Updated Specialist Report for the Proposed Housing Development on Remainder of Erf 2841 Called Seegenot, Tergniet

Terrestrial Biodiversity and Plant Species Themes Impact Assessment

Prepared For: Cape EAPrac

Author: Bianke Fouché
Confluent Environmental Pty (Ltd)
7 St. Johns Street,
Dormehls Drift,
George, 6529

SACNASP: Pr. Sci. Nat. (Botanical Science) – 141757

Reviewer: James Dabrowski

Date: 11 November 2024

Version: Final draft

DECLARATION OF SPECIALIST INDEPENDENCE

- I consider myself bound to the rules and ethics of the South African Council for Natural Scientific Professions (SACNASP);
- At the time of conducting the study and compiling this report I did not have any interest, hidden or otherwise, in the proposed development that this study has reference to, except for financial compensation for work done in a professional capacity;
- Work performed for this study was done in an objective manner. Even if this study results in views and findings that are not favourable to the client/applicant, I will not be affected in any manner by the outcome of any environmental process of which this report may form a part, other than being members of the general public;
- I declare that there are no circumstances that may compromise my objectivity in performing this specialist investigation. I do not necessarily object to or endorse any proposed developments, but aim to present facts, findings and recommendations based on relevant professional experience and scientific data;
- I do not have any influence over decisions made by the governing authorities;
- I undertake to disclose all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by a competent authority to such a relevant authority and the applicant;
- I have the necessary qualifications and guidance from professional experts in conducting specialist reports relevant to this application, including knowledge of the relevant Act, regulations and any guidelines that have relevance to the proposed activity;
- This document and all information contained herein is and will remain the intellectual property of Confluent Environmental. This document, in its entirety or any portion thereof, may not be altered in any manner or form, for any purpose without the specific and written consent of the specialist investigators.
- All the particulars furnished by me in this document are true and correct.

Bianke Fouche (MSc Conservation Biology)

November 2024

BIANKE FOUCHE ABRIDGED CV

Qualifications

- B.Sc. Environmental Sciences (Nelson Mandela University),
- B.Sc. Honours in Botany (Nelson Mandela University),
- M.Sc. Conservation Biology (University of Cape Town)

SACNASP Registration No: 141757 (Professional Botanical; Candidate Ecological)

Skills and Core Competencies

- My MSc research will add to our understanding of plant community niche construction and Alternative Stable State (ASS) theory. The knowledge gained will be used to advise landscape stewardship practices, especially regarding reforestation initiatives in the Overstrand.
- I have worked closely with the conservation team of the Grootbos Foundation, where I assisted with vegetation surveys, mounting voucher specimens in the Grootbos herbarium, and taken part in controlled fynbos fires in the Overberg.
- Postgraduate studies of mine included assessing the allelopathic effects of *Eucalyptus* leaves on garden peas and leeks and assessing the accuracy of the climate leaf analysis multivariate programme (CLAMP) in predicting the climate of fynbos vegetation.
- In Cape Town I regularly took part in alien clearing activities and helped to identify relevant listed invasive plants.
- I am currently a member of SACNASP, the International Association for Impact Assessment (IAIA) in South Africa, Botanical Society of South Africa, and the custodians for rare and endangered wildflowers (CREW-Outramps) in George.

References

Professor Michael D. Cramer
HW Pearson Building, UCT, Rondebosch
Phone: +27 21 650 2444
Email: michael.cramer@uct.ac.za

Professor Timm M. Hoffman
HW Pearson Building, UCT, Rondebosch
Phone: +27 21 650 5551
Email: timm.hoffman@uct.ac.za

Dr David Hoare
David Hoare Consulting, Pretoria
Phone: +27 83 284 5111
Email: david@davidhoareconsulting.co.za

Dr. Paul-Pierre Steyn
Botany Building, Nelson Mandela
University South Campus, Port Elizabeth
Phone: +27 41 504 4873
Email: paul.steyn@mandela.ac.za

Paula Strauss
Grootbos Foundation Conservation,
Grootbos Private Nature Reserve,
Overstrand
Phone: +27 72 611 7971
Email: paula@grootbosfoundation.org

Sean Privett
Grootbos Foundation Conservation,
Grootbos Private Nature Reserve,
Overstrand
Phone: +27 82 411 1008
Email: sean@grootbosfoundation.org

Mark Berry
Mark Berry Botanical Surveys, Cape
Town, Western Cape
Phone: +27 83 286 9470
Email: mark@mbbotanicalsurveys.co.za

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

BPA	Biodiversity Priority Area
BSP	Biodiversity Spatial Plan
CARA	Conservation of Agricultural Resources Act (Acto no 43 of 1983)
CBA	Critical Biodiversity Area
CD:NGI	Chief Directorate: National Geo-spatial Information
DFFE	Department of Forestry, Fisheries, and the Environment
EIA	Environmental Impact Assessment
EMP	Ecological Management Plan
EN	Endangered
ESA	Ecological Support Area
LC	Least Concern (referring ecosystems)
LT	Least Threatened (referring to ecosystems)
NEM:BA	National Environmental Management: Biodiversity Act
ONA	Other Natural Areas
PA	Protected Area
PAOI	Project Area of Influence
SACNASP	South African Council for Natural Science Professionals
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
SDP	Site Development Plan
SEI	Site Ecological Importance
VAST	Vegetation Assets, States, and Transitions

1. INTRODUCTION

1.1 Background

Confluent Environmental was appointed by Cape EAPrac to undertake a specialist assessment for botanical and terrestrial sensitivity of Erf RE/ 2841 called Seegenot in Tergniet. According to the Department of Forestry, Fisheries, and the Environment (DFFE) Screening Tool, this SSVR is required because the terrestrial plant species theme has been highlighted as having a Medium sensitivity, and the terrestrial biodiversity has a Very High sensitivity. Seegenot Erf RE/2841 is also close to the coastline, being in the second "row" of erven north of the coast (Fig. 1).

Figure 1: The general location of Erf 2841 in Tergniet.

1.2 Site Development Plan

The latest site development plan (SDP) is presented in Fig. 2. This Plan was updated in November of 2024 following the initial specialist report for the site. Several structures were removed from the easternmost section of the plan sue to the high sensitivity of the ecosystems present there. The Australian myrtle (*Leptospermum laevigatum*) used to cover the majority of Erf RE/2841 in a dense stand with little to no other species presence during the time of invasion. Most of these invasive trees were removed on the site in order to detect the protected tree species on the site . The SDP was first produced following the clearing of the myrtle. Following on from initial terrestrial and botanical assessments (by Jan Vlok) of the site from 2019, the site development plan was made and limited to the eastern half of the site (Erf RE/2841), however due to the 2023 subdivision of the original Erf 2841 into Erf Re/2841 and Erf 5572, the recommendation made by Jan Vlok for conserving the area now contained within Erf 5572 will not be considered in this application. Erf 5572 falls outside of the scope of study of this report, as only the eastern portion Erf RE/2841 is part of this application. The SDP also represents the project Area of Influence (PAOI) as these is a 5m buffer being implemented

around the development in an effort to reduce the edge effect on the thicket. The easternmost section on the other side of the existing road is currently being revised.

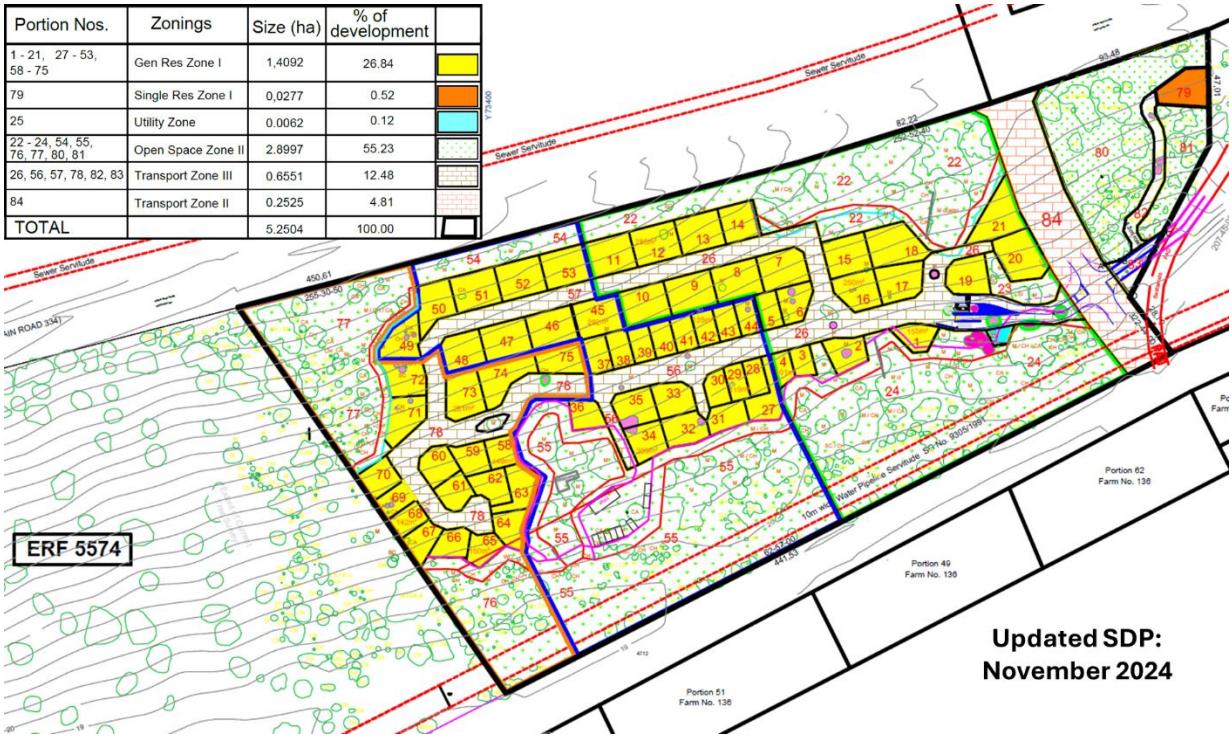

Figure 2: The site development plan of Erf RE/2841 as updated in November 2024. This SDP was amended in order to avoid High site ecological importance areas following the first version of this report.

2. TERMS OF REFERENCE

The screening tool sensitivity verification report provides information on the sensitivity of Terrestrial and Botanical diversity potentially affected by the proposed development. The results presented in this report are based on a desktop and field assessment, which includes a consideration of historical photographic records of the site. The assessment presented in this report follows the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity, and Terrestrial Plant Species themes.

This site sensitivity 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), which includes:
    - The protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial plant species (28 July 2023).
    - The protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity (20 March 2020). Additional guidelines for the terrestrial biodiversity theme:
    - Ecosystem Guidelines for Environmental Assessment in the Western Cape (de Villiers et al., 2016).

- The Western Cape Biodiversity Spatial Plan Handbook and summary booklet (CapeNature, 2017; Pool-Sandvliet et al., 2017).
- The Subtropical Thicket Ecosystem Programme Handbook: Integrating the natural environment into land-use decisions at the municipal level: towards sustainable development (Pierce & Mader, 2006).

- Additional guidelines for the terrestrial plant species theme:
  - Species Environmental Assessment Guideline: Guidelines for the implementation of the Terrestrial Flora (3c) & Terrestrial Fauna (3d) Species Protocols for environmental impact assessments in South Africa (Verburgt et al., 2020).

The assessment was undertaken by a specialist registered with the South African Council for Natural Scientific Professionals (SACNASP) with relevant expertise in the field of Botanical and/or Ecological science.

2.1 Online Screening Tool

The Department of Forestry, Fisheries, and the Environment (DFFE) screening tool report for the development footprint has identified the **terrestrial plant species theme as having a Medium sensitivity**, and the **terrestrial biodiversity theme as having a Very High sensitivity** (Fig. 3). Note that the Screening Tool plant species theme does not take Near Threatened plant populations into account.

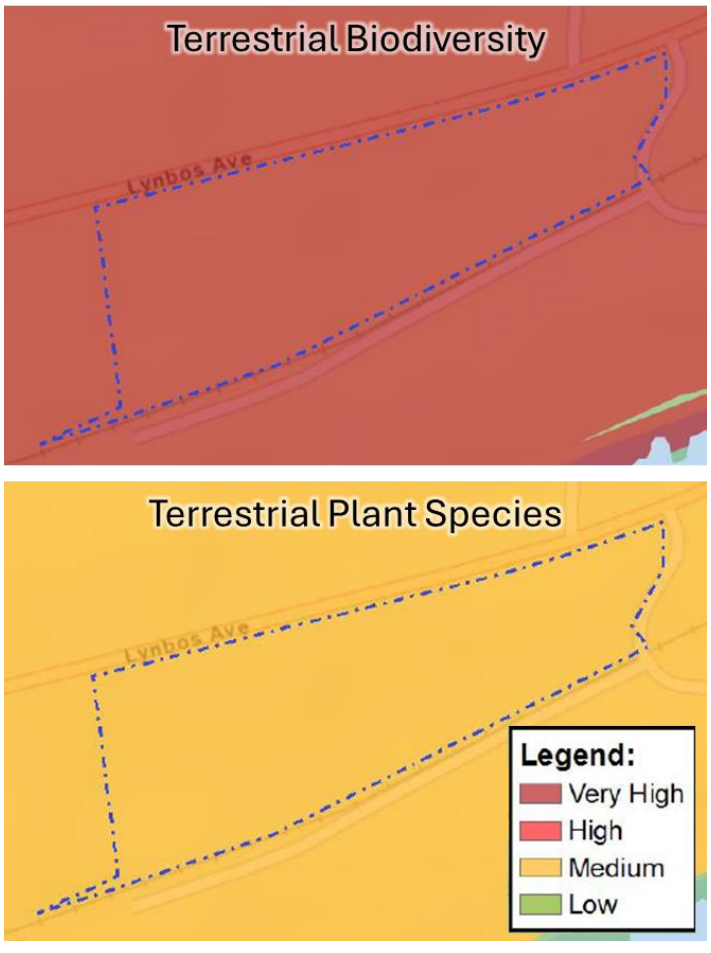

Figure 3: The screening tool generated site sensitivities for Erf 2841.

A Very High sensitivity rating for terrestrial biodiversity according to the screening tool is triggered for all Biodiversity Priority Areas (BPAs) and other sensitive features (Stewart et al., 2021). BPAs include the various management layers of the Western Cape Biodiversity Spatial Plan (WC BSP), as well as the other sensitive features in Table 1 below.

Table 1: Sources of BPA data for the Terrestrial Biodiversity Theme sensitivity (Stewart et al., 2021). Only BPAs that have been triggered for Erf RE / 2841 by the screening tool are listed.

Sensitivity layer	Data included and source
Ecological Support Areas (ESAs)	Most recent ESA spatial footprint for metros, provinces, or bioregional plans, combined to create a national data set.
Red Listed Ecosystems	Any ecosystem that is listed as Vulnerable, Endangered, or Critically Endangered according to the "Revised National List of Ecosystems that are Threatened and in Need of Protection (NEM:BA Act no.10 of 2004, as amended in November 2022)

3. METHODOLOGY

3.1 Desktop Assessment

The desktop assessment was performed using Cape Farm Mapper and QGIS version 3.28.3 "Firenze". Plant species data was sourced from the following sources:

- The DFFE screening tool listed SCC.
- Information on plant occurrence prior to the site visit was sourced from SANBIs Botanical Research and Herbarium Management System (BRAHMS) for the Plants of Southern Africa (POSA) database.
- iNaturalist observations of the property and surrounding areas.
- Specialist insight into the species likely present in the area.

Ecosystem/ vegetation type data was sourced from:

- The 2018 updated South African National Vegetation Map from SANBIs Biodiversity GIS (BGIS) database, and the National Biodiversity Assessment report of 2018 (Skowno et al., 2018).
- Shapefiles for the Western Cape Biodiversity Spatial Plan (WC-BSP) i.e., information on PAs, CBAs, ESAs, and ONAs were downloaded from BGIS database (CapeNature, 2017; Pool-Sandvliet et al., 2017).
- Cape Farm Mapper for additional spatial information required for the site.
- Chief Directorate: National Geo-spatial Information (CD: NGI) Geospatial Portal and Google Earth for the acquisition of historical aerial imagery of the site.
- The conservation status of ecosystems was found in the Revised National List of Ecosystems that are Threatened and in need of protection, published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004, as revised in Nov. 2022), and also using the Vegetation of South Africa, Lesotho, and Swaziland (Mucina & Rutherford, 2006).

