 2017 WCBSPP George [Vector] 2017. Available from the Biodiversity GIS website ([biodiversityadvisor.sanbi.org](http://biodiversityadvisor.sanbi.org))).

### **Vegetation and plant species**

- Plant species that could potentially occur on in the general area was extracted from the NewPosa database of the South African National biodiversity Institute (SANBI) for the quarter degree grid/s in which the site is located.
- The IUCN Red List Category for plant species, as well as supplementary information on habitats and distribution, was obtained from SANBI (Red List of South African Plants, <http://redlist.sanbi.org>).
- Lists were compiled specifically for any species at risk of extinction (Red List species) previously recorded in the area. Historical occurrences of threatened plant species were obtained from the South African National Biodiversity Institute (<http://posa.sanbi.org>) for the quarter degree square/s within which the study area is situated. Habitat information for each species was obtained from various published sources. The probability of finding any of these species was then assessed by comparing the habitat requirements with those habitats that were found, during the field survey of the site, to occur there.
- Regulations published for the National Forests Act (Act 84 of 1998) (NFA) as amended, provide a list of protected tree species for South Africa. The species on this list were assessed in order to determine which protected tree species have a geographical distribution that coincides with the study area and habitat requirements that may be met by available habitat in the study area. The distribution of species on this list were obtained from published sources (e.g. van Wyk & van Wyk 1997) and from the SANBI Biodiversity Biodiversity Advisor website for quarter degree grids in which species have been previously recorded. Species that have been recorded anywhere in proximity to the site, or where it is considered possible that they could occur there, were listed and were considered as being at risk of occurring there.

- The plant species checklist of species that could potentially occur on site was compiled from a plant species checklist extracted from the NewPosa database of the South African National biodiversity Institute (SANBI) for the quarter degree grid in which the site is located.
- The IUCN Red List Category for plant species, as well as supplementary information on habitats and distribution, was obtained from the SANBI Threatened Species Programme (Red List of South African Plants, <http://redlist.sanbi.org>).

### **Fauna**

- Lists of animal species that have a geographical range that includes the study area were obtained from literature sources (Bates et al., 2014 for reptiles, du Preez & Carruthers (2009) for frogs, Mills & Hes (1997) and Friedmann and Daly (2004) for mammals). This was supplemented with information from the Animal Demography Unit website ([adu.uct.ac.za](http://adu.uct.ac.za)) and literature searches for specific animals, where necessary.
- Appendix 1 is a summary of the expected animals (mammals, reptiles and amphibians) for the site.

## Limitations

The following assumptions, limitations, uncertainties are listed regarding the assessment of the site:

- The assessment is based on three separate site visits. The current study is based on several detailed site visits as well as a desktop study of the available information. The time spent on site was adequate for understanding general patterns across affected areas.
- Compiling the list of species that could potentially occur on site is limited by the paucity of collection records for the area. The list of possible sensitive plant species that could potentially occur on site was therefore taken from a wider area and from literature sources that may include species that do not occur on site and may miss species that do occur on site. In order to compile a comprehensive site-specific list of the biota on site, studies would be required that would include different seasons, be undertaken over a number of years and include extensive sampling. Due to legislated time constraints for environmental authorisation processes, this is not possible.
- Rare and threatened plant and animal species are, by their nature, usually very difficult to locate and can be easily missed.

## Impact assessment methodology

The Impact Assessment Methodology assists in evaluating the overall effect of a proposed activity on the environment. Impact assessment must take account of the nature, scale and duration of effects on the environment and whether such effects are positive (beneficial) or negative (detrimental). The rating system is applied to the potential impact on the receptor. The impact assessment methodology provided below explicitly takes into account the value and condition of the biodiversity resources affected. In assessing the significance of each issue the following criteria (including an allocated point system) is used:

<b>CRITERIA</b>	<b>SCORE 1</b>	<b>SCORE 2</b>	<b>SCORE 3</b>	<b>SCORE 4</b>	<b>SCORE 5</b>
<b>BIODIVERSITY VALUE / SENSITIVITY CRITERIA</b>					



CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
<b>Irreplaceability (I)</b> The biodiversity value of the affected resource	Resource is widespread and common and /or regenerates itself (LC)	Resource is uncommon, endemic to a restricted area, moderately rare, or is already noticeably affected but still relatively widespread (e.g., NT, ESA)	Resource is naturally rare, restricted to limited localities, ephemeral, or is approaching a threshold of persistence (VU, CBA2)	Resource is highly localised / loss has already exceeded persistence thresholds (EN, CBA1)	Resource is critically rare / loss has already well exceeded persistence thresholds (CR, Protected)
<b>Threshold (T)</b> The scale of the impact relative to the overall distribution of a resource, therefore the degree to which the impact contributes towards exceeding an ecological threshold	Impact affects a negligible proportion of the overall biodiversity resource	Impact affects a proportion of the biodiversity resource that is within 6 orders of magnitude of the total extent / number of the resource (0.001-0.1%)	Impact affects a proportion of the biodiversity resource that is within 4 orders of magnitude of the total extent / number of the resource (0.1-1%)	Impact affects a proportion of the biodiversity resource that is within 2 orders of magnitude of the total extent / number of the resource (1-10%)	Impact affects a proportion of the biodiversity resource that is within 1 order of magnitude or more of the total extent / number of the resource ( $\geq 10\%$ )
<b>Condition (C)</b> The integrity of the resource in terms of its intactness and functionality, the coherence of its ecological structure and function	Resource in very poor condition, displaying advanced degradation		Moderately affected resource, functional but displaying obvious signs of minor degradation		Fully functional and in a state expected in a completely natural state, unaffected by human influence.
<b>Reversibility (R)</b> The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation	Mostly reversible: requires minor mitigation	Partly reversible: Recoverable with more intense mitigation	Barely reversible: unlikely to be reversed, even with intense mitigation	Irreversible: Not possible despite action
<b>IMPACT MAGNITUDE CRITERIA</b>					
<b>Extent (E)</b> The geographical extent of the impact on a given environmental receptor	Site: Within site boundary only	Site & surroundings: Extends for a limited distance beyond site boundaries	Landscape: Outside activity area	Regional: Affects patterns at a regional or provincial scale	Global: Across borders or boundaries

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
<b>Duration (D)</b> The length of permanence of the impact on the environmental receptor	Immediate: On impact, 0-1 years	Short term: 1-5 years	Medium term: 5-10 years	Long term: Project life, 10-25 years	Permanent: Indefinite
<b>Magnitude (M)</b> The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease or continue in a highly modified way	Very High: Permanent cessation of processes
<b>Probability of Occurrence (P)</b> The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite
<b>Significance (S)</b> is determined by combining the above criteria in the following formula:	$S = [(E + D + M)/3 \times (R + I + T + C)/4 \times P]/25$ <p><i>Significance = (Extent + Duration + Magnitude)/3 × (Reversibility + Irreplaceability + Threshold + Condition)/4 × Probability</i></p>				
IMPACT SIGNIFICANCE RATING					
<b>Total Score</b>	<b>0 - 1</b>	<b>1 - 2</b>	<b>2 - 3</b>	<b>3 - 4</b>	<b>4 - 5</b>
<b>Environmental Significance Rating (Negative (-))</b>	Very low	Low	Moderate	High	Very High
<b>Environmental Significance Rating (Positive (+))</b>	Very low	Low	Moderate	High	Very High

# REGIONAL CONTEXT

## Regional vegetation patterns

The site is mapped as occurring within a regional vegetation type called **Garden Route Granite Fynbos**. To the north of this vegetation type is another regional vegetation type called **Garden Route Shale Fynbos**. There is also **Goukamma Dune Thicket** mapped as occurring in areas to the south of the site, which structurally matches remaining vegetation seen on site. Detailed descriptions of vegetation types are published and available on the SANBI BGIS website (<http://bgis.sanbi.org>).

On-site observations indicate that the patterns seen on site and the surrounding areas do NOT conform to these published descriptions of the vegetation. The combination of the two regional Fynbos vegetation units (**Garden Route Granite Fynbos** and **Garden Route Shale Fynbos**) are shown as extending from Keurbooms River in the east to north of Mossel Bay in the west, occurring on the inland plains and undulating hills between the Outeniqua Mountains and the coastal systems (part of which is shown in Figure 7). These two regional Fynbos units form a landscape mosaic with **Southern Afrotemperate Forest** (Figure 7), although forest tends to only occur closer to the mountains. Unfortunately, historical urban and agricultural development, as well as plantation forestry, has converted most of these areas mapped as **Garden Route Granite Fynbos** and **Garden Route Shale Fynbos** from the original natural state. The existence of fynbos has been assumed during the



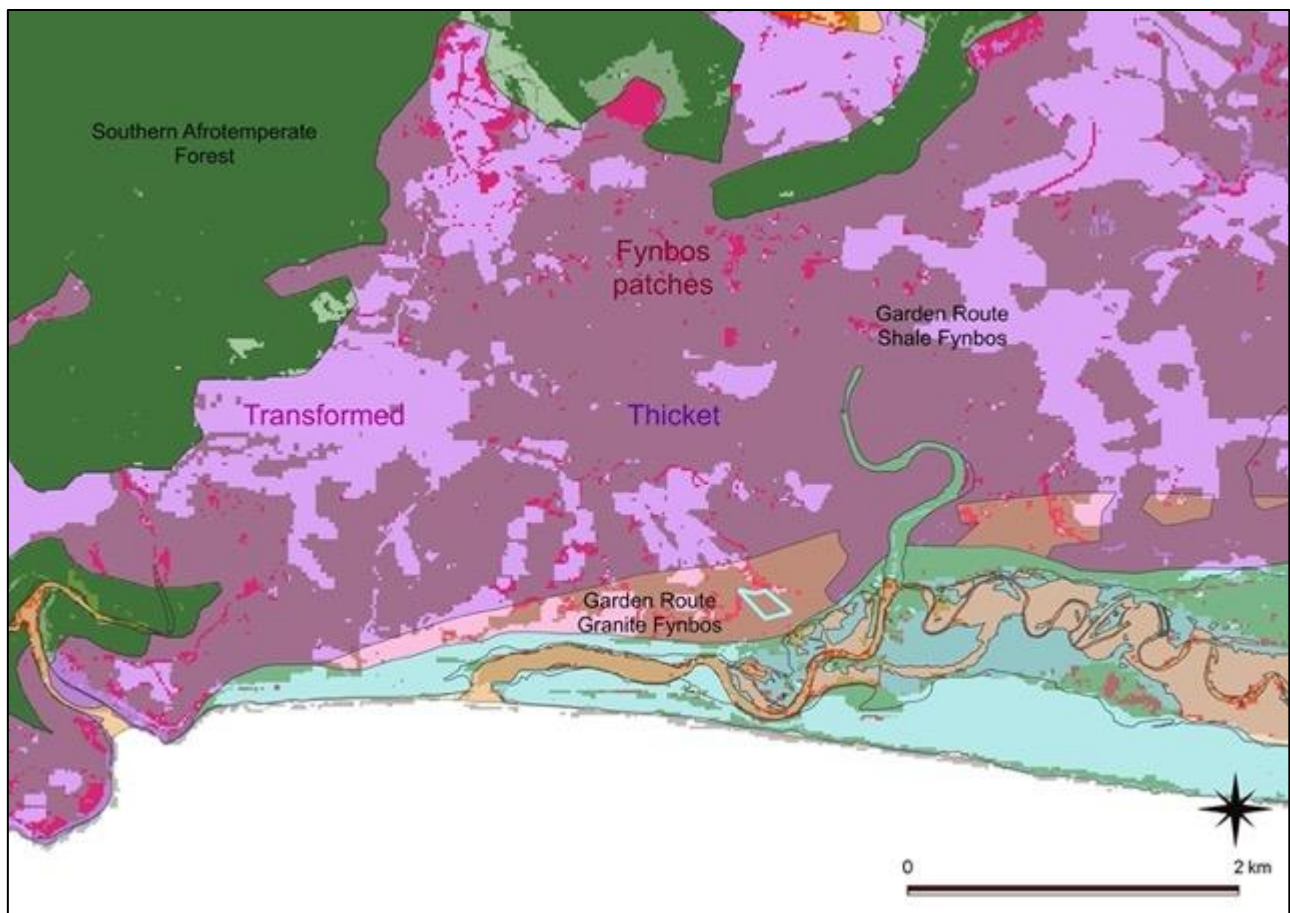
Figure 7: Regional vegetation types in different topographical regions of the general area that includes site.

mapping of the regional vegetation types (Mucina et al. 2006), but this is not supported by patterns seen on the ground.

Most of the remaining patches of natural vegetation in the mapped fynbos units for the Garden Route (**Garden Route Granite Fynbos** and **Garden Route Shale Fynbos**) are mesic thicket, which is mapped relatively well in the 2018 South African National Landcover map (see Figure 8 where "thicket" as a structural land cover class is shown as dark areas within the mapped fynbos vegetation units). This pattern is stable and can be seen in historical aerial photographs from 1936 (Figure 9) and 1957 (not shown). Thicket is, in fact, the typical vegetation seen in the Wilderness area (see example in Figure 10). The only places that fynbos appears to occur naturally is in small patches on dryer, north-facing slopes, but this is very rare (see small patches in the 2018 South African National Landcover map for the area shown in Figure 8). Secondary (impoverished) fynbos is common in previously cultivated areas only.

In the area between George and Knysna are two Thicket vegetation types, Dune Thicket (growing on sedimentary geology) and an undefined (undescribed) mesic thicket unit (growing on Cape geology rock formations, including granite and shale). The Dune Thicket is correctly mapped (called **Goukamme Dune Thicket** around Wilderness), but there is no mapped mesic thicket around Wilderness, which is incorrect. The closest (spatially and floristically) described thicket unit in the VegMap project is called **Vanstadens Forest Thicket**, but the description is not a match for the mesic thicket occurring in the Wilderness area.

Due to mapping inaccuracies, the vegetation that occurs on site does not match the mapped units shown here. Mesic thicket that is found on site occurs more widely than mapped and includes most



**Figure 8: National landcover categories in fynbos regional vegetation types of the study area. Fynbos patches are shown in dark pink, transformed areas as light pink, and thicket as dark areas.**

of the areas mapped as Garden Route Granite Fynbos and Garden Route Shale Fynbos. A new regional vegetation unit is required to adequately describe this vegetation.



Figure 9: Historical aerial photograph dated 31/12/1936 (site is within the red circle).

