TERRESTRIAL BIODIVERSITY ASSESSMENT

PROPOSED DEVELOPMENT OF TOURIST CAMPING INFRASTRUCTURE ON PORTION 104 OF FARM 216 BRENTON-ON-SEA, KNYSNA MUNICIPALITY, WESTERN CAPE PROVINCE

CAPENSIS

GREG NICOLSON AND ADAM LABUSCHAGNE

03 JULY 2024

REPORT PREPARED FOR
ECO ROUTE ENVIRONMENTAL CONSULTANTS

NATIONAL LEGISLATION AND REGULATIONS GOVERNING THIS REPORT

This is a 'specialist report' and is compiled in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment Regulations, 2014, as amended.

APPOINTMENT OF SPECIALIST

Capensis Ecological Consulting (Pty) Ltd was appointed by Eco Route Environmental Consultants to provide specialist botanical and terrestrial biodiversity consulting services for a proposed development on Portion 104 of Farm 216 in Brenton-on-Sea, Knysna, Western Cape.

CONDITIONS RELATING TO THIS REPORT

The content of this report is based on the authors' best scientific and professional knowledge as well as available information. Capensis Ecological Consulting (Pty) Ltd reserves the right to modify the report in any way deemed fit should new, relevant or previously unavailable or undisclosed information become known to the author from on-going research or further work in this field, or pertaining to this investigation.

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DETAILS OF THE SPECIALISTS

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Expertise

• Qualifications: BSc. Hons. (Environmental Science), MSc (Botany)
• Botanist with 10 years' experience in the field of Botanical Surveys
• Has experience in Botanical exploration in South Africa and Namibia
• Has conducted over 250 botanical assessments for the EIA process.

Adam Labuschagne MSc (Ecology & Evolutionary Biology) Cand. Sci. Nat.
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Expertise

• Qualifications B. Sc. (Zoology), MSc (Ecology & Evolutionary Biology).
• Ecologist with experience in faunal and environmental surveying across a variety of terrestrial and freshwater habitats in United Kingdom, Malaysia, and South Africa.
• Experience with remote sensing and spatial ecology.

THE SPECIALIST

We, Gregory Alexander Nicolson and Adam Edward Labuschagne, as the appointed specialists hereby declare/affirm the correctness of the information provided or to be provided as part of the application, and that I:

- in terms of the general requirement to be independent:
- other than fair remuneration for work performed/to be performed in terms of this application, have no business, financial, personal or other interest in the activity or application and that there are no circumstances that may compromise my objectivity; or
- in terms of the remainder of the general requirements for a specialist, am fully aware of and meet all of the requirements and that failure to comply with any the requirements may result in disqualification;
- have disclosed/will disclose, to the applicant all material information that have or may have the potential to influence the decision of the Department or the objectivity of any report, plan or document prepared or to be prepared as part of the application;
- have ensured/will ensure that information containing all relevant facts in respect of the application was/will be distributed or was/will be made available to interested and affected parties and the public and that participation by interested and affected parties was/will be facilitated in such a manner that all interested and affected parties were/will be provided with a reasonable opportunity to participate and to provide comments;
- have ensured/will ensure that the comments of all interested and affected parties were/will be considered, recorded and submitted to the Department in respect of the application;
- have ensured/will ensure the inclusion of inputs and recommendations from the specialist reports in respect of the application, where relevant;
- have kept/will keep a register of all interested and affected parties that participate/d in the public participation process; and
- am aware that a false declaration is an offence in terms of regulation 48 of the 2014 NEMA EIA Regulations.
  Note: The terms of reference of the review specialist must be attached.

Signature of the specialists:

Name of company: Capensis Ecological Consulting (Pty) Ltd
Date: 03 July 2024

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1. INTRODUCTION

Capensis Ecological Consulting has been appointed by Eco Route Environmental Consultants to provide specialist botanical and terrestrial biodiversity consulting services for a proposed development on Portion 104 of Farm 216 in Brenton-on-Sea, Knysna. The developments, if approved, would include the following:

- Five (5) camping areas with camping platforms. Each camping area will be comprised of five camp sites, each with a concrete pad and open timber deck. A total of 25 camp sites will be developed, divided equally amongst the five camping areas.
- Each camping area will also be accompanied by an ablution block and cooking facilities. Other developments include a jungle gym.

In total an area of approximately 1 (one) ha will be cleared for the proposed developments.

2. TERMS OF REFERENCE FOR IMPACT ASSESSMENTS

2.1. GENERAL

Terrestrial Biodiversity assessments must follow guidelines set out in the following documents:

- Department of Environmental Affairs and Development Planning (DEA&DP) Guidelines for Involving Biodiversity Specialists in the EIA Process (Brownlie, 2005);
- Ecosystem Guidelines for Environmental Assessment in the Western Cape (Cadman et al., 2016);
- The requirements of CapeNature for providing comments on agricultural, environmental, mine planning and water-use related applications (Turner, 2013); and
- Protocol for the assessment and reporting of environmental impacts on terrestrial biodiversity (Government Gazette 2020).

2.2. SPECIFIC

- Identify and describe biodiversity patterns at community and ecosystem level (main vegetation type, plant communities in the vicinity and threatened/vulnerable ecosystems), at species level (threatened Red List species, presence of alien species) and in terms of significant landscape features;
- Identify ecological drivers and ecological processes, including any likely presence of important faunal species;

- Assess the local and regional importance of the vegetation communities and plant species within the affected areas based on the relevant biodiversity plans, bioregional planning documents and Environmental Management Frameworks.
- Determine the implications that the proposed project has for the relevant fine-scale biodiversity plan (in this case the, 2017 Western Cape Biodiversity Spatial Plan).
- Describe the sensitivity of the site and its environs and map these resources.
- Identify any areas not suitable for construction activities (No-Go Areas) and related buffers that should be observed.
- Describe the direct, indirect and cumulative impacts (both before and after mitigation) and provide an assessment of the significance of the impacts.
- Describe the measures to mitigate any impacts, and an indication of whether or not the measures (if implemented) would change the significance of the impact.
- On the basis of the impact assessment findings provide an authorisation opinion regarding whether or not the proposed activity should proceed.

3. PROTOCOL FOR DETERMINING LEVEL OF REPORTING

Prior to the commencement of the survey, the sensitivity of the site was assessed using the Department of Forestry, Fisheries and the Environment's (DFFE) Screening Tool (https://screening.environment.gov.za/screeningtool/). The results of the screening tool indicate that the site has a "High" Terrestrial Biodiversity sensitivity (Figure 1). Should this level of sensitivity be confirmed during the site assessment, a **Terrestrial Biodiversity Impact Assessment** is to be submitted as part of the application for Environmental Authorisation (EA). The study area was found to contain areas of Medium, Low, & Vey Low sensitivity. Due to the presence of medium sensitivity areas a Terrestrial Biodiversity Impact Assessment is provided. This Terrestrial Biodiversity assessment forms part of this input as required in the Protocol for the assessment and reporting of environmental impacts on terrestrial biodiversity (Government Gazette, 2020a).

The relative plant species theme sensitivity for the site is rated as 'High'. "An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified by the screening tool as being of "Very High" or "High" sensitivity" for terrestrial plant species, must submit a **Plant Species Specialist Assessment Report**" (Government Gazette 2020b).

Two (2) plant species listed as Species of Conservation Concern (SCC), namely *Lebeckia gracilis* (EN) and *Selago villicaulis* (VU), have been identified at the site, and therefore a Plant Species Specialist Assessment Report is included in Appendix 3 of this report.

Figure 1. Map of relative Plant Species Theme sensitivity (left) and Terrestrial Biodiversity Theme sensitivity generated from the DFFE Screening Tool (https://screening.environment.gov.za).

4. METHODOLOGY, LIMITATIONS AND ASSUMPTIONS

The study area was visited on the 22nd of May 2024 and surveyed on foot. Sample waypoint positions were obtained using a Garmin GPS eTrex 10. Photographs were taken and georeferenced using an Olympus TG-5 Camera with built-in GPS and Nikon D5300.

The following sources have been used to inform this study:

- *Site boundaries:* The property boundaries have been downloaded from the Cape Farm Mapper Website (https://gis.elsenburg.com/apps/cfm/).
- *Vegetation Types*: Based on *The Vegetation of South Africa, Lesotho and Swaziland* (Mucina & Rutherford, 2006). The South African National Biodiversity Institute (SANBI) has updated the mapping for the VEGMAP (2018) and these latest shapefiles have been used. The Fine Scale Vegetation Map for the Garden Route (Vlok, Euston-Brown, & Wolf, 2008) has also been referenced.
- *Ecosystem threat status:* Informed by (1) The Revised National List of Ecosystems that are Threatened and in Need of Protection (Government Gazette, 2022)
- *Biodiversity planning*: The Western Cape Biodiversity Spatial Plan (WCBSP) for the Knysna Municipality (CapeNature, 2017) is essential to determine the conservation importance of the affected habitats. Ground-truthing is an essential component in terms of determining the habitat condition.
- *Important Plant species*: The presence or absence of threatened (i.e. species of conservation concern) and ecologically important species informs the ecological condition and sensitivity of the site. The latest conservation status of species is checked on the Red List of South African Plants (Raimondo *et al.* 2009) via the website

(www.redlist.sanbi.org). A list of sensitive species generated by the National Web-based Screening Tool (screening.enviornment.gov.za) was used. Certain species cannot be disclosed to the public as per the requirements of the screening tool. Observations from iNaturalist (inaturalist.org) at and in the vicinity of the study area were also noted.

The site visit was carried out during early winter. The timing of the survey is sub-optimal as many geophytic and annual plant species flower during spring. Some bulbs species were visible an identifiable from their new vegetative growth, such as *Chasmathe aethiopica,* however many other geophytic species are not identifiable to species level without observing their floral structures. It should be noted however that due to the year-round precipitation experienced in the Garden Route region this limitation is not considered to have had a highly significant effect on sampling efforts.

5. STUDY AREA

5.1. LOCALITY

The study area is located in Brenton-on-Sea, a suburb situated on the western portion of the Knysna Heads (Figure 2). The study area borders the Featherbed Nature Reserve (on the eastern boundary) and falls within the Western Heads Conservancy Area. Development on this part of the Western Heads is sparse, comprised predominantly of isolated homes and tourist facilities. The Western Head supports several Protected areas, namely Brenton Blue Butterfly Reserve, Featherbed Nature Reserve, and Skuilte Natre Reserve.

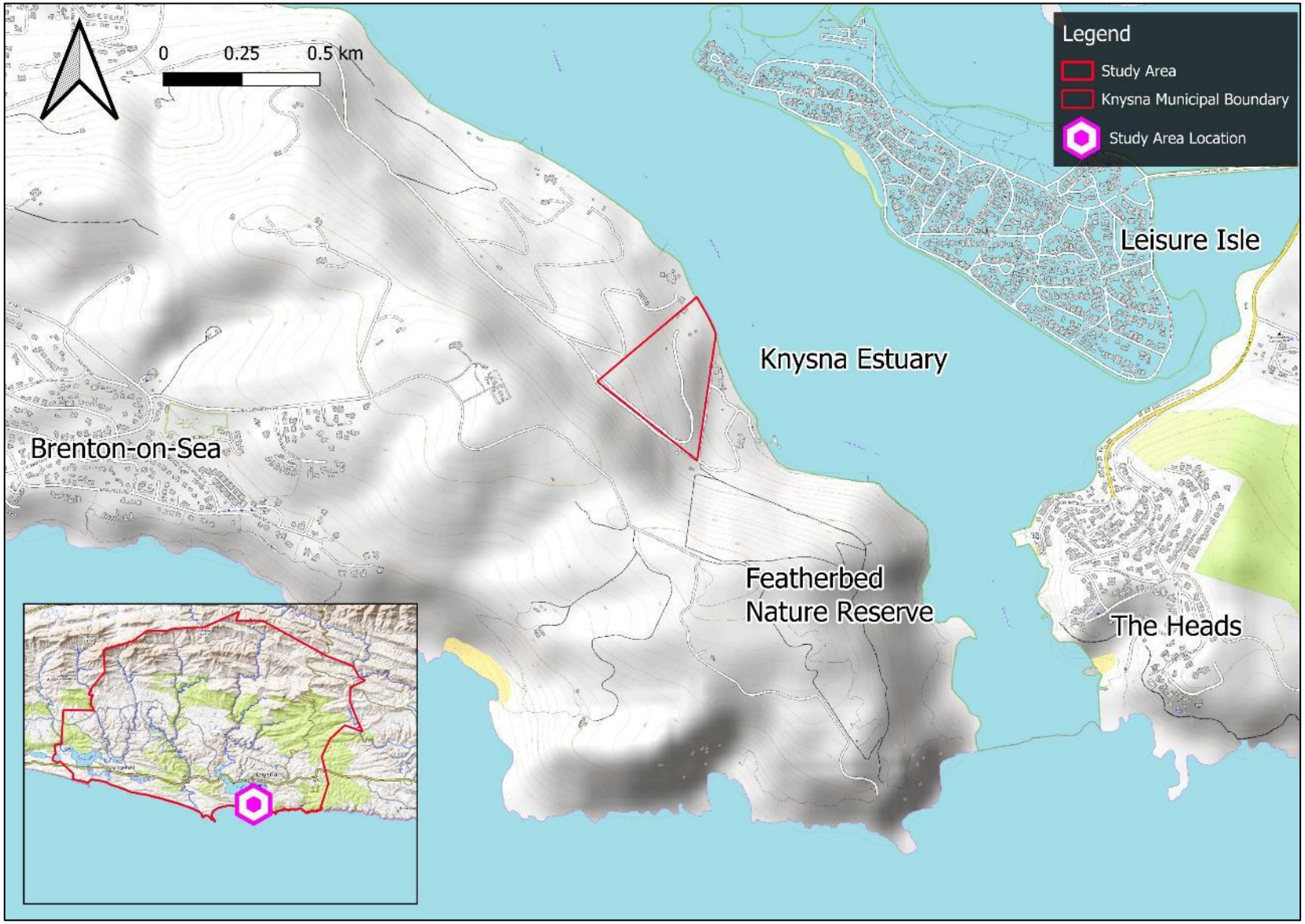

Figure 2. The location of the study area within the context of the Knysna Municipality and closest towns, overlaid on an Open Topo World ™ Map.

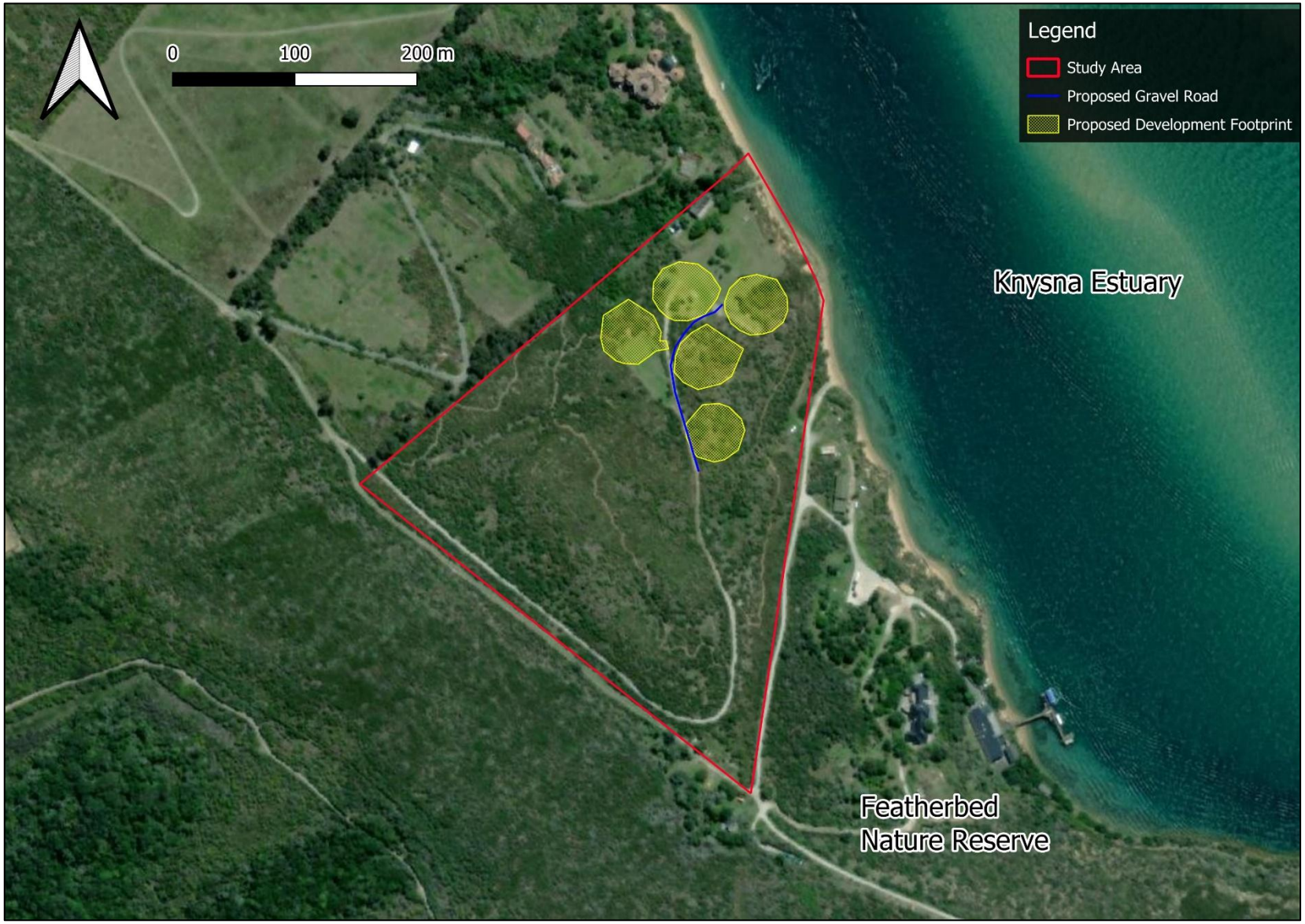

Figure 3. An ESRI ™ satellite image of the study area, including the proposed development footprint of the five camping areas. Note that the development footprint is an approximation of the proposed development and does not depict the exact size of the proposed development.