3.2 Field Assessment

Field work was undertaken on the 06th of May 2024. The method for identifying species was similar to a BioBlitz, also described as a "timed meander", where the specialist records plant species composition of the site, and actively searches for rarer and threatened species. Some Red Listed Plant species are found more easily during a site survey than other species. This survey method is an attempt to account for the short and single survey period, where detection probability of some rare and threatened species (e.g., geophytes, small succulents, small perennials etc.) are low (Garrard et al., 2008; Wintle et al., 2012). Observations of individual species and environmental characteristics were photographed.

3.3 Assumptions & Limitations

This assessment is subject to a few assumptions, uncertainties, and limitations, as listed below:

- Only one survey took place during Winter. Seasonal and time constrains always somewhat limit the findings of any ecological report.
- The species list and SCC reported are not exhaustive, and more species will be added to the list should more sampling effort, and sampling in different seasons occur (Perret et al., 2023).
- Some rare and threatened plant species are difficult to locate and easily overlooked in the field (e.g., geophytes, small succulents, small shrubs, and cryptic spp.). Furthermore, many plant species flower seasonally and are therefore difficult / not likely to be identified outside of their flowering season.
- Environmental factors such as the prevailing fire regime, successional stage of the vegetation present, previous cultivation of the land, and the level of alien infestation at the site affects the species visible at the time of assessment (Cowling et al., 2010; Privett et al., 2001).
- Dense and tall vegetation on the site made it hard to gain access to some sections of the site. It is possible that focus on "bundu bashing" and getting access to some parts of the site may have caused a lapse in concentration so that an SCC could have been missed on the site.

4. RESULTS: DESKTOP ASSESSMENT

4.1 Terrestrial Biodiversity

4.1.1 Climate

The climate of Erf 2841 is similar to that of Great Brak, which is described as warm and temperate. The rainfall pattern is a-seasonal, although two rainfall peaks typically occur during Autumn and Spring (see Fig. 4). The temperature throughout the year remains moderate, with sub-zero temperatures rarely occurring. The location of the erf next to the ocean also means that temperature extremes are rare, due to the effect of the ocean on moderating the climate.

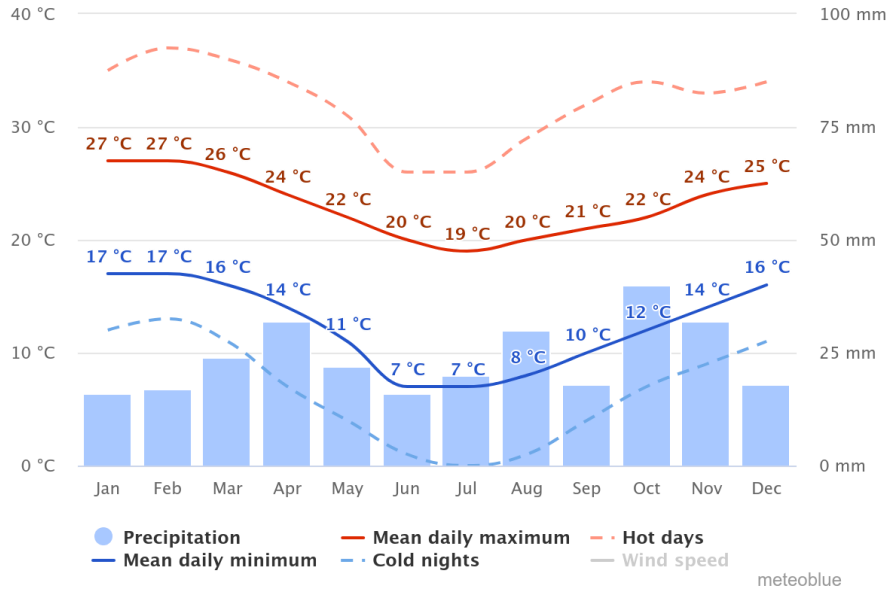

Figure 4: A summary graphic of the weather in Great Brak (year round rainfall and temperature), as sourced from meteoblue.

4.1.2 Geology and Soil

The soil on the site is sandy (i.e., derived from coastal dunes), with a high erodibility factor (0.61 on Cape Farm Mapper). These sandy substrates are very well drained and are typically quite deep, but with limited pedological development and a very low to negligible clay content. The geology on the site is sedimentary and dune rock formed from aeolian sands.

4.1.3 Vegetation Type(s)

The mapped vegetation type is Hartenbos Dune Thicket, which is Endangered (Fig. 5). This vegetation type only occurs in the Western Cape and is confined to coastal areas from Duiwenhoks River Mouth to the Great Brak River. The vegetation type is also associated with Wankoe and Strandveld Formations.

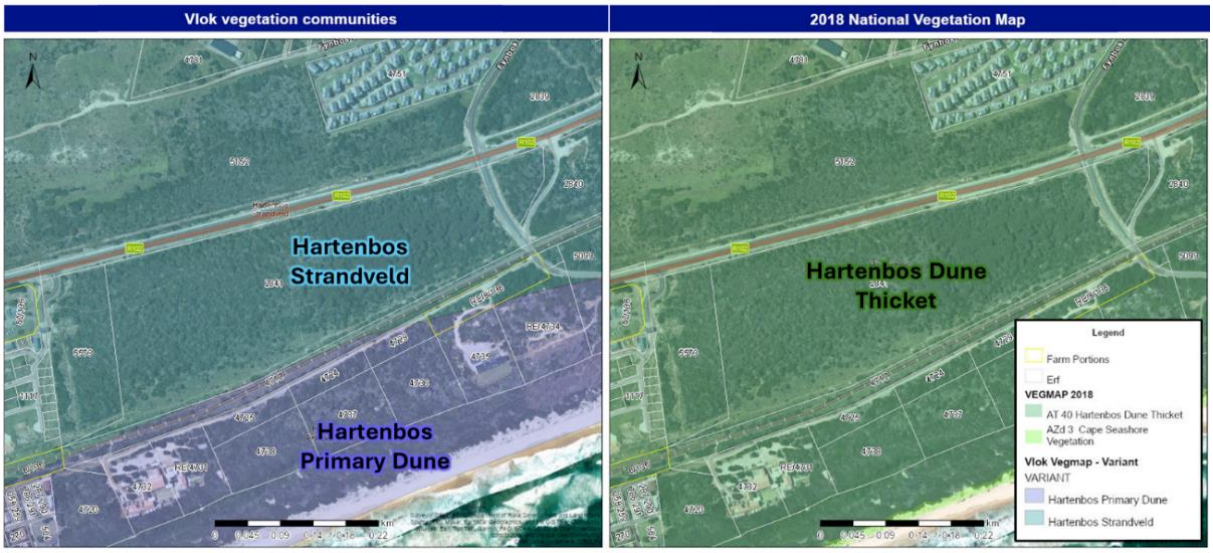

Figure 5: The vegetation maps for Erf 2841. The left map is the Vlok vegetation map, and the right map is the 2018 National vegetation map.

Some of the dominant species found in this vegetation type are listed below. Species that were found during the site assessment are highlighted in green, while blue entries indicate that the genus was found on the site, but not the specific species listed:

Important Taxa (d=dominant, e=South African endemic, et=possibly endemic to a vegetation type)

Growth form	Species
Small tree	*Pterocelastrus tricuspidatus* (d), *Sideroxylon inerme* (d)
Succulent tree	*Aloe ferox*
Succulent shrub	*Aloe arborescens*, *Carpobrotus acinaciformis* (d), *Carpobrotus edulis*, *Conicosia pugioniformis*, *Cotyledon orbiculata*, *Crassula nudicaulis*, *Cleretum bellidiforme*,, *Euphorbia burmannii*, *Euphorbia caput-medusae*, *Jordaaniella dubia*, *Roepera morgsana* (d)
Succulent herb	*Carpobrotus muirii*, *Haworthia mirabilis var. paradoxa*, *Euphorbia bayeri*
Geophytic herb	*Brunsvigia orientalis*, *Chasmanthe aethiopica*, *Freesia leichtlinii*, *Haemanthus coccineus*, *Ixia orientalis*
Low shrub	*Eriocephalus africanus*, *Felicia echinata*, *Helichrysum patulum*, *Muraltia spinosa*, *Salvia africana-lutea* (d), *Agathosma apiculata* (d), *Agathosma muirii*, *Athanasia cochlearifolia*, *Athanasia quinquedentata subsp. rigens*, *Diosma aristata*, *Euchaetis albertiniana*, *Hermannia muirii*, *Muraltia barkerae*, *Muraltia depressa*
Graminoid	*Restio eleocharis* (d), *Sporobolus fimbriatus*, *Stenotaphrum secundatum* (d), *Thamnochortus insignis* (d), *Themeda triandra* (d)
Tall shrub	*Azima tetracantha*, *Carissa bispinosa*, *Cassine peragua*, *Cussonia thyrsiflora*, *Euclea racemosa* (d), *Grewia occidentalis*, *Lauridia tetragona*, *Maytenus procumbens* (d), *Metalasia muricata* (d), *Morella cordifolia*, *Mystroxylon aethiopicum*, *Olea exasperata* (d), *Osteospermum moniliferum* (d), *Passerina rigida* (d), *Putterlickia pyracantha*, *Robsonodendron maritimum*, *Scutia myrtina*, *Searsia crenata* (d), *Searsia glauca*, *Searsia lucida*, *Searsia pterota*, *Leucospermum praecox*
Herbaceous climber	*Cynanchum ellipticum*, *Rhoicissus digitata*, *Solanum africanum*

The land-use land-cover dataset for 2020 is shown overlaying the total mapped extent of Hartenbos Dune Thicket (EN according to criteria B 1 (iii)) in Fig. 6. This map of Fig. 6 illustrates that the thicket represented on Erf 2841 covers just over 6 ha of the total erf size which is ca. 10.78 ha. Therefore, Hartenbos Dune Thicket on the site is mostly found in the western section of the Erf and is representative of about 60% of the vegetation on the erf. Furthermore, the total remaining area covered by Hartenbos Dune Thicket according to the National Vegetation Map of 2018 is ca. 650.66 square kilometres minus the transformed area of ca. 16.54%. That means the remaining area of Hartenbos Dune thicket is approximately 540 square kilometres, of which Erf 2841 represents ca. 0.06 square kilometres. In total, all the Hartenbos Dune Thicket vegetation on Erf 2841 represents 0.01%.

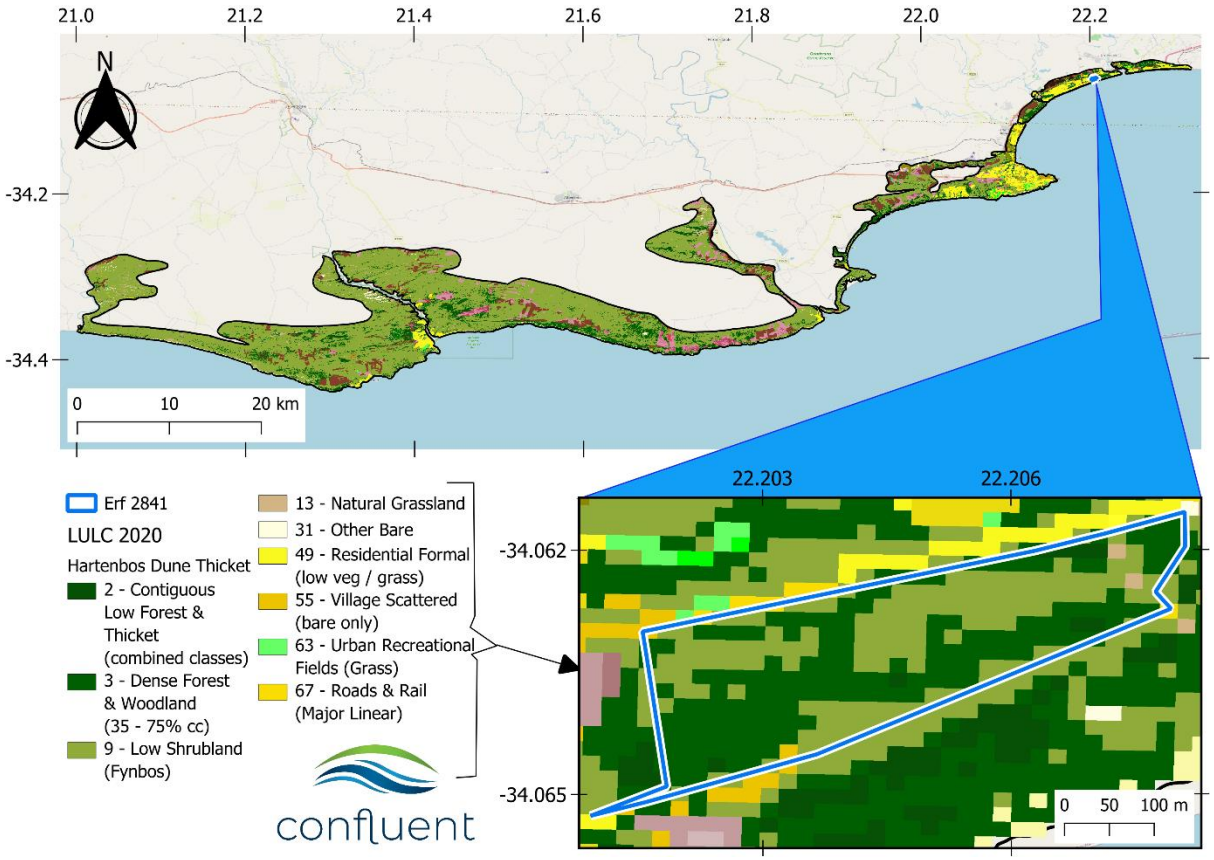

Figure 6: The land-use land-cover for the full mapped extent of Hartenbos Dune Thicket (EN). The legend land cover categories can be viewed here: SANLC (dffe.gov.za).

4.1.4 Western Cape Biodiversity Spatial Plan

The Biodiversity Spatial Plan for the Western Cape (WC BSP) includes the entirety of Erf 2841 as an Other Natural Area (ONA) and a mapped FEPA wetland area as an Ecological Support Area (ESA 1; Fig. 7) for aquatic biodiversity. Nearby, several primary Critical Biodiversity Areas (CBA1) are also mapped, however Erf 2841 itself was not identified as an essential or supporting area required for the Western Cape to meet its biodiversity conservation targets. Explanations of the BSP categories on the site are in Box 1 and the recommended land-uses for the various BSP categories are presented in Appendix 10.1. The reasons for the BSP layers mapped here are discussed below. Black entries apply to the site, grey entries are outside of the scope of this report to provide comment on, and brown entries do not apply to the site:

- **Groot Brak Dune Strandveld** – This vegetation type is mapped nearby, next to the Groot-brakriver east of the property. However it is not the mapped vegetation type of the site, which is Hartenbos Dune Thicket. Both Hartenbos Dune Thicket and Groot Brak Dune Strandveld are endangered (EN) vegetation types, and for this reason this trigger will be considered as valid (where Hartenbos Dune Thicket is the applicable reason instead of Groot Brak Dune Strandveld).
- **Western Cape Milkwood Forests (EN (C))** – This site is mapped as Hartenbos Dune Thicket, and from a review of past studies of the erf, it is known to be dominated by milkwood (*Sideroxylon inerme inerme*) and cheesewood (*Pittosporum viridiflorum*)

trees, which are both protected tree species. This site could be considered as counting towards our Milkwood Forests, and this trigger does apply to the site.

- **Coastal Resource Protection – Eden** – This designation emphasizes conservation of coastal ecosystems, which include dunes, estuaries, wetlands, and coastal forests, as well as species unique to these habitats. The trigger aligns with efforts to curb habitat degradation, erosion, and loss of biodiversity due to development pressures, recreational impacts, and other human activities along the coastline. The relevance of this protection measure extends to maintaining ecological corridors, such as the coastal corridor, which are natural linkages that connect critical habitats and allow species to move between them. Coastal corridors are essential for promoting genetic diversity, supporting species migration, and enabling resilience to environmental changes like climate shifts. Within the Eden District, coastal corridors facilitate movement across the landscape for both terrestrial and marine species and help sustain ecosystem services, such as flood regulation and carbon storage, which are vital to both biodiversity and human well-being. In terms of planning and development, the Coastal Resource Protection trigger may impose restrictions on activities within identified areas, requiring environmental assessments and adherence to specific management practices to safeguard biodiversity. This layer of protection ensures that critical coastal habitats and corridors are preserved and that development aligns with sustainable land use objectives.