## **Garden Route Granite Fynbos**

### **Distribution**

This vegetation type is found in the Western and Eastern Cape Provinces: patches along the coastal foothills of the Langeberg at Grootberg (northeast of Heidelberg), the Outeniqua Mountains from Cloete's Pass via the Groot Brak River Valley, Hoekwil, Karatara, Barrington and Knysna to Plettenberg Bay. Patches from the Bloukrans Pass along coastal platform shale bands south of the Tsitsikamma Mountains via Kleinbos and Fynboshoek to south of both Clarkson and the Kareedouw Mountains. Altitude 0–500 m.

### **Vegetation & Landscape Features**

Undulating hills and moderately undulating plains on the coastal forelands. Structurally this is tall, dense proteoid and ericaceous fynbos in wetter areas, and graminoid fynbos (or shrubby grassland) in drier areas. Fynbos appears confined to flatter more extensive landscapes that are exposed to frequent fires—most of the shales are covered with afrotemperate forest. Fairly wide belts of *Virgilia oroboides* occur on the interface between fynbos and forest. Fire-safe habitats nearer the coast have small clumps of thicket, and valley floors have scrub forest (Vlok & Euston-Brown 2002).

### **Geology & Soils**

Acidic, moist clay-loam, prisma-cutanic and pedocutanic soils derived from Caimans Group and Ecca (in the east) shales. Land types mainly Db and Fa.



**Figure 10: Typical vegetation of the Wilderness area, looking from Wilderness Heights towards Island Lake.**

**Climate**

Non-seasonal rainfall dominates the region, with MAP 310–1 120 mm (mean: 700 mm), relatively even throughout the year, but with a slight low in winter. Mean daily maximum and minimum temperatures 27.6°C and 6.5°C for January and July, respectively. Frost incidence 2 or 3 days per year.

**Important Taxa**

**Growth form**

**Tall shrubs**

**Species**

*Leucadendron eucalyptifolium* (d), *Protea aurea* subsp. *aurea* (d), *P. coronata* (d), *Leucospermum formosum*, *Metalasia densa*, *Passerina corymbosa*, *Protea neriifolia*, *Rhus lucida*<sup>T</sup>

**Low shrubs**

*Acmadenia alternifolia*, *A. tetragona*, *Anthospermum aethiopicum*, *Cliffortia ruscifolia*, *Elytropappus rhinocerotis*, *Erica hispidula*, *Helichrysum cymosum*, *Leucadendron salignum*, *Pelargonium cordifolium*, *Phyllica axillaris*, *P. pinea*, *Psoralea monophylla*, *Selago corymbosa*.

**Herbs**

*Helichrysum felinum*

**Geophytic herb**

*Pteridium aquilinum* (d), *Eriospermum vermiforme*

**Succulent herb**

*Crassula orbicularis*

**Herbaceous**

*Crassula roggeveldii*

**succulent climber**

**Graminoid**

*Ischyrolepis sieberi* (d), *Aristida junciformis* subsp. *galpinii*, *Brachiaria serrata*, *Cymbopogon marginatus*, *Elegia juncea*, *Eragrostis capensis*, *Ischyrolepis gaudichaudiana*, *Restio triticeus*, *Themeda triandra*, *Tristachya leucothrix*.

## **Southern Afrotemperate Forest**

### **Distribution**

Western Cape, Eastern Cape and (only few patches) in Northern Cape Provinces: The largest complex is found in the southern Cape along the narrow coastal strip (250 km long) between Humansdorp in the east and Mossel Bay (Knysna-Tsitsikamma forest region)—here occurring on sheltered seaward slopes, plateaux and coastal scarps. The easternmost outlier forest patches occur near Port Elizabeth, while westwards floristically impoverished forms of these forests occur along the feet of south- and east-facing slopes and in deep kloofs and ravines of the Cape Fold Belt mountains as far as the Cape Peninsula in the west. The northernmost localities are near Vanrhynsdorp Pass and in the Matsikamma Mountains. At altitudes ranging from about 10 m (Tsitsikamma region) to 600 m (most of patches), with notable outliers occurring as high as 1 060 m.

### **Vegetation & Landscape Features**

Tall, multilayered afrotemperate forests dominated by yellowwoods (*Afrocarpus falcatus* and *Podocarpus latifolius*), *Ocotea bullata*, *Olea capensis* subsp. *macrocarpa*, *Pterocelastrus tricuspidatus*, *Platylophus trifoliatus* etc. In scree and deep-gorge habitats *Cunonia capensis*, *Heeria argentea*, *Metrosideros angustifolia*, *Podocarpus elongatus* and *Rapanea melanophloeos* predominate. The shrub understorey and herb layers are well developed, especially in mesic and wet habitats.

### **Geology & Soils**

Soils varying from shallow (and skeletal) Mispah, Glenrosa and Houwhoek forms to sandy humic Fernwood form, derived from Table Mountain Group sandstones and shales of the Cape Supergroup and partly also from Cape Granite.

### **Important Taxa**

Tall Trees: *Afrocarpus falcatus* (d), *Cunonia capensis* (d), *Curtisia dentata* (d), *Nuxia floribunda* (d), *Ocotea bullata* (d), *Olinia ventosa* (d), *Podocarpus elongatus* (d), *P. latifolius* (d), *Pterocelastrus tricuspidatus* (d), *Rapanea melanophloeos* (d), *Ilex mitis*, *Olea capensis* subsp. *macrocarpa*.

Small Trees: *Canthium inerme* (d), *Cassine peragua* (d), *Diospyros whyteana*.

Tree Fern: *Cyathea capensis* (d).

Herbaceous Climber: *Cissampelos torulosa*.

Epiphytic Herb: *Angraecum pusillum*.

Tall Shrubs: *Burchellia bubalina* (d), *Trichocladus crinitus* (d), *Sparrmannia africana*.

Geophytic Herbs: *Blechnum capense* (d), *B. tabulare* (d), *Dietes iridioides* (d), *Rumohra adiantiformis* (d), *Todea barbara* (d), *Oxalis incarnata*.

Graminoid: *Oplismenus hirtellus* (d).

### **Biogeographically Important Taxa**

(<sup>°</sup>Endemic of Capensis, <sup>W</sup>Western distribution limit)

Tall Trees: *Brabejum stellatifolium*<sup>°</sup>, *Ochna arborea* var. *arborea*<sup>W</sup>.

Small Trees: *Gonioma kamassi*<sup>W</sup> (d), *Heeria argentea*<sup>°</sup> (d), *Metrosideros angustifolia*<sup>°</sup> (d), *Allophylus decipiens*<sup>W</sup>, *Brachylaena neriiifolia*<sup>°</sup>, *Cassine schinoides*<sup>°</sup>, *Lachnostylis hirta*<sup>°</sup>, *Virgilia divaricata*<sup>°</sup>.

Woody Climber: *Asparagus scandens*<sup>°</sup>.

Epiphytic Herb: *Mystacidium capense*<sup>W</sup>.

Tall Shrub: *Laurophyllus capensis*<sup>°</sup>.

Herb: *Gerbera cordata*<sup>W</sup>, *Streptocarpus rexii*<sup>W</sup>.

Geophytic Herbs: *Liparis capensis*<sup>°</sup>.

Graminoids: *Ischyrolepis subverticillata*<sup>°</sup>, *Schoenoxiphium lanceum*<sup>°</sup>.

### **Endemic Taxon**

Tall Tree: *Platylophus trifoliatus* (d).

Small Trees: *Apodytes geldenhuysii*, *Cryptocarya angustifolia*, *Virgilia oroboides* subsp. *ferruginea*, *V. oroboides* subsp. *oroboides*.

Megaherb: *Strelitzia alba* (d).

Geophytic Herbs: *Amauropelta knysnaensis*, *Clivia mirabilis*, *Freesia sparrmannii*, *Polystichum incongruum*.

Graminoid: *Schoenoxiphium altum*.

Note that this is a desktop description of what could possibly occur on site, based on mapped vegetation types. The on-site habitat assessment, described in a section below, determines whether any such vegetation occurs on site or not: although mapped as occurring within Garden Route Granite Fynbos, such vegetation does not necessarily occur on site.

## Conservation status of broad vegetation types

The conservation status in accordance with the Revised National List of Ecosystems (Government Notice No 2747 of 18 November 2022) published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004), is Critically Endangered.

*Table 1: Conservation status of different vegetation types occurring in the study area.*

<b>Vegetation Type</b>	<b>Conservation status: (Government Notice No 2747 of 18 November 2022)</b>
Garden Route Granite Fynbos	Critically Endangered
Southern Afrotropical Forest	Least Concern
Goukamma Dune Thicket	Least Concern

Note that this is a desktop description of what could possibly occur on site, based on mapped ecosystems. The on-site habitat assessment, described in a section below, determines whether any such vegetation occurs on site or not.

**It is therefore verified that the site occurs spatially within a mapped Listed Ecosystem, as listed in The National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011). However, the characteristics of the on-site vegetation, as described in the on-site habitat assessment below, determine whether vegetation of a listed ecosystem occurs on site or not – if there is no natural habitat remaining on site then the sensitivity is LOW with respect to this attribute, or, if natural habitat occurs on site then those areas would have VERY HIGH sensitivity with respect to this attribute.**



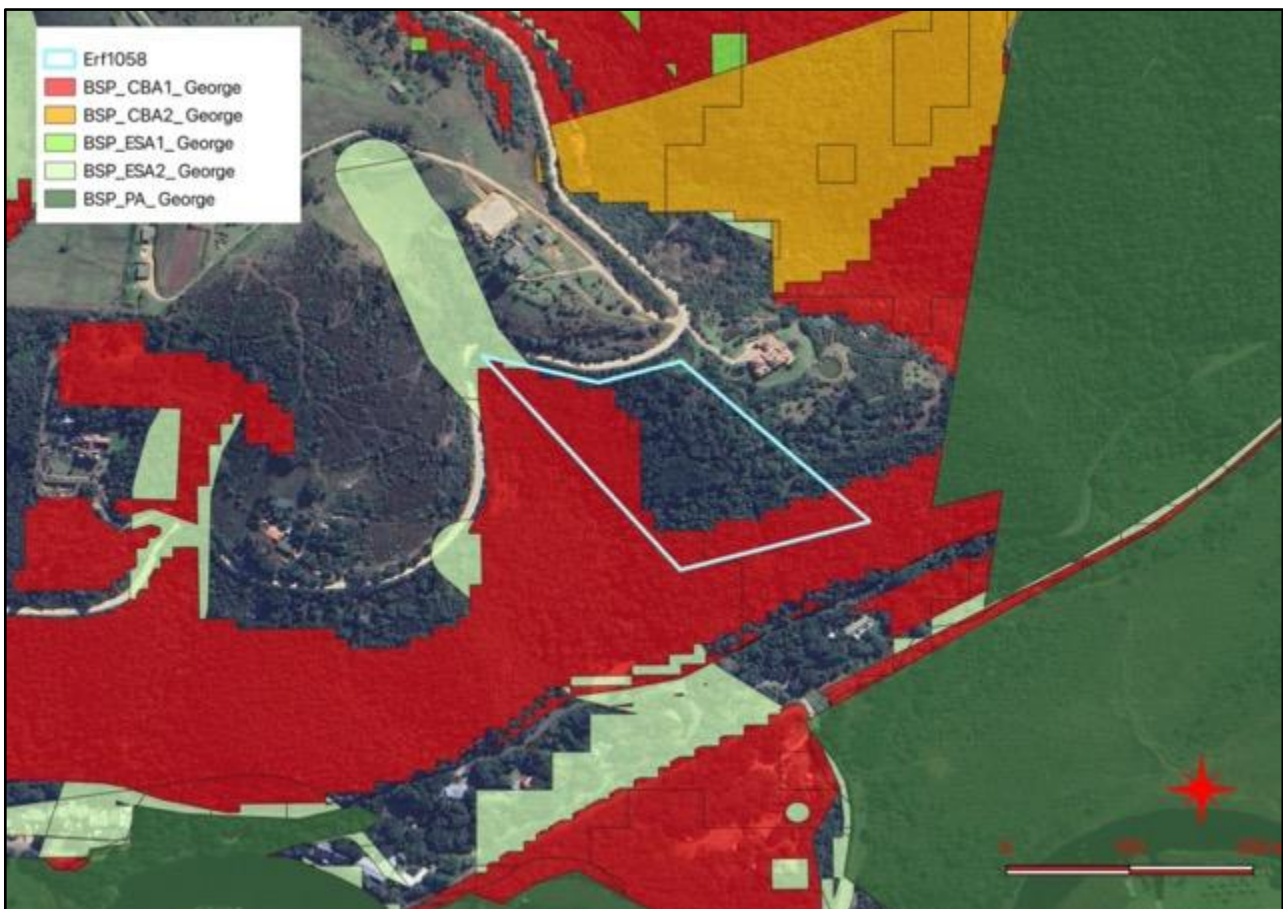
## Biodiversity Conservation Plans

The Western Cape Biodiversity Spatial Plan (WCBSP) classifies the habitats of the province according to conservation value in decreasing value, as follows:

1. Protected Areas (PA);
2. Critical Biodiversity Areas 1 (CBA1);
3. Critical Biodiversity Areas 2 (CBA2);
4. Ecological Support Area 1 (ESA1);
5. Ecological Support Area 2 (ESA2);

The WCBSP map for George shows that parts of the site are within a CBA1 area (Figure 11). This CBA1 area continues beyond the boundaries of the site. This indicates that the vegetation on this part of the site is considered to be highly important for the conservation of biodiversity in the Province as well as for maintaining ecological patterns in the landscape.

The WCBSP map only shows the CBA1 areas on site, but the ESA1 area adjacent to the site exists independently through the drainage line that runs down the western side of the site, i.e. if the CBA1 area was not defined for the site, there would still be an ESA1 area running through the site.



**Figure 11: Western Cape Biodiversity Spatial Plan of the site and surrounding areas.**

The site is also in close proximity to a large protected area, both to the south and to the east. The CBA1 areas on site therefore have value as a buffer for these protected areas, as well as for the preservation of biodiversity patterns and processes.