5.2. LANDSCAPE AND GEOLOGY

The study area is located on the western portion of the Knysna Heads. The underlying geology of the Western Head belongs to the Bredasdorp Group (Figure 4), and is comprised of marine or marine associated deposits laid down during the Cenozoic (Malan, 1990). The land type at the site is classified as Ga3, with a CA soil type.

The topography of the site is characterised by steep to moderately steep slopes with a north-easterly aspect, sloping down to the estuary below. Some of the site has been levelled, however not all areas of the proposed development are situated on levelled land.

Figure 4. Geological Map (Council of Geoscience, Geology classification (1:1M)) of the study area overlaid on an ESRI ™ aerial image.

Figure 5. View of the Knysna Heads looking south-east from the site.

6. OVERVIEW OF VEGETATION AND CONSERVATION PLANS

6.1. NATIONAL VEGETATION TYPE

The National Vegetation Map of South Africa, Lesotho and Swaziland (SANBI, 2018) (VEGMAP) classifies the expected vegetation type in the study area as Knysna Sand Fynbos (Figure 6). Found on deep acidic tertiary sands along the coastal flats of the Garden Route, from Wilderness to the Robberg Penninsula. Knysna Sand Fynbos is described as follows:

> "*Undulating hills and moderately undulating plains covered with a dense, moderately tall, microphyllous shrubland, dominated by species more typical of sandstone fynbos"*

The neighbouring property has been mapped as Goukamma Dune Thicket. Based on the results of infield verification, the vegetation found at the study site corresponds more closely to this vegetation type than to Knysna Sand Fynbos.

> *"On flat to moderately undulating coastal dunes. A mosaic of low to tall (1 - 5 m), dense thicket, dominated by small trees and woody shrubs with lianas abundant, in a mosaic of low (1 - 2 m) asteraceous fynbos. Thicket clumps are best developed in fire-protected dune slacks, which occasionally also support pockets of coastal forest (Celtis africana, Ekebergia capensis, Searsia chirindensis). The fynbos shrubland occurs on upper dune slopes and crests where succulents may be common in more open areas.* (Grobler, Vlok, Cowling, van der Merwe, Skowno, & Dayaram, 2018)

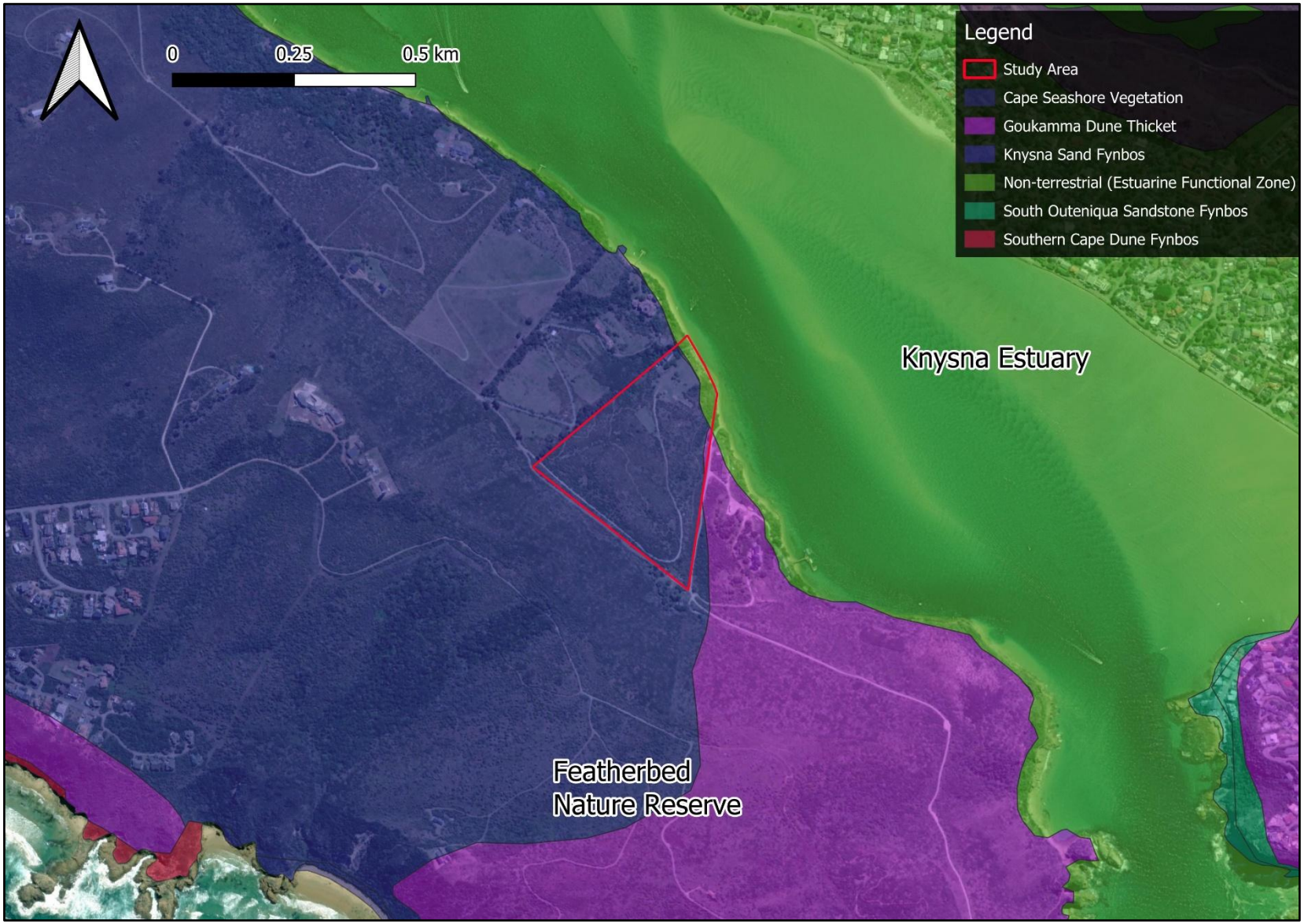

Figure 6. Map of the study area in relation to the VEGMAP (SANBI, 2018) overlaid on an ESRI ™ satellite image.

6.2 GARDEN ROUTE INITIATIVE VEGETATION MAP (2008)

The vegetation within the study area was mapped at a fine scale by Vlok, Euston-Brown, & Wolf (2008) in the C.A.P.E. Fine-scale Mapping Project. According to this map two vegetation units are found within the study area, namely Groenvlei Coastal Forest and Sedgefield Thicket-Fynbos (Figure 7).

> ***Groenvlei Coastal Forest:*** *"restricted to deep sandy soils in the lowlands. It is best developed next to extensive water bodies, where fires originate and burn upslope. The tall closed canopy is similar to those of the Afromontane Plateau Forest, with tall Afrocarpus falcatus often emerging above the canopy. It does, however, differ in its floristic component and in having deciduous trees such as Celtis africana often locally abundant. It is most easily recognized as it has trees with a subtropical affiliation such as Calodendrum africana, Ekebergia capensis, Strychnos decussata and even sometimes Olea europaea spp. africana present. No rare plant species are known from this unit, but it is the habitat of the rare Knysna Woodpecker (Campethera notata)."* (Vlok, Euston-Brown, Wolf, 2008).
>
> ***Sedgefield Thicket-Fynbos: "****The bush-clumps currently present in this unit are probably much more abundant and larger than they used to be as most of this habitat has been protected against fires for many years. In the past browsers probably also contained the extent of these bushclumps, which consists mostly of Dune thicket species such as Azima tetracantha, Carissa bispinosa, Cussonia thyrsiflora, Euclea racemosa, Olea exasperata, Rhus glauca, Sideroxylon inerme and Tarchonanthus camphoratus, which all can grow rapidly in the absence of fire. These bush-clumps easily overgrow the adjacent matrix Fynbos vegetation in the absence of fire. This results in the loss of the rich biodiversity of the matrix Sandplain Fynbos. Geophyte species endemic to the Sandplain Fynbos, such as Gladiolus vaginatus and Satyrium princeps will first go extinct without the correct fire regimes, but they will soon be followed by endemic shrubs such as Erica glandulosa ssp. fourcadei."* (Vlok, Euston-Brown, Wolf, 2008).

The ecosystem threat status of the vegetation types included in the Garden Route Initiative Vegetation Map (2008) are derived from the Critical Biodiversity Areas of the Garden Route Conservation Planning Technical Report (Holness et al, A. 2010). A summary table of the ecosystem threat status can be found in Table 2.

Table 1. Ecosystem threat status for the FSP vegetation units derived from available information sources.

Vegetation type	**National Equivalent Ecosystem Status**
Groenvlei Coastal Forest	ENDANGERED
Sedgefield Thicket-Fynbos	LEAST THREATENED
Garden Route Estuary	LEAST THREATENED

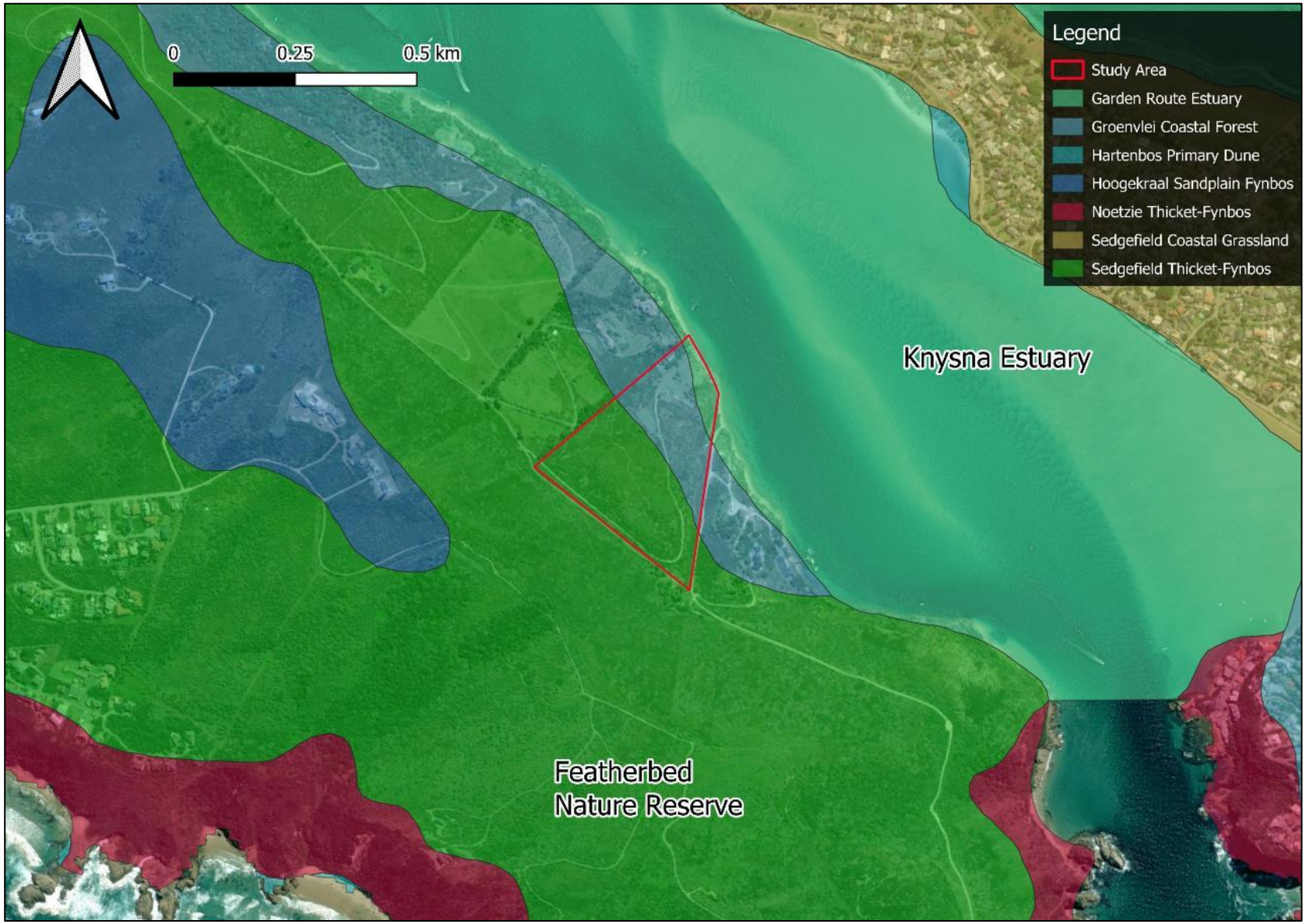

Figure 7. The study area in relation to the C.A.P.E FSP Vegetation Map for the Garden Route (Vlok, Euston-Brown, & Wolf 2008) overlaid on an ESRI ™ aerial image

6.3 NATIONAL ECOSYSTEM THREAT STATUS

Ecosystem threat status is informed by *The Revised National List of Ecosystems that are Threatened and Need of Protection* (RNLETNP) (Government Gazette, 2022). Species information is not provided in the RNLETNP and is thus taken from *The National List of Ecosystems that are Threatened and in Need of Protection* (Government Gazette, 2011). Table 2 provides a summary of (a) the ecosystem status and reasons, (b) the remaining percentage of the ecosystem and the original (national) extent, (c) the proportion of ecosystem target protected, and (d) the national conservation target from the two most relevant information sources.

Table 2. Ecosystem threat status derived from available information sources

	The Revised National List of Ecosystems that are Threatened and in Need of Protection
Knysna Sand Fynbos	
Ecosystem threat status	CRITICALLY ENDANGERED
Reason	B (Rate of loss of natural habitat)
Remaining % of ecosystem	21% of 15212 (ha)
Conservation target	23%
Protected area	10.1 %
Species of Concern	3 Red Listed plant Species
NOTES	Knysna Sand Fynbos is narrowly distributed with high rates of habitat loss in the past 28 years (1990-2018), placing the ecosystem type at risk of collapse.
National Biodiversity Assessment (SANBI, 2018) Ecosystem Threats	The decline in natural area of Knysna Sand Fynbos to 22 % (3207 ha)(2014) of its original extent, was driven primarily by plantations (Rebelo et al. 2006). Although the land cover of plantations have decreased by 1298 ha (9 %)(1990-2014) from 9945 ha (68 %)(1990), it still covers 8646 ha (59 %) of the ecosystem type(HBMOD 2018). Agriculture has also been a pressure both historically, with 1637 ha (11 %)(2014) consisting of old fields, and more recently, with croplands in 442 ha (3 %)(2014) of the ecosystem (HBMOD 2018). The ecosystem is further degraded by erosion and alien invasions of Acacia melanoxylon, A. mearnsii and A. longifolia (Rebelo et al. 2006).
Goukamma Dune Thicket	
Ecosystem threat status	LEAST CONCERN
Reason	(No Criteria for LC)
Remaining % of ecosystem	71% of 9178 ha
Conservation target	19%
Protected area	50.6%
Species of Concern	Data deficient
NOTES	Goukamma Dune Thicket has experienced low rates of natural habitat loss and biotic disruptions, placing this ecosystem at low risk of collapse.