- **Canca Limestone Fynbos** – This vegetation type is not mapped or confirmed to be present on the site. This reason does not apply to Erf 2841.
- **South Coast Limestone Fynbos Flat Wetland, Unchannelled Valley Bottom Wetland** – A FEPA wetland is mapped in the western portion of the erf, and this is discussed in more detail in the aquatic specialist report for Erf 2841.
- **Water source protection (Groot Brak), & Watercourse protection (Southern Coastal Belt)** – The site is located close to the Great Brakriver, and there is a mapped wetland on the erf. These triggers are expanded upon in the aquatic specialist report for the site, and therefore fall outside of the scope of this report.
- **Bontebok Extended Distribution Range** – The site certainly is home to some small mammals, however an analysis of the suitability of the habitat for Bontebok falls outside of the scope of this report. Refer to the animal specialist report.

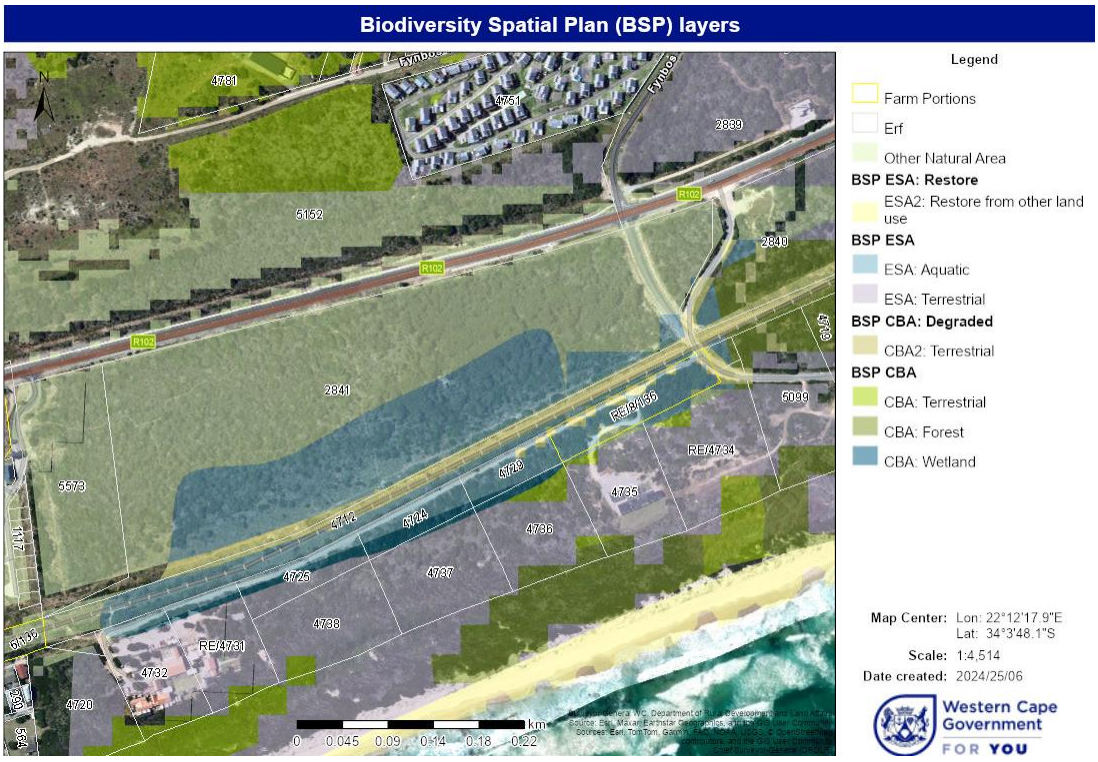

Figure 7: The Western Cape Biodiversity Spatial Plan (WC BSP) categories that have been mapped for Erf 2841.

BOX 1: The Biodiversity Spatial Plan

Critical Biodiversity Area 1

Definition: Areas in a natural condition. Required to meet biodiversity targets for species, ecosystems or ecological processes and infrastructure.

Objective: Maintain in a natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.

Critical Biodiversity Area 2

Definition: Areas in a degraded or secondary condition. Required to meet biodiversity targets for species, ecosystems or ecological processes and infrastructure.

Objective: Maintain in a functional, natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.

Ecological Support Area 1

This applies to the mapped wetland area on Erf 5572, but not to Erf RE/2841

Definition: Not essential for meeting biodiversity targets. An important role in supporting the functioning of PAs or CBAs. Often vital for ecosystem services.

Objective: Maintain in a functional, near-natural state. Some habitat loss is acceptable, provided underlying biodiversity objectives/ecological functioning are not compromised.

BOX 1: The Biodiversity Spatial Plan

Ecological Support Area 2

Definition: Not essential for meeting biodiversity targets. Important in supporting functioning of PAs or CBAs. Often vital for ecosystem services.

Objective: Restore/minimise impact on ecological infrastructure functioning, especially soil and water-related services.

Other Natural Areas

This is the category the majority of Erf RE/2841 is mapped as

Definition: These areas retain most of their natural character and perform biodiversity and ecological infrastructure functions but have not been prioritised in the current Western Cape Biodiversity Spatial Plan.

Objective: Minimise habitat and species loss to ensure ecosystem functionality through strategic landscape planning. Some flexibility in permissible land uses, but authorisation may still be required for high-impact uses.

Protected Areas

Definition: Areas that are proclaimed as protected areas under national (National Environment Management: Protected Areas Act, Act 57 of 2003) or provincial (Mountain Catchment Areas Act, Act no 63 of 1970) legislation.

Objective: Keep in a natural state, with a management plan focused on maintaining or improving biodiversity. A benchmark for biodiversity conservation.

4.1.5 Historical Aerial Imagery

High resolution historical imagery (Fig. 8) can be sourced upon request from the CD: NGI Geospatial porta. Google Earth is also a repository of more recent historical images. The historical imagery of Fig 8 illustrates that that the woody vegetation cover of the site has changed at different points in time. In 1939 the woody cover of Erf 2841 was not continuous, with many paths visible across the property. In 1957, the area that is mapped as a FEPA wetland (although this area is not indicated as a wetland on the revised National Wetland Map 5) had the most woody cover on the site, but it is hard to tell the degree to which this cover was natural. In 1989 the site seems relatively pristine, with clearing only visible around the railway along the southern boundary. However, from the early 2000s onwards, the Australian myrtle / tea tree (*Leptospermum laevigatum*) invasion in the eastern half of the site became very evident. The imagery also show that the myrtle invasion was cleared at some point in the recent past between 2022 and 2023.

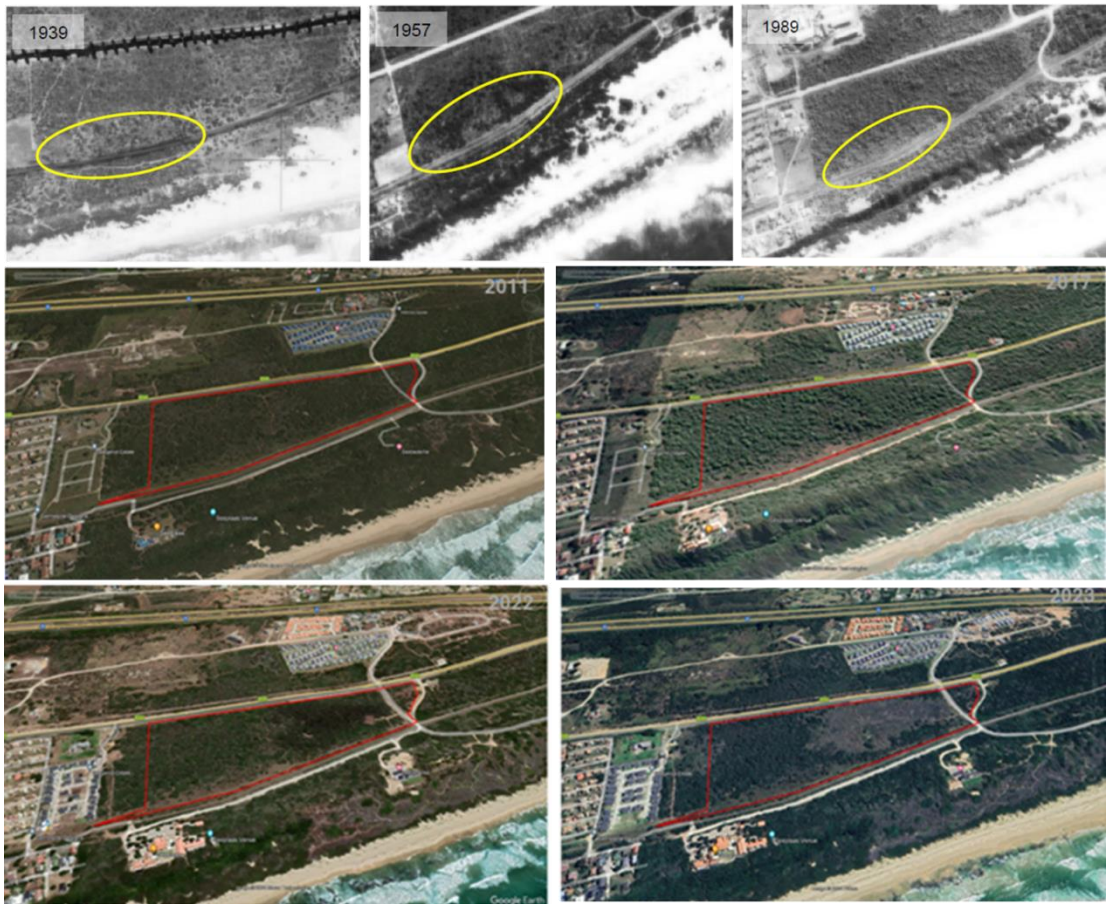

Figure 8: A series of historical imagery sourced from the CD: NGI geospatial portal (top row) and Google Earth (bottom two rows).

4.2 Plant Species

The plant species theme sensitivity of Medium is dependent on the presence, or likely presence, of several plant species of conservation concern (SCC) that are listed on the National Red List (produced by SANBI) as either Vulnerable, Endangered, or Critically Endangered. In addition to the species highlighted by the screening tool, other potential SCC were identified, as well as SCC that could occur on the site that are Near Threatened, Rare, or protected. The Red List categories of all the species listed here are discussed later in the report. The SCC that have the potential to occur on the site include the following, where blue entries were not included in the Screening Tool report for the site.

Agathosma eriantha
Agathosma muirii
Asparagus lignosus
Cullumia carlinoides
Duvalia immaculata
Erica glandulosa subsp. fourcadei
Erica unicolor subsp. mutica
Euchaetis albertiniana
Freesia carryophyllaceae
Gnidia chrysophylla
Hermannia lavandulifolia
Lampranthus fergusoniae
Lampranthus pauciflorus
Lebeckia gracilis
Leucospermum praecox
Muraltia knysnaensis
Selago burchellii
Selago villicaulis
Sensitive species 153
Sensitive species 268
Sensitive species 516
Wahlenbergia polyantha
Sideroxylon inerme inerme
Pittosporum viridiflorum

5. RESULTS: FIELD ASSESSMENT

5.1 Terrestrial Biodiversity

5.1.1 Vegetation & Ecosystem Description

The state of the vegetation on Erf 2841 differs between the eastern subdivision and the western subdivision of the original Erf. The western half is far more intact, closed-canopy thicket, where the eastern half is an open canopy, recently cleared landscape with some recovering thicket clumps around the peripheral portions of the Erf (Fig. 9). The area directly north of the train track remains an open grassy area (Fig. 9 A).

The majority of the area cleared of Australian myrtle / tea tree (*Leptospermum laevigatum*) is currently occupied by pioneering plant species, most notably bietou (*Osteospermum moniliferum*; Fig. 9 B). Around the "Bietou veld" are areas where thicket clumps persist and are busy slowly recovering (Fig. 9 C & E). However, thicket recovery is incredibly difficult to achieve without active restoration effort. Thicket ecosystems, particularly in degraded landscapes, struggle to regenerate fully on their own because of several factors, including soil degradation, limited seed dispersal, and invasive species competition. Without active and long-term intervention, natural regrowth is often slow and insufficient to restore the structural and functional diversity of the original vegetation (Hall et al., 2003). Recovery periods of hundreds of years for severely degraded thicket has been reported in Albany thicket types. Additionally, thickets often contain long-lived species, so that their life history strategies mean that recruitment via a seed bank is often very limited in degraded areas (Midgley & Cowling, 1993).

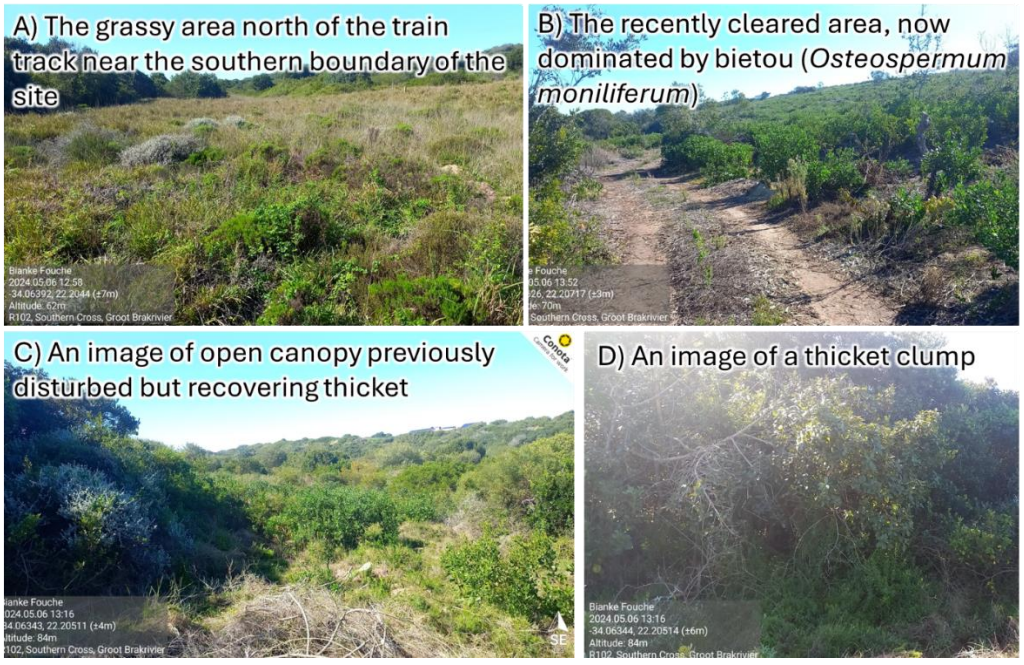

Figure 9: Images taken in the eastern subdivided section of Erf RE/2841, where the development considered in this report is planned

5.1.2 Site Ecological Importance (SEI)

The site ecological importance map is intended to provide a more refined overview of the sensitivity of the various habitats that have been identified on the site (Fig. 10). The benchmark

for “fully natural” vegetation is defined according to the Vegetation Assets, States, and Transitions (VAST) framework, which considers natural vegetation to be the state pre-European conditions (i.e., period prior to the 1700s or 1600s). The VAST framework is summarised in Table 2 below. The VAST framework works as an aid for the SEI calculation as it helps to (Thackway & Lesslie, 2006):

- Describe and accounts for changes in the condition and status of vegetation.
- Make explicit links between land management (current) and vegetation modification.
- Provide a mechanism for describing the consequences of certain land management on vegetation.
- Contribute to the analysis of terrestrial ecosystem services that are provided by vegetation, including comparison between various land-use