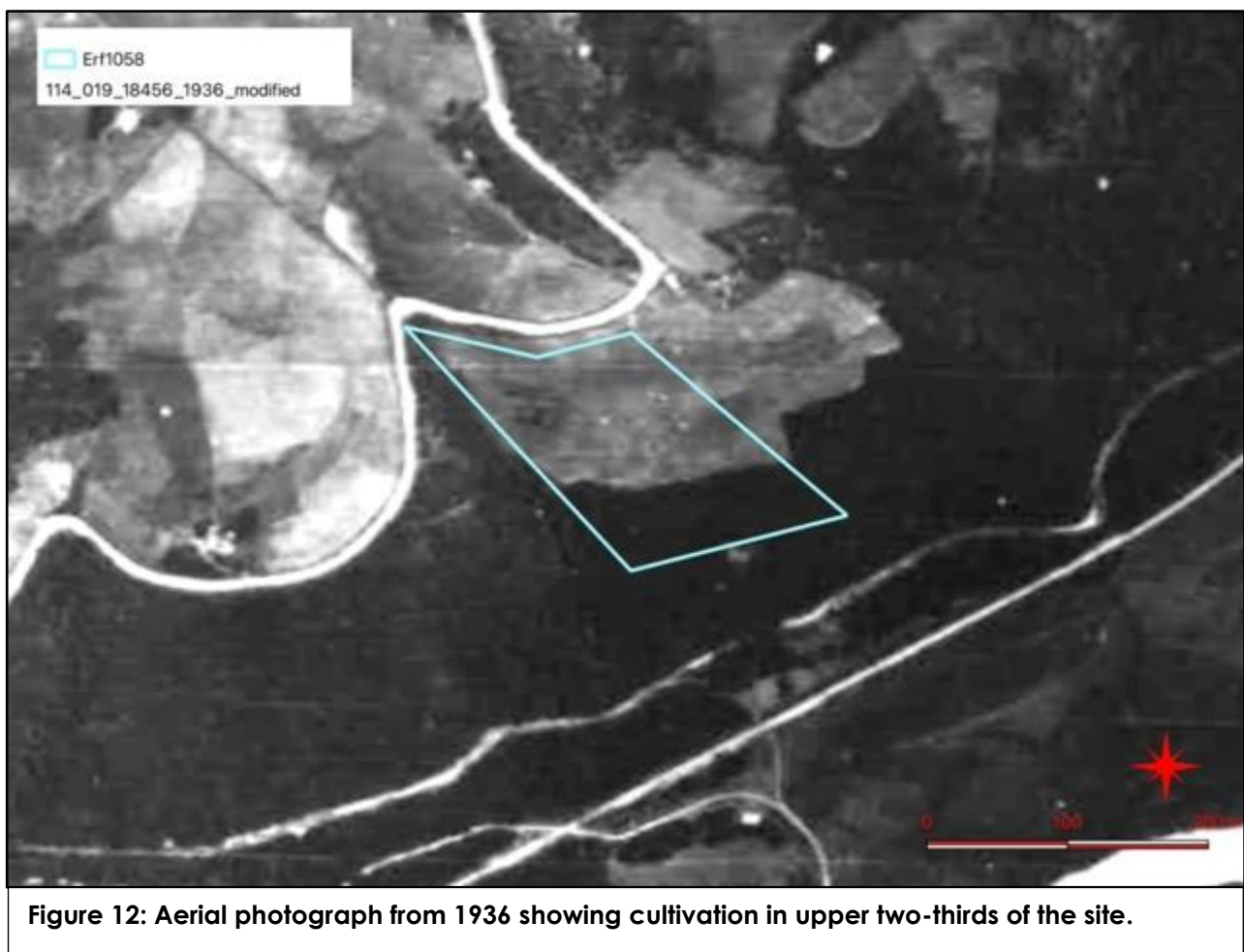
The purpose of the specialist study undertaken here, is to verify whether the vegetation on site meets the standards for inclusion in a conservation zone or not. Provincial-level conservation assessments make use of remote methods for mapping and do not ground-truth all locations. It is therefore necessary to verify on the ground whether natural habitat occurs on site or not in order to determine whether the inclusion in a conservation zone is supported by patterns on the ground.

The on-site habitat assessment shows that the southern part of the site is in a natural state and it therefore verifies the status of these areas as being of high biodiversity value. The area along the western boundary within the CBA1 was found to consist mostly of alien trees and is therefore highly degraded.

**This desktop description verifies that parts of the site are included in conservation zones and that an on-site assessment is required to verify the sensitivity of the site with respect to this attribute. The on-site assessment confirms the sensitivity for the southern part.**

## Historical disturbance

An aerial photograph from 1936 shows that a significant part of the site was cultivated on that date. The cultivation excluded the areas along the southern side of the site that are currently covered by mesic thicket / low forest. This is confirmation that the upland parts of the site, where they are vegetated, only contain secondary vegetation. The on-site assessments show that these areas are currently heavily invaded, or contain thicket patches, but it can be seen that these are secondary in nature. However, it must be noted that the definition of natural vegetation, according to the National Environmental Management Act, 1998 (Act No. 107 of 1998) is "*vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding 10 years.*" According to this description, the vegetation on site (including secondary vegetation) is legally in a natural state.



**Figure 12: Aerial photograph from 1936 showing cultivation in upper two-thirds of the site.**

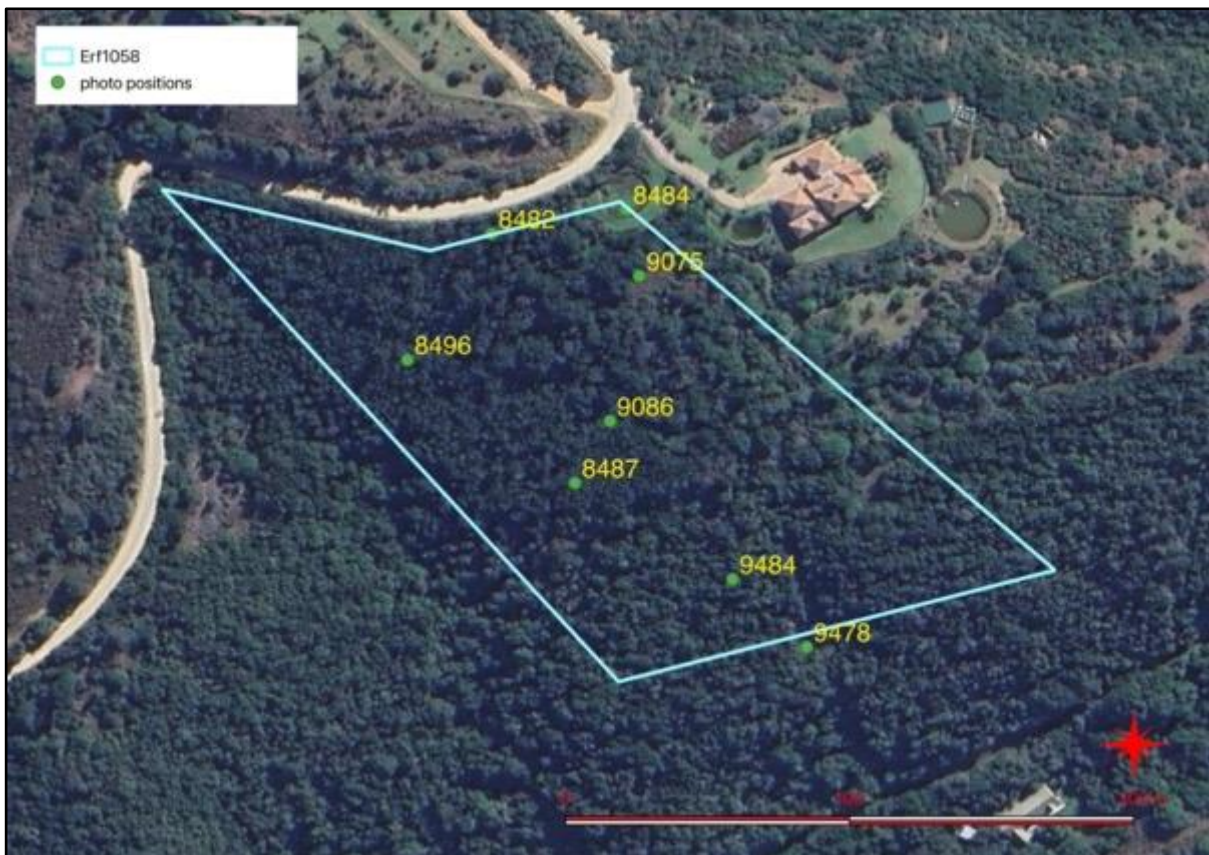
# OUTCOME OF THE ASSESSMENT

## Verification of observations on site

According to the "AMENDMENT TO THE PROTOCOLS FOR THE SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS FOR ENVIRONMENTAL IMPACTS ON TERRESTRIAL ANIMAL AND PLANT SPECIES IN TERMS OF SECTIONS 24(5)(a) AND (h) AND 44 OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998", a specialist report must include the following:

- 5.3.4A verifiable evidence from the specialist's site inspection, including as a minimum:
- 5.3.4A.1 a map showing the specialist's GPS track in relation to the study area; and
  - 5.3.4A.2 at least 4 spatially representative sample site descriptions from across the study area that include as a minimum:
    - (a) precise geographical coordinates of the sample site;
    - (b) at least one in situ photograph (taken on site by the specialist during the site inspection) of the sample site; and
    - (c) a habitat description of the sample site.

To address these specific requirements, photographs of landscapes on site were taken at various localities to show conditions on site. A map showing the location of these photographs is provided in Figure 13. A GPS track log is provided in Figure 6 in the section of this report titled "Field Survey Approach".



**Figure 13: Location of photographs taken on site during the site inspection.**



**Photo 9478**  
34° 00' 1.15" S, 21° 23' 19.152" E

Mesic thicket / low forest in a band on the southern side of the site. Photo is taken from the cleared servitude of the powerline that crosses the property.



**Photo 9484**  
33° 59' 24.162" S, 22° 35' 58.848" E

View within the mesic thicket / low forest on the southern side of the property. The woodland has parts with open floor and other parts with tangled, impenetrable vegetation, but the structure consists mostly of a single canopy layer.



**Photo 9086**  
33° 59' 21.99" S, 22° 35' 57.168" E

Secondary fynbos elements within the patches of secondary thicket, including *Erica sparsa*, *Agathosma ovata*, *Passerina corymbosa*, *Helichrysum petiolare*, *Helichrysum foetidum*, *Helichrysum cymosum*, *Pelargonium capitatum*, *Seriphium plumosum*, *Searsia lucida* and *Searsia pallida*.



**Photo 8482**  
33° 59' 19.422" S, 22° 35' 55.542" E

Typical vegetation in the northern two-thirds of the site in which clumps of thicket species co-occur with weeds, alien shrubs and patches of herbaceous vegetation.



**Photo 8484**  
33° 59' 19.092" S, 22° 35' 57.39" E

Small man-made pond in the northern corner of the property.



**Photo 9075**  
33° 59' 19.998" S, 22° 35' 57.57" E

Grassy patches within the thicket clumps in the northern to north-eastern parts of the site, typically dominated by *Stenotaphrum secundatum* and *Carpobrotis edulis*.



**Photo 8496**  
33° 59' 21.15" S, 22° 35' 54.39" E

View over the valley that runs along the eastern side of the site. This valley is completely dominated by wattles, primarily *Acacia mearnsii*.



**Photo 8487**  
33° 59' 22.842" S, 22° 35' 56.688" E

View of understory of areas dominated by *Acacia mearnsii*. This shows a complete lack of anything else growing underneath the wattles.

## Habitats on site

Based on a detailed field survey to verify conditions on site, a detailed landcover and habitat mapping exercise was undertaken for the site. This identified two main habitats occurring on site, shown in Figure 14. These are mapped as **Mesic Thicket/Forest** and **Secondary Thicket**. There are also areas of **Alien trees**. The habitat assessment is important for understanding the suitability of habitat on site for various plant and animal species of concern, which usually have very specific habitat requirements.

### **Mesic thicket/Forest**

The steep-sided slopes in the southern part of the site contain indigenous mesic thicket or low forest (see Figure 15) that should be classified and mapped as a form of Albany Thicket. It has a closed canopy, open to tangled understorey and relatively low structure, therefore qualifies to be mapped as thicket. Based on observations of constituent species, it resembles mesic thicket in other parts of the Wilderness section of the Garden Route. There is no mapped mesic thicket around Wilderness, which is incorrect. The closest (spatially and floristically) described thicket unit in the VegMap project is called **Vanstadens Forest Thicket**, but the description is not a match for the mesic thicket occurring in the Wilderness area.

Observed species in the Mesic thicket/forest include the trees / tall shrubs, *Acokanthera oppositifolia*, *Capparis sepiaria*, *Carissa bispinosa*, *Cussonia thyrsiflora*, *Diospyros dichrophylla*, *Elaeodendron croceum*, *Lauridia tetragona*, *Mystroxydon aethiopicum*, *Ochna arborea*, *Ochna serrulata*, *Olea capensis*, *Scolopia zeyheri* and *Trimeria grandifolia*, and the herbaceous species, *Anemia cafferorum*, *Asparagus africanus*, *Asparagus setaceus*, *Asplenium rutifolium*, *Commelina africana*, *Cynanchum*



Figure 14: Map of habitats on site.



*viminale*, *Dietes iridioides*, *Euphorbia kraussiana*, *Galopina circaeoides*, *Gerbera cordata*, *Habenaria arenaria*, *Megathyrsus maximus*, *Ornithogalum graminifolium*, *Peperomia retusa*, *Rhoicissus digitata*, *Rumohra adiantiformis*, *Senecio macroglossus*, *Stachys aethiopica*, *Streptocarpus rexii* and *Tulbaghia capensis*. This species composition is very similar to that found in nearby similar thicket in other parts of Wilderness.

*Asparagus setaceus*, *Asplenium rutifolium*, *Chaenostoma* sp., *Crassula orbicularis*, *Stachys aethiopica*, *Cheilanthes hirta*, *Gerbera cordata*, *Oxalis algoensis*, *Streptocarpus rexii*, and *Tritoniopsis caffra*.

### **Secondary Thicket mosaic**

The vegetation in the upper parts of the site (north of the mesic thicket) is a secondary thicket that occurs as several bush-clumps interspersed with more bare areas of herbaceous vegetation (the largest are shown as area A and area B in Figure 15), as well as significant amounts of alien invasive shrubs. These areas were previously cultivated, as can be seen from historical aerial photographs, which means that the vegetation in these areas is a secondary woodland that is about 50 years old. A typical example of the vegetation is shown in Photo 8482.