Ecological drivers

The key ecological drivers for the ecosystems according to Cadman et al. (2016) include:

Lowland fynbos

(1) the natural fire frequency, (2) diversity of habitat and environmental gradients, (3) regional and local natural water drainage patterns and (4) natural grazing and physical soil disturbance.

Albany Thicket: (1) Herbivory, (2) fire, (3) rainfall, (4) climatic variability, (5) ecosystem engineers, (6) seed dispersal by animals (especially birds) and (7) topography, geology and soil type.

6.4 CONSERVATION AND BIODIVERSITY PLANS

The 2017 WCBSP Handbook (Pool-Stanvliet *et al*., 2017) distinguishes between the various conservation planning categories. Critical Biodiversity Areas are habitats with high biodiversity and ecological value. Such areas include those that are likely to be in a natural condition (CBA 1) and those that are potentially degraded or represent secondary vegetation (CBA 2). Ecological Support Areas are not essential for meeting biodiversity targets. However, they play an important role in supporting the functioning of Protected Areas (PA) or CBAs and are often vital for delivering ecosystem services. A distinction is made between ESAs that are still likely to be functional (i.e. in a natural, near-natural or moderately degraded condition; (ESA 1) and Ecological Support Areas that are severely degraded, or have no natural cover remaining, and therefore require restoration (ESA 2). Other Natural Area (ONA) sites are not currently identified as a priority, but retain most of their natural character and perform a range of biodiversity and ecological infrastructure functions. Although not prioritised, they are still an important part of the natural ecosystem. Ground-truthing of the assigned CBA and ESA sites are described in the vegetation and discussion section below.

The majority of the study area is classified as CBA 2 (Figure 8), with a smaller area classified as CBA 1 in the vicinity of the proposed development foot print. Two very small areas are classified as ESA 2 in the northern corner of the site. TA more appropriate classification fot the area classified as CBA 1 is CBA 2 given the previous high density of IAPs in the recent past (Figure 15). The vegetation in this area is secondary and in a state of degradation, all of which more closely align to the CBA 2 classification.

The South African Protected Areas Database (SAPAD)

The eastern boundary of the site abuts the Featherbed Nature Reserve whereas the north-eastern boundary borders on the Garden Route National Park, both of which as designated protected areas. Other protected areas in the broader landscape include (1) Knysna National Lake Area, (2) Brenton Blue Butterfly Nature Reserve found to the west of the site, and (3) Skuilte Private Nature Reserve to the north-west of the site (Figure 9).

The South African Conservation Areas Database (SACAD)

The study area falls within a SACAD protected area, namely the Garden Route Biosphere Reserve, a nationally important conservation area that was recognised by UNESCO as South Africa's ninth Biosphere Reserve (https://gardenroutebiosphere.org.za/). This extensive area includes the whole Garden Route Area.

Figure 8. The study area in relation to the Western Cape Biodiversity Spatial Plan (CapeNature 2017) overlaid on a ESRI ™ aerial image.

Table 3. The CBA categories from the WCBSP (CapeNature, 2017) with the associated subcategory, definition and management objectives that are found on the site

Map category	Subcategory & Features	Definition	Management objective	Reasons
CBA 1	CBA: Terrestrial & Forest	Areas that are required to meet biodiversity targets for species, ecosystems or ecological processes and infrastructure. These include: • All areas required to meet biodiversity pattern (e.g. species, ecosystems) targets; • Critically Endangered (CR) ecosystems (terrestrial, wetland and river types); • All areas required to meet ecological infrastructure targets, which are aimed at ensuring the continued existence and functioning of ecosystems and delivery of essential ecosystem services; and • Critical corridors to maintain landscape connectivity.	Maintain in a natural or near natural state, with no further loss of natural habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.	Coastal resource protection- Eden Indigenous Forest Type Knysna Sand Fynbos (CR) Water source protection- Knysna Watercourse protection- South Eastern Coastal Belt
CBA 2	Terrestrial	Areas in a degraded or secondary condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure.	Maintain in a functional, natural or near-natural state, with no further loss of natural habitat. These areas should be rehabilitated.	
ESA 2	NA	These areas may be degraded but still play an important role in supporting the functioning of PAs or CBAs, and are essential for delivering ecosystem services. Plantations may be included in this category. These areas should be restored and/or managed to minimise impact on ecological infrastructure functioning; especially soil and water-related services, and to allow for faunal movement.	Restore and/or manage to minimise impact on ecological infrastructure functioning; especially soil and water-related services	

Figure 9. The study area in relation to areas from the South African Protected Areas Database (SAPAD, 2024), overlaid on a ESRI ™ aerial image.

6.5 STRATEGIC WATER SOURCE AREAS (SWSAS)

Surface Water

Strategic Water Source Areas (SWSAs) surface water refer to the 10% of South Africa's land area that provides a disproportionate 50% of the country's water runoff. Understanding where these SWSAs are is crucial to planning and management of water resources, including the ecosystems that support water quality and quantity. The 2021 spatial layer for SWSAs for surface water is a fine-scale delineation of the SWSAs, intended to support the integration of SWSAs in a range of catchment- and local-level planning, management, and regulatory processes. Portion 104 of Farm 216 is included within the Outeniqua SWSA (Figure 10).

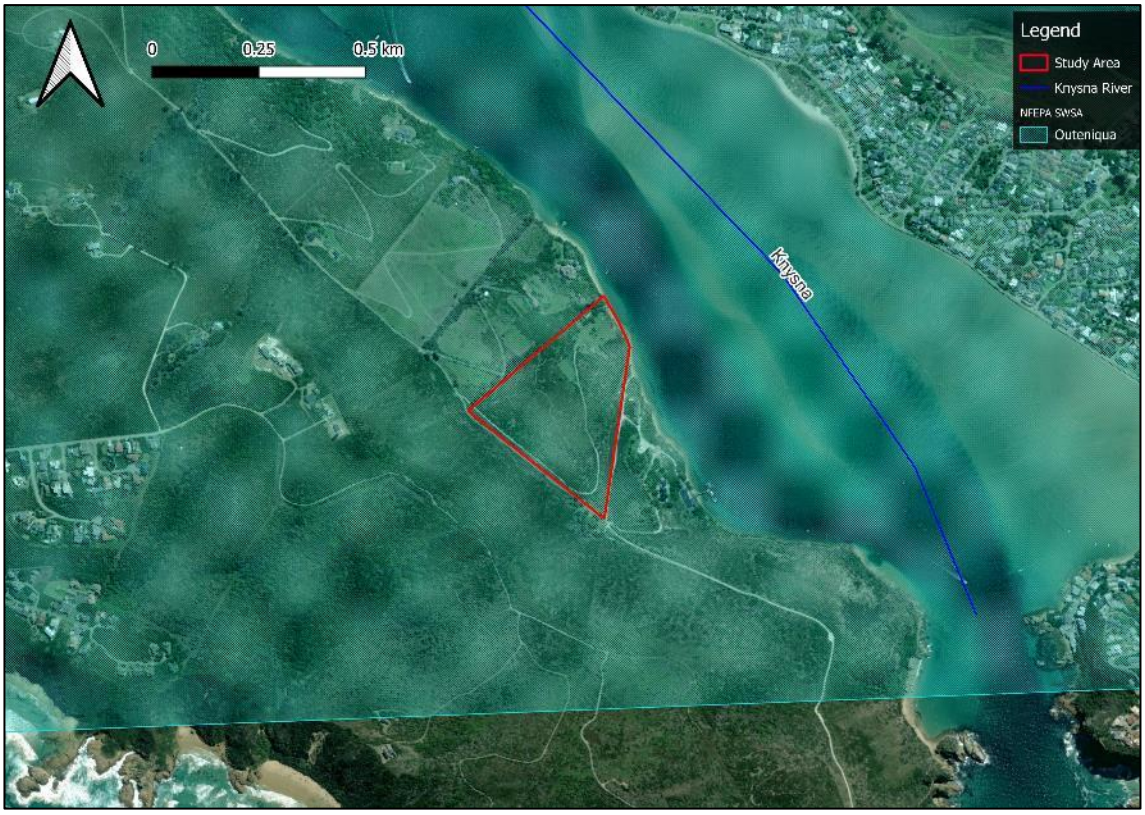

Figure 10. The study area overlaid onto a ESRI hybrid satellite image showing the SWSA for the area and NFEPA Rivers.

Wetlands (NFEPA)

This layer shows Wetland Freshwater Priority Areas (FEPAs), wetland ecosystem types and wetland condition on a national scale. The delineations are based largely on satellite imagery and do not include historic wetlands lost through drainage, ploughing and concreting. Irreversible loss of wetlands is expected to be high in some areas, such as urban centres. In addition, there are many gaps in wetlands as remote sensing does not detect all wetlands. In the case of the study area, the Knysna estuary adjacent to the site has been included (Figure 11), as well as small areas of wetland habitat on the southern slope of the western head.

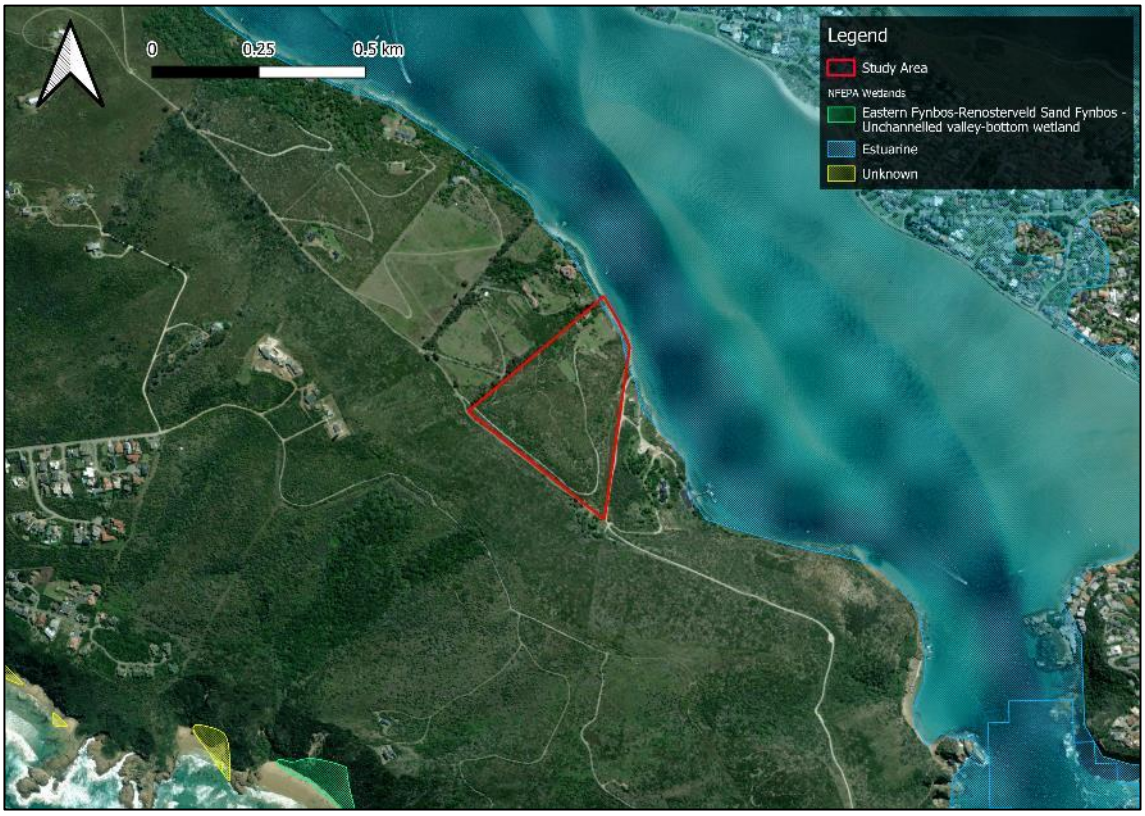

Figure 11. The study area overlaid onto a ESRI hybrid satellite image showing the NFEPA Wetland layer.

Rivers (FEPA Sub-catchments)

FEPAs were identified based on

- 20% biodiversity target for river, wetland and estuarine ecosystem types across the country
- 20% biodiversity target for significant wetland clusters embedded in natural landscapes, within each wetland vegetation group
- Population targets for threatened freshwater fish species indigenous to South Africa.

- alignment with all remaining free-flowing rivers.
- alignment with priority estuaries identified in the National Biodiversity Assessment 2010.
- alignment with existing protected areas and focus areas for protected area expansion

For rivers and fish, whole sub-catchments were identified as FEPAs. For rivers, FEPAs were identified in rivers that are in a good condition (A or B). Where it was not possible to meet biodiversity targets for river ecosystems in such rivers, Phase 2 FEPAs were identified in moderately modified (C) rivers. D rivers were not considered as they usually cannot be rehabilitated back to an AB state. Different categories are shown on the FEPA maps, each with different management implications.

"River FEPA and associated sub-quaternary catchment: River FEPAs achieve biodiversity targets for river ecosystems and threatened fish species, and were identified in rivers that are currently in a good condition (A or B ecological category). Their FEPA status indicates that they should remain in a good condition in order to contribute to national biodiversity goals and support sustainable use of water resources. For river FEPAs the whole sub-quaternary catchment is shown in dark green, although FEPA status applies to the actual river reach within such a sub-quaternary catchment. The shading of the whole sub-quaternary catchment indicates that the surrounding land and smaller stream network need to be managed in a way that maintains the good condition (A or B ecological category) of the river reach. It is important to note that river FEPAs currently in an A or B ecological category may still require some rehabilitation effort, e.g. clearing of invasive alien plants and/or rehabilitation of river banks. From a biodiversity point of view, rehabilitation programmes should therefore focus on securing the ecological structure and functioning of FEPAs before embarking on rehabilitation programmes in Phase 2 FEPAs (or other areas)" (Nel et al. 2011).

In the case of the study area, the Knysna River flows into the adjacent Knysna estuary, and this catchment is mapped as a FEPA sub-catchment (Figure 12).

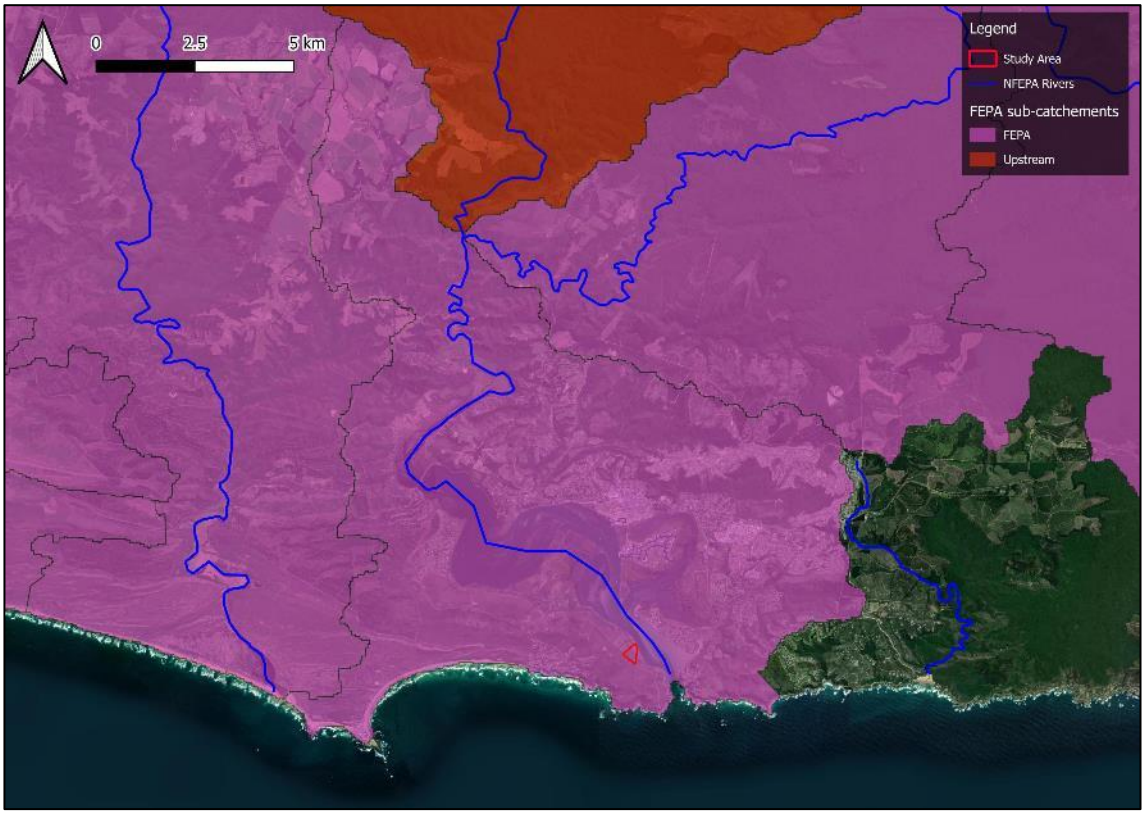

Figure 12. The study area overlaid onto an ESRI ™ satellite image showing the NFEPA Rivers and sub catchment layer.