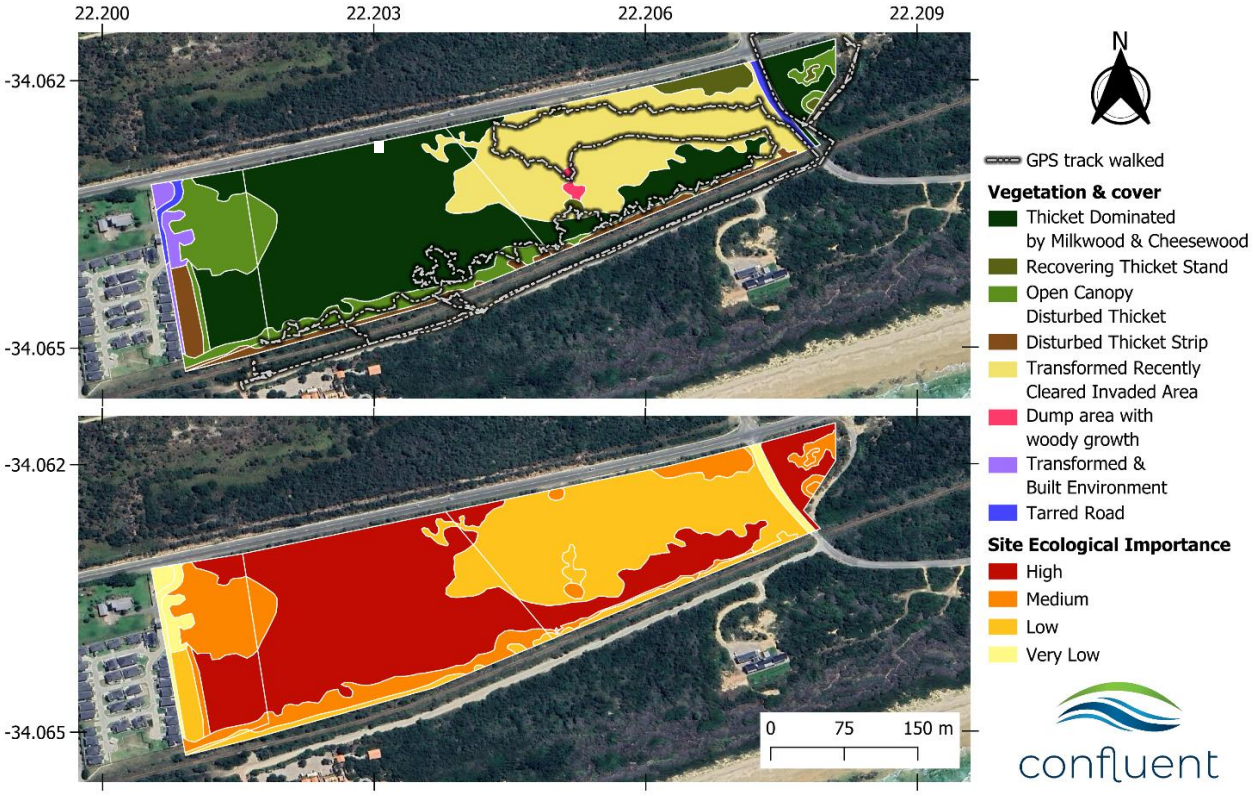

Figure 10: Maps indicating Top) the vegetation present on Erf RE/2841 as well as Erf 5572 & 5573 (for completeness) and Bottom) the corresponding site ecological Importance (SEI) categories that are applicable to the different areas.

The cleared thicket areas on this site have been assessed as having a Low Site Ecological Importance (SEI) due to significant transformation resulting from invasive species (see Table 3). The former dominance of invasives has left the area substantially degraded, and the resilience of the native thicket community – especially in terms of biodiversity—has been markedly compromised. While some native thicket clumps are present and slowly regenerating, this recovery process is outpaced by the regrowth of invasives, indicating an ecosystem that remains far from its pre-invaded state. Given that thicket vegetation is generally slow to recover and does not rely on fire for regeneration, the area’s SEI remains low, reflecting the site’s reduced ecological function and the challenges to achieving natural thicket resilience without long-term active intervention.

Table 2: Vegetation Assets, States, and Transitions (VAST) framework with columns representing states and shifts between them defined as transitions, as laid out in (Lesslie et al., 2010; Thackway & Lesslie, 2006).

Increasing modification

		Native vegetation cover Dominant plant species indigenous to the locality and spontaneous in occurrence, i.e. a vegetation community described using definitive vegetation types relative to estimated pre 1750 types				**Non-native vegetation cover** Dominant structuring plant species indigenous to the locality but cultivated; alien to the locality and cultivated; or alien to the locality and spontaneous		
Vegetation cover classes		**Class 0: RESIDUAL BARE** Areas where native vegetation does not naturally persist	**Class I: RESIDUAL** Native vegetation community structure, composition, and regenerative capacity intact—no significant perturbation from land use or land management practice. Class I forms the benchmark for classes II to VI	**Class II: MODIFIED** Native vegetation community structure, composition and regenerative capacity intact—perturbed by land use or land management practice	**Class III: TRANSFORMED** Native vegetation community structure, composition and regenerative capacity significantly altered by land use or land management practice	**Class IV: REPLACED -ADVENTIVE** Native vegetation replacement—species alien to the locality and spontaneous in occurrence	**Class V: REPLACED -MANAGED** Native vegetation replacement with cultivated vegetation	**Class VI: REMOVED** Vegetation removed
Diagnostic criteria	Current regenerative capacity	Natural regenerative capacity unmodified—ephemerals and lower plants	Natural regenerative capacity unmodified	Natural regeneration tolerates or endures under past and or current land management practices	Natural regenerative capacity limited or at risk under past and or current land use or land management practices. Rehabilitation and restoration possible through modified land management practice	Regeneration of native vegetation community has been suppressed by ongoing disturbances of the natural regenerative capacity; limited potential for restoration	Regeneration of native vegetation community lost or suppressed by intensive land management; limited potential for restoration	Nil or minimal
	Vegetation structure	Nil or minimal	Structural integrity of native vegetation community is very high	Structure is predominantly altered but intact, e.g. a layer or strata and or growth forms and or age classes removed	Dominant structuring species of native vegetation community significantly altered, e.g. a layer or strata frequently removed	Dominant structuring species of native vegetation community removed or predominantly cleared or extremely degraded	Dominant structuring species of native vegetation community removed	Vegetation absent or ornamental
	Vegetation composition	Nil or minimal	Compositional integrity of native vegetation community is very high	Composition of native vegetation community is altered but intact	Dominant structuring species present—species dominance significantly altered	Dominant structuring species of native vegetation community removed	Dominant structuring species of native vegetation community removed	Vegetation absent or ornamental

The SEI calculation reasons are given in Table 3, and mitigation recommendations for the various ecological importance categories are in in Table 4. The method that was used to calculate the SEI map provided is given in Appendix 10.3.

Table 3: The evaluation of the SEI for the vegetation / habitats present within and surrounding the proposed development.

Land use / Land cover	Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience (RR)	Site Ecological Importance (SEI)
Thicket dominated by Milkwood and Cheesewood trees	**High** Likely occurrence of CR, EN, VU species that have a global EOO of > 10 km^2 listed under criterions other than A.	**High** Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches.	**Medium** VAST class I: Residual Thicket habitat will recover slowly following a disturbance and will be more prone to being taken over by invasive species.	**High** BI: High RR: Medium
Open Canopy Disturbed Thicket	**Medium** likely occurrence of populations of NT species, threatened species (CR, EN, VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals.	**High** Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches	**Medium** VAST class II: Modified Thicket habitat will recover slowly following a disturbance and will be more prone to being taken over by invasive species.	**Medium** BI: Medium RR: Medium
Recovering Thicket stands	**Medium** likely occurrence of populations of NT species, threatened species (CR, EN, VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals.	**High** Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches	**Medium** VAST class II: Modified Thicket habitat will recover slowly following a disturbance and will be more prone to being taken over by invasive species.	**Medium** BI: Medium RR: Medium
Disturbed Thicket strip	**Low** No confirmed or highly likely populations of SCC.	**Medium** Mostly minor current negative ecological impacts with some major impacts (e.g. established population of alien and invasive flora) and a few signs of minor past disturbance. Moderate rehabilitation potential.	**Medium** VAST class III: Transformed Thicket habitat will recover slowly following a disturbance and will be more prone to being taken over by invasive species.	**Low** BI: Low RR: Medium
Land use / Land cover	**Conservation Importance (CI)**	**Functional Integrity (FI)**	**Receptor Resilience (RR)**	**Site Ecological**

				Importance (SEI)
Dump area with woody growth	**Low** < 50% of receptor contains natural habitat with limited potential to support SCC.	**Medium** Mostly minor current negative ecological impacts with some major impacts (e.g. established population of alien and invasive flora) and a few signs of minor past disturbance. Moderate rehabilitation potential.	**Medium** VAST class III: Transformed Thicket habitat will recover slowly following a disturbance and will be more prone to being taken over by invasive species.	**Low** BI: Low RR: Medium
Transformed Recently Cleared invaded area	**Low** < 50% of receptor contains natural habitat with limited potential to support SCC.	**Medium** Mostly minor current negative ecological impacts with some major impacts (e.g. established population of alien and invasive flora) and a few signs of minor past disturbance. Moderate rehabilitation potential.	**Medium** VAST class III: Transformed Thicket habitat will recover slowly following a disturbance, and invasive myrtles have a moderate likelihood of becoming dominant here again.	**Low** BI: Low RR: Medium
Tarred roads & Transformed & Built Environment	**Very Low** No natural habitat remaining.	**Very Low** Several major current negative ecological impacts.	**High** VAST classes V & VI: Replaced – managed & Removed Habitat that is unable to recover from major impacts.	**Very Low** BI: Very Low RR: High

Table 4: The mitigation guidelines for interpreting the various SEI categories for the proposed development activities.

Site Ecological Importance	Recommendation for activities based on the mitigation hierarchy
Very High	Avoidance mitigation – no destructive development activities should be considered.
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.
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.

5.2 Plant Species

5.2.1 Provisional Plant Species List

A species accumulation curve for all the species recorded on the site during the assessment are presented in Fig. 11. The curve does not flatten out by the end of the 2-and-a-half-hour field assessment period, which means than many of the species on the site were not recorded by the end of the assessment. By extension, the likelihood that rarer and less obvious SCC were missed on the site are high, but only within the Medium and High SEI areas. In Low SEI areas, SCC are unlikely to be present. The accumulation curve below represents the Medium and High SEI areas, as the Low SEI areas were quite depauperate. Depauperate vegetation refers to plant communities that are lacking in species diversity or are impoverished in terms of the number and variety of species present. This condition typically arises due to environmental stressors such as overgrazing, habitat disturbance, invasive species, or nutrient imbalances, all of which prevent the establishment or maintenance of a full and diverse plant community. Depauperate vegetation is often characterized by the dominance of a few resilient or opportunistic species (in this case *Osteospermum moniliferum* at the time of the survey). In ecological terms, depauperate vegetation is often an indicator of disturbance or degradation. It can occur in areas where ecosystems have been heavily altered or where conditions do not support a rich variety of plant life. For example, areas that were once part of biodiverse habitats

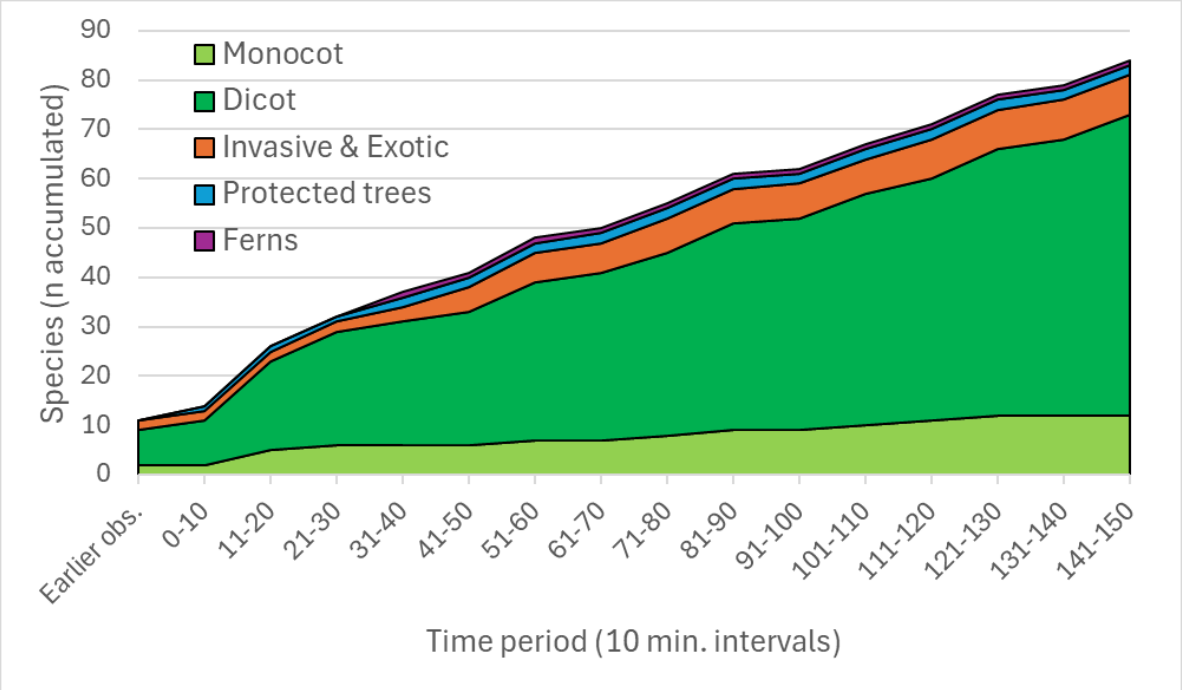

Figure 11: A plant species accumulation curve for the site assessment.

All species that were observed during the site visit are listed in Table 5. The site assessment species list is not exhaustive, as discussed above. Two protected tree species are very abundant on Erf 2841, namely Milkwood trees (*Sideroxylon inerme inerme*, no. 579) and cheesewood trees (*Pittosporrum viridiflorum*, no. 139). A survey of all the locations of these two tree species has already been conducted, and due to the sheer abundance of the trees, another survey of the exact locations of the trees are not included in the scope of this project. However, many seedlings were present on the site, and it should be noted that any survey of

existing trees on the site will inevitably result in some trees being missed in dense thicket, and smaller trees that grow are also likely to change the outcome of the tree survey over time. Nono of the SCC listed in the screening tool, or SCC flagged as occurring nearby on iNaturalist, were found on the site. An analysis of the likelihood of occurrence of the SCC flagged is discussed in the next section of this report.

Several invasive species were present on the site (see Table 5) that all have the potential to become more invasive and dominant over time. It is therefore important that an alien management plan be compiled / used in the site. The categories for the invasive species listed according to the National Environmental Management: Biodiversity Act (NEMBA) is explained in Box 2.

Table 5: A provisional species list made for plants found during the site assessment on Erf 2841. Orange entries represent species that are exotic but not listed as invasive, red entries are invasive plants, and green entries represent the protected tree species that were found on the site.