Woody species (trees and shrubs) that have become established in these secondary vegetation areas include *Allophylus decipiens*, *Buddleja saligna*, *Diospyros whyteana*, *Elaeodendron croceum*, *Grewia occidentalis*, *Gymnosporia buxifolia*, *Gymnosporia nemorosa*, *Myrsine africana*, *Olea europaea*, *Pittosporum viridiflorum*, *Pterocelastrus tricuspidatus*, *Putterlickia pyracantha*, *Rapanea melanophloeos*, *Scutia myrtina*, *Searsia chirindensis*, *Searsia lucida*, *Searsia pallens*, *Sideroxylon inerme*, *Tarchonanthus littoralis*, *Trimeria grandifolia*, *Vepris lanceolata*, and *Zanthoxylum capense*. This is accompanied by a suite of herbaceous species found in woody vegetation, not fynbos.



**Figure 15: Drone image of the site with approximate position of boundaries shown, as well as some important features on site. The red dashed line is the powerline that crosses the site.**

There are several open grassy areas within the bushclumps (A and B in Figure 15). An example is shown in Photo 9075. They are often dominated by the grass, *Stenotaphrum secundatum*, accompanied by several herbaceous weedy species, including *Arctotheca prostrata*, *Carpobrotus edulis*, *Cyperus congestus*, *Eragrostis curvula*, *Gomphocarpus physocarpus*, *Hibiscus trionum*, *Melica racemosa*, *Nidorella ivifolia*, *Paspalum urvillei*\*, *Physalis peruviana*\*, *Pseudognaphalium luteoalbum*, *Senecio ilicifolius* and *Solanum giganteum*. The small tree, *Tarchonanthus littoralis*, often grows within or on the margin of these clearings.

The elements of fynbos vegetation on site occur as patches within the secondary thicket vegetation. The species composition is typical of recent secondary fynbos that has been recorded within recently cleared pine plantations on sandy soils near Knysna, including *Erica sparsa*, *Agathosma ovata*, *Passerina corymbosa*, *Helichrysum petiolare*, *Helichrysum foetidum*, *Helichrysum cymosum*, *Pelargonium capitatum*, *Seriphium plumosum*, *Searsia lucida* and *Searsia pallida*.

The fynbos elements on site are NOT representative of the regional vegetation type, Garden Route Granite Fynbos, nor are they located in parts of the landscape where fynbos would be expected to occur.

A typical example of secondary fynbos vegetation is shown in Photo 9086.

### **Aliens**

There are parts of the site in the valley on the western side that are completely dominated by alien shrubs, primarily *Acacia mearnsii*. These have no biodiversity value and represent a significant threat to surrounding ecosystems, especially those downslope and downstream. Typical examples are shown in Photos 8496 and 8487.

There are also two places near the eastern boundary dominated by single large pine trees (easily visible in Figure 15).

## Plant species recorded on site

A total of 92 plant species were recorded on site (see Appendix 1), of which 5 are declared weeds and/or alien invader plants, 2 are naturalized exotic species, 12 are indigenous weedy species that mostly occur in disturbed locations, 10 are fynbos species that typically colonise disturbed areas, such as old lands and recently felled plantations, and the remainder (63) are indigenous species that would be expected to occur in some form of indigenous vegetation. Of the 63 indigenous species recorded on site, 29 (46%) are entirely restricted to the mesic thicket/forest areas and 22 (35%) are woody species that have emerged in the secondary thicket. Another 9 species (14%) are herbaceous species typical of woody vegetation.

The alien invasive species are as follows:

- *Acacia cyclops*\* (NEMBA Category 1b)
- *Acacia mearnsii*\* (Invader category 1b)
- *Lantana camara*\* (Invader category 1b)
- *Nephrolepis cordifolia*\* (NEMBA Category 1b)
- *Phytolacca octandra*\* (Invader category 1b)

Two tree species protected under Section 15(1) of the National Forests Act, 1998 occur on site, as follows:

- *Pittosprum viridiflorum*
- *Sideroxylon inerme*

## Plant species flagged for the study area

According to the National Web-Based Environmental Screening Tool, a number of plant species of concern are flagged as of concern for the site (see previous section of this report). These are mostly fynbos species, or coastal species.

There is no suitable habitat on site for any of the flagged species. None were found there or are likely to occur there.

A full list of the flagged species is provided below in Table 3.

**There are no threatened, near threatened or rare species that could occur in the study area. It is therefore verified that the Plant Species Theme has LOW sensitivity for this site.**

**Table 2: Plant species of concern flagged for the site.**

Family	Taxon	Common name	IUCN status*	Distribution	Habitat	Probability of occurrence
RUTACEAE	<i>Agathosma muirii</i>	None	Vulnerable A4abc	Found from Stilbaai to Mossel Bay	On deep sands on coastal dunes associated with limestone	<b>LOW</b> No suitable habitat on site. <b>NOT FOUND</b>
ASTERACEAE	<i>Cotula myriophylloides</i>	None	CR	Cape Peninsula to Plettenberg Bay. Recorded from Piesang's River in salt marsh vegetation with similar characteristics to that found on the property (outside the PAOI).	Submerged in seasonal coastal pools, but also in marshes and on wet sand. Mostly in brackish, but also fresh, still or slowly moving water.	<b>LOW</b> No suitable habitat on site. <b>NOT FOUND</b>
RUTACEAE	<i>Diosma passerinoides</i>	None	Vulnerable A2c; C2a(i)	Robertson and Caledon to Bredasdorp, Albertinia and eastwards to the Baviaanskloof.	Dry clayish soils in renosterveld, associated with patches of silcrete.	<b>LOW</b> No suitable habitat on site. <b>NOT FOUND</b>
ERICACEAE	<i>Erica chloroloma</i>	None	VU	Wilderness to Fish River Mouth. Most observations are between Cape St Francis and Gqeberha. Nearest population known from Goukamma Nature Reserve (recent) and Buffalo Bay (1921).	Coastal dune fynbos.	<b>LOW</b> No dune fynbos on site <b>NOT FOUND</b>
ERICACEAE	<i>Erica glandulosa</i> subsp. <i>fourcadei</i>	None	VU	Mossel Bay to Cape St. Francis.	Coastal fynbos. Common in Goukamma Nature Reserve and on coastal cliffs SW of Plettenberg Bay	<b>LOW</b> No coastal fynbos on site <b>NOT FOUND</b>
ERICACEAE	<i>Erica glumiflora</i>	None	VU	Wilderness to East London, extending inland to Grahamstown. Recorded from Robberg peninsula near end.	Sandy coastal flats and dunes in low coastal hills. All observations are in sandy substrates.	<b>LOW</b> No suitable habitat on site. <b>NOT FOUND</b>
MALVACEAE	<i>Hermannia lavandulifolia</i>	None	VU	Western Cape, from Worcester to the Overberg,	Clay slopes in renosterveld and	<b>LOW</b>

Family	Taxon	Common name	IUCN status*	Distribution	Habitat	Probability of occurrence
				and extending along the southern Cape coastal lowlands to Plettenberg Bay. All observations on iNaturalist are west of Knysna.	valley thicket. Collected on western part of Robberg Peninsula in 1960 (Acocks Coll. No. 21141).	Habitat conditions not met by those found on site <b>NOT FOUND</b>
AIZOACEAE	Lampranthus fergusoniae	None	Vulnerable B1ab(ii,iii,iv,v)	Western Cape, Pearly Beach to Knysna.	Calcareous soils often associated with limestone dunes.	<b>LOW</b> Distribution includes site but preferred habitat does not match habitat conditions on site. <b>NOT FOUND</b>
AIZOACEAE	Lampranthus pauciflorus	None	Endangered B1ab(ii,iii,iv,v)	Found in the Western Cape from Cape Infanta to Plettenberg Bay. Four known locations remain after most of this species' habitat has been transformed for coastal development. Habitat loss continues, especially around Plettenberg Bay, Mossel Bay and Knysna.	On rocky coastal slopes and clay hills.	<b>LOW</b> Known locations are along the coastline. No suitable habitat on site. <b>NOT FOUND</b>
FABACEAE	Lebeckia gracilis	None	Endangered B1ab(ii,iii,iv,v)	Port Elizabeth to Bredasdorp. Two main areas of occurrence are in the Lakes District between Knysna and George, and in the Albertinia area.	Coastal fynbos in deep sandy soils below 300 m.	<b>LOW</b> Habitat conditions not met by those found on site <b>NOT FOUND</b>
PROTEACEAE	Leucospermum glabrum	Outeniqua Pincushion	EN	Outeniqua and Tsitsikamma mountains. Observed multiple times around George in the mountains, as well as north of Plett. and around Keurbooms.	Wet south slopes in Sandstone Fynbos.	<b>LOW</b> The key habitat appears to be mesic mountain fynbos on the southern flanks of mountains. <b>NOT FOUND</b>

Family	Taxon	Common name	IUCN status*	Distribution	Habitat	Probability of occurrence
POLYGALACEAE	Muraltia knysnaensis	Knysna butterflybush	EN	Coastal lowlands between Mossel Bay and Keerbooms River.	Coastal fynbos on dry flats and hills.	<b>LOW</b> Habitat conditions not met by those found on site <b>NOT FOUND</b>
APIACEAE	Nanobubon hypogaeum	None	Endangered B1 ab(i,ii,iii,iv,v)	Mossel Bay to Knysna	Sandy coastal fynbos	<b>LOW</b> Habitat conditions not met by those found on site <b>NOT FOUND</b>
SCROPHULARIACEAE	Selago burchellii	None	VU	George to Plettenberg Bay, including Robberg coastal corridor, Knysna western heads, Goukamma, inland parts of the lakes area, and in the Outeniqua Mountains.	Coastal slopes and flats. Unverified observation from Robberg. Distribution data shows that it also occurs in the Outeniqua Mountains, which would be mountain fynbos.	<b>LOW</b> Habitat conditions not met by those found on site <b>NOT FOUND</b>
SCROPHULARIACEAE	<i>Selago villicaulis</i>	None	Vulnerable B1 ab(ii,iii,iv,v)	Western Cape, Stilbaai to Knysna.	Fixed dunes up to 150 m.	<b>LOW</b> , potentially suitable habitat on site but all recent observations are close to Gqeberha. <b>NOT FOUND</b>
CAMPANULACEAE	Wahlenbergia polyantha	None	Vulnerable B1 ab(ii,iii,iv,v)	Western Cape, Kleinmond to Knysna.	Sandy flats.	<b>LOW</b> Habitat conditions not met by those found on site <b>NOT FOUND</b>
	Sensitive species 419		VU	George to Humansdorp. Recorded numerous times in Plett area.	Damp sandstone slopes in coastal fynbos. Numerous observations in mountains.	<b>LOW</b> Habitat conditions not met by those found on site <b>NOT FOUND</b>
	Sensitive species 500		EN	Cape Flats to Gqeberha. Previously recorded from near Robberg.	Lowland sandy flats, stabilised dunes and coastal rock	<b>LOW</b>

Family	Taxon	Common name	IUCN status*	Distribution	Habitat	Probability of occurrence
					promontories. Observations include coastal and mountain habitats.	Habitat conditions not met by those found on site <b>NOT FOUND</b>
	Sensitive species 657		EN	Great Brak River to Port Elizabeth.	Coastline. Coastal habitats.	<b>LOW</b> , confined to coastal littoral habitat <b>NOT FOUND</b>
	Sensitive species 763		VU	Riversdale to Port St Johns. Recorded previously from near Keurbooms, as well as Diepwalle.	Dry coastal renosterveld and grassy places in coastal forest.	<b>LOW</b> Habitat conditions not met by those found on site <b>NOT FOUND</b>
	Sensitive species 800 (herbaceous geophyte)		Vulnerable B1	Cape Peninsula to Knysna. One record from Plett airport in 1976.	Limestone and clay loam soil, fynbos and renosterveld on coastal lowlands	<b>LOW</b> Habitat conditions not met by those found on site <b>NOT FOUND</b>
	Sensitive species 1024 (orchid)		Endangered B1	Riversdale to Knysna and northern slopes of Langeberg Mountains.	Relatively dry to moist slopes, up to 200 m.	<b>LOW</b> Habitat conditions not met by those found on site <b>NOT FOUND</b>
	Sensitive species 1032		VU	George to Port Alfred.	On stabilised (fixed) dunes close to the shoreline. 0-150 m.	<b>LOW</b> , confined to coastal habitat <b>NOT FOUND</b>
	Sensitive species 1081					<b>LOW</b> Habitat conditions not met by those found on site. <b>NOT FOUND</b>

## Animal species flagged for the study area

According to the National Web-Based Environmental Screening Tool, a small number of animal species have been flagged as of concern for the current project (see previous section of this report). These are all species that require specific habitat conditions to inhabit the site.

### ***Circus ranivorus* (African marsh harrier)**

Endangered

This site was flagged as having **High sensitivity** potential for this species. Widespread but sparsely distributed throughout central, eastern and southern Africa, only absent from areas of lower rainfall (<300 mm p.a.). It is dependent on permanent wetlands for breeding, feeding and roosting. The main threat to this species is loss and degradation of wetlands. It also hunts over drier floodplains, grasslands, croplands, and Fynbos, where it preys mainly on small rodents, as well as birds, reptiles, frogs and insects.

There are no (suitable) wetlands on site although there are nearby. The proposed development is located well away from these habitats. The species is unlikely to occur on site and the proposed project will have no effect on it.

### ***Stephanoaetus coronatus* (Crowned Eagle)**

Near Threatened

This site was flagged as having **High sensitivity** potential for this species. Occurs from Guinea to South Africa, with an isolated population in Ethiopia. It is found at low densities in eastern and southern South Africa. It generally prefers forest habitats, such as gallery forest, dense woodland, forest gorges in savanna or grassland and alien tree plantations (such as *Eucalyptus* and pine). Not threatened internationally but Near-threatened in South Africa, largely due to persecution by small stock farmers and destruction of forest habitats, although it has adapted to living in alien tree plantations.

There are forest-like habitats on site and extensive forests in the general Wilderness area, including suitable gorges and nesting sites. It has been recorded near Saasveld and west of George, therefore must be assumed to be present in the general area. The mesic thicket on site may not be of tall enough stature for nesting, but could possibly form part of foraging habitat. On condition these mesic thicket areas are protected, there will be negligible impact on this species, but any impact on the forest could negatively effect habitat for this species.

### ***Bradypterus sylvaticus* (Knysna warbler)**

Vulnerable

This site was flagged as having **High sensitivity** potential for this species. It has a restricted and fragmented distribution in four areas of Eastern and Western Cape. One sub-population occurs in the Garden Route between Tsitsikamma and Stilbaai. It occurs along the edges of Afrotemperate forests and in thick, tangled vegetation along the banks of watercourses or drainage lines in forest patches in the Fynbos Biome (Taylor et al. 2015). Population decline is attributed to clearance of habitat for developments, agriculture and silviculture, leading to a decrease in the amount of available habitat, as well as the quality (Taylor et al. 2015).