6.6. PROTECTED AREA EXPANSION

The National Protected Area Expansion Strategy for South Africa 2018 (DEA, 2018) describes the need for protected area expansion across South Africa. The strategy identifies priority areas and the mechanisms through which such expansion can be achieved. The main motivation for protected area expansion according to the NPAES is that "South Africa's protected area network currently falls far short of representing all ecosystems and maintaining ecological processes". There are no areas identified as priority focus areas within the site footprint. It should be noted that the site borders NPAES priority areas to the north and west, with NPAES priority areas also in close proximity due south of the property (Figure 13).

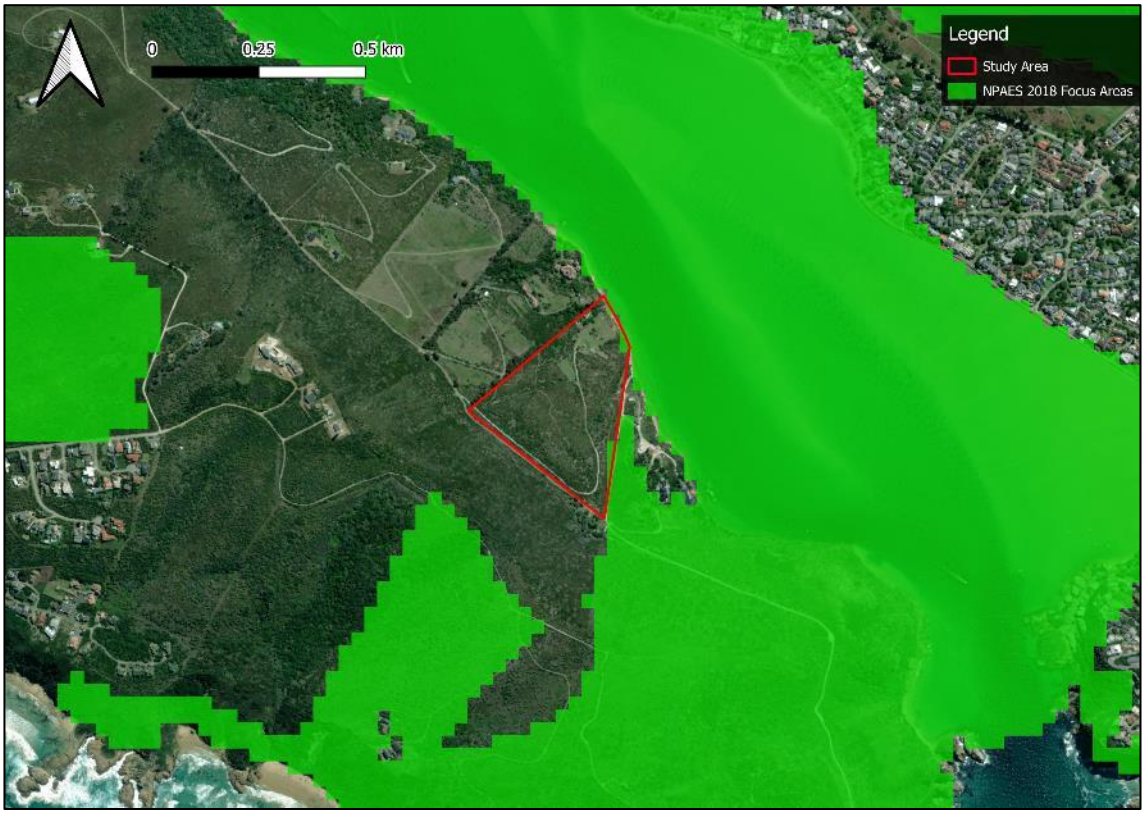

Figure 13. The NPAES map for the immediate area around the site, showing the priority focus areas for expansion.

7. VEGETATION OF THE STUDY AREA

The study area is mapped as Knysna Sand Fynbos according to the *Vegetation map of South Africa, Swaziland, & Lesotho* (VEGMAP, 2018) (Figure 6), whereas the C.A.P.E. Fine Scale Mapping Project (Vlok, Euston-Brown, & Wolf, 2008) describe two vegetation types in the study area (Groenvlei Coastal Forest and Sedgefield Thicket-Fynbos) (Figure 7). The vegetation of the site is a fynbos thicket mosaic of varying degrees of degradation. This vegetation is closer in structure to Sedgefield Thicket-Fynbos and Goukamma Dune Thicket (Vlok, Euston-Brown & Wolf, 2008; Grobler, Vlok, Cowling, van der Merwe, Skowno, & Dayaram, 2018) than to Knysna Sand Fynbos (VEGMAP, 2018). It is likely that prior to the development of the site, an area of coastal forest would have persisted along the edge of the lagoon, with a more developed fynbos-thicket habitat on the upper slopes.

The majority of the survey site, much like the surrounding area, has been subject to significant disturbance events as well as high levels of Invasive Alien Plant Species (IAPs) (Figure 14). Prior to the extreme Knysna fire event of 2017, the area on which the proposed

development will be situated hosted a dense population of IAPs, namely *Eucalyptus* and *Pinus* species (Figure 15). Since the fire event, there has been an effort to remove IAPs from the burnt areas, allowing the recovery of naturally occurring species. The site is currently dominated by pioneer species, with IAPs still prevalent on neighbouring properties (Figure 16).

The habitat map provided in Figure 17 distinguishes between dune thicket and thicket-fynbos vegetation, and their corresponding condition. The habitats mapped at the site include (1) Degraded Dune Thicket, (2) Degraded Thicket-Fynbos, and (3) Transformed vegetation. The description of habitat condition classes appears in Table 4. The vegetation types present at the site are described in the following section.

Table 4. The habitat condition descriptions used for the vegetation on the site.

Habitat category	Description	Indigenous vegetation
Intact vegetation	A true representation of the original vegetation type in terms of structure and species makeup. Minimal soil disturbance. Unlikely to have ever been ploughed. Disturbance may be evident.	Yes
Semi-intact	Resembles the original vegetation type in terms of structure and species makeup but has lower species diversity than intact vegetation. Dominated by disturbance-resilient species. Soils may have been heavily disturbed in the past. Restoration potential is high.	Yes
Degraded	Only a few species representative of the original vegetation type are present. The vegetation has undergone heavy disturbance. Restoration potential is either low or moderate.	Yes
Highly degraded	The original vegetation is usually absent and has been removed in the past. Only a few remnant or pioneer species are present. Soils usually ploughed in the past. Restoration potential is very low.	*No (not naturally occurring as per the NEMA definition)
Transformed	No remnant species exist anymore. The landscape is altered irreversibly with no restoration potential. Examples include cultivated farmland and the built environment.	*No (not naturally occurring as per the NEMA definition)

Figure 14. Google Earth ™ aerial image from April 2016 showing high density of IAPs in the vicinity of the proposed development footprint.

Figure 15. Google Earth ™ aerial image from August 2020, after the Knysna Fires. The area previously dominated by IAPs has been cleared by the fire and recolonized by pioneer vegetation such as *Osteospermum moniliferum*.

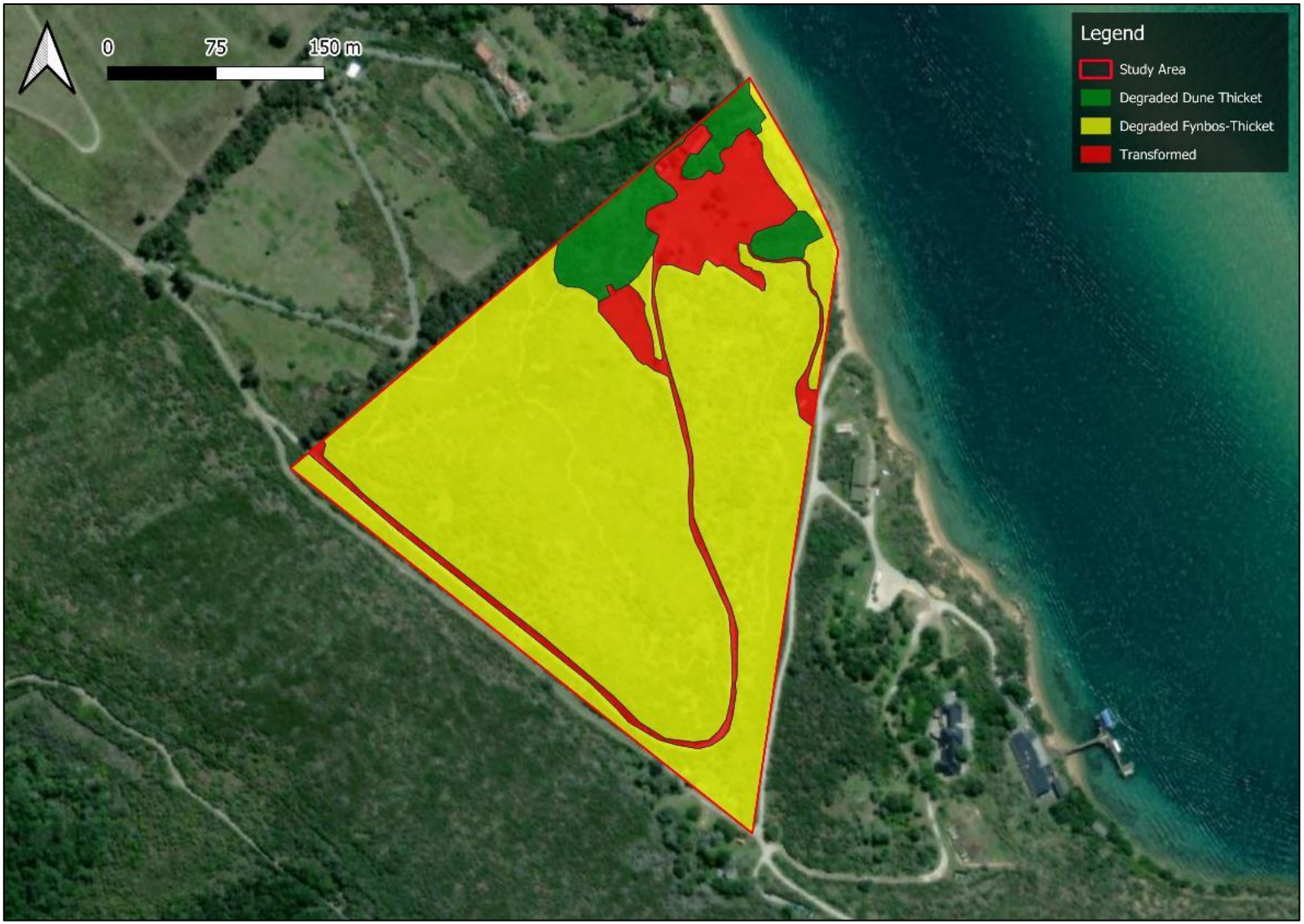

Figure 16. The habitats identified at the study area, superimposed on an ESRI ™ satellite image.

7.1 DEGRADED DUNE THICKET

Several portions of the study area can be classified as degraded dune thicket. This habitat is found primarily on the north-western boundary of the site, with smaller areas to the north-east. The vegetation consists primarily of moderately sized thicket shrubs and small trees (2 -2.5m). The dominant species, much like the rest of the site is *Osteospermum moniliferum* however this vegetation type is distinguished from the thicket-fynbos vegetation by its increased diversity of thicket species and its denser structure.

The ecological function of this habitat is likely to be significantly altered in its current state. The neighbouring property (to the north-west) contains a high density of IAPs, which poses a significant risk for re-invasion of the site. Furthermore, the relative lack of connectivity to similar habitat threatens the integrity of the habitat.

Table 5. Plant Species List for Degraded Dune Thicket Habitat. Species marked with * indicate dominant species.

Scientific Name	Common Name	Scientific Name	Common Name
Abutilon sonneratianum	Butter and Cheese	*Helichrysum foetidum*	Stinking Everlasting
Afrocanthium mundianum	Rock Alder	*Helichrysum petiolare*	
Agathosma apiculata	Garlic Buchu	*Heliophila subulata*	Common Sunspurge
Allophylus decipiens	Bastard Currant	*Hermannia hyssopifolia*	Fat Dollsrose
Apodytes dimidiata	Water Holly	*Hibiscus aethiopicus*	Cape Hibiscus
Aspalathus alopecurus	Foxtail Capegorse	*Hypoxis villosa*	Shaggy Stargrass
Aspalathus spinosa	Spiny Capegorse	*Imperata cylindrica*	Cogon Grass
Asparagus aethiopicus	Hookthorn Asparagus	*Indigofera verrucosa*	Warty Indigo
Asparagus africanus	Bush Asparagus	*Ischyrolepsis*	
Asparagus asparagoides	Bridal Asparagus	*Jamesbrittenia tenuifolia*	
Brunsvigia orientalis	Candelabra Lily	*Lauridia tetragona*	Climbing Saffron
Buddleja saligna	False Olive	*Megathyrsus maximus*	Guinea Grass
Canthium inerme	Turkeyberry	*Melinis repens*	Natal Grass
Carissa bispinosa	Num num	*Metalasia muricata*	Strandveld Blombush
Carpobrotus edulis	Sour fig	*Myrsine africana*	African Boxwood
Chaenostoma cordatum	Forest Skunkbush	*Mystroxylon aethiopicum*	Kooboo-Berry
Chasmanthe aethiopicum	Cobra lily	*Nidorela ivifolia*	Oven Bush
Chironia baccifera	Christmas Berry	*Olea europaea*	Wild Olive
Colchicum eucomoides	Green Men-in-a-Boat	*Osteospermum moniliferum* *	Bitou
Crassula subulata	Bihair Stonecrop	*Oxalis ciliaris*	Fringe Sorrel
Cullumia decurrens	Sprawling Snakethistle	*Oxalis depressa*	Early Sorrel
Cynanchum africanum	Cape Buckhorn	*Oxalis stellata*	Star Sorrel
Cynanchum obtusifolium	Roundleaf Buckhorn	*Passerina corymbosa* *	Common Gonna
Cynodon dactylon	Couch Grass	*Pelargonium capitatum*	Common Storksbill
Delosperma inconspicuum	White Gardenroute Sheepfig	*Pennisetum clandestinum*	Kikuyu Grass
Diospyros dichrophylla	Poison Starapple	*Phylica litoralis*	Beach Hardleaf
Diospyros simii	Climbing Star-Apple	*Plectranthus neochillus*	
Dovyalis rhamnoides	Cape Cranberry	*Polygala myrtifolia*	September Bush
Erharta villosa		*Pterocelastrus tricuspidatus* *	Candlewood
Erica discolor	Discolorous Heath	*Rapanea melanophloeos*	Cape Beech
Erica leucopelta	Whiteshield Heath	*Restio* sp.	
Erythrina cf. lysistemon	Common Coral Tree	*Rhoicissus digitata*	Baboon Grape
Euclea crispa	Blue Guarri	*Rhynchosia leucoscias*	Shiny Snoutbean
Euclea racemosa	Dune Guarri	*Salvia aurea*	Brown Sage
Felicia echinata	Dune daisy	*Scutia myrtina*	Cat-Thorn
Ficinia bulbosa	Bulbous Sedge	*Searsia lucida**	Blinktaaibos
Ficinia ramosissima	Branch Clubrush	*Selago corymbosa*	Stiff Bitterbush
Genus Schoenus	*Veldrushes*	*Senecio ilicifolius*	Kowanna Ragwort

Grewia occidentalis	Common Crossbery	*Seriphium plumosum*	Common Snakebush
Gymnosporia buxifolia	Common Spikethorn	*Sideroxylon inerme*	White Milkwood
*Gymnosporia nemorosa**	White Forest Spikethorn	*Stenotaphrum secundatum*	Buffalo Grass
Harpephyllum caffrum	Wild Plum	*Tetragonia fruticosa*	Sprawling Sea Coral
Hebenstretia integrifolia	Summer Slugwort	*Thamnochortus glaber*	Eastern Thatchreed
Helichrysum cymosum	Fume Everlasting	*Virgilia divaricata*	Gardenroute Keurboom

Figure 17. Degraded Dune Thicket Vegetation. Species include *Sideroxylon inerme* (pictured above).

Figure 18. The dune thicket is differentiated from the fynbos-thicket based on the density and height of the vegetation, with the degraded dune vegetation considerably thicker and taller than the fynbos-thicket.