Family	Species	Common name	Information
Liliopsida (Monocotyledons)			
AMARYLLIDACEAE	*Haemanthus sanguineus*	Smooth Bloodlily	This species was common in shaded sandy areas between intact thicket clumps of Erf RE/2841.
ASPARAGACEAE	*Asparagus aethiopicus*	African Asparagus	
ASPARAGACEAE	*Asparagus asparagoides*	Cape Smilax	
ASPHODELACEAE	*Aloe maculata*	soap aloe	
CYPERACEAE	*Ficinia bulbosa*	Bulbous Sedge	
CYPERACEAE	*Ficinia lateralis*	Side Clubrush	
CYPERACEAE	*Hellmuthia membranacea*	Helmet Sedge	
IRIDACEAE	*Chasmanthe aethiopica*	Cobra Lily	
POACEAE	*Chloris gayana*	Rhodes Grass	
POACEAE	*Ehrharta villosa*	Pipe Grass	
POACEAE	*Imperata cylindrica*	Cogon grass	
POACEAE	*Stenotaphrum secundatum*	Saint Augustine grass	
RESTIONACEAE	*Thamnochortus insignis*	True Thatchreed	
Magnoliopsida (Dicotyledons)			
AIZOACEAE	*Carpobrotus sp.*	sea figs	
AIZOACEAE	*Conicosia pugioniformis*	Pig's-root	
AIZOACEAE	*Delosperma inconspicuum*	White Gardenroute Sheepfig	
AIZOACEAE	*Mesembryanthemum aitonis*	Coast Solfig	
AIZOACEAE	*Tetragonia fruticosa*	Sprawling Seacoral	
ANACARDIACEAE	*Searsia crenata*	Crowberry	
ANACARDIACEAE	*Searsia glauca*	Blue Kunibush	
APOCYNACEAE	*Carissa bispinosa*	num-num	
APOCYNACEAE	*Cynanchum obtusifolium*	Roundleaf Buckhorn	
ARALIACEAE	*Cussonia thyrsiflora*	Cape Coast Cabbagetree	
ASTERACEAE	*Arctotheca prostrata*	Prostrate Capeweed	

Family	Species	Common name	Information
ASTERACEAE	*Chrysocoma ciliata*	Bitterbush	
ASTERACEAE	*Erigeron sumatrensis*	tropical horseweed	Exotic from South America
ASTERACEAE	*Felicia muricata*	Pale Felicia	
ASTERACEAE	*Helichrysum foetidum*	Stinking Everlasting	
ASTERACEAE	*Helichrysum patulum*	Honey Everlasting	
ASTERACEAE	*Metalasia densa*	Fynbos Blombush	
ASTERACEAE	*Osteospermum moniliferum*	Bietou	
ASTERACEAE	*Senecio burchellii*	Kill Ragwort	
ASTERACEAE	*Senecio ilicifolius*	Kowanna Ragwort	
CACTACEAE	*Opuntia ficus-indica*	Indian fig opuntia	Invasive; NEMBA category 1b & CARA category 1
CARYOPHYLLACEAE	*Pollichia campestris*	Waxberry Plant	
CELASTRACEAE	*Mystroxylon aethiopicum*	Kooboo-berry	
CELASTRACEAE	*Pterocelastrus tricuspidatus*	Candlewood	
CELASTRACEAE	*Putterlickia pyracantha*	Bastard Spikethorn	
CRASSULACEAE	*Cotyledon orbiculata*	pig's ear	
EBENACEAE	*Diospyros dichrophylla*	Poison Starapple	
ERICACEAE	*Erica discolor*	Discolorous Heath	
ERICACEAE	*Erica rosacea*	Rose Heath	
FABACEAE	*Acacia cyclops*	western coastal wattle	Invasive; NEMBA category 1b & CARA category 2
FABACEAE	*Indigofera priorii*	Squashed Indigo	
GENTIANACEAE	*Chironia baccifera*	Christmas Berry	
GERANIACEAE	*Pelargonium betulinum*	Camphor Storksbill	
GERANIACEAE	*Pelargonium capitatum*	rose-scented geranium	
LAMIACEAE	*Leonotis ocymifolia*	Rock Lionspaw	
LAMIACEAE	*Plectranthus verticillatus*	Whorled plectranthus	
LAMIACEAE	*Salvia aurea cf. africana-lutea*	Brown Sage	
MALVACEAE	*Grewia occidentalis*	Crossberry	
MALVACEAE	*Hermannia holosericea*	Kwaaiman Dollsrose	
MELIACEAE	*Melia azedarach*	Chinaberry	Invasive; NEMBA category 1b, but 3 in urban areas & CARA category 3
MENISPERMACEAE	*Cissampelos capensis*	Cape Moonseed Vine	
MYRTACEAE	*Leptospermum (Gaudium) laevigatum*	Australian Tea Tree	Invasive; NEMBA category 1b & CARA category 1
OLEACEAE	*Olea europaea cuspidata*	African olive	
OLEACEAE	*Olea exasperata*	Dune olive	
OXALIDACEAE	*Oxalis caprina*	Goat's-foot	
OXALIDACEAE	*Oxalis ciliaris*	Fringe Sorrel	
OXALIDACEAE	*Oxalis depressa*	Early Sorrel	

Family	Species	Common name	Information
OXALIDACEAE	*Oxalis pes-caprae*	Bermuda buttercup	
PERACEAE	*Clutia laxa*	Twiggy Clut	
PITTOSPORACEAE	*Pittosporum viridiflorum*	Cape Cheesewood	Protected tree species no 139. Dominant species in the thicket. It is not possible to tally all the trees in the thicket, and there are a large number of seedlings also present.
POLYGALACEAE	*Muraltia cf. ericoides*	Purplegorses	
POLYGALACEAE	*Polygala myrtifolia*	Sweet Pea Shrub	
RANUNCULACEAE	*Knowltonia vesicatoria*	Common Burnleaf	
ROSACEAE	*Cliffortia falcata*	Curly Caperose	
RUTACEAE	*Agathosma apiculata*	Garlic Buchu	
RUTACEAE	*Euchaetis albertiniana*	Albertinia Beardbuchu	
SALICACEAE	*Scolopia zeyheri*	Thorn Pear	
SALVADORACEAE	*Azima tetracantha*	Needle Bush	
SANTALACEAE	*Colpoon compressum*	Cape Sumach	
SAPOTACEAE	*Sideroxylon inerme inerme*	Southern White Milkwood	Protected tree species no 579. Dominant species in the thicket. It is not possible to tally all the trees in the thicket, and there are a large number of seedlings also present.
SCROPHULARIACEAE	*Chaenostoma revolutum*	Fineleaf Skunkbush	
SOLANACEAE	*Datura stramonium*	jimsonweed	Invasive; NEMBA category 1b & CARA category 1
SOLANACEAE	*Solanum africanum*	drunken berry	
THYMELAEACEAE	*Passerina corymbosa*	Common Gonna	
THYMELAEACEAE	*Struthiola hirsuta*	Shaggy Capespray	
VERBENACEAE	*Lantana camara*	common lantana	Invasive; NEMBA category 1b & CARA category 1
ZYGOPHYLLACEAE	*Roepera morgsana*	Twinleaves	
Polypodiopsida			
PTERIDACEAE	*Cheilanthes viridis*	Green Cliff Brake	

BOX 2: NEMBA categories for listed invasive alien plants.

Category 1a

Species which must be combatted or eradicated.

- Immediate steps must be taken to eradicate and combat or eradicate.
- Authorised officials must be permitted to enter properties to monitor, assist with or implement the combatting or eradication.
- If an Invasive Species Management Programme has been developed, a person must combat or eradicate the listed invasive species in accordance with such programme.

Category 1b

Species which must be controlled.

- Property owners and organs of state must control the listed invasive species within their properties.
- If an Invasive Species Management Programme has been developed, a person must control the listed invasive species in accordance with such programme.
- Authorised officials must be permitted to enter properties to monitor, assist with or implement the control of listed species.
- Any Category 2 listed species (where permits are applicable) which fall outside of containment and control, revert to Category 1b and must be controlled.
- Any Category 3 listed species which occur within a Protected Area or Riparian (wetland) revert to Category 1b and must be controlled.
- The Minister may require any person to develop a Category 1b Control Plan for one or more Category 1b species occurring on a property.

Category 2

Any species listed under Category 2 requires a permit issued by the Department of Forestry, Fisheries and the Environment (DFFE) to carry out a restricted activity (See Permit Applications.)

- A permit is required to carry out any restricted activity.
- No person may carry out a restricted activity in respect of a Category 2 listed invasive species without a permit.
- A person in control of a Category 2 listed species must take all necessary measures to ensure that specimens of the species do not spread outside of the land or area, such as an aviary) specified in the permit.

Category 3

Category 3 listed invasive species are subject to certain exemptions in terms of section 70(1)(a) of the NEMBA Act, which applies to the listing of alien invasive species.

- Any category 3 listed plant species that occurs in riparian areas must be considered as category 1b and the appropriate control measures instituted.

5.2.2 Species of Conservation Concern Likelihood of Occurrence

All SCC that may be present on the site have been identified using the screening tool report for the site, iNaturalist nearby observations, and the POSA database (Table 6). A liste was provided earlier in this report differentiating between the SCC listed in the Screening Tool, and others that have been added to the list from nearby observations and other available information. The Red List reasons for applying different statuses to species are presented in Appendix 10.2.

The discussion of Table 6 is an attempt at accounting for the possibility that some SCC could have been missed during the site assessment, especially since none of the listed SCC were found on the site during the site assessment. The likelihood that an SCC occurs on the site is presented in Table 6, so that even though SCC were not found during the survey (apart from the two protected tree species), there is a high likelihood that some SCC occur here. The high likelihood of occurrence of some SCC are due to the explanations and specialist understanding of the species, as presented in Table 6. The likelihood of occurrence is made even more probable, given the limitations of this study, as illustrated by the still increasing species accumulation curve in Fig. 11.

Confirming the presence or absence of Species of Conservation Concern (SCC) with complete certainty is inherently challenging due to limitations in the survey approach, plant life cycles, and ecological complexity. Botanical surveys are typically constrained by seasonal visibility, as some plants may only flower at specific times of the year, and others may remain dormant or not be identifiable outside particular growth phases. Additionally, the presence of invasive species and past disturbances can obscure SCC, making them harder to detect, even with multiple surveys. Even with multiple surveys, it is still possible for SCC to be missed, especially if they are sparsely distributed or if they require very specific conditions in order to grow or flower.

In the event that any SCCs are discovered, mitigation can include measures such as adjusting development plans to avoid areas with high SCC density, implementing translocation efforts, and enhancing conservation management on the remaining areas to support SCC persistence. For developments in ecologically sensitive sites, these measures allow for some balance between conservation goals and development needs while respecting the critical habitat requirements of SCCs.

The Riversdale Bluebell (*Gladiolus rogersii*) is a Least Concern (LC) species which is not included in the table as it is not considered an SCC. This species would have a High likelihood of occurrence as the habitat is correct, and it has been observed nearby in Tergniet. *Gladiolus rogersii* is not explicitly listed as a protected species under South Africa's National Environmental Management: Biodiversity Act (NEMBA) or in the Species Protection Guidelines. However, it is native to the Western Cape and considered regionally significant, as it is part of the indigenous fynbos flora.

Table 6: All plant SCC and protected species flagged for the site and nearby surroundings, and their probability of occurrence on the site.

Species	Common name	Family	Growth form	Status	Probability of occurrence
Lampranthus fergusoniae	Limestone brightfig	AIZOACEAE	Succulent	Rare	**Low** This Rare species is found in Hartenbos Dune Thicket in calcareous soils associated with limestone. It is unlikely to be on the site.
Lampranthus pauciflorus	Beach brightfig	AIZOACEAE	Succulent	Endangered B1ab(ii,iii,iv,v)	**Moderate** Rocky coastal slopes and clayish hills. This species could conceivably be on the site,
Duvalia immaculata	Succulent	APOCYNACEAE	Succulent	Endangered B1ab(ii,iii,iv,v)	**Moderate** Found from Cape Infanta to Klein Brak River in Arid fynbos-renosterveld ecotone vegetation, on shale and limestone.
Asparagus lignosus	Fire asparagus	ASPARAGACEAE	Climbing perennial	Near Threatened A2c	**Moderate** Once widespread species that is now quite rare across its range.
Sensitive species 268		ASPHODELACEAE	Succulent	Endangered B1ab(iii,iv,v)	**Very Low**
Sensitive species 516		ASPHODELACEAE	Succulent	Endangered A2cd+4cd; B1ab(i,ii,iii,iv,v) +2ab(i,ii,iii,iv,v)	**Low**
Cullumia carlinoides	Limestone snakethistle	ASTERACEAE	Perennial	Near Threatened B1ab(ii,iii,iv,v)	**Moderate** Found near the coast between Duiwenhoksriver and Herold's Bay. This species could conceivably be on the site in areas with open canopy vegetation.
Wahlenbergia polyantha	Capebells	CAMPANULACEAE	Herbaceous perennial	Vulnerable B1ab(ii,iii,iv,v)	**Moderate** Habitat could support this species.
Erica glandulosa subsp. fourcadei	Ridges glandular heath	ERICACEAE	Shrub	Vulnerable B1ab(ii,iii,iv,v)	**High** This species is associated with coastal fynbos between Mossel Bay and Cape St. Francis. It is likely that it could be on the site, as it has been observed at the edge pf coastal thickets too (pers. obs.)
Lebeckia gracilis	Slender ganna	FABACEAE	Shrub	Endangered A2bc; B1ab(ii,iii,iv,v)	**Moderate** This species inhabits coastal fynbos, renosterveld and strandveld in deep, sandy soil below 300 m. This is a long-lived resprouter with a generation length of 50-80 years. It is conceivable that it could be on the site.
Freesia carryophyllaceae	Fragrant kammetjie	IRIDACEAE	Geophyte	Near Threatened B1ab(i,ii,iii,iv,v)	**Low** Usually the detection likelihood of this species is very good, and since it was

Species	Common name	Family	Growth form	Status	Probability of occurrence
					not seen during the site assessment, this species is not in the propoised disturbance footprint, and is not likely to be on the remainder of the site.
Hermannia lavandulifolia	Lavender-leaved dollrose	MALVACEAE	Herbaceous perennial	Vulnerable A2c	**High** This species is often found on disturbed areas, and it is possible that it is in the site and was overlooked during the assessment.
Pittosporum viridiflorum	Cheesewood	PITTOSPORACEAE	Tree	Protected tree 139	**Confirmed** These trees were dominant in the thicket-forest on the site.
Muraltia knysnaensis	Garden Route purplegorse	POLYGALACEAE	Perennial	Endangered B1ab(ii,iii,iv,v)	**Low** It is conceivable that this species could be found here, although there are no nearby reliable observations.
Leucospermum praecox	Mossel Bay pincushion	PROTEACEAE	Shrub	Vulnerable A2c+3c+4c	**Very Low** The past disturbance of the site makes this an unlikely species to be found here.
Sensitive species 153		RUSCACEAE	Tuberous perennial	Endangered B1ab(ii,iii,v)+2ab(ii,iii,v)	**Moderate**
Agathosma eriantha	Ridged buchu	RUTACEAE	Shrub	Vulnerable B1ab(ii,iii,iv,v)	**Moderate** Found from Bredasdorp to Stilbaai. Plants grow in sea level flats in dry clay soil interspersed with limestone chips. It is conceivable that it might be on the site.
Agathosma muirii	Heart buchu	RUTACEAE	Shrub	Vulnerable A4abc	**High** From Stilbaai to Mossel Bay in deep coastal sands associated with limestone. Development & invasions threatened populations. There is a high likelihood that this species is present on the site.
Euchaetis albertiniana	Albertinia bearded buchu	RUTACEAE	Shrub	Endangered A2c	**High** The habitat can potentially support this species in the future, and David Hoare has observed this species nearby.
Sideroxylon inerme inerme	White Milkwood	SAPOTACEAE	Tree	Protected tree 579	**Confirmed** These trees were dominant in the thicket-forest on the site.
Selago burchellii	Garden Route Bitterbush	SCROPHULARIACEAE	Herbaceous perennial	Vulnerable B1ab(ii,iii,iv,v)	**Moderate** This species is associated with coastal fynbos, It is conceivable that it could be on the site.
Selago villicaulis	Dune bitterbush	SCROPHULARIACEAE	Herbaceous perennial	Vulnerable B1ab(ii,iii,iv,v)	**High** Found in Hartenbos Dune Thicket, and Goukamma

Species	Common name	Family	Growth form	Status	Probability of occurrence
					Dune Thicket. This species could be on the site.
Gnidia chrysophylla	Gold capesaffron	THYMELAEACEAE	Perennial	Near Threatened B1ab(i,ii,iii,iv,v)	**Moderate** It is conceivable that this species could be on the site.

6. SITE SENSITIVITY VERIFICATION

6.1 Terrestrial Biodiversity

The terrestrial biodiversity theme sensitivity is confirmed to have a **Very High** sensitivity, due to the applicability of the triggered Biodiversity Priority Areas (BPAs) of the Screening tool report (Table 7). The BPAs that were triggered are discussed below, as an explanation of the confirmed sensitivity of the site.

Table 7: The original triggers for the terrestrial biodiversity theme sensitivity. Grey entries represent reasons that do not apply to the site, and green entries do apply to the site.

Sensitivity layer	Reasoning & applicability
Ecological Support Areas (ESAs)	The ESA was not mapped in the Eastern subdivided section of Erf 2841 and does not apply to the site. The easter portion is mapped as an Other Natural Area (ONA) and is not critical for the Western Cape to meet Biodiversity targets.
Red Listed Ecosystems	Hartenbos Dune Thicket (EN) is mapped here and is confirmed on the site. The site could also potentially count towards the EN milkwood thicket-forest inventory of the Western Cape. The recovering clumps of thicket on the site, as well as the large number of tree seedlings observed means that the thicket is slowly returning on the site. The pioneer bietou (*Osteospermum moniliferum*) on the recently cleared area of the site also indicates that a seed bank is still intact in this section of the site despite the previous severe invasion by Auatralisn myrtle (*Leptospermum laevigatum*). Furthermore, the author is confident that the site can recover back to a functional near-natural thicket if ongoing alien clearing effort occurs on the site.