Suitable habitat occurs on site within the mesic thicket/forest areas. It has been previously recorded numerous times in the Wilderness area, which is the core area for the population in the Garden Route. The species almost certainly occurs within the thicket that occurs partly on this site. These areas may possibly be impacted by the proposed project. However, the presence of houses does not seem to limit the species. On condition the habitat is preserved, the proposed project would have little effect on them.



### ***Polemaetus bellicosus* (Martial Eagle)**

Endangered

This site was flagged as having **High sensitivity** potential for this species. The Martial Eagle is found throughout sub-Saharan Africa, only being absent from the lowland forests of West Africa (Ferguson-Lees and Christie 2001). With the exception of Lesotho, the species is widespread in the region but is more commonly encountered in protected areas such as in the Lowveld and Kalahari (Barnes 2000). Martial Eagles still require an exceptionally large home range, in excess of 130 km<sup>2</sup> (Brown et al. 1982). Densities in areas stocked with indigenous game are higher than in areas supporting only domestic stock, and the species is virtually absent from cultivated areas (Machange et al. 2005). Martial Eagles occur in a variety of habitats but seem to prefer arid and mesic savannah but are also commonly found at forest edges and in open shrubland (Simmons 2005). Birds will occupy most habitats provided there are adequate tall trees or pylons for nesting and perching (Machange et al. 2005). It rarely occurs in mountainous areas. It is known to nest on human-made structures, such as pylons and wind-pumps, and in alien trees (Tarboton and Allan 1984).

Suitable forest and forest margin habitat occurs on site, although not possible nesting sites. It has been previously recorded north of Harkerville. If it occurs in the general area, the site may constitute a small part of the overall range of any individual or breeding pair (if they occur there). On condition natural habitat is preserved, the proposed project would have little effect on them - even loss of all habitat on site would be unlikely to affect the species, given the large ranges of individuals.

### ***Afrivalus knysnae* (Knysna Leaf-folding Frog / Spiny Reed Frog)**

Endangered

This site was flagged as having **Medium sensitivity** potential for this species. Endemic to the Western Cape Province, occurring from Groenvlei (3422BB) in the west to Covie (3323DC) in the east, and is confined to the coastal region by the Outeniqua and Tsitsikamma mountains (Pickersgill 1996, 2000). Found in the coastal mosaic of Mountain Fynbos and Afromontane Forest. As examples of habitats in which the species is found, FitzSimons (1946) recorded specimens in glades, clearings and roadside pools at Diepwalle (3323CA), while Pickersgill (2000) collected juveniles from "arum blooms on boggy ground near an irrigation dam at Barrington" (3322DD). The species has previously been recorded at Saasveld close to the Garden Route Dam (De Lange 2019, page 26 for locality information). The frogs breed in small dams and shallow semi-permanent water with much emergent vegetation and even in well vegetated ornamental garden ponds; it is suspected that this species requires high water quality for breeding. The species is threatened by habitat loss and degradation as a result of coastal development, forestry and agriculture, often due to draining, impoundment and eutrophication of wetlands near residential areas and agricultural lands, and encroachment of invasive alien vegetation.

There is a single man-made small pond on the northern corner of the site, but it is not ideal habitat for this species (see Photo 8484). There may therefore be suitable habitat on site for breeding, and the species could also occur there within the thicket areas. The site is also well within the known distribution range of the species, with numerous geographically nearby recent observations. On this basis, the pond on site should be considered to be potentially suitable habitat for this species, with the potential for them to occur there being moderate.

### ***Aloeides thyra orientis* (Red Copper Butterfly)**

Endangered

This site was flagged as having **Medium sensitivity** potential for this species. This species is endemic to the southern coastal regions of the Western Cape Province in South Africa, from Witsand to Gouritsmond in the west, to the Brenton Peninsula near Knysna in the east. It is found in coastal fynbos on flat sandy ground (either naturally occurring or from anthropogenic disturbances such as footpaths or unsurfaced track) between 40 m to 240 m above sea level. The nominate species larvae feed on *Aspalathus acuminata*, *A. laricifolia* and *A. cymbiformis* (Woodhall 2005), but none of these plant species occur on site or nearby. The larvae are attended to by *Lepisiota capensis* ants. No suitable fynbos habitat occurs on site and the species is unlikely to occur there.

### ***Chlorotalpa duthieae* (Duthie's Golden Mole)**

Vulnerable

This site was flagged as having **Medium sensitivity** potential for this species. Found in a narrow coastal band from Wilderness to Storms River mouth, as well as near Port Elizabeth. There is a disjunction in the distribution of this species showing that it does not occur in the Plettenberg Bay area, probably due to the absence of proper forests in this area. Locally common in coastal and scarp southern Cape Afrotropical forest habitats, and adjacent pasturelands, cultivated lands and gardens. Restricted to alluvial sands and sandy loams in deeper forest habitats. They construct shallow subsurface foraging tunnels that radiate outwards from under the roots of trees.

There is forest-like habitat on site, as well as sandy soils in which the species is likely to occur. Most of the soils on site are sandy. It is therefore possible that this species occurs on site. If it did occur there, it would be within the mesic thicket/forest, part of which is outside the footprint of the proposed development.

### ***Sensitive species 8 (small antelope)***

Vulnerable

This site was flagged as having **Medium sensitivity** potential for this species. Found in a variety of forested and wooded habitats, including primary and secondary forests, gallery forests, dry forest patches, coastal scrub farmland and regenerating forest (Venter et al. 2016). Within South Africa, they occur mainly within scarp and coastal forests, thickets or dense coastal bush (Skinner & Chimimba 2005), although they can occupy modified habitats. They frequent forest glades and open areas but need dense underbrush to rest or take cover. They are selective foragers which mainly feed on fruit, dicots and a small percentage of monocots (Venter et al. 2016).

There are several records of the species in areas around George, all within thicket or forest areas. Mesic thicket/low forest occurs on site and the species could occur there. In the event that the species occurs on site, damage to primary thicket habitat may have an effect on them, in terms of habitat loss, loss of forage, and loss of migration corridors.

### ***Aneuryphymus montanus* (Yellow-winged Agile Grasshopper)**

Vulnerable B2ab(iii,v)

This site was flagged as having **Medium sensitivity** potential for this species. Only known from six localities in the Cape region (Brown 1960). The species is associated almost strictly with fynbos vegetation, although extending geographically towards East London, where it has been collected "amongst partly burnt stands of evergreen Sclerophyll in rocky foothills" (Brown 1960). It prefers south-facing cool slopes (Kinvig 2005). It is a medium-sized, robust, active geophilous insect which readily flies off when disturbed and is easily distinguished in flight by the pale lemon base of the hind wing (Brown 1960).

Published descriptions suggest that it is not often seen but, when observed, occurs in obvious numbers. No grasshoppers were seen on site that matched the description of this species. If it occurred in the area it would be found within fynbos, which does not occur on site. It is therefore unlikely that it would occur on site.

### **Summary**

- The Knysna Warbler (Vulnerable) has been recorded numerous times in Wilderness, which is the core area for the distribution of the species in the Garden Route. The site has highly suitable habitat for this species. There is therefore a high probability of the species occurring in thicket areas on site.
- The forests on site may constitute part of the general foraging range of Crowned Eagle (Near Threatened), but it is unlikely that they occur on site, or are dependent on it.
- A small man-made pond at the northern corner of the site is potentially suitable habitat for the Knysna Leaf-folding Frog (Endangered).
- The site has potentially suitable habitat for Duthie's Golden Mole (Vulnerable). There is therefore a possibility of the species occurring in mesic thicket areas on site.

- There is a moderate to high probability of the small antelope (Vulnerable) occurring in the forests on site. If not resident, it is very likely to migrate through the site.

**It is therefore verified that the Animal Species Theme has MEDIUM sensitivity for the site** (*suspected habitat for SCC based either on historical records (prior to 2002) or being a natural area included in a habitat suitability model for this species*). Where SCC are found on site or have been confirmed to be likely present, a Terrestrial Animal Species Specialist Assessment must be submitted in accordance with the requirements specified for "very high" and "high" sensitivity (GN 1150: PROTOCOL FOR THE SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS FOR ENVIRONMENTAL IMPACTS ON TERRESTRIAL ANIMAL SPECIES).

# SITE ECOLOGICAL IMPORTANCE

The Species Environmental Assessment Guidelines require that a Site Ecological Importance is calculated for each habitat on site, and provides methodology for making this calculation.

As per the Species Environmental Assessment Guidelines, Site Ecological Importance (SEI) is calculated as a function of the Biodiversity Importance (BI) of the receptor and its resilience to impacts ( $SEI = BI + RR$ ). The Biodiversity Importance (BI) in turn is a function of Conservation Importance (CI) and Functional Integrity (FI), i.e.  $BI = CI + FI$ .

Sensitivity scores provided in the Species Environmental Assessment Guidelines allow evaluation relative to ecosystem status and/or presence of sensitive species.

**Table 3: Site ecological importance for habitats found on site.**

Habitat	Conservation importance	Functional integrity	Receptor resilience	Site Ecological Importance (BI)
Mesic Thicket/Forest	<p style="text-align: center;"><b>Medium</b></p> <p>SPECIES CRITERION: MEDIUM: &gt; 50% of receptor contains natural habitat with potential to support SCC.</p>	<p style="text-align: center;"><b>Very High</b></p> <p>Very large (&gt; 100 ha) intact area for any conservation status of ecosystem type. Mesic Thicket/Forest on site is evaluated in terms of entire connected extent, both on-site and in surrounding areas, because it acts as a continuous unit = &gt;100 ha. High habitat connectivity serving as functional ecological corridors, limited road network between intact habitat patches. Minimal current negative ecological impacts although parts of system have been developed.</p>	<p style="text-align: center;"><b>Very low</b></p> <p>Habitat that is unable to recover from major impacts, or species that are unlikely to remain at a site even when a disturbance or impact is occurring, or species that are unlikely to return to a site once the disturbance or impact has been removed. Based on the fact that the habitat is structurally dominated by long-lived tree species.</p>	<p style="text-align: center;"><b>Very High</b> (BI = High)</p>
Secondary thicket mosaic	<p style="text-align: center;"><b>Medium</b></p> <p>No confirmed or highly likely populations of SCC. Although old secondary, area is part of EN ecosystem.</p>	<p style="text-align: center;"><b>Medium</b></p> <p>Mostly minor current negative ecological impacts (although cultivated ~50 years ago) with some major impacts (e.g. established population of alien and invasive flora)</p>	<p style="text-align: center;"><b>Medium</b></p> <p>Will recover slowly (~ more than 10 years) to restore &gt; 75% of the original species composition and functionality of the receptor functionality. Vegetation on site is</p>	<p style="text-align: center;"><b>Medium</b> (BI = Medium)</p>

		and a few signs of minor past disturbance. Moderate rehabilitation potential.	> 40 years post-successional old lands.	
Alien trees	Very low No natural habitat remaining.	Very low Several major current negative ecological impacts.	Very High Habitat that can recover rapidly	Very low (BI = Very low)

The calculation of Site Ecological Importance includes an explicit recognition of the ability of each ecosystem to tolerate and recover from disturbance. Guidelines for development activities within different importance levels are given in the Table below. This shows that impacts within Forests should be avoided, and impacts within Secondary vegetation should be minimized, followed by restoration activities.

**Table 4: Guidelines for interpreting SEI in the context of the proposed development activities.**

Site ecological importance	Interpretation in relation to proposed development activities
Very high	Avoidance mitigation – no destructive development activities should be considered. Offset mitigation not acceptable/ not possible (i.e. last remaining populations of species, last remaining good condition patches of ecosystems/ unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains.
High	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted; limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Medium	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Low	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities
Very low	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

## Habitat sensitivity

According to the "PROTOCOL FOR THE SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS FOR ENVIRONMENTAL IMPACTS ON TERRESTRIAL BIODIVERSITY", there are only two sensitivity classes for the Terrestrial Biodiversity Theme, namely VERY HIGH or LOW. The VERY HIGH category includes any area of natural vegetation that falls within one of the following categories:

1. terrestrial critical biodiversity areas (CBAs).
2. terrestrial ecological support areas (ESAs).
3. protected areas as defined by the National Environmental Management: Protected Areas Act, 2004.
4. priority areas for protected area expansion.
5. strategic water source areas (SWSAs).
6. freshwater ecosystem priority areas (FEPA) subcatchments.
7. indigenous forests.

Any area that is in a natural state and that falls within one of these categories is therefore automatically assigned a sensitivity class of VERY HIGH and requires a Terrestrial Biodiversity Specialist Assessment.

It is important to note that the definition of natural vegetation, according to the National Environmental Management Act, 1998 (Act No. 107 of 1998) is "*vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding 10 years.*" According to this description, the vegetation on site (including secondary vegetation) is legally in a natural state.

The southern part of the site is within a CBA1, which is also indigenous thicket. It is confirmed from the site visit that these areas are in a natural state. They therefore have VERY HIGH sensitivity according to the Terrestrial Biodiversity Theme.

The Mesic Thicket habitat on site is suspected habitat for threatened animal species. The species that could potentially occur within this habitat are as follows:

- Knysna Warbler (Vulnerable) has a moderate probability of occurring in forest margin areas.
- Crowned Eagle (Near Threatened) - the forests on site may constitute part of the general foraging range but it is unlikely that they are resident on site, or are dependent on it.
- Small antelope (Vulnerable). There is a moderate to high probability of it occurring in the forests on site.
- Duthie's Golden Mole (Vulnerable). There is a moderate probability of it occurring in the mesic thicket/forest on site.

A map of combined habitat sensitivity on site for the Terrestrial Biodiversity Theme and Animal Species Theme is provided in Figure 16, mapped according to the calculations provided through the process of calculating Site Ecological Importance.