7.2 DEGRADED FYNBOS-THICKET

The majority of the site is covered in thicket-fynbos vegetation. The composition and structure of the habitat conforms more closely to the Sedgefield Fynbos-Thicket habitat described by Vlok, Euston-Brown, & Wolf (2008) than to Knysna Sand Fynbos (VEGMAP, 2018). The vegetation is dominated by *Osteospermum monileferum,* with other sclerophyllous shrub species forming a dense mid-canopy layer. These include *Passerina corymbosa* and *Metalasia muricata.* Thicket species such as *Pterocelastrus tricuspidatus* and *Searsia lucida* are fairly common and are likely to increase in density should fire continue to be excluded from the site. Two species of conservation concern were found in this habitat. These include *Lebeckia gracilis* (EN), and *Selago villicaulis* (VU) (Figure 19). Within the dense fynbos-thicket vegetation there are open gaps, supporting low growing vegetation such as *Helichrysum cymosum, Helichrysum foetidum, Helichrysum petiolare, Selago corymbosa,* and *Ficinia acuminata*.

Figure 19. (top) *Lebeckia gracilis;* (bottom) *Selago villicaulis*.

The ecological integrity and functionality are moderately degraded. The historic high density of IAPs and previous high intensity fire events have depleted the species richness of the vegetation. However, the removal of IAPs and the proximity of the site to protected areas should allow for the potential reestablishment of naturally occurring species at the site.

Table 6. Plant Species List for Degraded Thicket-Fynbos Habitat. Species marked with * indicate dominant species.

Scientific Name	Common Name	Scientific Name	Common Name
Abutilon sonneratianum	Butter and Cheese	*Helichrysum foetidum*	Stinking Everlasting
Afrocanthium mundianum	Rock Alder	*Helichrysum petiolare*	Bedding Helichrysum
Agathosma apiculata	Garlic Buchu	*Heliophila subulata*	Common Sunspurge
Allophylus decipiens	Bastard Currant	*Hermannia hyssopifolia*	Fat Dollsrose
Aspalathus alopecurus	Foxtail Capegorse	*Hibiscus aethiopicus*	Cape Hibiscus
Aspalathus spinosa	Spiny Capegorse	*Hypoxis villosa*	Shaggy Stargrass
Asparagus aethiopicus	Hookthorn Asparagus	*Imperata cylindrica*	Cogon Grass
Asparagus africanus	Bush Asparagus	*Indigofera verrucosa*	Warty Indigo
Asparagus asparagoides	Bridal Asparagus	*Ischyrolepsis*	
Brunsvigia orientalis	Candelabra Lily	*Jamesbrittenia tenuifolia*	
Buddleja saligna	False Olive	*Lauridia tetragona*	Climbing Saffron
Canthium inerme	Turkeyberry	*Lebeckia gracilis* (VU)	Slender Ganna
Cassytha ciliolata	False Dodder	*Megathyrsus maximus*	Guinea Grass
Carissa bispinosa	Num num	*Melinis repens*	Natal Grass
Carpobrotus edulis	Sour fig	*Metalasia muricata**	Strandveld Blombush
Chaenostoma cordatum	Forest Skunkbush	*Myrsine africana*	African Boxwood
Chasmanthe aethiopicum		*Mystroxylon aethiopicum*	Kooboo-Berry
Chironia baccifera	Christmas Berry	*Nidorela ivifolia*	Oven Bush
Colchicum eucomoides	Green Men-in-a-Boat	*Olea europaea*	Olyfboom
Crassula subulata	Bihair Stonecrop	*Osteospermum moniliferum**	Bitou
Cullumia decurrens	Sprawling Snakethistle	*Oxalis ciliaris*	Fringe Sorrel
Cynanchum africanum	Cape Buckhorn	*Oxalis depressa*	Early Sorrel
Cynanchum obtusifolium	Roundleaf Buckhorn	*Oxalis stellata*	Star Sorrel
Cynodon dactylon	Couch Grass	*Passerina corymbosa**	Common Gonna
Delosperma inconspicuum	White Gardenroute Sheepfig	*Pelargonium capitatum*	Common Storksbill
Diospyros dichrophylla	Poison Starapple	*Pennisetum clandestinum*	Kikuyu Grass
Diospyros simii	Climbing Star-Apple	*Phylica litoralis*	Beach Hardleaf
Dovyalis rhamnoides	Cape Cranberry	*Plectranthus neochillus*	
Erharta villosa		*Polygala myrtifolia*	September Bush
Erica discolor	Discolorous Heath	*Pterocelastrus tricuspidatus*	Candlewood
Erica leucopelta	Whiteshield Heath	*Rapanea melanophloeos*	Cape Beech
Euclea crispa	Blue Guarri	*Rhoicissus digitata*	Baboon Grape
Euclea racemosa	Dune Guarri	*Rhynchosia leucoscias*	Shiny Snoutbean
Felicia echinata	Dune daisy	*Salvia aurea*	Brown Sage
Ficinia acminata	Long Clubrush	*Scutia myrtina*	Cat-Thorn
Ficinia bulbosa	Bulbous Sedge	*Searsia lucida*	Blinktaaibos
Ficinia ramosissima	Branch Clubrush	*Selago corymbosa**	Stiff Bitterbush
Genus Restio	Capereeds	*Selago villicaulis* (VU)	Dune Bitterbush
Genus Schoenus	*Veldrushes*	*Senecio ilicifolius*	Kowanna Ragwort
Grewia occidentalis	Common Crossbery	*Seriphium plumosum*	Common Snakebush
Gymnosporia buxifolia	Common Spikethorn	*Sideroxylon inerme*	White Milkwood
Gymnosporia nemorosa	White Forest Spikethorn	*Tetragonia fruticosa*	Sprawling Sea Coral
Hebenstretia integrifolia	Summer Slugwort	*Thamnochortus glaber*	Eastern Thatchreed
Helichrysum cymosum	Fume Everlasting	*Virgilia divaricata*	Gardenroute Keurboom

Figure 20. Open spaces within the Fynbos-thicket vegetation. Low growing graminoids (such as *F. acuminata*) and herbaceous species (such as *Hermannia hyssopifolia* or *Heliophila subulata*).

Figure 21. The majority of the site is dominated by a dense fynbos-thicket matrix comprised primarily of *Osteospermum monileferum* and *Passerina corymbosa*.

7.3 TRANSFORMED HABITAT

Transformed habitat contains very little indigenous or naturally occurring vegetation and describes areas of the study area that have been converted to open grassy areas, or replaced by roads and other hard infrastructure (buildings, concrete pads etc.). The vegetation is dominated by grasses such as *Cynodon dactylon, Stenotaphrum secundatum,* and *Pennisetum clandestinum*, interspersed with common ruderal species.

The ecological functioning of this habitat has been highly altered with little to no ecological integrity remaining. The lack of naturally occurring locally indigenous vegetation severely affects the ecological functioning of this habitat. Secondly, whilst the planting of exotic species in landscaped areas may provide some ecological services through the creation of habitat or providing food sources for pollinators, the threat of these exotics invading the surrounding vegetation is high. Examples of this include *Plectranthus neochilus*.

Figure 22. The majority of the transformed habitat at the site consists of large grassy areas, dominated by lawn grasses (*C. dactylon, S.* secundatum). The margins of this habitat are host to several ruderal species and other vegetation common in disturbed areas such as *Nidorella ivifolia* and *Helichrysum cymosum*.

Figure 23. The transformed habitat includes concrete pads for caravans, as well as landscaped areas planted with non-native or extralimital species such as *Erythrina lysistemon* and *Harpephyllum caffrum*.

8. SENSITIVITY

Sensitivity is defined here as the **'conservation value'** together with the **'degree of resilience to disturbance'**. The conservation value relates to the conservation status (including the ecosystem threat status) and other factors including ecological connectivity, habitat condition, persistence of ecological process and the site's role in supporting biodiversity. The degree of resilience takes into consideration factors such as sensitivity to disturbance and restoration potential.

In the case of the study area, a **Medium sensitivity** applies to the Degraded Fynbos-thicket habitat for the following reasons:

1. The site classified as a CBA 1 and CBA 2 in the WCBSP. The CBA 1 area would be more accurately classified as CBA 2 due to the poor condition of the vegetation.
2. Two SCC were found in this habitat (*Lebeckia gracillis* & *Selago villicaulis*).
3. The ecological functioning of this habitat is moderately modified. The historic medium to high density of IAPs and high intensity fires have depleted the species richness of the vegetation.

4. This habitat occurs on moderate to steep slopes which would be prone to erosion if developed.
5. The restoration potential of this area is moderate with appropriate active management inputs.

A **Low sensitivity** applies to the Degraded Dune Thicket habitat for the following reasons:

1. The vegetation type present is Least Concern, however the vegetation that remains in this habitat is only marginally representative of the original ecosystem in its current condition. However, it does contain “indigenous vegetation” by definition.
2. The site classified as CBA 1 and CBA 2 in the WCBSP. The CBA 1 area would be more accurately classified as CBA 2 due to the poor condition of the vegetation.
3. Two protected tree species were found in this habitat (White Milkwood *Sideroxylon inerme* and Outeniqua yellowwood *Afrocarpus falcatus*). The white milkwood is likely naturally occurring whereas the Outeniqua yellowwood appears to have been planted.
4. The ecological functioning of this habitat is modified in its current state due to the long history of high-density IAPs and significant fire events.
5. The restoration potential of this habitat is low to moderate without active management inputs, but restoration is possible, and recommended for the areas which are not developed.

A **Very Low sensitivity** applies to the Transformed habitat for the following reasons:

1. The indigenous vegetation has been almost completely removed from this habitat, with the dominant vegetation consisting of lawn grasses.
2. One individual of one SCC (*Selago villicaulis*)was found in this habitat however this species is fairly abundant elsewhere on the property.

The sensitivity map is provided below in Figure 24.

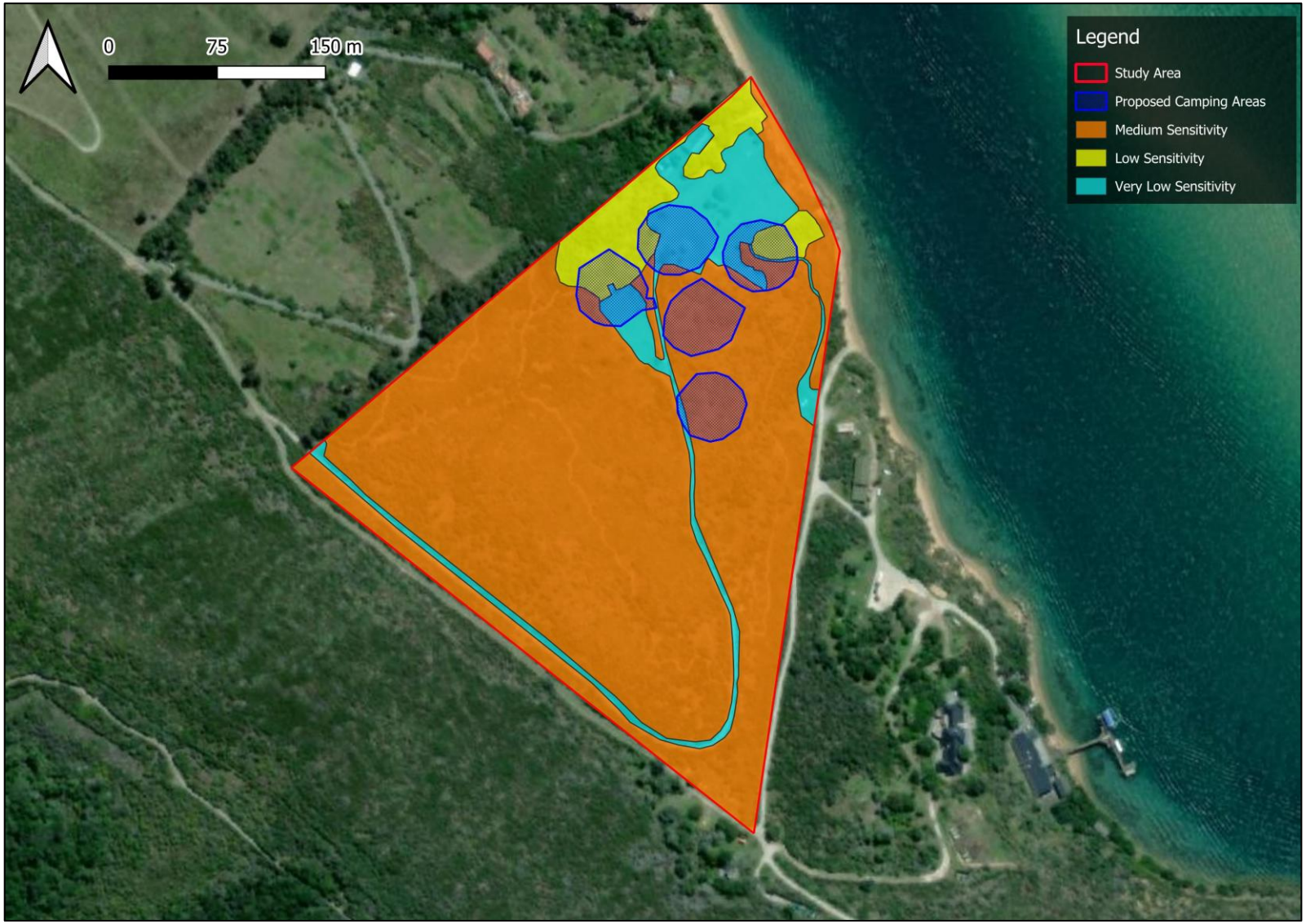

Figure 24. The sensitivities for habitats described in the study area overlaid on an ESRI ™ image.

9. IMPACT ASSESSMENT

The impact assessment is a measure of the impacts likely to occur on the affected environment, specifically the vegetation, ecological processes, important species and habitats. They are considered for (a) the 'No Go' scenario and (b) the direct, indirect and cumulative impacts of the proposed project. Impacts are assessed for the construction and operational phase together (Table 8).

The impact assessment methodology is explained in detail in Appendix 1.

9.1. 'NO GO' OR NO DEVELOPMENT SCENARIO

The 'No Go' or no development scenario takes into consideration the impacts associated with the no construction option. It is a prediction of the future state of the affected area in the event of no construction activities taking place and is based on the current and/or anticipated future land use. If no construction were to take place and the *status quo* would remain the same, it is likely that the site would remain in a similar condition. The owner currently removes IAPs from the property thereby reducing the likelihood of invasion. The exclusion of fire from the habitat is likely to result in further colonisation and proliferation of thicket species, ultimately leading to the loss of fynbos specialist species from the site. In the medium term the impact of the No-Go scenario is **Low Negative**, with a **Low Negative** impact in the long term. It should be noted that it is the legal responsibility of the landowner to remove and control these species so this should not be considered as a reason to allow development on the site.

9.2. DIRECT IMPACTS

Direct impacts are those that would occur as a direct result of the proposed tourism accommodation and associated infrastructure. The vegetation that occurs in the areas proposed for development would be removed and permanently lost. Additionally, increased run-off from impermeable structures could result in erosion on the steeper parts of the property. Lastly, there exists a risk of the introduction of IAPs or insects by visitors, such as Polyphagous Shot Hole Borer (PSHP), if outside plant material such as fire wood is brought to the site.