6.2 Botanical Diversity

The botanical sensitivity on the site is confirmed to be **High**, due to the highly likely presence of several SCC evaluated in this report. Two protected trees are also dominant on the site, namely Milkwood (*Sideroxylon inerme inerme*, protected tree number 579) and Cheesewood trees (*Pittosporum viridiflorum*, protected tree number 139).

7. IMPACT ASSESSMENT

For any impact assessment, the mitigation hierarchy must be kept in mind (Fig. 12; Ekstrom et al., 2015) in mind. If mitigation measures are unlikely to be effective at minimising large impacts, then avoidance mitigation must be implemented. If an impact cannot be prevented, then minimisation mitigation is preferred. The methods used for this impact assessment is provided in Appendix 10.4.

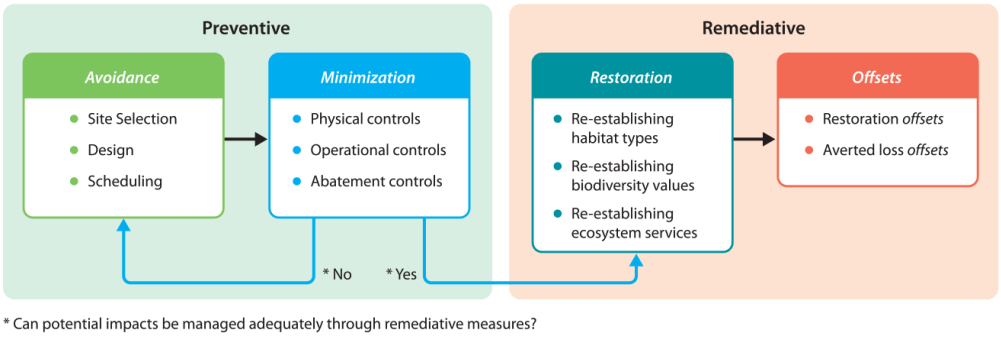

Figure 12: The iterative process of avoiding and minimising the predicted impacts on biodiversity and ecosystem services, as described in (Ekstrom et al., 2015).

7.1 Current Impacts

The main current negative impacts on the site are:

- The landfill / garden dump area in the eastern subdivision of Erf 2841 is a hotspot for the introduction of new invasive plant species to the site and altering the soil characteristics on the site. It is also a hazard for people on the site.
- Existing invasive alien plants like Rooikrans (*Acacia cyclops*), the few remaining Australian myrtle trees (after the clearance of the large monoculture stand in 2022/3), and prickly pears. These invaders pose a threat to the future recovery and persistence of a biodiverse thicket on the site, even though they were not dominant monocultures at the time of writing this report (because these species can grow quickly, and “invade” over short periods).
- The grassy area north of the railway will likely always remain modified.

7.2 Cumulative Impacts

The most intuitive cumulative impacts on the site are related to the potential for the Erf to become invaded with a host of invasive species over time, especially Australian myrtle (*Leptospermum laevigatum*) and Rooikrans (*Acacia cyclops*). The dumping site on the Erf also has the potential to have long-lasting cumulative impacts on the site if it is not cleared up and future dumping prevented. Alien clearing on Seegenot Erf RE/2841 (eastern portion) will require long-term commitment, as the surrounding landscape is likely to remain heavily invaded. The implementation of the mitigation in this impact assessment will lead to reduced pressure from invasive plants, and a reduction in litter in the landscape. Information on trees of Hartenbos Dune Thicket may also inspire others to take better care of their properties. The impact assessment for this proposed development will include the analysis of the following alternative development solutions:

1. An evaluation of impacts associated with the current SDP layout on Erf RE 2841 only.

2. An evaluation of the no-go scenario, where no development will take place in the eastern portion of Erf 2841.
3. IMPACTS ONE SURROUNDING ENVIRONMENTS – BE MORE CLEAR ON THAT

7.3 Construction Phase

The construction phase for this project will be implemented in phases, as indicated on the site development plan (SDP; Fig. 2). The construction phase will have the most severe impacts on the vegetation and habitats of the site because of the permanent loss and high intensity activities associated with this phase.

7.3.1 A loss of Hartenbos Dune Thicket (EN) habitat due to earthworks and other construction related activities for the eastern portion of Erf 2841.

Description: The proposed development of ca. 60% of the eastern portion of Erf RE/2841 could potentially result in the permanent loss and fragmentation of Hartenbos Dune Thicket (EN) which is currently in the process of recovering following occupation by invasive Australian myrtles. The impact assessment is illustrated in Table 8.

Impact consequences:

1. Fragmentation and loss of an endangered (EN) ecosystem type (Hartenbos Dune Thicket).
2. The loss of habitat that could have counted towards the Western Cape Milkwood Forest inventory.
3. Although this represents an insignificant loss (i.e., 0.01 % of the total remaining area of Hartenbos Dune Thicket), it does contribute towards a cumulative loss of Hartenbos Dune Thicket due to development, which over time could lead to a negative change in the conservation status of this vegetation type.

Mitigation:

1. The disturbance footprint of proposed developments should be clearly defined and demarcated to prevent unnecessary damage to the surrounding environment.
    a. Protected trees, and other large trees on the site that could still be protected must be marked on the site. The marked trees are to be left undisturbed during construction, and this could be made easier by using wooden boxes around the trees (see Fig. 13).

Figure 13: An example of a construction site with protected and other indigenous trees marked and sectioned off from the rest of the construction site. Each tree and box was marked, and interesting facts about the species and its ecology was provided on the construction site.

b. Construction netting and fencing must be used to clearly indicate construction areas (Fig. 14). Shade cloth used as fencing should be hammered into the ground using wooden pegs.

c. Clear signs for “no-go” areas for vehicles and personnel should be placed strategically on the site. No-go areas are anywhere outside of the direct area of influence of the construction phase.

Figure 14: Examples of construction fencing that can be used on the site.

d. A turning circle and parking area for construction and delivery vehicles may only take place in areas that are already cleared, i.e., not between the railway and development area where some thicket vegetation remains outside of the PAOI.

e. No delivery vehicles are allowed in fynbos and thicket vegetation.

f. For once off deliveries, clear indications on the nearby roads should be put up to guide truck drivers to the construction site, thus avoiding divers getting lost and causing unnecessary disturbance.

2. Weather reports must be checked daily to avoid heavy machinery and activities on the site during rainy weather. Following a rainfall event (excluding short periods of gentle, light rain), all construction on the site must cease temporarily.

3. Where vegetation will be cleared to make way for construction, filled sandbags must be used to reduce the intensity of water runoff and flow over the site (Fig. 15).

Figure 15: Examples of silt socks placed perpendicular to the flow of water. These reduce the force of water flow, erosion, and can prevent unwanted sedimentation on the site.

4. Protection and re-use of topsoil.

a. The topsoil will be vital for the success of rehabilitation of vegetation following construction processes and must therefore be treated with care.

b. Topsoil on the site (excluding topsoil under dense stands of invasive plants in the previously cleared area) in new excavation areas must be stripped to a depth of ca. 30cm and kept in designated piles. Topsoil piles must be suitably covered with a geotextile to prevent any additional invasive species seeds from falling in and establishing in the soil.

c. If the SDP of a proposed development does not have enough space for the storage and protection of topsoil within the disturbance envelope, then the Contractor must identify an alternative temporary stockpile area that is already transformed and where it can easily be retrieved for post-construction rehabilitation.

d. The topsoil piles must be clearly labelled so that it does not mix with subsoils excavated or any other construction material for the site.

2. Dust suppression mechanisms e.g., materials and regular site maintenance (e.g., cleaning surfaces and "rounding off" a workday) is essential to reduce dust, and general pollution.

Table 8: Construction Impact 1 - A loss of Hartenbos Dune Thicket (EN) habitat due to earthworks and other construction related activities for the eastern portion of Erf 2841.

CONSTRUCTION	SDP followed for Erf RE/2841		No-go Scenario
Impact 1	Without Mitigation	With Mitigation	Without Mitigation
Duration	Permanent	Permanent	Immediate
Extent	Limited	Very limited	Very limited
Intensity	High	Low	Negligible
Probability	Certain	Almost certain	Highly unlikely
SCORE	Moderate Negative: -98	Minor Negative: -66	Negligible Negative: -3
Confidence	High	High	High
Reversibility	Medium	Medium	Medium
Resource irreplaceability	Medium	Medium	Medium
Positive or negative?	-1	-1	-1

7.3.2 A loss of protected tree species (Sidoxylon inerme inerme & Pittosporrum viridiflorum), and potential SCC due to earthworks and other construction related activities for the eastern portion of Erf RE/2841.

Description: Although no SCC were found on the site, the species accumulation curve indicated that the site potentially contained many species that were not recorded during the assessment. Some of those species could have been SCC that have a high likelihood of occurrence. It is known that protected tree species and biodiversity will be lost and replaced with permanent structures on the site. The impact assessment is illustrated in Table 9.

Impact consequences:

1. Fragmentation of SCC sub-populations
2. Reduction in the extent of occurrence (EOO) of SCC.
3. A general loss of suitable habitat for SCC.
4. A loss of genetic variation within remaining SCC stands.
5. A shift towards a negative change in the conservation status of the SCC and other indigenous species affected by the development. The combined effect of this development and the many other developments in the area will negatively affect the conservation status of species.
6. An increased risk of re-invasion of portions of the site that fall outside of the PAOI.

Mitigation:

1. The proposed development can have up to a maximum disturbance envelope of 2m around the proposed development.
    a. Prior to the commencement of construction and earth movement on the site, a plant search and rescue must be conducted by a suitably qualified horticultural specialist.
        i. For a successful plant search and rescue in Hartenbos Dune Thicket, the recommended timing is typically in the cooler, wetter months of late autumn to early spring, from May through August. This period allows plants to be relocated when soil moisture is more stable, reducing transplant shock and giving plants a better chance to establish roots before the hotter, drier months. Additionally, it aligns with the growing season for many thicket species, particularly those adapted to the seasonal Mediterranean-type climate.
        ii. Although plant search and rescue does not compensate for all negative impacts from development, it can serve as a meaningful supplementary mitigation measure. While it cannot fully replace the ecological value lost from habitat transformation, search and rescue contributes by salvaging individual plants, particularly species of conservation concern, and by enhancing the biodiversity of nearby suitable habitats when successful translocation occurs. Despite low translocation success rates for certain sensitive species, some hardy or adaptable

plants can thrive with proper handling and placement in ecologically similar sites. As such, search and rescue does not substitute the lost ecosystem function entirely but offers a valuable contribution to conserving individual plants and propagating species of interest elsewhere. With careful planning, this strategy enhances biodiversity conservation beyond the immediate impact area, supporting a commitment to ecological responsibility even in the context of development.

b. The rescued plants must be kept in a nursery that should preferably be set up on the construction site on Erf RE/2841. Alternatively, arrangements with a suitable nursery should be made to keep and care for removed plants during the construction phase of the project.

c. The rescued plants must be planted back with the aid of an ECO with demonstrable botanical knowledge, or a botanist or horticultural specialists within the 2m disturbance footprint around the permanent disturbance footprints. This will promote the regeneration of natural fynbos abound the developments and reduce the possibility of negative edge effects on the site.

d. Any additional plants that are observed during construction within a development footprint must be rescued and added to the rescued plants in the indigenous nursery.

2. Alien clearing must be undertaken during the construction phase to prevent invasive plants from becoming large stands during this time.

    a. No kikuyu grass is allowed anywhere on the site.

3. Materials used during construction must be sourced and transported responsibly to minimise the risk of further introductions of new invasive plants and contamination of the site, and especially the fynbos vegetation.

4. Driveways and parking spaces for non-heavy machinery could make use of open pavers (Fig. 16)

    a. Pavers can be planted with non-invasive grasses, like *Cynodon dactylon* (the Cape Royal variety; Fig. 17), or as an alternative *Stenotaphrum secundatum* (Buffalo grass; Fig. 17), *Chloris virgata* (Feather Finger Grass), *Melinis repens* (Natal Red Top), or *Eragrostis capensis* (Heart-seed Love Grass).

Figure 16: A local example of the use of open pavers for car parking in George.

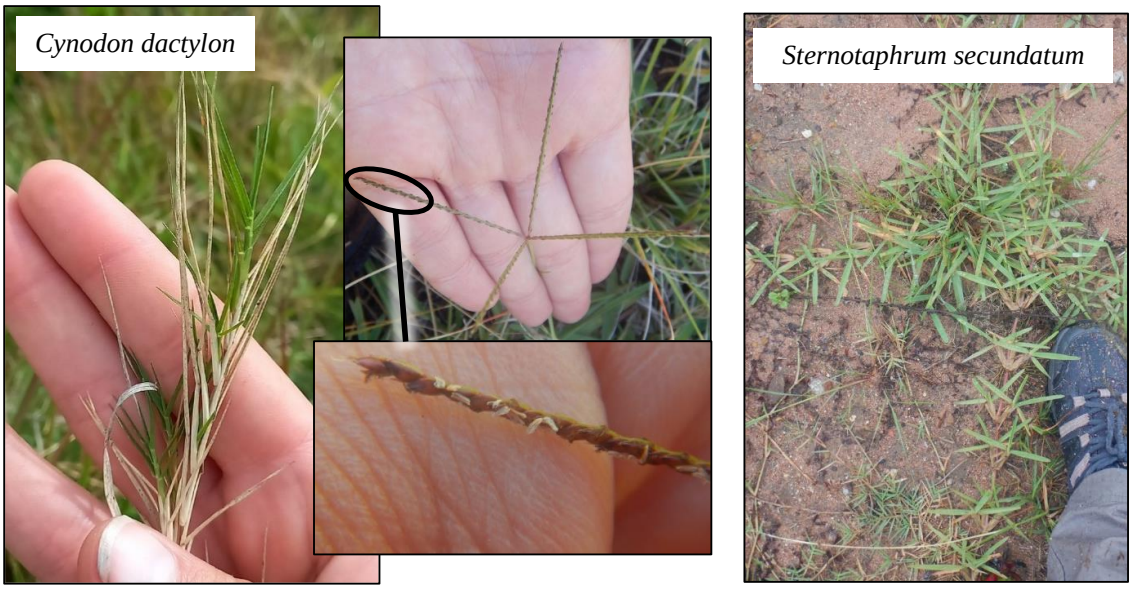

Figure 17: Images of *Cynodon dactylon* and *Stenotaphrum secundatum*.

Table 9: Construction Impact 2 – A loss of protected tree species (*Sidoxylon inerme inerme & Pittosporum viridiflorum*), and potentially SCC due to earthworks and other construction related activities for the eastern portion of Erf RE/2841.

CONSTRUCTION	SDP followed for Erf RE/2841		No-go Scenario
Impact 2	Without Mitigation	With Mitigation	Without Mitigation
Duration	Ongoing	Medium term	Immediate
Extent	Limited	Very limited	Very limited
Intensity	Low	Very low	Negligible
Probability	Certain	Certain	Highly unlikely
SCORE	Moderate Negative: -77	Minor Negative: -49	Negligible Negative: -3
Confidence	High	High	High
Reversibility	Medium	Medium	Medium
Resource irreplaceability	Medium	Medium	Medium
Positive or negative?	-1	-1	-1

7.3.3 Remaining thicket habitat, protected trees, and plant biodiversity are negatively affected by the management of the construction site (i.e., staff, stockpiles, and equipment).

Description: In addition to the large and obvious construction impacts, the management of materials and staff on the site is also an important impact on the site. If managed properly, many accidents and unanticipated negative losses to the expense of the environment, as well as staff can be avoided. The impact assessment is illustrated in Table 10.

Impact consequences:

1. Unanticipated losses of vegetation outside of designated areas.

2. Increased duration of negative construction impacts.
3. Increased vulnerability to impacts of remaining habitat portions elsewhere due to a negative disturbance to the processes that are necessary to maintain biodiversity and ecosystem goods and services.
4. Potential health and safety hazards on the site and in the surrounding environment.
5. The creation of novel habitat that indigenous species cannot survive in, but where exotics and invasive plants thrive in. This results from
    a. disorganised materials ending up in wrong places and
    b. the creation of gardens where they are inappropriate on the construction site.