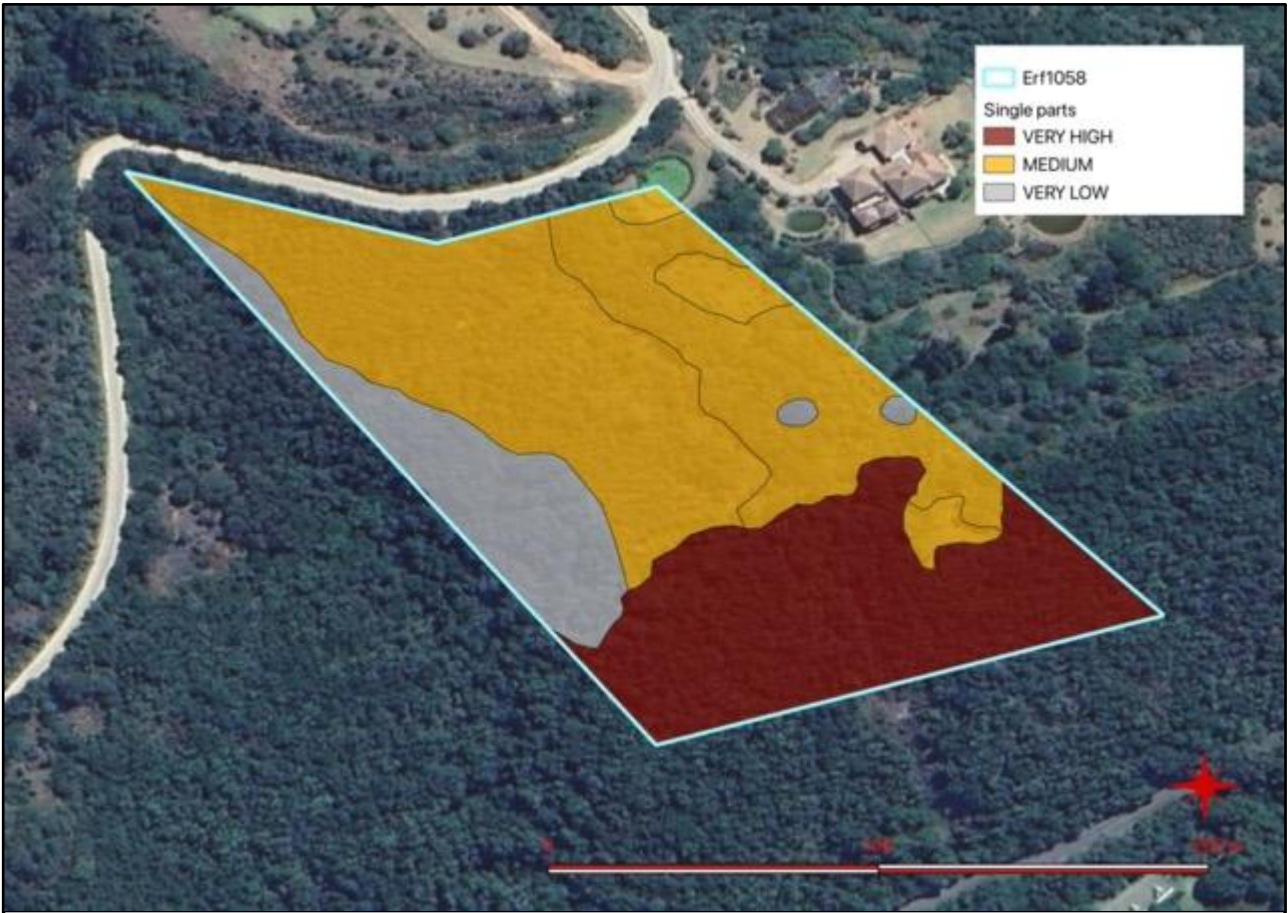


Figure 16: Site Ecological Importance of habitats on site.

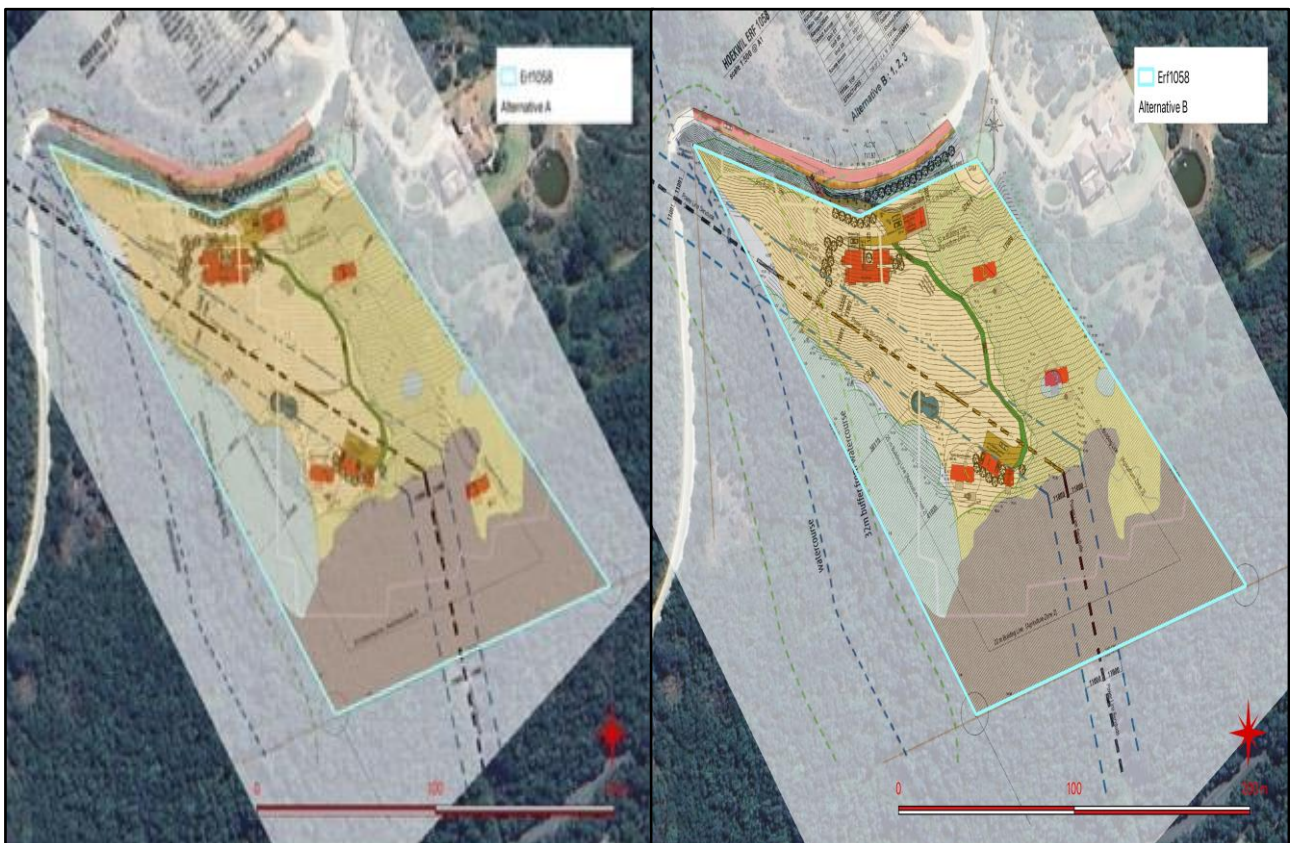
# IMPACT ASSESSMENT

The proposal is to develop housing on site. The footprint of the proposed development is mostly within areas mapped as "Secondary thicket mosaic" (Medium sensitivity) (see Figure 17). There are two layout options, Alternative A and Alternative B, the difference being the location of unit 3 in the south-eastern corner or not.

No plant species of concern were found on site, but the habitat on site is marginally suitable for a variety of animal SCC. There are various sensitive animal species that are likely to use the mesic thicket parts of the site, although it is not confirmed that any occur there. There are also small numbers of juvenile milkwood trees (*Sideroxylon inerme*) and cheesewoods (*Pittosporum viridiflorum*) on site that are protected under the National Forests Act.

The impacts assessed here are therefore as follows:

1. LOSS OF NATURAL FYNBOS VEGETATION.
2. LOSS OF NATURAL MESIC THICKET/FOREST VEGETATION
3. LOSS OF INDIVIDUALS OF A PROTECTED TREE SPECIES
4. LOSS OF HABITAT FOR LISTED THREATENED ANIMAL SPECIES



**Figure 17: Proposed development plan (Alternative A and B) superimposed on Site Ecological Importance of habitats on site (see Figure 15).**



## Loss of natural fynbos vegetation

The part of the site that is affected by the proposed development is mapped as Garden Route Granite Fynbos, but currently contains secondary thicket patches, alien plants and some small areas of herbaceous vegetation that includes a small number of fynbos elements typical of secondary vegetation.

There are two scenarios that can be evaluated with respect to the possible loss of natural fynbos on site:

1. Fynbos previously occurred there naturally but has been lost due to historical processes of degradation.
2. Fynbos never occurred there naturally and will therefore not be affected.

If the assumption is made that the national vegetation map is correct and that fynbos is the natural vegetation that should occur on site then the following factors affect the re-establishment of fynbos on site:

1. **There is currently no typical fynbos vegetation on site.** The vegetation that currently occurs on site is not representative of the regional vegetation type, Garden Route Granite Fynbos. In the areas not currently occupied by natural thicket, it is currently a combination of secondary thicket with a small number of species that are considered to be fynbos elements.
2. **There are currently few fynbos plant species on site.** The fynbos species that occur on site are a small number of species that typically colonise previously disturbed areas. The suite of fynbos species that occur on site are small in number (only 9 species), and have been consistently observed to emerge in areas recently cleared of pine plantations.
3. **There are no nearby areas from which recruitment of natural fynbos species can take place.** All nearby areas that currently contain some form of vegetation that resembles fynbos are previously cultivated areas. This means that any fynbos vegetation that occurs there is secondary and also not representative of the regional vegetation type.
4. **There is unlikely to be any soil seed bank of fynbos species occurring on site.** Historical aerial photographs show that the site was ploughed prior to 1936 (exact date of initial ploughing unknown but probably many years prior to 1936), therefore any soil seed bank would need to have survived almost 100 years, possibly more. Soil seed survival is unlikely for the majority of species that could occur in typical fynbos. Recruitment from a soil-based seed bank would therefore yield few original species (if any).

The more likely scenario is that fynbos didn't naturally occur on site prior to cultivation in 1936. This is supported by various observations:

1. Landcover data shows that, within areas currently in proximity to the site (within about 10 km) defined as either Garden Route Granite Fynbos or Garden Route Shale Fynbos, most remnants are thicket/forest, not fynbos. The only places that fynbos currently seems to occur is in locations where the environment specifically supports pockets of fynbos, such as localised areas on north-facing (drier, warmer) slopes, or areas with atypical substrate properties.
2. Climate data shows that the Wilderness area has mean annual rainfall patterns typical of the Forest Biome (intermediate to Albany Thicket Biome), not typical of the Fynbos Biome, therefore it would be expected that the typical vegetation would be forest or mesic thicket.
3. Remnant vegetation in the Wilderness area show that areas with similar slope, aspect and elevation above sea level in proximity to the site currently contain mesic thicket/forest typical of the Wilderness area, not fynbos.
4. Secondary vegetation on site is rapidly developing towards mesic thicket in both structure and species composition. Woody species (trees and shrubs) that have already established in these secondary vegetation areas include *Allophylus decipiens*, *Buddleja saligna*, *Diospyros whyteana*, *Elaeodendron croceum*, *Grewia occidentalis*, *Gymnosporia buxifolia*, *Gymnosporia nemorosa*, *Myrsine africana*, *Olea europaea*, *Pittosporum viridiflorum*, *Pterocelastrus tricuspidatus*, *Putterlickia pyracantha*, *Rapanea melanophloeos*, *Scutia*

*myrtina*, *Searsia chirindensis*, *Searsia lucida*, *Searsia pallens*, *Sideroxylon inerme*, *Tarchonanthus littoralis*, *Trimeria grandifolia*, *Vepris lanceolata*, and *Zanthoxylum capense*. This is accompanied by a suite of herbaceous species found in woody vegetation, not fynbos.

The assessment below takes these factors into consideration:

### **Resource irreplaceability**

The vegetation type (Garden Route Granite Fynbos) is listed as Endangered. However, the small areas of secondary vegetation that contain any fynbos species are a poor example of the regional vegetation type. These areas are not within any CBA. Score = 1.

### **Threshold**

The potential impact affects a small proportion of the vegetation type (Garden Route Granite Fynbos) and no CBA. Score = 1.

### **Resource condition**

The vegetation on site (within the proposed development footprint) is secondary and in relatively poor condition, and consists of secondary vegetation with a species composition that is not representative of the natural habitat. Score = 1.

### **Reversibility of impact**

Loss of habitat on site (within the proposed development footprint) is almost fully REVERSIBLE, on the basis that it is secondary and could therefore easily be replaced - if disturbed, the vegetation can easily be restored to its current state through rehabilitation. Score = 1.

### **Extent of impact**

The impact will occur within the site boundary. Score = 1.

### **Duration of impact**

Loss of the habitat on site is assessed as being permanent. Score = 5

### **Intensity of impact**

At a local scale, the impact is of LOW intensity, since it would result in ecological processes on site continuing but in a highly modified way. Score = 2.

### **Probability of occurrence**

Based on the proposed development plan and the known location of the habitats found on site, the impact will be DEFINITE. Score = 5.

### **Confidence**

There is a high understanding in the identity and on-site value of the vegetation, as well as the nature and extent of the proposed activity. No measures are therefore required to improve the confidence in the assessed impact.

### **Significance of impact**

The significance is a combination of the value of the biodiversity resource, the magnitude of the expected impact and the probability of the impact occurring.

Biodiversity value score:  $(1 + 1 + 1 + 1)/4 = 1.00$

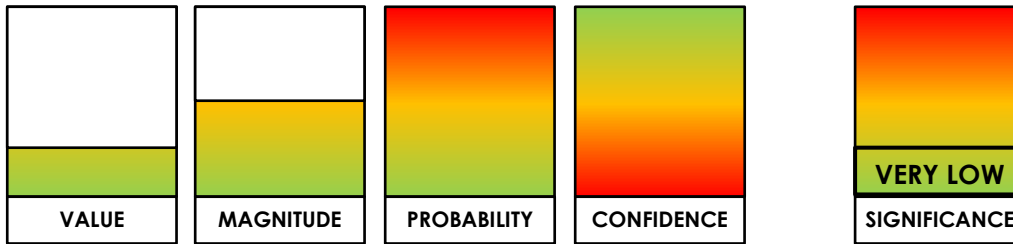
Impact magnitude:  $(1 + 5 + 2)/3 = 2.67$

Impact probability: 5.00

The calculation of the significance of an impact uses the following formula:

**Significance = (Biodiversity value) x (Magnitude) x (Probability).**

On this basis, the impact is calculated as  $(1.00 \times 2.67 \times 5.00 = 13.3)/25 = 0.5 = \text{VERY LOW}$  significance



### **Possible mitigation measures**

Possible mitigation measures that can be applied are as follows:

1. It would be ecologically desirable to (as much as possible) cluster development in nodes within previously disturbed areas and close to existing disturbance (e.g. major roads). Where development is proposed further from the main road, this should be located within existing open areas in the secondary thicket.
2. Exclude development from areas of indigenous natural vegetation, in this case, the mesic thicket/forest at the bottom (southern side) of the site (see "Recommendations"). The current development proposal indicates a lapa within this zone, which should be excluded from the development plan.
3. Consult with the local fire protection agency regarding whether to implement a fire management plan for the site. Note that the natural vegetation occurring on site, and the probable natural vegetation in previously cultivated areas on site, is NOT fire-prone. Exclusion of fire will probably lead to promotion of more mesic thicket vegetation and exclusion of secondary fynbos, but this is supported by the ecological assessment of the site as likely having historically been mesic thicket.
4. Access to areas of VERY HIGH sensitivity during construction must not be permitted by any construction personnel (mapped as "Mesic thicket/forest in Figure 14 on page 32, and as "VERY HIGH" in Figure 16 on page 46). These areas must be fenced off and no access allowed.
5. Compile and implement an alien management plan, which highlights control priorities and areas and provides a programme for long-term control.