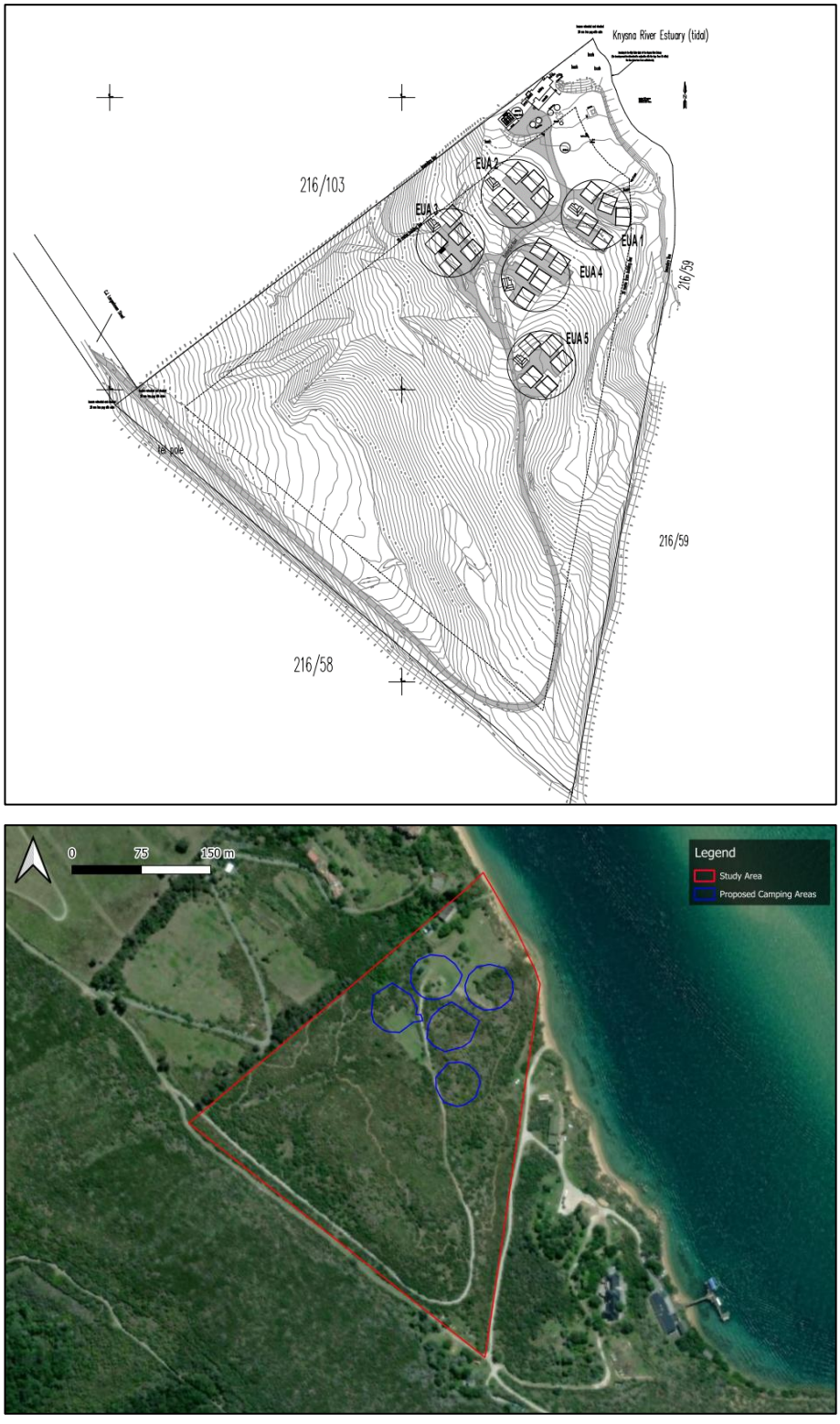

Figure 25. (top) The proposed development for Portion 104 of Farm 216 as provided by the applicant. (bottom) aerial image of the proposed development overlaid on an ESRI ™ satellite image.

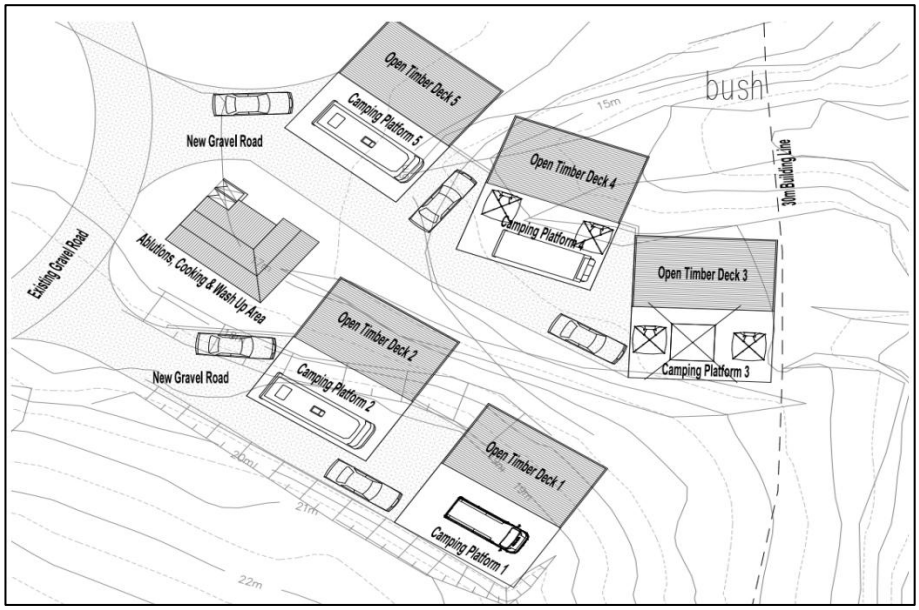

Figure 26. The standardised layout of each of the five camping areas

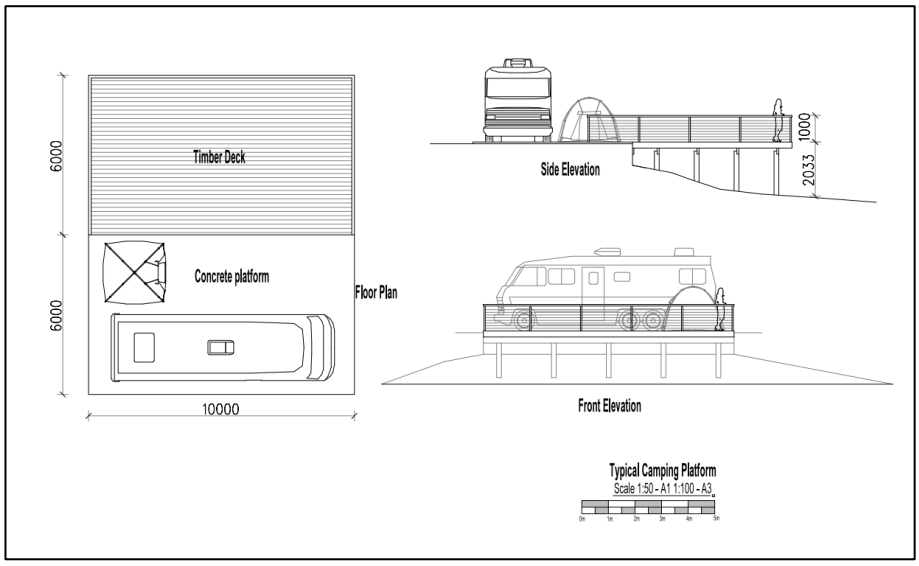

Figure 27. Diagram of each proposed camping site, including concrete pad and timber deck.

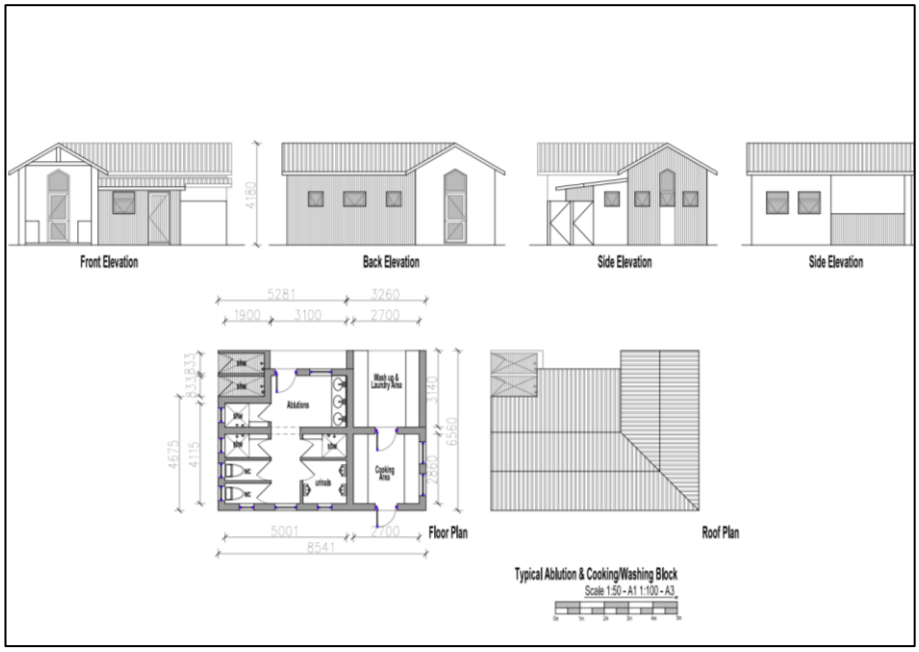

Figure 28. Diagram of the proposed ablution block and cooking area at each camping area.

The direct impacts are considered separately for the two following components:

1. Loss of terrestrial ecology including: vegetation type, ecological processes, indigenous vegetation, ecologically important species, terrestrial habitat and ecological connectivity.
2. Loss of species of conservation concern (SCC).

Some habitat classed as having a medium sensitivity will be directly affected by the proposed development, namely the Thicket Fynbos habitat (Figure 16 & 24). The primary disturbance will be loss of habitat through clearing, with potential disturbance to the surrounding vegetation during the construction phase. Due to the small area of the developmental footprint, and the low conservation priority of the dominant vegetation type, the loss of vegetation is assessed to be a **Low Negative** impact.

Whilst the loss of and disturbance to these areas affects a fairly small area, the current layout of the proposed developments would result in the clearance of habitat supporting two species of conservation concern; the Vulnerable *Selago villicaulis*, and the Endangered *Lebeckia gracilis.* The population of *Selago villicaulis* in the survey area of the property is fairly robust (*n* = 53) and is likely to occur elsewhere in the property. The population of *Lebeckia gracilis* (*n* = 22) is much smaller and more vulnerable to disturbance. Without mitigation measures (Section 9.5) the loss of these two populations of SCC is rated as **High**. The most effective mitigation measure would be to relocate one of the camping areas

(Figure 29), and alter the layout of the remaining camping areas to avoid disturbing other SCC individuals.

Mitigation is further detailed in section 9.5

Table 7. Impact table for the construction phase of the proposed development.

	Loss of SCC	**Loss of Terrestrial Biodiversity**	**No-Go Alternative**
Potential impact and risk:	Loss of two SCC Species; *Selago villicaulis* (VU), and *Lebeckia gracillis* (EN)	Loss of approximately 1 ha of indigenous vegetation, mostly representative of Goukamma Dune Thicket (LC)	Status quo remains
Nature of impact:	Negative	Negative	Negative
Extent and duration of impact:	Site (1), Local (2) and Long-term (3)	Site (1) and Long-term (3)	Site (1) and Medium term (2)
Magnitude	High (3)	Medium (2)	Zero (0)
Consequence of impact or risk:	Highly detrimental (9)	Slightly detrimental (5)	Negligibly detrimental (3)
Probability of occurrence:	Definite (4)	Definite (4)	Probable (3)
Degree to which the impact may cause irreplaceable loss of resources:	Low	Low	Low
Degree to which the impact can be reversed:	Low	Low	Low
Cumulative impact prior to mitigation:	Very Low	Very Low	Very Low
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	High (36)	Low (24)	Negligible (9)
Degree to which the impact can be avoided:	Low	Low	Low
Degree to which the impact can be managed:	Low	Low	Low
Degree to which the impact can be mitigated:	Low	Low	Low
Proposed mitigation:	Move construction footprint to avoid SCCs present at the site.	None Proposed	N/A
Residual impacts:	Low	Low	Low
Cumulative impact post mitigation:	Very Low	Very Low	Very Low
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low (24)	Low (24)	Negligible (9)

Operational Phase

The operational phase impacts are related to the use of the site for tourism. Impacts are unlikely to be significant in this phase of the project, as the site is managed for low intensity tourism activities such as camping. The impacts are rated as Negligible for the loss of SCC, loss of terrestrial biodiversity and for the No-go scenario (Table 8). Fire exclusion in the areas adjacent to the

development is likely to be maintained, but this would already have been the status quo for the existing infrastructure on the site. No mitigation is proposed for this phase.

Table 8. Impact table for the operational phase of the proposed development.

	Loss of SCC	**Loss of Terrestrial Biodiversity**	**No-Go Alternative**
Potential impact and risk:	No SCC are expected to be lost in this phase.	No loss of terrestrial biodiversity is expected for this phase.	Status quo remains
Nature of impact:	Negative	Negative	Negative
Extent and duration of impact:	Site (1) and Medium term (2)	Site (1) and Medium term (2)	Site (1) and Medium term (2)
Magnitude	Zero (0)	Zero (0)	Zero (0)
Consequence of impact or risk:	Negligibly detrimental (3)	Negligibly detrimental (3)	Negligibly detrimental (3)
Probability of occurrence:	Probable (3)	Probable (3)	Probable (3)
Degree to which the impact may cause irreplaceable loss of resources:	Low	Low	Low
Degree to which the impact can be reversed:	Low	Low	Low
Cumulative impact prior to mitigation:	Very Low	Very Low	Very Low
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Negligible (9)	Negligible (9)	Negligible (9)
Degree to which the impact can be avoided:	Low	Low	Low
Degree to which the impact can be managed:	Low	Low	Low
Degree to which the impact can be mitigated:	Low	Low	Low
Proposed mitigation:	N/A	N/A	N/A
Residual impacts:	Low	Low	Low
Cumulative impact post mitigation:	Very Low	Very Low	Very Low
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Negligible (9)	Negligible (9)	Negligible (9)

9.3 INDIRECT IMPACTS

Indirect impacts occur mostly at the operational stage and are less obvious. Examples include loss of diversity due to loss of connectivity between vegetation remnants and associated loss of pollination. The primary indirect impact identified at this site is fire suppression, leading to the invasion of fynbos habitats by thicket species. As the site has existing infrastructure fire suppression will not be a new indirect impact. Additionally, large areas of vegetation on the upper slopes of the property can still be burnt as part of appropriate land and fire risk management.

9.4 CUMULATIVE IMPACTS

Cumulative impacts are those impacts linked but not limited to (a) increased loss of vegetation type or the ecosystems listed in the Revised National List of Ecosystems that are threatened and in need of protection (Government Gazette, 2022) and (b) other local developments taking place in the region. The area that would be lost should the proposed developments take place is 1 ha. This represents < 0.0001% of the remaining natural area of the ecosystem (91780 ha) (Government Gazette, 2022). Considering the low percentage lost, and the low conservation priority of the vegetation type, the cumulative impact is rated as **Low negative**.

9.5 MITIGATION

Mitigation options are generally considered in terms of the following mitigation hierarchy: (1) avoidance, (2) minimization, (3) restoration and (4) offsets. A distinction is also made between essential mitigation (non-negotiable mitigation measures that lower the impact significance) and non-essential mitigation (best practise measures that do not lower the impact significance).

The following essential mitigation measures are required to reduce the impact of the proposed development.

1. The relocation of camping areas that would result in the disturbance or removal of SCCs (Figure 29). Based on the distribution of SCC in the surveyed area, only one camping area needs to be moved or excluded. Where other camping areas infringe on the presence of SCCs or protected trees, the final location of camping site can be designed in such a way that avoids disturbing these individuals. Should no suitable site be found to locate the highlighted camping area, this camping area should be removed from the proposal.
2. The vegetation from the thicket fynbos habitat that is not developed must be rehabilitated to a state where it is at least partially representative of the original fynbos ecosystem and supports ecological functioning to a moderate or high level. This rehabilitation must be undertaken in a phased approach, according to a rehabilitation plan and undertaken by a qualified botanist or restoration ecologist.
3. The initial step is to ensure that all IAPs on the property are removed, with erosion control implemented where necessary. Passive rehabilitation is recommended on the parts of the site where no earthworks have taken place. The site must be

assessed by the restoration contractor to determine the level of active rehabilitation input. Active rehabilitation will be required for areas where topsoil has been removed.

4. Follow-up clearing of all exotic and listed IAPs is required every 6 months for the first three years, and annually thereafter to ensure that the IAPs do not dominate the fynbos.

In addition to the required mitigation measures, other best practise mitigation includes the following:

1. Mark off the areas that are not going to be developed prior to undertaking any works, and ensure that no unnecessary loss of adjacent vegetation occurs.
2. Sites for building material stocks, vehicles, toilets etc must be clearly marked and restricted to the building footprint, exiting roads or existing disturbed areas.

Figure 29. Map showing suitable locations to move camping areas (yellow) to avoid disturbing SCC.

10. CONCLUSIONS AND RECOMMENDATIONS

According to the VEGMAP, the study area contains only the Critically Endangered Knysna Sand Fynbos. The results of the survey indicate that the vegetation more closely aligns to Goukamma Dune Thicket vegetation and Sedgefield Thicket-Fynbos (Vlok, Euston-Brown, & Wolf, 2008). The WCBSP 2017 classes the majority of the site as CBA 2 and CBA 1. The classification of parts of the site as CBA 1 is questionable as the areas in question were previously occupied by dense communities of IAPs, and the current vegetation is not in a near natural state.

The areas proposed for development are currently degraded and only partially representative of the original vegetation unit that should occupy the site. The source of this degradation is attributed to previous infestations of IAPs, as well as the sever Knysna Fires in 2017. The sensitivity of the vegetation varies from low to medium, with the majority of the site classified as medium sensitivity. The classification of the sensitivity as medium is partly due to the presence of two species of conservation concern, *Lebeckia gracilis* (EN) and *Selago villicaulis* (VU). Additionally, Two Protected tree species, *Afrocarpus falcatus* and *SIderoxylon inerme* were found on the site.