Mitigation:

1. All new staff must be briefed about the layout of the construction site and must be made aware of the no-go areas and fact that the surrounding environment is sensitive and must not be disturbed.
2. Construction vehicles should be checked on a daily basis at the start of the day for leaks and other faults.
    a. Sandbags or sawdust should be available on the site to ensure that any accidental oil or toxic material spills can be contained and stopped quickly.
    b. Any contaminated soil on the site must be removed by a registered hazardous waste service provider (Spill Tech, Interwaste, EnviroServ etc.).
    c. Vehicles with leaks and other problems must not be allowed to operate on the site until they have been repaired.
3. Ongoing monitoring and clearing of invasive plants on the site should occur. This is a requirement by law.
4. Materials used during construction must be sourced responsibly to minimise the risk of further introductions of new invasive plants.
5. No waste dumping or burning is to be allowed on the site or in the surrounding environment. All material waste is to be collected in designated bins and must be transported to a registered waste disposal facility.
6. Adequate ablution facilities must be provided for every construction project.
    a. Should portable toilets be used, these must be placed on a level platform before construction starts and they must be placed away from any potential fynbos habitat on the site.
    b. Ablution facilities must be regularly maintained and cleaned.
    c. At least one toilet per ten to fifteen construction staff should be available.
7. Concrete, cement, plastering, and painting:
    a. Mixing areas be properly defined on the site and must be bunded or surrounded by an impermeable material to prevent any runoff into the surrounding environment.

b. The designated mixing areas should be limited to areas that will become future hard surfaces on the site, or that are already transformed and likely to remain transformed.

c. No concrete and cement mixing is allowed in areas outside of the Low SEI areas indicated within the PAOI. The 2m disturbance envelope should preferably also be avoided for this activity on the site.

d. Cleaning of cement, plastering & paint equipment must be done into a designated, bunded & lined slurry sump or container to avoid contaminating the environment.

8. Stockpiles of materials management:

a. Stockpiles and soil must all be covered by a geotextile or plastic covering, which must also be bunded (e.g., sandbags) when the piles are not in use on the site (Fig 18). This will prevent the material from washing away and contaminating the substrate of the site which likely still contains useful seeds and soil organisms.

Figure 18: An example of a protected stockpile (image from stormwaterhawaii.com).

Table 10: Construction Impact 3 - The thicket habitat, protected trees, and plant biodiversity are negatively affected by the management of the construction site (i.e., staff, stockpiles, and equipment).

CONSTRUCTION	SDP followed for Erf RE/2841		No-go Scenario
Impact 3	Without Mitigation	With Mitigation	Without Mitigation
Duration	Ongoing	Medium term	Immediate
Extent	Limited	Very limited	Very limited
Intensity	Moderate	Low	Negligible
Probability	Almost certain	Rare	Unlikely
SCORE	Minor Negative: -72	Negligible Negative: -16	Negligible Negative: -9
Confidence	High	High	High
Reversibility	Medium	Medium	Medium
Resource irreplaceability	Medium	Medium	Medium
Positive or negative?	-1	-1	-1

7.4 Conclusion of the Construction Phase

The conclusion of any project is an essential, but often overlooked aspect of projects. This relates primarily to the cleaning up of the site once construction has concluded.

1. All of the mitigation measures proposed above are only meaningful if construction was properly concluded.
2. Construction sites should have been cleared of all waste material, rubble, and debris associated with the construction phase at regular intervals during, and at the conclusion of the construction phase.
3. Revegetation of bare soil following construction is an essential part of concluding the construction phase of the project.
4. Drainage structures had to be checked to ensure that there are no blockages or pollution that is blocking the free flow of water over the site; these checks will prevent erosion during and after the construction phase that could have potentially far-reaching implications beyond the PAOI for the proposed development.

7.5 Operational Phase

The operational phase of the project refers to the state of the site after the construction phase has been concluded, when the proposed developments are ready for, or are in use.

7.5.1 A slow loss of thicket habitat, protected tree species, and plant species biodiversity due to maintenance activities required to maintain Erf RE/2841 (e.g., vegetation trimming, path and road maintenance, ongoing management of invasive plants, etc.).

Description: The proposed development will result in an altered landscape which would produce negative edge effects that impact upon the natural Hartenbos Dune Thicket habitat. Protected tree species (Milkwood and Cheesewood trees), and some potentially occurring SCC will be affected by the management of the land. The impact assessment is illustrated in Table 11.

Impact consequences:

1. A general loss of habitat for plants, pollinators, and other important taxa.
2. Altered soil characteristics which causes unnecessary harm to thicket / forest vegetation dynamics.
3. Pollution of the environment.
4. Loss of habitat to invasive plants species.
5. A loss of resilience to disturbance from an increasingly species poor remaining habitat.

Mitigation:

1. is a requirement of the law that alien clearing and monitoring according to an alien eradication plan be followed.
2. Emergency & cleaning supplies for incidents of waste spillage, or accidental fires should be kept nearby (e.g., keep lime, spades, first aid etc. handy). Fire extinguishers etc. must be kept on the camp as per fire safety regulations.

a. The site is predominantly covered by thicket, with pioneering fynbos occurring only in small, fragmented patches within the cleared area. This type of thicket, dominated by species like Milkwood and Cheesewood, is not fire-prone, and regenerates primarily through vegetative growth. The recommendation to burn the entire conservation area, including areas of thicket, would therefore be inappropriate and potentially harmful to the thicket's ecological integrity. While fire is crucial for fynbos regeneration, particularly for pioneering fynbos, its use in thicket areas would likely damage these sensitive vegetation zones. A more suitable management approach would involve selective thinning of the fynbos vegetation with stacks of fynbos material being burned in drums. The ash and burned woody material can then be spread over the areas where the fynbos was found. Unnecessary harm to the recovering EN thicket must be avoided. This strategy ensures the maintenance of ecological functions specific to both vegetation types.

3. Staff on the site must be properly trained and guests must be well aware of activities that are not allowed on the site.
    a. No staff member is allowed to dispose of grey water in the environment.
    b. No member of staff or guest are allowed to walk where a path is not clearly labelled or outside of roads and boardwalks.
    c. Instructions for the proper use of chemical toilets must be provided and must be clearly visible in all restrooms.
4. No plants may be brought to the site from elsewhere. Gardens must be planted responsibly.
    a. Kikuyu (*Cenchrus clndestinus*) grass must be avoided on the site.
    b. Plants naturally found in Hartenbos Dune Thicket may be used in gardening / reestablishing natural thicket vegetation following alien clearing efforts.
    c. Information plaques could be made for some of the tree species on the site with interesting information about each species.

Table 11: Operational Phase Impact 1 – A slow loss of thicket habitat, protected tree species, and plant species biodiversity due to maintenance activities required to maintain Erf RE/2841 (e.g., vegetation trimming, path and road maintenance, ongoing management of invasive plants, etc.).

OPERATIONAL	SDP followed for Erf RE/2841		No-go Scenario
Impact 1	Without Mitigation	With Mitigation	Without Mitigation
Duration	Ongoing	Medium term	Immediate
Extent	Limited	Very limited	Very limited
Intensity	Very high	Low	Negligible
Probability	Certain	Almost certain	Likely
SCORE	Moderate Negative: -98	Minor Negative: -48	Negligible Negative: -15
Confidence	High	High	High
Reversibility	Medium	Medium	Medium
Resource irreplaceability	Medium	Medium	Medium
Positive or negative?	-1	-1	-1

7.5.2 Protected trees on the site negatively affected by inappropriate landscaping resulting in genetic pollution, and potential long-term biodiversity loss from the cultivation of species that are not indigenous to the vegetation type and surrounding landscape.

Description: Most landowners plant gardens with plants that are not native and indigenous to the area where they live, as briefly mentioned in the previous impact. The creation of Frankenflora means that genetic pollution could result in cryptic hybridisation and eventual species loss. By allowing the planting of gardens in sensitive natural habitat (even with species advertised as being locally sourced), a loss of plant species diversity could result on the site. Furthermore, there is a problem with invasive plant species on the site, which currently includes Australian myrtle / tea trees, Rooikrans, etc. This might not be a big problem in areas where there are large relatively natural areas of an ecosystem remaining, but in this case Hartenbos Dune Thicket habitat is already severely fragmented and under pressure. “Hard landscaping” must be avoided where possible (Box 3). Some sustainable and ecologically friendly principles for gardens are presented in Fig. 19. The impact assessment is illustrated in Table 12.

BOX 3: Landscaping

Soft landscaping

Soft landscaping refers to natural spaces around constructed buildings that contain plants. The plants used are often trees, shrubs, and herbs that perform valuable ecosystem functions and services at different levels. Soft landscapes support biodiversity if local indigenous species are planted, or better yet, of the natural vegetation is left to recover and grow with minimal to no planting of man-made gardens. Grasses and shrubs are as effective at converting Carbon dioxide as are trees. Keeping vegetation allows groundwater attenuation and minimisation of erosion risk, so that the consequences of groundwater and rainfall risks are far more manageable and are less likely to have far reaching and / or catastrophic impacts.

Hard landscaping

Hard landscaping refers to spaces around constructed buildings that have been transformed into impermeable surfaces, such as pavements, and concrete driveways. Hard landscapes have negative impacts on the natural environment and are less ideal than soft landscaping. Hard landscaping results in the absorption and reflection of heat, which makes them hotter than the surrounding natural areas. Furthermore, they speed up the flow of rainwater which means that water disposal systems need to be adequate to prevent erosion. No plants can really grow on these surfaces making groundwater attenuation problematic.

Impact consequences:

1. A gradual increase in the number of negative edge effects that result from exotic garden plants outcompeting natural species in the environment.
2. Biodiversity loss from introduction & establishment of invasive plants in natural fynbos vegetation
3. Eventual loss of any remaining native vegetation remaining due to the gradual naturalisation of exotic garden plant varieties.
4. Loss of specific adaptations that make plant species resilient.
5. Altered soil characteristics, including soil microbes, & seed bank changes.

Figure 19: An illustration that can help guide future gardening decision making, as provided by the https://www.fynboslife.com/life-garden/ website.

Mitigation:

1. Rehabilitation of thicket should be prioritised above gardening. Lawns must be limited.
2. Ongoing effort to remove all invasive plants species is a requirement by law. As mentioned before, no more planting of kikuyu grass will be allowed.
3. Landowners are responsible to maintain their gardens, so that plants do not overgrow. No garden waste may be dumped in any remaining natural area and must be disposed of in a responsible manner.
4. Fertilisers and pesticides must be avoided, and when used it must be done with caution and may not become routine practice.
5. Gardens can be designed to be water wise (avoid erosion) and wildlife friendly. Fynbos Life in Cape Town is an inspirational indigenous landscaping project (Fig. 19). Their tips form part of the mitigation on the impact of landscaping. Although the poster is geared towards Fynbos gardens, the general gardening principles can also apply to thickets.

Table 12: Operational Phase Impact 2: Protected trees on the site negatively affected by inappropriate landscaping resulting in genetic pollution, and potential long-term biodiversity loss from the cultivation of species that are not indigenous to the vegetation type and surrounding landscape.

OPERATIONAL	SDP followed for Erf RE/2841		No-go Scenario
Impact 2	Without Mitigation	With Mitigation	Without Mitigation
Duration	Ongoing	Short term	Immediate
Extent	Local	Limited	Very limited
Intensity	High	Moderate	Negligible
Probability	Certain	Certain	Likely
SCORE	Moderate Negative: -98	Minor Negative: -63	Negligible Negative: -15
Confidence	High	High	High
Reversibility	Medium	Medium	Medium
Resource irreplaceability	Medium	Medium	Medium
Positive or negative?	-1	-1	-1

7.6 Cumulative impacts

The proposed development is situated within a Planning Area of Interest (PAOI), which includes a 5-meter buffer zone around the development. This buffer aims to mitigate edge effects by providing a transition area that may help preserve some of the ecological integrity of the surrounding thicket. The establishment of such buffers has been shown to reduce the intensity of ecological degradation near urban or agricultural developments, particularly in areas with high biodiversity value. However, while this buffer may alleviate some impacts, the long-term success of preserving the sensitive Hartenbos Dune Thicket will depend on careful

management, monitoring, and active restoration efforts to maintain the resilience of the native plant communities and prevent further degradation due to ongoing human activity. This will be especially important in light of the fact that thicket recovery, while occurring, is often slower than that of more rapidly regenerating vegetation types like fynbos.

8. CONCLUSION

The results from the botanical survey and impact assessment presented in this report illustrates that following the appropriate mitigation measures on Erf RE/2841 will, on the whole, result in reduced impacts here. Note that a separate development application can be undertaken for the western adjacent Erf 5572. The loss of habitat that will result from this development will not reduce the ability to meet conservation targets for Hartenbos Dune Thicket. The SDP has been adjusted to avoid sensitive thicket habitat, and this is already a first step on the mitigation hierarchy (i.e., avoidance). However, the areas of overlap with High SEI areas are negligible in the current updated November 2024 version of the SDP and given that the residual impacts all of the impacts can be reduced to either minimal or negligible, the SDP currently presented has aimed to follow the mitigation hierarchy.

The consideration of the sensitive thicket areas identified during this environmental process has led the developers to avoid some areas that were originally included in their SDP. Due to this improvement in the consideration of the mitigation hierarchy, the impact after mitigation for the first construction phase impact is not a Low negative and is no longer a Moderate negative. The avoidance of High SEI areas had reduced the probability of the loss of Hartenbos Dune Thicket from Certain, to Almost Certain after mitigation due to the avoidance that has been incorporated into the plan.

Two protected tree species were found on the site, namely milkwood trees (*Sideroxylon inerme inerme*) and cheesewood trees (*Pittosporum viridiflorum*). No SCC were found, although several SCC assessed have a high likelihood of occurring on the site. The appropriate forestry license is required to trim, remove, or cut any part of these protected tree species. The erf also needs to undertake alien clearing in accordance with an alien clearing and monitoring plan, as this is a requirement by law. If no alien clearing and monitoring plan is set up to include Erf RE/2481, one must be compiled. Although the majority of the Australian myrtle (*Leptospermum laevigatum*) has been cleared on the site, this invader is still present and follow up alien clearing will be required to prevent further invasion that will undo the hard work that has already been put into clearing the site.

Due to the high number of likely occurring SCC listed for the property, a follow up assessment undertaken by the EO / ECO prior to the commencement of any construction on the site to make sure that the areas with low sensitivity are still clear of SCC. If an SCC is found, a botanist can be consulted before proceeding with construction. The likelihood of occurrence for Sensitive and Red-Listed SCC is closely tied to the quality of the habitat and the ecological integrity of the area. Areas with higher Site Ecological Importance (SEI), such as those with more intact or undisturbed vegetation, offer a greater likelihood of supporting SCC. Conversely, areas with Low SEI, especially those that have been heavily disturbed and invaded by non-native species such as Australian Myrtle, have reduced ecological resilience. These low-SEI areas are depauperate making them less likely to support populations of SCC. The historical Australian Myrtle invasion and the dumping observed on the site has not only displaced native flora but also altered the habitat conditions, making it even less conducive to

SCC survival. Secondary vegetation refers to plant communities that establish themselves in an area following significant disturbance or disruption, and this vegetation does not necessarily represent the original ecosystem structure. Secondary vegetation often begins with pioneer species—those that are hardy and capable of thriving in disturbed or degraded environments—and over time, may progress to a more complex community as conditions improve. However, if the disturbance was severe or the site remains heavily disturbed (e.g., by invasive species or frequent fire), the recovery of primary vegetation may be significantly delayed, resulting in a more permanent or long-lasting secondary vegetation state. In this case, active restoration would be required to ensure the site can be restored, and this could need to be an ongoing investment on the site to prevent further degradation.

As such, SCC are not expected to occur in these Low SEI areas, and the likelihood of their occurrence is therefore minimal in these areas. This understanding is supported by general ecological principles that emphasize the role of habitat quality in determining species occurrence (Apedo, 2015; Putz & Redford, 2010). For instance, fragmented or disturbed landscapes with high levels of invasion often show reduced species diversity and ecological function, which lowers the probability of finding sensitive species. SCC presence in the Low SEI areas is low, and this conclusion is supported by both the current depauperate and secondary vegetation structure and the disturbance history of the site.

9. REFERENCES

Apedo, G. A. (2015). *Occurrences and Impacts of Invasive Alien Plant Species in the Agulhas Plain and Lacustrine Wetlands , Western Cape , South Africa Occurrences and Impacts of Invasive Alien Plant Species in the Agulhas Plain and Lacustrine Wetlands ,*.