## Loss of natural mesic thicket/forest vegetation

The lower one third of the site contains a band of natural mesic thicket or low forest that is in a good natural condition. No infrastructure is proposed for this area, except for a lapa (see Figure 16), but it is possible that some secondary impacts could occur from upslope activities.

### **Resource irreplaceability**

The vegetation is part of a CBA1 area and is an important part of a connected system of vegetation in the Wilderness area. It is part of a listed Endangered ecosystem but the vegetation is not fynbos and therefore not representative of this ecosystem type. Score = 4.

### **Threshold**

Damage to this area of thicket (in combination with the existing powerline servitude) could potentially affect the connectivity of the entire landscape, as well as buffer areas associated with the Garden Route National Park. The potential impact affects a small proportion of the vegetation but could have wider ecological implications. Score = 4.

### **Resource condition**

The vegetation on site (within the proposed development footprint) is in good condition. Score = 5.

### **Reversibility of impact**

Damage to this type of mesic thicket/forest on these steep slopes is IRREVERSIBLE - if disturbed, the vegetation cannot be restored to its current state through any form of rehabilitation. Score = 5.

### **Extent of impact**

The impact will occur within the site boundary, but would affect the ecological functioning of a much wider landscape. Score = 4.

### **Duration of impact**

Loss of the habitat on site is assessed as being permanent. Score = 5

### **Intensity of impact**

At a local scale, as a worst-case scenario, the impact would be of HIGH intensity, since it would result in ecological processes on site and in adjacent areas continuing but in a highly modified way. Score = 4.

### **Probability of occurrence**

Based on the proposed development plan and the known location of the habitats found on site, the impact is PROBABLE. Score = 3.

### **Confidence**

There is a high understanding in the identity and on-site value of the vegetation, as well as the nature and extent of the proposed activity. No measures are therefore required to improve the confidence in the assessed impact.

### **Significance of impact**

The significance is a combination of the value of the biodiversity resource, the magnitude of the expected impact and the probability of the impact occurring.

Biodiversity value score:  $(4 + 4 + 5 + 5)/4 = 4.50$

Impact magnitude:  $(4 + 5 + 4)/3 = 4.33$

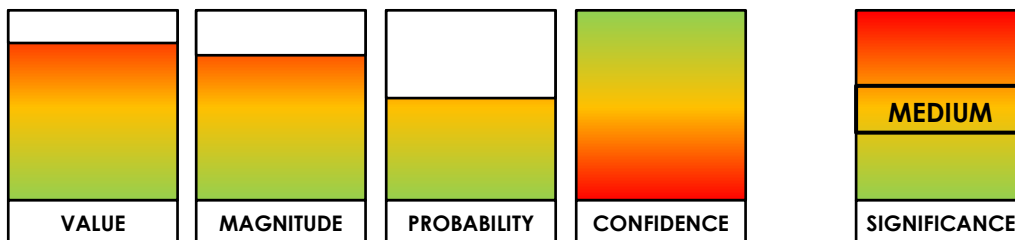
Impact probability: 3.00

The calculation of the significance of an impact uses the following formula:

**Significance = (Biodiversity value) x (Magnitude) x (Probability).**

On this basis, the impact is calculated as  $(4.50 \times 4.33 \times 3.00 = 58.5) / 25 = 2.3 =$  **MEDIUM** significance

Note that if any impact did occur, then the probability would be definite and the significance of the impact would then be HIGH. The most important mitigation is therefore to minimise the possibility of the risk occurring.



### **Possible mitigation measures**

Possible mitigation measures that can be applied are as follows:

1. All mitigation measures for the previous assessed impact should be applied for this impact.
2. Keep all proposed infrastructure away from the mesic thicket/forest areas (see Figure 17). In all areas close to the mesic thicket, rehabilitation of disturbed areas after construction should promote natural successional processes that currently drive the secondary vegetation towards thicket development.
3. Access to forested areas during construction must not be permitted by any construction personnel. These areas must be fenced off and no access allowed.
4. Strictly control any possible erosion from upslope areas. There should be no erosion or runoff effects on the mesic thicket/forest areas.
5. Undertake regular monitoring to detect erosion or other degrading impacts early so that they can be controlled.
6. Where possible, retain well-developed thicket patches within the upper parts of the site. These have a high diversity of woody plant species, including several that occur within existing mesic thicket.
7. Once construction is complete, rehabilitate previously disturbed areas to a state where natural successional processes can operate. Based on current processes occurring on site, this is very likely to lead to further thicket development within these areas.
8. Future garden development on site should use only site-appropriate indigenous species. It is recommended that thicket species that currently occur on site be used for future gardens. This will result in mostly thicket-type vegetation developing, but this should be allowed to the extent that it doesn't compromise any fire-protection considerations.

## Loss of individuals of protected tree species

Currently, only a small number of small individuals of protected tree species were found on site. These have introduced through natural processes relatively recently, i.e. through natural propagation. They were only found within the secondary vegetation and are juveniles (see Figure 18 for typical example). Nevertheless, they are protected under national legislation and must therefore be protected, or be dealt with appropriately.

### **Resource irreplaceability**

The tree species affected are *Sideroxylon inerme* and *Pittosporum viridiflorum*, protected under the National Forests Act. A small number were seen on site, mostly of a small size. The species are widespread but is a key component of coastal forests in the Garden Route. Score = 2.

### **Threshold**

The potential impact affects a very small proportion of the overall known population of the species, and the proportion affected of those occurring on site is also smaller. Score = 1.

### **Resource condition**

The trees on site are small but in good condition. Score = 3.

### **Reversibility of impact**

Loss of individuals on site is completely REVERSIBLE in terms of replacement of individuals due to natural population processes or deliberate planting (milkwoods plant easily and grow well in this type of environment). Score = 1.

### **Extent of impact**

The impact will occur within the site boundary (within the development footprint). Score = 1.

### **Duration of impact**

Loss of the habitat on site is assessed as being medium-term on the basis that trees removed can be replaced through planting - the timeframe is to allow planted individuals to achieve a reasonable size, which could take 10 years or more. Score = 3



**Figure 18: Typical size and condition of juvenile milkwood trees occurring on site.**

### **Intensity of impact**

At a local scale, the impact is of LOW intensity, since it would result in the permanent loss of only a small number of young trees. Score = 2.

### **Probability of occurrence**

Based on the proposed development plan and the known location of the individuals found on site, the impact has HIGH PROBABILITY. Score = 4.

### **Confidence**

There is a moderate understanding in the identity and distribution of the species on site, as well as the nature and extent of the proposed activity. Additional searches will improve the overall count of the on-site distribution. Additional measures are therefore required to improve the confidence in the assessed impact.

### **Significance of impact**

The significance is a combination of the value of the biodiversity resource, the magnitude of the expected impact and the probability of the impact occurring.

Biodiversity value score:  $(2 + 1 + 3 + 1)/4 = 1.75$

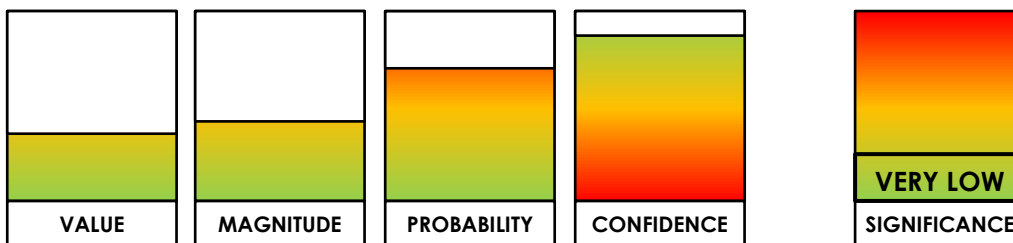
Impact magnitude:  $(1 + 3 + 2)/3 = 2.00$

Impact probability: 4.00

The calculation of the significance of an impact uses the following formula:

**Significance = (Biodiversity value) x (Magnitude) x (Probability).**

On this basis, the impact is calculated as  $(1.75 \times 2.00 \times 4.00 = 14)/25 = 0.6 = \text{VERY LOW}$  significance



### **Possible mitigation measures**

Possible mitigation measures that can be applied are as follows:

1. Do not disturb natural woodland where there is a continuous canopy of forest trees, and protect forest margin areas so that forest interiors maintain existing microhabitat conditions and structural integrity.
2. If any trees need to be removed or pruned then a permit is required, according to the National Forests Act.
3. If necessary, plant additional milkwoods in the development as part of the final landscaping. These can be planted along with other appropriate coastal forest species, but the proportions and composition should reflect habitat that would have occurred naturally at this site.

# Loss of habitat for flagged animal species

## **Resource irreplaceability**

There is mesic thicket/forest habitat on site that is suspected habitat for flagged animal species. This includes all natural thicket habitat on site, none of which is within the proposed development footprint, but which may possibly be affected by the proposed development. Score = 4.

The species that could potentially occur within this habitat are as follows:

- Knysna Warbler (Vulnerable) has a moderate probability of occurring in forest margin areas.
- Crowned Eagle (Near Threatened) - the forests on site may constitute part of the general foraging range but it is unlikely that they are resident on site, or are dependent on it.
- Small antelope (Vulnerable). There is a moderate to high probability of it occurring in the forests on site.
- Duthie's Golden Mole (Vulnerable). There is a moderate probability of it occurring in the mesic thicket/forest on site.

## **Threshold**

The potential impact affects a small proportion of the overall habitat available for these species and will possibly not directly affect any individuals. Nevertheless, the threatened status of many species is due significantly to overall loss of habitat, which is reflected in the threatened status of the species. Additional loss of habitat, however small, continues to drive ecosystems towards new thresholds of loss. More importantly at the current location, the mesic thicket habitat is part of a wider network of habitat and loss of the habitat on site could break migration routes and habitat connectivity. The threshold score is evaluated for this type of habitat in the Wilderness area. There is a moderate to high probability of it occurring in the forests on site. Score = 4.

## **Resource condition**

The vegetation on site is in relatively good condition. Score = 4.

## **Reversibility of impact**

Loss of natural habitat on site is IRREVERSIBLE. Score = 5.

## **Extent of impact**

The impact will occur within the site boundary. It is possible that there may be spillover effects into surrounding areas, due mostly to secondary impacts, such as dust deposition, alien invasive species spread, etc. Score = 2.

## **Duration of impact**

Loss of the habitat on site is assessed as being permanent. Score = 5

## **Intensity of impact**

At a local scale, the impact is currently assessed as being of LOW magnitude, since it is not expected to affect any of the sensitive habitat resource for potentially affected species. However, the detection of any of the SCC on site would change this score, depending on the distribution and importance of the species concerned. Score = 2.

## **Probability of occurrence**

Based on the proposed development plan and the known location of the habitats found on site, the impact will be IMPROBABLE, although any actual impacts on animal species of concern is LOW PROBABILITY. Score = 2. This score would change if any SCC were detected on site.



## Confidence

There is a high understanding in the identity and on-site value of the vegetation, as well as the nature and extent of the proposed activity. No measures are therefore required to improve the confidence in the assessed impact.

## Significance of impact

The significance is a combination of the value of the biodiversity resource, the magnitude of the expected impact and the probability of the impact occurring.

Biodiversity value score:  $(4 + 4 + 4 + 5)/4 = 4.25$

Impact magnitude:  $(2 + 5 + 2)/3 = 3.00$

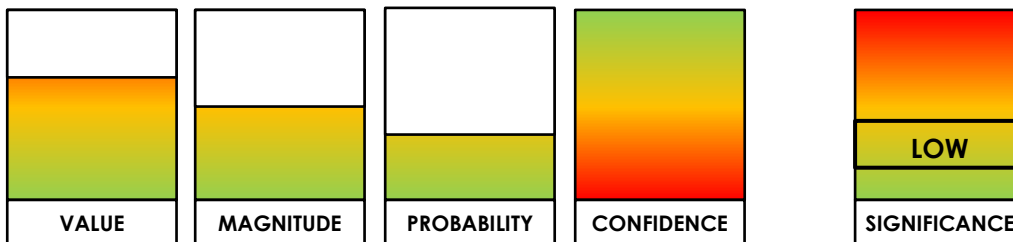
Impact probability: 2.00

The calculation of the significance of an impact uses the following formula:

**Significance = (Biodiversity value) x (Magnitude) x (Probability).**

On this basis, the impact is calculated as  $(4.25 \times 3.00 \times 2.00 = 25.5)/25 = 1.0 = \text{LOW}$  significance

**Note that the detection on site of any SCC would change this score.**



## Possible mitigation measures

Possible mitigation measures that can be applied are as follows:

1. Protect natural mesic thicket vegetation adjacent to the proposed development site, as per the previous impact.

# CONCLUSION

Desktop information, field data collection and mapping from aerial imagery provides the following verifications of patterns for various themes:

1. The site consists of a combination of mesic thicket/ forest (on the steep south-facing slopes), secondary thicket, and areas of alien trees. The mesic thicket/forest, is in an ecologically natural state whereas secondary thicket occurs in areas that were ploughed approximately 90 years ago. These secondary thicket areas are therefore legally defined as being in a natural state, although they no longer contain the original vegetation that occurred there.
2. All natural areas on site occur in areas designated as Critical Biodiversity Area 1. The site occurs partially within Garden Route Granite Fynbos, which is listed as Endangered. It is confirmed no intact fynbos occurs on site, but the mesic thicket/forest represents the original vegetation that would have occurred on site.
3. Following the procedures within the Species Environmental Assessment Guidelines, the natural areas on site (mesic thicket/forest) have been assessed as having Very High sensitivity / Ecological Importance, secondary thicket vegetation as having Medium sensitivity / Ecological Importance, and areas with alien vegetation as having Very Low sensitivity / Ecological Importance.
4. On the basis of the presence of natural habitat within a CBA1 area and within a listed ecosystem, it is verified that the site occurs partially within an area of VERY HIGH sensitivity with respect to the Terrestrial Biodiversity Theme. These areas are not directly affected by the proposed development.
5. No plant species of concern were found on site and based on the available habitat, it is considered unlikely that any occur there. It is therefore verified that the site has LOW sensitivity with respect to the Plant Species Theme.
6. The site is considered to be potential habitat for any of four of the animal species flagged for the site. The woodland habitats (mesic thicket/forest) is likely habitat for three animal species, the Knysna Warbler (Vulnerable), a small antelope (Vulnerable), and Duthie's Golden Mole (Vulnerable). A small, man-made pond on site is potential habitat for the Knysna Leaf-folding Frog (Endangered). It is therefore verified that the Animal Species Theme has MEDIUM sensitivity for the site.
7. The on-site vegetation was found to be mostly in a legally natural state. There are areas of secondary vegetation, and areas of dense alien plants, but these are legally natural vegetation within an Endangered ecosystem (according to the legal definition of natural vegetation in NEMA).
8. An impact assessment determined that the impact of the proposed development has Very Low significance for loss of fynbos vegetation, Medium significance for loss of mesic thicket vegetation (although this would change to High if any impacts did occur), Very Low significance for loss of protected trees, and Very Low significance for animal species of concern (although this would change if any of the species were detected on site).
9. Alternative B is marginally better than Alternative A, because Alternative A intrudes slightly into the thicket, whereas Alternative B is well away from the thicket.