Without mitigation the proposed development will result in the permanent loss of habitat and loss of SCC, including species classified as **Endangered**. The impact of the loss of habitat is considered Low negative, given the small area to be cleared (1 ha) and the low conservation priority of the vegetation type lost. The impact of losing two SCC, in particular *Lebeckia gracilis* is considered to be High Negative. Essential mitigation measures include excluding or relocating one of the camping areas, altering the layout of remaining camp sites to avoid SCC, and appropriate rehabilitation of the remaining vegetation on the remainder property.

The outcome of the mitigation measures should see an improvement in the ecological functioning and integrity of remaining habitat. The proximity of the neighbouring protected area, Featherbed Nature Reserve, should facilitate the migration of floral and faunal species into the study area, further enhancing the ecological integrity of the site. As fire suppression is likely to be continued, it is likely that the site will be over taken by thicket species. It is therefore recommended that ecological burns be practiced, in the upper parts of the property, in order to promote fynbos elements within the vegetation.

The proposed development is for five (5) camping areas, each consisting of five camp sites and an ablutions block (for a total of 25 camp sites and 5 ablutions blocks). The total area

proposed for development is expected to be around 1 ha (of a total of 9.9 ha). The loss of vegetation represents a loss of < 0.001% of the total existing area covered by the vegetation at the site (Goukamma Dune Thicket) and will thus have a Low negative cumulative impact, and no change to the ecosystem threat status will occur as a result of the proposed development. The application is thus supported from a Terrestrial Biodiversity perspective, provided that the mitigation measures are adhered to.

11. REFERENCES

Brownlie, S. 2005. *Guideline for involving biodiversity specialists in EIA processes: Edition 1.*CSIR Report No. ENV-S-C 2005-053 C. Provincial Government of the Western Cape: Department of Environmental Affairs and Development Planning.

Cadman, M., de Villiers, C., Holmes, P., Rebelo, T., Helme, N., Euston Brown, D., Clark, B., Milton, S., Dean, R., Brownlie, S., Snaddon, K., Day, L., Ollis, D., Job, N., Dorse, C., Wood, J., Harrison, J., Palmer, G., Maree, K., Manuel, J., Holness, S., Ralston, S. and Driver, A. 2016. Fynbos Forum Ecosystem Guidelines for Environmental Assessment in the Western Cape Fynbos Forum, Edition 2.

Cape Farm Mapper website: https://gis.elsenburg.com/apps/cfm/

CapeNature. 2017 WCBSP Knysna [Vector] 2017. Available from the Biodiversity GIS website, downloaded on Friday, May 25, 2024

Government Gazette No. 26436. 2004. National Environmental Management: Biodiversity Act 2004.

Government Gazette 37885. 2014. Invasive Species Regulations of the National Environmental Management: Biodiversity Act (No. 10 of 2004).

Government Gazette No. 34809. 2011. Threatened Terrestrial Ecosystems in South Africa. National Environmental Management: Biodiversity Act (No. 10 of 2004).

Government Gazette No. 43110. 20 March 2020. Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in Terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act. 1998, When Applying for Environmental Authorisation.

Government Gazette No. 47526 (2747), 18 November 2022. The Revised National List of Ecosystems that are Threatened and in need of protection. Department Of Forestry, Fisheries and the Environment.

Government Gazette No. 49208, 28 July 2023. Amendment to the protocols for the specialist assessment and minimum report content requirements for Environmental Impacts on Terrestrial Plant and Animal species in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998.

Grobler, A., Vlok, J., Cowling, R, van der Merwe, S., Skowno, A.L., Dayaram, A. 2018. Technical Report: Integration of the Subtropical Thicket Ecosystem Project (STEP) vegetation types into the VEGMAP national vegetation map 2018.

Holness, S., Bradshaw, P. & Brown, A. 2010. Critical Biodiversity Areas of the Garden Route Conservation Planning Technical Report. South African National Biodiversity Institute.

Malan, J.A., 1990. The stratigraphy and sedimentology of the Bredasdorp Group, southern Cape Province.

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

Pool-Stanvliet, R., Duffell-Canham, A., Pence, G. & Smart, R. 2017.The Western Cape Biodiversity Spatial Plan Handbook. Stellenbosch: CapeNature.

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

South African National Biodiversity Institute (SANBI). 2019. National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity. Synthesis Report. South African National Biodiversity Institute, an entity of the Department of Environment, Forestry and Fisheries, Pretoria. http://hdl.handle.net/20.500.12143/6362

South African National Biodiversity Institute. 2018 Vegetation Map of South Africa, Lesotho and Swaziland [vector geospatial dataset] 2018. Available from the Biodiversity GIS website, downloaded on 18 January 2020.

Turner, A.A. 2013. CapeNature's requirements for providing comments on agricultural, environmental, mining, planning and water-use related applications. Jonkershoek Scientific Services Offices.

Turner, A. A. (ed.) 2017. Western Cape State of Biodiversity. Cape Nature Scientific Services. Stellenbosch. ISBN:978-0-621-45962-3

Vlok, J.H.J., Euston-Brown D.I.W. & Wolf, T. 2008. A vegetation map for the Garden Route Initiative. Unpublished 1:50 000 maps and report supported by CAPE FSP task team.

APPENDIX 1: ASSESSMENT METHODOLOGY

For each impact, the **nature** (positive/negative), **extent** (spatial scale), **magnitude/intensity** (intensity scale), **duration** (time scale), **consequence** (calculated numerically) and **probability** of occurrence is ranked and described. These criteria would be used to ascertain the **significance** of the impact, firstly in the case of no mitigation and then with the most effective mitigation measure(s) in place.
The tables below show the rankings of these variables, and defines each of the rating categories.

Table 2: Assessment criteria for the evaluation of impacts

CRITERIA	RANK	DESCRIPTION
Nature	**Positive (+)**	The environment will be positively affected.
	Negative (-)	The environment will be negatively affected.
Extent or spatial influence of impact	**National (4)**	Beyond provincial boundaries, but within national boundaries.
	Regional (3)	Beyond a 10 km radius of the proposed activities, but within provincial boundaries.
	Local (2)	Within a 10 km radius of the proposed activities.
	Site specific (1)	On site or within 100 m of the proposed activities.
	Zero (0)	Zero extent.
Magnitude/ intensity of impact (at the indicated spatial scale)	**High (3)**	Natural and/ or social functions and/ or processes are *severely* altered.
	Medium (2)	Natural and/ or social functions and/ or processes are *notably* altered.
	Low (1)	Natural and/ or social functions and/ or processes are *slightly* altered.
	Zero (0)	Natural and/ or social functions and/ or processes remain *unaltered.*
Duration of impact	**Long Term (3)**	More than 10 years, but impact ceases after the operational phase.
	Medium Term (2)	Between 3 – 10 years.
	Short Term (1)	Construction period (up to 3 years).
	None (0)	Zero duration.
Consequence (Nature x (Extent + Magnitude/ Intensity + Duration))	**Extremely beneficial/ detrimental (10 – 11) (+/-)**	The impact is *extremely* beneficial/ detrimental.
	Highly beneficial/ detrimental (8 – 9) (+/-)	The impact is *highly* beneficial/ detrimental.
	Moderately beneficial/ detrimental (6 – 7) (+/-)	The impact is *moderately* beneficial/ detrimental.

	Slightly beneficial/ detrimental (4 – 5) (+/-)	The impact is *slightly* beneficial/ detrimental.
	Negligibly beneficial/ detrimental (1 – 3) (+/-)	The impact is *negligibly* beneficial/ detrimental.
	Zero consequence (0) (+/-)	The impact has zero consequence.
Probability of occurrence	**Definite (4)**	Estimated at a greater than 95% chance of the impact occurring.
	Probable (3)	Estimated 50 – 95% chance of the impact occurring.
	Possible (2)	Estimated 6 – 49% chance of the impact occurring.
	Unlikely (1)	Estimated less than 5% chance of the impact occurring.
	None (0)	Estimated no chance of impact occurring.

The **significance** of an impact is derived by taking into account the **consequence** (nature of the impact and its extent, magnitude/intensity and duration) of the impact and the **probability** of this impact occurring through the use of the following formula:

Significance Score = Consequence x Probability

The means of arriving at a significance rating is explained in Table 3.

Table 3: Definition of significance ratings

SIGNIFICANCE SCORE	SIGNIFICANCE RATINGS	
32 – 40	**High (+)**	**High (-)**
25 – 31	**Medium (+)**	**Medium (-)**
19 – 24	**Low (+)**	**Low (-)**
10 – 18	**Very-Low (+)**	**Very-Low (-)**
1 – 9	**Negligible**	

Once the significance of an impact has been determined, the **confidence** in the assessment of the impact, as well as the degree of **reversibility** of the impact and **irreplaceable loss of resources** would be determined using the rating systems outlined in Table 4, 5 and 6 respectively. Lastly, the **cumulative impact** is ranked and described as outlined in Table 7.

Table 4: Definition of confidence ratings

CONFIDENCE RATINGS	CRITERIA
High	Wealth of information on and sound understanding of the environmental factors potentially influencing the impact.
Medium	Reasonable amount of useful information on and relatively sound understanding of the environmental factors potentially influencing the impact.
Low	Limited useful information on and understanding of the environmental factors potentially influencing this impact.

Table 5: Degree of reversibility

REVERSABILITY OF IMPACT	CRITERIA
High	High potential for reversibility.
Medium	Medium potential for reversibility.
Low	Low potential for reversibility.
Zero	Zero potential for reversibility.

Table 6: Degree of irreplaceability

IRREPLACEABLE LOSS OF RESOURCES	CRITERIA
High	Definite loss of irreplaceable resources.
Medium	Medium potential for loss of irreplaceable resources.
Low	Low potential for loss of irreplaceable resources.
Zero	Zero potential for loss of irreplaceable resources.

Table 7: Cumulative Impact on the environment

CUMULATIVE IMPACTS	CRITERIA
High	The activity is one of *several* similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the geographical, physical, biological, social, economic and cultural aspects of the environment.
Medium	The activity is one of a *few* similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the geographical, physical, biological, social, economic and cultural aspects of the environment.
Low	The activity is localised and might have a negligible cumulative impact.
Zero	No cumulative impact on the environment.

APPENDIX 2: ABBREVIATED CURRICULUM VITAE: GREG NICOLSON

Experience

- Expertise in field work in the CFR – vegetation surveys, plant identification, plant collection, ecological monitoring
- Data management and analysis
- Basic skills in GIS programs
- Vegetation and species mapping
- MSc thesis entitled *" Road reserves as conservation assets: exploring the species of conservation concern and the ecological condition of the N7 road reserve".* Graduation date: December 2010
- Experience leading teams of field assistants in remote mountainous areas
- Completed over 100 botanical survey/assessment reports

Career History

- 2019 – present: Co-founder and independent botanist at Capensis Ecological Surveys
- March 2013 – Dec 2018: independent botanical specialist and associate of Bergwind Botanical Surveys & Tours CC
- March 2011 – December 2012: conducted a comprehensive post fire survey of the Paardeberg (Paardeberg Sustainability Institute)

Education and qualifications

- Pr. Nat. Sci. (116488)
- MSc (Botany) – University of Cape Town (2010).
- BSc: Hons (Env. Science) – University of Cape Town (2005)
- BSc: Environmental and Geographical Science – University of Cape Town (2002 – 2004)

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- Dependents – 3

APPENDIX 3: ABBREVIATED CURRICULUM VITAE: ADAM LABUSCHAGNE

Experience

- Terretrial and aquatic ecological field experience across a wide range of biomes including Tropical Asia, Tempereate Europe, and the CFR
- Data management and analysis
- Experience with statisical and GIS programs including R and QGIS.
- Species distribution and Ecoloigcal Niche modelling experience.
- MSc Thesis Title "*Using satellite telemetry to understand the movement ecology and diving behavioir of Caretta caretta in the Cape Verde Archipelago"*
- Completed 17 Botanical/Terrestrial Biodiversity specialist survey reports

Career History

- 2023 – present: Independent ecologist at Capensis Ecological Surveys
- August 2023 – present: Independent Ecologist and Field Technician at Inkululeko Wildlife Services
- March 2023 – present: Independent ecology specialist and associate of Bergwind Botanical Surveys & Tours CC.
- December 2020-February 2023: Field Manager and Research Officer at Human Wildlife Solutions.

Education and qualifications

- Cand. Nat. Sci. (133686)
- MSc (Ecology & Evolutionary Biology) – Queen Mary University (2019).
- BSc (Zoology) – University of Roehampton (2015-2018)

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APPENDIX 3: PLANT SPECIES SPECIALIST ASSESSMENT REPORT

1. Introduction

The relative plant species theme sensitivity for the site generated by the web-based Screening Tool (https://screening.environment.gov.za) is rated as "High" (Figure 1). It should be noted that the majority of the site is rated as "Medium", with most of the study area situated in an area of medium sensitivity. "An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified by the screening tool as being of "High sensitivity" for plant species, must submit a **Plant Species Specialist Assessment Report**, depending on the outcome of a site inspection undertaken in accordance with paragraph 4" (Government Gazette 2020b). Plants listed as Species of Conservation Concern (SCC) have been identified at this site, and therefore a Plant Species Specialist Assessment Report is provided. This report has been compiled following the guidelines set out for the **Terrestrial Fauna and Terrestrial Flora Species Protocols for Environmental Impact Assessments in South Africa** (SANBI 2022).[1]

Figure 1. Map of relative plant species theme diversity.

[1] South African National Biodiversity Institute (SANBI). 2022. *Species Environmental Assessment Guideline. Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa.* South African National Biodiversity Institute, Pretoria. Version 3.1.

2. Project Area of Influence (PAOI) and Sampling Density

The PAOI consists of the area surveyed during the site visit (Figure 2). Due to the intended use of the development for tourism, no impacts are expected to occur outside of the proposed development footprint should the appropriate mitigation measures are applied. 48 Waypoints were recorded in the 1.92 ha site making the sampling density 25 waypoints/hectare.

Figure 2. The map of the study area showing the survey tracks, waypoints recorded, and proposed development footprint.

3. SCC within the study area

Two SCC were recorded during the site visits (See Figure 3 and Tables 1 – 4 below). The contents of tables 1 – 4 appears below:

Table 1: The SCC predicted to occur within the study area (based on the screening tool).
Table 2: The SCC confirmed within the study area.
Table 3: Additional details about the SCC confirmed or suspected to occur within the study area.
Table 4: Additional information on the SCC confirmed on the site or likely to be found on the site from The Red List of South African Plants website (www.redlist.sanbi.org)

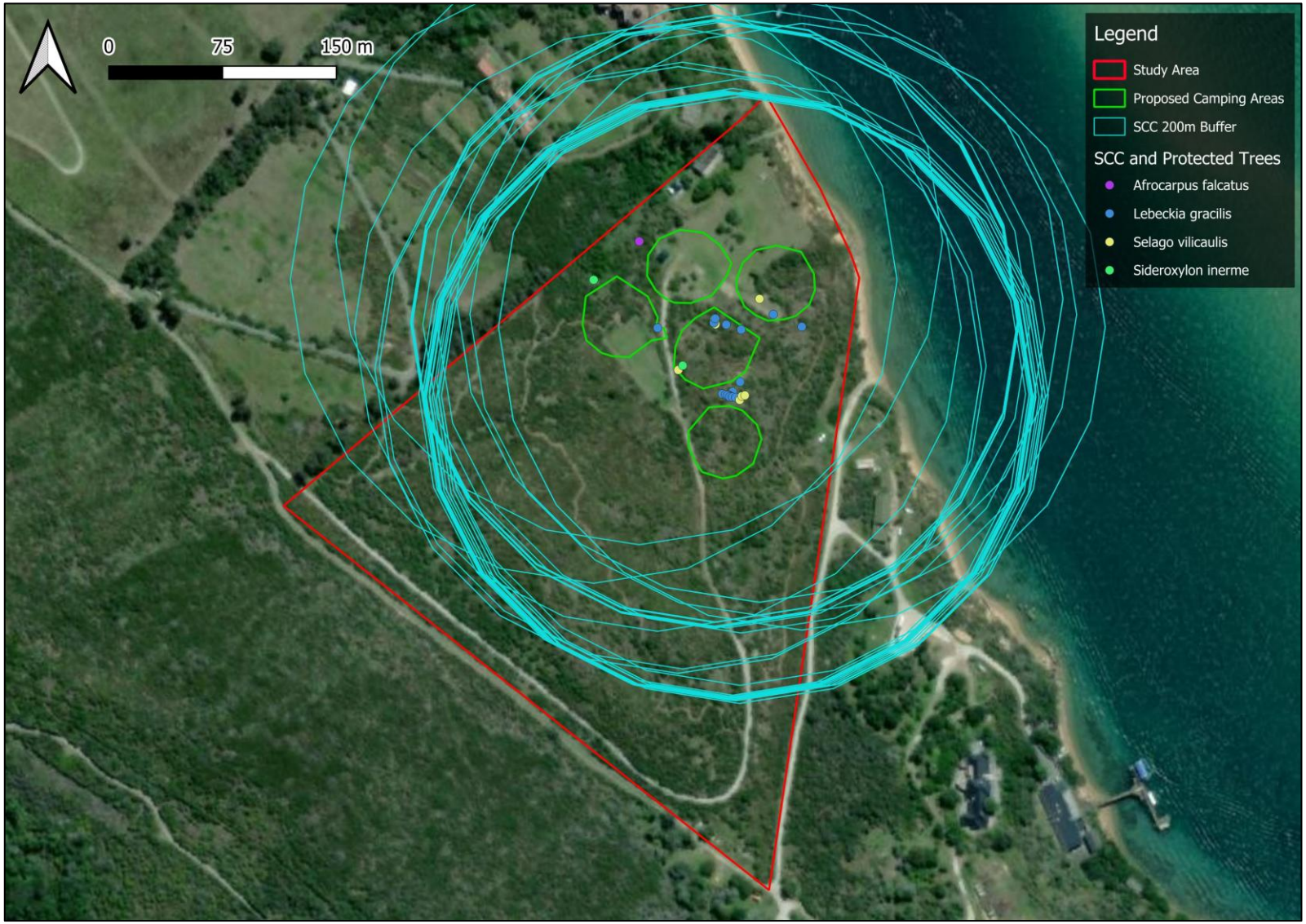

Figure 3. The map of the study area showing the SCC and 200m buffer found in or surrounding the proposed development footprint. Also included are Protected Tree Species

Table1. Species predicted to be in the study area (by the screening tool) AND those not predicted in the screening tool that were found in the adjacent vegetation.