CapeNature. (2017). *An overview of the Western Cape Biodiversity Spatial Plan*. https://www.capenature.co.za/wp-content/uploads/2019/10/A-Summary-Overview-of-the-Biodiversity-Spatial-Plan_web.pdf

Cowling, R. M., Knight, A. T., Privett, S. D. J., & Sharma, G. (2010). Invest in opportunity, not inventory of hotspots. In *Conservation Biology* (Vol. 24, Issue 2). https://doi.org/10.1111/j.1523-1739.2009.01342.x

de Villiers, C., Holmes, P., Rebelo, T., Helme, N., Brown, D.-E., Clark, B., Milton, S., Dean, W. R., Brownlie, S., Snaddon, K., Day, L., Ollis, D., Job, N., Dorse, C., Wood, J., Harrison, J., Palmer, G., Cadman, M., Maree, K., … Driver, A. (2016). *Ecosystem Guidelines for Environmental Assessment in the Western Cape* (M. Cadman, Ed.; 2nd ed.). Fynbos Forum.

Ekstrom, J., Bennun, L., & Mitchell, R. (2015). *A cross-sector guide for implementing the Mitigation Hierarchy*.

Garrard, G. E., Bekessy, S. A., McCarthy, M. A., & Wintle, B. A. (2008). When have we looked hard enough? A novel method for setting minimum survey effort protocols for flora surveys. *Austral Ecology*, *33*(8), 986–998. https://doi.org/10.1111/J.1442-9993.2008.01869.X

Hall, A. R., Du Preez, D. R., & Campbell, E. E. (2003). Recovery of thicket in a revegetated limestone mine. *South African Journal of Botany*, *69*(3), 434–445. https://doi.org/10.1016/S0254-6299(15)30327-6

Lesslie, R., Thackway, R., & Smith, J. (2010). *A national-level Vegetation Assets, States and Transitions (VAST) dataset for Australia* (2nd ed., Issue 2). Bureau of Rural Sciences. http://www.ag.gov.au/cca.

Midgley, J. J., & Cowling, R. M. (1993). Regeneration patterns in Cape subtropical transitional thicket; Where are all the seedlings? *South African Journal of Botany*, *59*(5), 496–499. https://doi.org/10.1016/S0254-6299(16)30694-9

Mucina, L., & Rutherford, M. C. (2006). *The Vegetation of South Africa, Lesotho and Swaziland*. Strelitzia.

National Environmental Management Act, 1998 (Act No. 107 of 1998): Procedures for Assessment and Minimum Criteria for Reporting on Identified Environmental Themes When Applying for Environmental Authorisation, Government Gazette of South Africa (2020).

NEM:BA Act, 2004 (Act no. 10 of 2004). (2022). *The Revised National List of Ecosystems that are Threatened and in Need of Protection.* www.gpwonline.co.za

Perret, J., Besnard, A., Charpentier, A., & Papuga, G. (2023). Plants stand still but hide: Imperfect and heterogeneous detection is the rule when counting plants. *Journal of Ecology*, 1–14. https://doi.org/10.1111/1365-2745.14110

Pierce, S. M., & Mader, A. D. (2006). *The Subtropical Thicket Ecosystem Programme Handbook: Integrating the natural environment into land-use decisions at the municipal level: towards sustainable development* (2nd ed.).

Pool-Sandvliet, R., Duffel-Canham, A., Pence, G., & Smart, R. (2017). *Western Cape Biodiversity Spatial Plan Handbook*.

Privett, S. D. J., Cowling, R. M., & Taylor, H. C. (2001). Thirty years of change in the fynbos vegetation of the Cape of Good Hope Nature Reserve, South Africa. *Bothalia*, *31*(1), 99–115. https://doi.org/10.4102/abc.v31i1.509

Putz, F. E., & Redford, K. H. (2010). The Importance of Defining 'Forest': Tropical Forest Degradation, Deforestation, Long-term Phase Shifts, and Further Transitions. *Biotropica*, *42*(1), 10–20. https://doi.org/10.1111/J.1744-7429.2009.00567.X

Skowno, A. L., Poole, C. J., Raimondo, D. C., Sink, K. J., van Deventer, H., van Niekerk, L., Harris, L. R., Smith-Adao, L. B., Tolley, K. A., Zengeya, T. A., Foden, W. B., Midgley, G. F., Driver, A., Adams, J. B., Adams, R., da Silva, J. M., Fizzotti, B., Jansen van Vuuren, B., Kelly, C., … Whitehead, T. O. (2018). *National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity*.

Stewart, W., Bahindwa, A., Adams, A., Daniels, F., Nzimande, M., Job, N., Dabrowski, J., Ollis, D., & Palmer, R. (2021). *Environmental Assessment Guideline for Ecosystem-related aspects of the Terrestrial Biodiversity and Aquatic Biodiversity Protocols: Final Draft*.

Thackway, R., & Lesslie, R. (2006). *Reporting vegetation condition using the Vegetation Assets, States and Transitions (VAST) framework*. https://doi.org/10.1111/j1442-8903.2006.00292.x

Verburgt, L., McCleland, W., McKenzie, D., Laurence, S., Niemand, L., & Raimondo, D. (2020). *Species Environmental Assessment Guideline: Guidelines for the implementation of the Terrestrial Flora (3c) & Terrestrial Fauna (3d) Species Protocols for environmental impact assessments in South Africa.* SANBI. http://opus.sanbi.org:80/jspui/handle/20.500.12143/6922

Wintle, B. A., Walshe, T. v., Parris, K. M., & Mccarthy, M. A. (2012). Designing occupancy surveys and interpreting non-detection when observations are imperfect. *Diversity and Distributions*, *18*(4), 417–424. https://doi.org/10.1111/J.1472-4642.2011.00874.X

10. APPENDIX

10.1 Land-Use Recommendations According to the WC BSP

Recommended acceptable land-uses for each BSP layer is outlined and summarised in Table 13 below.

Table 13: The land-use planning proposed by the Western Cape Biodiversity Spatial Plan. IUCN Red Listing Criteria for species

LAND USE CATEGORIES		Conservation		Agriculture		Tourism and Recreational Facilities		Rural Accomodation		Urban			Business & Industrial				Infrastructure Installations			
LAND USE SUB-CATEGORIES (Refer to table 4.7 for descriptions)		Proclaimed Protected Areas	Other Nature Areas	Intensive Agriculture	Extensive Agriculture	Low Impact Facilities	High Impact Facilities	Agri-worker Accommodation	Small holdings	Urban Development & Expansion	Community Facilities & Institutions	New Settlements	Rural Business	Non-place-bound Industry (low-moderate impact)	Non-place-bound Industry (high impact)	Extractive Industry (incl. Prospecting)	Linear - roads & rail	Linear - pipelines & canals	Linear - powerlines	Other Utilities
MAP CATEGORY	DESIRED MANAGEMENT OBJECTIVE	Y = Yes: Permissible land uses that are not likely to compromise the biodiversity objective						R = Restricted: Land uses that may compromise the biodiversity objective are only permissible under certain conditions (refer to Table 4.7 for conditions)							N = No: Land uses that will compromise the biodiversity objective and are not permissible							
Protected Area	Must be kept in a natural state, with a management plan focused on maintaining or improving the state of biodiversity.	Land use within proclaimed protected areas are subject to management plan drawn up for that specific protected area.																		
Critical Biodiversity Area 1	Keep natural, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.	Y	Y	N	R	N	N	N	N	N	N	N	N	N	N	N	N	N	R	N
Critical Biodiversity Area 2	Keep natural, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.	Y	Y	N	R	R	N	N	N	N	N	N	N	N	N	N	R	R	R	N
Ecological Support Area 1: Terrestrial	Maintain in a functional, near-natural state. Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised.	Y	Y	N	R	R	N	N	N	N	N	N	R	R	N	N	R	R	R	R
Ecological Support Area 1: Aquatic	Maintain in a functional, near-natural state. Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised.	Y	Y	N	R	R	N	N	N	N	N	N	N	N	N	N	R	R	R	N
Ecological Support Area 2	Restore and/or manage to minimise impact on ecological infrastructure functioning, especially soil and water-related services.	Y	Y	N	R	R	N	N	R	N	N	N	N	N	N	N	R	R	R	R
ONA: Natural to Near-Natural	Minimise habitat and species loss and ensure ecosystem functionality through strategic landscape planning. Offers flexibility in permissible land uses, but some authorisation may still be required for high impact land uses.	Y	Y	R	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
ONA: Degraded	Minimise habitat and species loss and ensure ecosystem functionality through strategic landscape planning. Offers flexibility in permissible land uses, but some authorisation may still be required for high impact land uses.	R	R	R	Y	Y	R	R	Y	R	R	R	R	R	R	R	Y	Y	Y	Y
No Natural Remaining	These areas are suitable for development but may still provide limited biodiversity and ecological infrastructure functions and should be managed in a way that minimises impacts on biodiversity and ecological infrastructure.	R	R	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

10.2 The IUCN Species Red List Criteria Summary

This section contains an extra summary explaining the very basics of the five Red List criteria used when assessing the Red List status of species. Note that this summary sheet does not provide detail on the "Near Threatened" category (sometimes also called an "Orange List" category) which comes before the "Vulnerable" category. These are the criteria that are used by the IUCN to assign the extinction threat status for individual plant species. In South Africa there are additional criteria (not shown on Fig. 20) for Rare and Critically Rare plant species.

SUMMARY OF THE FIVE CRITERIA (A-E) USED TO EVALUATE IF A TAXON BELONGS IN AN IUCN RED LIST THREATENED CATEGORY (CRITICALLY ENDANGERED, ENDANGERED OR VULNERABLE).[1]

A. Population size reduction. Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4

	Critically Endangered	Endangered	Vulnerable
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3 & A4	≥ 80%	≥ 50%	≥ 30%

A1 Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible AND understood AND have ceased.
A2 Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.
A3 Population reduction projected, inferred or suspected to be met in the future (up to a maximum of 100 years) *[(a) cannot be used for A3]*.
A4 An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.

based on any of the following:

(a) direct observation *[except A3]*
(b) an index of abundance appropriate to the taxon
(c) a decline in area of occupancy (AOO), extent of occurrence (EOO) and/or habitat quality
(d) actual or potential levels of exploitation
(e) effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

B. Geographic range in the form of either B1 (extent of occurrence) AND/OR B2 (area of occupancy)

	Critically Endangered	Endangered	Vulnerable
B1. Extent of occurrence (EOO)	< 100 km²	< 5,000 km²	< 20,000 km²
B2. Area of occupancy (AOO)	< 10 km²	< 500 km²	< 2,000 km²
AND at least 2 of the following 3 conditions:			
(a) Severely fragmented **OR** Number of locations	= 1	≤ 5	≤ 10
(b) Continuing decline observed, estimated, inferred or projected in any of: **(i)** extent of occurrence; **(ii)** area of occupancy; **(iii)** area, extent and/or quality of habitat; **(iv)** number of locations or subpopulations; **(v)** number of mature individuals			
(c) Extreme fluctuations in any of: **(i)** extent of occurrence; **(ii)** area of occupancy; **(iii)** number of locations or subpopulations; **(iv)** number of mature individuals			

C. Small population size and decline

	Critically Endangered	Endangered	Vulnerable
Number of mature individuals	< 250	< 2,500	< 10,000
AND at least one of C1 or C2			
C1. An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future):	25% in 3 years or 1 generation (whichever is longer)	20% in 5 years or 2 generations (whichever is longer)	10% in 10 years or 3 generations (whichever is longer)
C2. An observed, estimated, projected or inferred continuing decline AND at least 1 of the following 3 conditions:			
(a) **(i)** Number of mature individuals in each subpopulation	≤ 50	≤ 250	≤ 1,000
(ii) % of mature individuals in one subpopulation =	90–100%	95–100%	100%
(b) Extreme fluctuations in the number of mature individuals			

D. Very small or restricted population

	Critically Endangered	Endangered	Vulnerable
D. Number of mature individuals	< 50	< 250	**D1.** < 1,000
D2. *Only applies to the VU category* Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time.	-	-	**D2.** typically: AOO < 20 km² or number of locations ≤ 5

E. Quantitative Analysis

	Critically Endangered	Endangered	Vulnerable
Indicating the probability of extinction in the wild to be:	≥ 50% in 10 years or 3 generations, whichever is longer (100 years max.)	≥ 20% in 20 years or 5 generations, whichever is longer (100 years max.)	≥ 10% in 100 years

1 Use of this summary sheet requires full understanding of the *IUCN Red List Categories and Criteria* and *Guidelines for Using the IUCN Red List Categories and Criteria*. Please refer to both documents for explanations of terms and concepts used here.

Figure 20: The IUCN summary for the five assessment criteria used during the species Red Listing process.

10.3 Site Ecological Importance (SEI) Methods

The site ecological importance (SEI) assessment is a function of biodiversity importance (BI) and receptor resilience (RR), which is defined as:

> *"The intrinsic capacity of the receptor (i.e., habitat type in question) to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention."*

The function is as follows: SEI = BI + RR. BI is a function of conservation importance (CI) and habitat functional integrity (FI), so that BI = CI + FI. The definition of CI given by the Species Environmental Assessment Guideline of 2022 is:

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

Most features included in CI are provided by the screening tool but needs to be evaluated at a finer scale from the field work assessment. FI is defined as:

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

The criteria for defining RR, CI and FI are provided in the Species Environmental Assessment Guidelines of 2022. BI can be derived from a simple matrix of CI and FI, as illustrated in Table 14 below.

Table 14: The matrix that defines the biodiversity importance (BI) of a given habitat type, as identified from a desktop and field assessment.

Biodiversity Importance		**Conservation Importance**				
		Very High	High	Medium	Low	Very Low
Functional Integrity	Very High	Very High	Very High	High	Medium	Low
	High	Very High	High	Medium	Medium	Low
	Medium	High	Medium	Medium	Low	Very Low
	Low	Medium	Medium	Low	Low	Very Low
	Very Low	Medium	Low	Very Low	Very Low	Very Low

SEI can then be derived from a second matrix, as depicted in Table 15. SEI is specific to the proposed development and can therefore only be compared between alternative layouts for the same proposed development, but not between developments.

Table 15: The matrix that defines the site ecological importance (SEI) of a given habitat type, as identified from a desktop and field assessment.

Site Ecological Importance		**Biodiversity Importance**				
		Very High	High	Medium	Low	Very Low
Receptor Resilience	Very High	Very High	Very High	High	Medium	Low
	High	Very High	Very High	High	Medium	Very Low
	Medium	Very High	High	Medium	Low	Very Low
	Low	High	Medium	Low	Very Low	Very Low
	Very Low	Medium	Low	Very Low	Very Low	Very Low

10.4 Impact Assessment Methods

Individual impacts for the construction and operational phase were identified and rated according to criteria which include their intensity, duration, and extent. The ratings were then used to calculate the consequence of the impact which can be either negative or positive as follows:

Consequence = *type x (intensity + duration + extent)*

Where type is either negative (i.e., -1) or positive (i.e., 1). The significance of the impact was then calculated by applying the probability of occurrence to the consequence as follows:

Significance = *consequence x probability*

The criteria and their associated ratings are shown in Table 16.

Table 16: Categorical descriptions for impacts and their associated ratings.

Rating	Intensity	Duration	Extent	Probability
1	Negligible	Immediate	Very limited	Highly unlikely
2	Very low	Brief	Limited	Rare
3	Low	Short term	Local	Unlikely
4	Moderate	Medium term	Municipal area	Probably
5	High	Long term	Regional	Likely
6	Very high	Ongoing	National	Almost certain
7	Extremely high	Permanent	International	Certain

Categories assigned to the calculated significance ratings are presented in Table 17.

Table 17: Value ranges for significance ratings, where (-) indicates a negative impact and (+) indicates a positive impact

Significance Rating	Range	
Major (-)	-147	-109
Moderate (-)	-108	-73
Minor (-)	-72	-36
Negligible (-)	-35	-1
Neutral	0	0
Negligible (+)	1	35
Minor (+)	36	72
Moderate (+)	73	108
Major (+)	109	147

Each impact was considered from the perspective of whether losses or gains would be irreversible or result in the irreplaceable loss of biodiversity of ecosystem services. The level of confidence was also determined and rated as low, medium, or high (Table 18).

Table 18: Definition of reversibility, irreplaceability, and confidence ratings.

Rating	Reversibility	Irreplaceability	Confidence
Low	Permanent modification, no recovery possible.	No irreparable damage and the resource isn't scarce.	Judgement based on intuition.
Medium	Recovery possible with significant intervention.	Irreparable damage but is represented elsewhere.	Based on common sense and general knowledge
High	Recovery likely.	Irreparable damage and is not represented elsewhere.	Substantial data supports the assessment