# RECOMMENDATIONS

- Mesic Thicket/Forest habitats on the steeply-sloping part of the site, have high biodiversity and conservation value, and are designated as sensitive. These areas must not be affected by the proposed development. The forest margin areas must be protected and post-construction rehabilitation should promote expansion of these forest margin areas. An open space management system should be developed to formalize such steps for mesic thicket/forest protection.
- Fynbos habitats on site that are in an intact state are part of a listed Endangered ecosystem (Garden Route Shale Fynbos), and are sensitive. These areas must not be affected by the proposed development. If necessary and in consultation with the appropriate fire protection agency, a fire management plan should be implemented to maintain these areas in an ecologically functional state.
- It is important for the maintenance of biodiversity and ecological patterns in the general Wilderness area that ecological linkages are maintained in the landscape. This includes coastal-inland linkages, lowland-upland linkages, migration corridors that run parallel to the coast, and ecotones between the different major habitat types. The mesic thicket/forest area on site is a key component of all of these linkages.
- Where rehabilitation of disturbed areas is implemented, including for previously invaded areas, establishment of site-appropriate indigenous species should be promoted, rather than use of exotic species, or species that are not ecologically appropriate for the site.
- It is a legal requirement that an alien invasive management should take place on site. This will protect habitats from degradation and could potentially be the biggest contribution to maintaining and protecting biodiversity on site and in surrounding areas.
- It is a legal requirement that a permit is required for any protected trees that may be affected by proposed development. A survey of all protected trees within the footprint area is required in order to apply for any necessary permits.

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# APPENDICES:

## Appendix 1: Plant species recorded on site.

Acacia cyclops (Category 1b)  
Acacia mearnsii (Category 1b)  
Acokanthera oppositifolia  
Agathosma ovata  
Allophylus decipiens  
Anemia cafferorum  
Arctotheca prostrata  
Asparagus africanus  
Asparagus asparagoides  
Asparagus setaceus  
Asplenium rutifolium  
Buddleja saligna  
Capparis sepriaria  
Carissa bispinosa  
Carpobrotus edulis  
Cheilanthes viridis  
Commelina africana  
Cussonia thysiflora  
Cynanchum ellipticum  
Cynanchum viminale  
Cyperus congestus  
Dietes iridioides  
Diospyros dichrophylla  
Diospyros whyteana  
Elaeodendron croceum  
Eragrostis curvula  
Erica sparsa  
Euphorbia kraussiana  
Galopina circaeoides  
Gerbera cordata  
Gomphocarpus physocarpus  
Grewia occidentalis  
Gymnosporia buxifolia  
Gymnosporia nemorosa  
Habenaria arenaria  
Helichrysum cymosum  
Helichrysum foetidum  
Helichrysum petiolare  
Hibiscus trionum  
Lantana camara (Category 1b)  
Lauridia tetragona  
Megathyrsus maximus  
Melica racemosa  
Monopsis unidentata  
Myrsine africana  
Mystroxyloa aethiopicum  
Nephrolepis cordifolia (Category 1b)  
Nidorella ivifolia  
Ochna arborea

Ochna serrulata  
Olea capensis  
Olea europaea  
Ornithogalum graminifolium  
Paspalum urvillei\*  
Passerina corymbosa  
Passerina rigida  
Pelargonium capitatum  
Pelargonium grossularioides  
Peperomia retusa  
Physalis peruviana\*  
Phytolacca octandra (Category 1b)  
Pittosporum viridiflorum (PROTECTED TREE)  
Pseudognaphalium luteoalbum  
Pteridium aquilinum  
Pteris sp.  
Pterocelastrus tricuspidatus  
Putterlickia pyracantha  
Rapanea melanophloeos  
Rhoicissus digitata  
Rumohra adiantiformis  
Schoenoplectus cuspidatus  
Scolopia zeyheri  
Scutia myrtina  
Searsia chirindensis  
Searsia lucida  
Searsia pallens  
Selago corymbosa  
Senecio deltoideus  
Senecio ilicifolius  
Senecio macroglossus  
Seriphium plumosum  
Sideroxylon inerme (PROTECTED TREE)  
Solanum giganteum  
Stachys aethiopica  
Stenotaphrum secundatum  
Streptocarpus rexii  
Tarchonanthus littoralis  
Trimeria grandifolia  
Tulbaghia capensis  
Ursinia paleacea  
Vepris lanceolata  
Zanthoxylum capense

## Appendix 2: Protected Trees of South Africa

In terms of section 15(1) of the National Forests Act, 1998, no person may cut, disturb, damage or destroy any protected tree; or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any product derived from a protected tree, except under a licence or exemption granted by the Minister of Agriculture, Forestry and Fisheries. The list of Protected Tree Species under the National Forest Act, 1998 (Act No. 84 of 1998) is attached here as Schedule A. The most recent version of this list was published in the Government Gazette No. 41887 on 7 September 2018, designated as GN No. 536 of 2018, and contains 47 species distributed across South Africa.

### SCHEDULE A

<b>Botanical name</b>	<b>English common names</b>	<b>Other common names</b> <b>Afrikaans (A), Sepedi (P), Sesotho (S), Setswana (T), Tshivenda (V), isiXhosa (X), isiZulu (Z), Xitsonga (XT)</b>	<b>National tree number</b>
<i>Acacia erioloba</i>	Camel thorn	Kameeldoring (A)/Mogohlo (NS)/Mogoŋho (T)/	168
<i>Acacia haematoxylon</i>	Grey camel thorn	Vaalkameeldoring (A)/Mokholo (T)	169
<i>Adansonia digitata</i>	Baobab	Kremetart (A)/Seboi (NS)/Mowana (T)/Ximuwu (XT)	467
<i>Azelia quanzensis</i>	Pod mahogany	Peulmahonie (A)/Mutokota (V)/Inkehli (Z)	207
<i>Balanites</i> subsp. <i>maughamii</i>	Torchwood	Groending (A)/Ugobandlovu (Z)	251
<i>Barringtonia racemosa</i>	Powder-puff tree	Poeierkwasboom (A)/Iboqo (Z)	524
<i>Boscia albitrunca</i>	Shepherd's tree	Witgat (A)/Mohlopi (NS)/Motlhoŋpi (T)/Muvhombwe (V)/Umgqomogqomo (X)/Umvithi (Z)	122
<i>Brachystegia spiciformis</i>	Msasa	Msasa (A)	198.1
<i>Breonadia salicina</i>	Matumi	Mingerhout (A)/Mohlome (NS)/Mutu-lume (V)/Umfomfo (Z)	684
<i>Bruguiera gymnorhiza</i>	Black mangrove	Swartwortelboom (A)/isiKhangati (X)/IsiHlobane (Z)	527
<i>Cassipourea swaziensis</i>	Swazi onionwood	Swazi-uehout (A)	531.1
<i>Catha edulis</i>	Bushman's tea	Boesmanstee (A)/Mohlatse (NS)/Igqwaka (X)/Umhlwazi (Z)	404
<i>Ceriops tagal</i>	Indian mangrove	Indiese wortelboom (A)/isinkaha (Z)	525



<i>Cleistanthus schlechteri</i> var. <i>schlechteri</i>	False tamboti	Bastertamboetie (A)/Umzithi (Z)	320
<i>Colubrina nicholsonii</i>	Pondo weeping thorn	Pondo-treurdoring (A)	453.8
<i>Combretum imberbe</i>	Leadwood	Hardekool (A)/Mohwelere-tšhipi (NS)/Motswiri (T)/Impondondlovu (Z)	539
<i>Curtisia dentata</i>	Assegai	Assegai (A)/Umgxina (X)/Umagunda (Z)	570
<i>Elaeodendron transvaalensis</i>	Bushveld saffron	Bosveld-saffraan (A)/Monomane (T)/Ingwavuma (Z)	416
<i>Erythrophysa transvaalensis</i>	Bushveld red balloon	Bosveld-rooiklapperbos (A)/Mofalatsane (T)	436.2
<i>Euclea pseudebenus</i>	Ebony guarri	Ebbeboom-ghwarrie (A)	598
<i>Ficus trichopoda</i>	Swamp fig	Moerasvy (A)/Umvubu (Z)	54
<i>Leucadendron argenteum</i>	Silver tree	Silwerboom (A)	77
<i>Lumnitzera racemosa</i> var. <i>racemosa</i>	Tonga mangrove	Tonga-wortelboom (A)/isiKhahasesibomvu (Z)	552
<i>Lydenburgia abbottii</i>	Pondo bushman's tea	Pondo-boesmanstee (A)	407
<i>Lydenburgia cassinoides</i>	Sekhukhuni bushman's tea	Sekhukhuni-boesmanstee (A)	406
<i>Mimusops caffra</i>	Coastal red milkwood	Kusrooimelkhout (A)/Umthunzi (X)/Umkhakhayi (Z)	583
<i>Newtonia hildebrandtii</i> var. <i>hildebrandtii</i>	Lebombo wattle	Lebombo-wattel (A)/Umfomothi (Z)	191
<i>Ocotea bullata</i>	Stinkwood	Stinkhout (A)/Umhlungulu (X)/Umnukane (Z)	118
<i>Ozoroa namaquensis</i>	Gariep resin tree	Gariep-harpuisboom (A)	373.2
<i>Philenoptera violacea</i>	Apple-leaf	Appelblaar (A)/Mphata (NS)/Mohata (T)/isiHomohomo (Z)	238
<i>Pittosporum viridiflorum</i>	Cheesewood	Kasuur (A)/Kgalagangwe (NS)/Umkhwenkwe (X)/Umfusamvu (Z)	139
<i>Podocarpus elongatus</i>	Breede River yellowwood	Breeëriviergeelhout (A)	15
<i>Podocarpus falcatus</i> ( <i>Afrocarpus falcatus</i> )	Outeniqua yellowwood	Outniekwageelhout (A)/Mogōbagōba (NS)/Umkhoba (X)/Umsonti (Z)	16
<i>Podocarpus henkelii</i>	Henkel's yellowwood	Henkel se geelhout (A)/Umsonti (X)/Umsonti (Z)	17
<i>Podocarpus latifolius</i>	Real yellowwood	Regte-geelhout (A)/Mogōbagōba (NS)/Umcheya (X)/Umkhoba (Z)	18
<i>Protea comptonii</i>	Saddleback sugarbush	Barberton-suikerbos (A)	88

<i>Protea curvata</i>	Serpentine sugarbush	Serpentynsuikerbos (A)	88.1
<i>Prunus africana</i>	Red stinkwood	Rooistinkhout (A)/Umkhakhase (X)/Umdumezulu (Z)	147
<i>Pterocarpus angolensis</i>	Wild teak	Kiaat (A)/Moroto <sup>o</sup> (NS)/Mokwa (T)/Mutondo (V)/Umvangazi (Z)	236
<i>Rhizophora mucronata</i>	Red mangrove	Rooiwortelboom (A)/isiKhangathi (X)/Umhlume (Z)	526
<i>Sclerocarya birrea</i> subsp. <i>caffra</i>	Marula	Maroela (A)/Morula (NS)/Morula (T)/Umganu (Z) /Nkanyi (XT)	360
<i>Securidaca longepedunculata</i>	Violet tree	Krinkhout (A)/Mmaba (T)	303
<i>Sideroxylon inerme</i> subsp. <i>inerme</i>	White milkwood	Witmelkhout (A)/Ximafana (X)/Umakhwelafingqane (Z)	579
<i>Tephrosia pondoensis</i>	Pondo poison pea	Pondo-gifertjie (A)	226.1
<i>Warburgia salutaris</i>	Pepper-bark tree	Peperbasboom (A)/Molaka (NS)/Mulanga (V)/isiBaha (Z)	488
<i>Widdringtonia cedarbergensis</i>	Clanwilliam cedar	Clanwilliamseder (A)	19
<i>Widdringtonia schwarzii</i>	Willowmore cedar	Baviaanskloofseder (A)	21
<i>Berchemia zeyheri</i> (RHAMNACEAE) LC	Red ivory Pink ivory	Rooi-ivoor (A) / Rooihout (A) / Monee (S) / umNeyi (SW) / umNini (Z, X) / Xiniyani (TS) / Moye (T) / Munianiane (V)	450
<i>Diospyros mespiliformis</i> (EBENACEAE) LC	Jackal berry	Jakkalsbessie (A) / Musuma (V) / Muntoma (TS) / Mgula (TS)	606
<i>Schinziophyton rautanenii</i>	Manketti / Mongongo	Mankettiboom (A) / Monghongho (T) / Makongwa (T)	337
<i>Umtiza listeriana</i>	Umtiza	Umtiza (X) / Omtisa (A)	205