Species	***IUCN Status***	***Observed/Likelihood of occurrence***	***Justification for likelihood of occurrence***
Sensitive species 1252			*This species was not found on the site and is unlikely to have been missed*
Lampranthus fergusoniae	*VU*	*No/Low*	*No succulents with this growth form were found in the study area*
Lampranthus pauciflorus	*EN*	*No/Low*	*No succulents with this growth form were found in the study area*
Ruschia 54uthieae	*VU*	*No/Low*	*No succulents with this growth form were found in the study area*
Lebeckia gracilis	*EN*	*Confirmed*	
Wahlenbergia polyantha	*VU*	*No/Low*	*This species was not found on the site and is unlikely to have been missed*
Selago burchellii	*VU*	*No/Low*	*This species was not found on the site and is unlikely to have been missed*
Selago villicaulis	*VU*	*Confirmed*	
Pentameris barbata subsp. orientalis	*CR*	*No/Low*	*This species was not found on the site and is unlikely to have been missed*
Sensitive species 419	*VU*	*No/Low*	*This species was not found on the site and is unlikely to have been missed*
Erica chloroloma	*VU*	*No/Low*	*This species was not found on the site and is unlikely to have been missed*
Erica glandulosa subsp. fourcadei	*VU*	*No/Low*	*This species was not found on the site and is unlikely to have been missed*
Hermannia lavandulifolia	*VU*	*No/Low*	*This species was not found on the site and is unlikely to have been missed*
Sensitive species 657	*VU*	*No/Low*	*One species from this genus occurs on the adjacent property but not this species.*
Sensitive species 1024	*EN*	*No/Low*	*This species was not found on the site but was potentially missed due to seasonality of the survey, but this is unlikely as the leaves should have been present and none for this genus were found in the site.*
Sensitive species 1032	*VU*	*No/Low*	*This species was not found on the site but was potentially missed due to seasonality of the survey, but this is unlikely as the leaves should have been present and none for this genus were found in the site.*
Cotula myriophylloides	*CR*	*No/Low*	*Specific habitat does not occur on the site.*

Acmadenia alternifolia	*VU*	*No/Low*	*This species was not found on the site and is unlikely to have been missed*
Muraltia knysnaensis	*EN*	*No/Low*	*This species was not found on the site and is unlikely to have been missed*
Nanobubon hypogaeum	*EN*	*No/Medium*	*Cryptic and easily overlooked, this is was potentially overlooked but this is unlikely. It has been recorded in the vicinity at Brenton*
Sensitive species 500	*EN*	*No/Low*	*This species was not found on the site but was potentially missed due to seasonality of the survey, but this is unlikely as the leaves should have been present and none for this genus were found in the site.*
Sensitive species 800	*VU*	*No/Low*	*This species was not found on the site but was potentially missed due to seasonality of the survey, but this is unlikely as the leaves should have been present and none for this genus were found in the site.*
Sensitive species 53	*VU*	*No/Low*	*Specific wetland habitat not found on the site*
Sensitive species 763	*VU*	*No/Low*	*This species was not found on the site but was potentially missed due to seasonality of the survey, but this is unlikely as the leaves should have been present and none for this genus were found in the site.*
Pterygodium cleistogamum	*VU*	*No/Low*	*This species was not found on the site but was potentially missed due to seasonality of the survey, but this is unlikely as the leaves should have been present and none for this genus were found in the site.*
Zostera capensis	*EN*	*No/Low*	*Estuarine habitat not present on the site*
Erica glumiflora	*VU*	*No/Low*	*This species was not found on the site and is unlikely to have been missed*

Table 2. Plant Species of Conservation Concern found within the study area.

FAMILY	*Species*	*Status*	*Url link to observation(s)*
SCROPHULARIACEAE	*Selago villicaulis*	**Vulnerable B1ab(ii,iii,iv,v)**	*https://www.inaturalist.org/observations/218900328*
FABACEAE	*Lebeckia gracilis*	**Endangered A2bc; B1ab(ii,iii,iv,v)**	*https://www.inaturalist.org/observations/218900391*

Table 3. SCC confirmed on the site or likely to be found on the site

Species	**Distribution (Figure 3)**	**Viability**	**Population Size**	**Nature and extent of impact on SCC**	**Known population size* and AOO (Appendix 8 of Guidelines) and loss**	**Conservation importance of SCC**
Selago villicaulis	Occurs within the Degraded Dune Thicket habitat to the east of the dirt road that bisects the property. Likely to occur elsewhere on the property	Likely to persist in the long term with appropriate land management (rehabilitation and IAP clearance)	Four sub-populations with a total of 53 individuals.	Likely loss of these individuals during the construction phase, and this area is likely to be disturbed used for access in the operational phase. If appropriate mitigation measures are adhered to, there should be no loss of any population of this species.	AOO not listed in guidelines EOO 3800 km² listed in Redlist website	This species persists in the neighbouring Featherbed Nature Reserve as recorded in iNaturalist. Other observations indicate that the species occurs more extensively in the suitable habitat on the western Knysna head between Brenton and Belvidere. If populations within the development footprint are lost, the species will still persist on the property and no change in conservation status will occur.
Lebeckia gracilis	Occurs within the degraded Dune Thicket vegetation.	Likely to persist in the long term with	Four sub-populations with	Without mitigation, a total of 7 individuals would be	AOO in guidelines listed as 1.49 km.	This endangered species has a limited number of observations on the Western Head, between Belvidere and Lovemore

		appropriate land management (rehabilitation and IAP clearance)	a total of 22 individuals.	lost through vegetation clearance during the construction phase. If appropriate mitigation measures are adhered to, there should be no loss of any population of this species.	EOO 4000 km^2 listed in Redlist website	Farm. The loss of individuals from this species is likely to have a significant effect on the distribution of this species in the Knysna area as the population on the farm likely represents a significant proportion of the area's population.

* Derived from the Red List of South African Plants (www.redlist.org.za)

Table 4. Additional information on the SCC confirmed on the site or likely to be found on the site from The Red List of South African Plants website (www.redlist.sanbi.org)

Name	Justification	Range	Habitat Description	Threats	Population
Selago villicaulis	EOO 3800 km², known from less than 10 locations. Threatened by ongoing coastal development on the South Coast as well as by alien plant invasion.	Stilbaai to Knysna.	Fixed dunes up to 150 m.	Coastal development is an ongoing, moderate to severe threat throughout this species range- especially in the George, Wilderness and Knysna areas. Alien plants are an ongoing, moderate threat throughout the species range.	Decreasing
Lebeckia gracilis	A population reduction of at least 70% is estimated based on habitat loss to agriculture, forestry plantations, alien plant invasion and coastal development	Bredasdorp to Port Elizabeth.	This species inhabits coastal fynbos, renosterveld and strandveld in deep,	Coastal development is a severe past and ongoing threat throughout this species' range. Afforestation was a severe past	Decreasing

	in the past 120 years (generation length 50-80 years), resulting in local extinctions at 73% of known locations. Only between two and five locations within an EOO of 4000 km² are likely to remain, and these continue to decline due to ongoing habitat loss. It is therefore assessed as Endangered under criteria A and B.		sandy soil below 300 m. This is a long-lived resprouter with a generation length of 50-80 years.	threat between Wilderness and Plettenberg Bay. Agriculture was a severe past threat, especially around Albertinia.	

4. Site Ecological Importance (SEI)(Derived from SANBI 2022 Guidelines)

SEI is considered to be a function of the biodiversity importance (BI) of the receptor (e.g. species of conservation concern, the vegetation/fauna community or habitat type present on the site) and its resilience to impacts (receptor resilience [RR]) as follows:

EI = BI + RR

BI is a function of conservation importance (CI) and the functional integrity (FI) of the receptor as follows:

BI = CI + FI

SEI Calculation for Development Footprint

The SEI for each habitat has been calculated according to the Species Guidelines (SANBI, 2022) (Table 5) and the appropriate mitigation suggested for each SEI category is provided in Table 6.

Table 5. Calculation of SEI ratings for each habitat and the relevant fulfilling criteria for the proposed development.

Habitat	Conservation Importance	Functional Integrity	Receptor Resilience	Site Ecological Importance
Degraded Thicket Fynbos	**High** Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km^2. IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A. If listed as threatened only under Criterion A, include if there are less than 10 locations or < 10 000 mature individuals remaining.	**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** Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	**Medium**

Degraded Dune Thicket	**Low** No confirmed or highly likely populations of SCC. No confirmed or highly likely populations of range-restricted species. < 50% of receptor contains natural habitat with limited potential to support SCC.	**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** Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	**Medium**
Transformed	**Very low** No confirmed and highly unlikely populations of SCC. No confirmed and highly unlikely populations of range-restricted species. No natural habitat remaining.	**Very low** Several major current negative ecological impacts.	**Low** Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~ less than 50% of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed.	**Very Low**

Table 6. Guidelines for interpreting SEI in the context of the proposed development activities.

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

The habitats within the study area are classified as Medium or Very Low SEI. The majority of the development will result in the loss of habitat classified as Medium.

5. Impacts and Mitigation

The loss of species of conservation concern from within the proposed development footprint would be High negative. By relocating proposed construction footprint, it is possible to avoid disturbing SCC (refer to section 9 of the Terrestrial Biodiversity Report), thereby reducing the impact to Low negative.

6. Buffers

The SCC buffers appear in Figure 3. The suggested 200m buffer around the Vulnerable and Endangered species cannot be applied and allow the proposed developments. The propsed development activity, low impact camping tourism, is estimated to be of low intensity. Furthermore, the proposed development would result in a fairly small area of habitat loss (<1 ha of 9.9 ha), whilst leaving sufficient habitat on the rest of the property to support SCC populations. Due to these factors, a 200m buffer is not applicable, should the proposed mitigation measures be implemented.

7. Conclusion

This plant species specialist assessment report has been compiled according to the relevant legislation using the guidelines provided. The impact on SCC of the proposed development is Medium to High negative and several mitigation measures are proposed (Section9. This includes moving part of the proposed development to avoid disturbing or clearing areas that host SCC, with a focus on *Lebeckia gracilis*. The Site Ecological Importance is Medium, Low or Very low. No essential mitigation is required, and the proposed developments are considered acceptable from a Plant species theme perspective.

7. Content of report requirement and relevant sections

		Section or page of report
2.1	The assessment must be undertaken by a specialist registered with the South African Council for Natural Scientific Professions (SACNASP), within a field of practice relevant to the taxonomic groups ("taxa") for which the assessment is being undertaken.	Page ii and Appendix 2-3
2.2	The assessment must be undertaken within the study area.	
2.3	The assessment must be undertaken in accordance with the *Species Environmental Assessment Guideline*[23] and must:	

2.3.1	Identify the SCC which were found, observed or are likely to occur within the study area;	Tables 1 and 2 in Appendix 4
2.3.2	provide evidence (photographs) of each SCC found or observed within the study area, which must be disseminated by the specialist to a recognized online database facility[24] immediately after the site inspection has been performed (prior to preparing the report contemplated in paragraph 3).	Table 2 in Appendix 4
2.3.3	identify the distribution, location, viability[25] and detailed description of population size of the SCC identified within the study area.	Figure 2 & Table 3 in Appendix 4
2.3.4	identify the nature and the extent of the potential impact of the proposed development to the population of the SCC located within the study area.	Section 9
2.3.5	determine the importance of the conservation of the population of the SCC identified within the study area, based on information available in national and international databases including the IUCN Red List of Threatened Species, South African Red List of Species, and/or other relevant databases.	Table 3 in Appendix 4
2.3.6	determine the potential impact of the proposed development on the habitat of the SCC located within the study area.	Table 3 in Appendix 4
2.3.7	include a review of relevant literature on the population size of the SCC, the conservation interventions as well as any national or provincial species management plans for the SCC. This review must provide information on the need to conserve the SCC and indicate whether the development is compliant with the applicable species management plans and if not, a motivation for the deviation;	Table 3 & 4 in Appendix 4
2.3.8	identify any dynamic ecological processes occurring within the broader landscape, that might be disrupted by the development and result in negative impact on the identified SCC, for example, fires in fire-prone systems.	N/A
2.3.9	identify any potential impact on ecological connectivity within the broader landscape and resulting impacts on the identified SCC and its long term viability.	N/A
2.3.10	determine buffer distances as per the *Species Environmental Assessment Guidelines* used for the population of each SCC; and	Section 6 of Appendix 4
2.3.11	discuss the presence or likelihood of additional SCC including threatened species not identified by the screening tool, *Data Deficient or Near Threatened Species, as well as any undescribed species26; and*	Table 1 of Appendix 4.
2.3.12	identify any alternative development footprints within the preferred development site which would be of “low” sensitivity” or “medium” sensitivity as identified by the screening tool and verified through the site sensitivity verification.	Figure 29 Section 9.

APPENDIX 5: MINIMUM CONTENT REQUIREMENTS FOR TERRESTRIAL BIODIVERSITY SPECIALIST REPORTS AS PER PROTOCOL FOR THE SPECIALIST ASSESSMENT OF ENVIRONMENTAL IMPACTS ON TERRESTRIAL BIODIVERSITY (GN 320 OF 20 MARCH 2020)

Protocol ref	**Terrestrial Biodiversity Specialist Assessment Report Content**	**Section / Page**
3.1.1.	contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	Page ii and Appendix 3
3.1.2.	a signed statement of independence by the specialist;	Page iii
3.1.3.	a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 4
3.1.4.	a description of the methodology used to undertake the site verification and impact assessment and site inspection, including equipment and modelling used, where relevant;	Section 4
3.1.5.	a description of the assumptions made and any uncertainties or gaps in knowledge or data as well as a statement of the timing and intensity of site inspection observations;	Section 4
3.1.6.	a location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);	Section 9
3.1.7.	additional environmental impacts expected from the proposed development;	Section 9
3.1.8.	any direct, indirect and cumulative impacts of the proposed development;	Section 9
3.1.9.	the degree to which impacts and risks can be mitigated;	Section 9
3.1.10.	the degree to which the impacts and risks can be reversed;	Section 9
3.1.11.	the degree to which the impacts and risks can cause loss of irreplaceable resources;	Section 9
3.1.12.	proposed impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	Section 9
3.1.13.	a motivation must be provided if there were development footprints identified as per paragraph 2.3.6 above that were identified as having a "low" terrestrial biodiversity sensitivity and that were not considered appropriate;	N/A
3.1.14.	a substantiated statement, based on the findings of the specialist assessment, regarding the acceptability, or not, of the proposed development, if it should receive approval or not; and	Section 10
3.1.15.	any conditions to which this statement is subjected.	Section 10