NICK HELME BOTANICAL SURVEYS
PO Box 22652 Scarborough 7975
Ph: 021 780 1420 cell: 082 82 38350 email: botaneek@iafrica.com
Pri.Sci.Nat # 400045/08

BOTANICAL ASSESSMENT OF PROPOSED UPGRADE OF RUSTY GATE MOUNTAIN RETREAT TOURIST INFRASTRUCTURE, FARM 824, REM. FARM 826 & FARM 887, CALEDON, WESTERN CAPE.

Compiled for: Lornay Environmental Consulting, Hermanus

Applicant: Rusty Gate Mountain Retreat (Pty) Ltd

23 Feb 2024

DECLARATION OF INDEPENDENCE

In terms of Chapter 5 of the National Environmental Management Act of 1998 specialists involved in Impact Assessment processes must declare their independence and include an abbreviated Curriculum Vitae.

I, N.A. Helme, do hereby declare that I am financially and otherwise independent of the client and their consultants, and that all opinions expressed in this document are substantially my own.

NA Helme

ABRIDGED CV:

Contact details as per letterhead.
Surname : HELME
First names : NICHOLAS ALEXANDER
Date of birth : 29 January 1969
University of Cape Town, South Africa. BSc (Honours) – Botany (Ecology & Systematics), 1990.

Since 1997 I have been based in Cape Town, and have been working as a specialist botanical consultant, specialising in the diverse flora of the south-western Cape. Since the end of 2001 I have been the Sole Proprietor of Nick Helme Botanical Surveys, and have undertaken over 1700 site assessments in this period.

A selection of relevant previous botanical work is as follows:

- Botanical assessment of proposed development on Erf 4570 Betty's Bay (Lornay Environmental 2023)
- Botanical assessment of proposed sand mine on Ptn 30 of Farm 711, Gansbaai (Grasaro Consulting 2023)
- Botanical assessment of proposed development on Erf 1486 Vermont (Lornay Environmental 2023)
- Botanical assessment of Ptns 3 & 6 of Farm 563 Kleinmond (Lornay Environmental 2021)
- Botanical assessment of Ptn 9 of Farm 429 Gabrielskloof, Caledon (Infinity Environmental 2021)

- Baseline ecological assessment of Karwyderskraal 584, Caledon (Terramanzi 2021)
- Botanical impact assessment of proposed development of Ptn 29 of Farm 410, Caledon (PHS Consulting 2021)
- Botanical assessment of proposed new cultivation on Welbedacht farm, Tra Tra Mountains (Footprint Environmental 2020)
- Biodiversity Compliance Statement - Philippi erf 1/1460 (Infinity Environmental 2020)
- Botanical assessment of Kleinmond WWTW expansion (Aurecon 2020)
- Botanical assessment of Mooreesburg WWTW expansion (Aurecon 2020)
- Botanical assessment of Struisbaai cemetery sites (Infinity Environmental 2020)
- Botanical assessment of MoPama development site, Swellendam (Landscape Dynamics 2020)
- Botanical assessment of Ptn of Rem of Erf 1 Caledon (Theewaterskloof Municipality 2019)
- Botanical assessment of proposed new cultivation on Portion of Wittewater 148, Piketberg (Cornerstone Environmental 2019)
- Botanical assessment of Droogerivier farm Leipoldtville (Footprint Environmental 2018)
- Botanical assessment of Sebulon farm, Redelinghuys (Natura Libra Environmental Services 2018)
- Botanical assessment of proposed new cultivation on Ptn 2 of farm Groenevalley 155, Piketberg (Cederberg Environmental Assessment Practise 2017)
- Botanical assessment of proposed new cultivation on Groot Patrysvlei, Clanwilliam (Cederberg Environmental Assessment Practise 2017)
- Botanical assessment of proposed new cultivation on farm Rosendal, Koue Bokkeveld (Cederberg Environmental Assessment Practise 2016)
- Botanical assessment of proposed cultivation on farm Kransvlei, Clanwilliam (Cederberg Environmental Assessment Practise 2016)
- Botanical assessment of proposed cultivation on farm Erfdeel, Bo-Swaarmoed, Ceres (Cederberg Environmental Assessment Practise 2016)

CONDITIONS RELATING TO THIS REPORT:

The methodology, findings, results, conclusions and recommendations in this report are based on the author's best scientific and professional knowledge, and on referenced material and available knowledge. Nick Helme Botanical Surveys and its staff reserve the right to modify aspects of the report, including the recommendations and conclusions, if and when additional relevant information becomes available.

This report may not be altered or added to without the prior written consent of the author, and this also applies to electronic copies of this report, which are supplied for purposes of inclusion in other reports, including in the report of EAPs. Any recommendations, statements or conclusions drawn from or based on this report must cite this report, and should not be taken out of context, and may not change, alter or distort the intended meaning of the original in any way. If these extracts or summaries form part of a main report relating to this study or investigation this report must be included in its entirety as an appendix or separate section to the main report.

TABLE OF CONTENTS

1. INTRODUCTION

This botanical assessment as requested to help inform the environmental application process for a proposed infrastructure upgrade to the tourism facilities on Rusty Gate Mountain Retreat, on Farms 824, Rem. Farm 826 and Farm 887, in the Caledon district (see Figure 1). The applicant wishes to expand the tourist accommodation offered at the retreat by constructing several new accommodation units, a new boma and a new campsite. An initial proposed layout was prepared prior to specialist input (Alternative 1) and then Alternative 2 was developed after specialist input, and is hence the preferred development alternative.

The proposed new development at Rusty Gate Mountain Retreat comprises the development of the following, as shown in Figure 2, 3 & 4:

☐ Eco Cabins (2 per site at sites 7, 26 & 27 and 1 per site at sites 6, 24 & 25)
☐ Eco Pods (2 per site at sites 3B and 28 and 1 per site at site 30)
☐ A sundowner boma and fire pit at site 29
☐ A campsite at site 3A, and
☐ A new primary residence at site 2.

Each site will be serviced in the following manner:

☐ Power supply: Each accommodation unit and the facilities at the camp site will be supplied with an off-grid solar PVC power generating system;
☐ Water supply: Some accommodation units and the ablutions at the campsite will be connected via HDPE pipelines to the farm's potable water supply while other higher elevated sites (Sites 28, 27, 25 and 31) need to be provided with a tanker supply;
☐ Sewerage: All effluent from the accommodation units and ablutions for the campsite will be discharged via a buried HDPE pipe leading to a conservancy tank which will be located at an accessible location for emptying by the landowner.

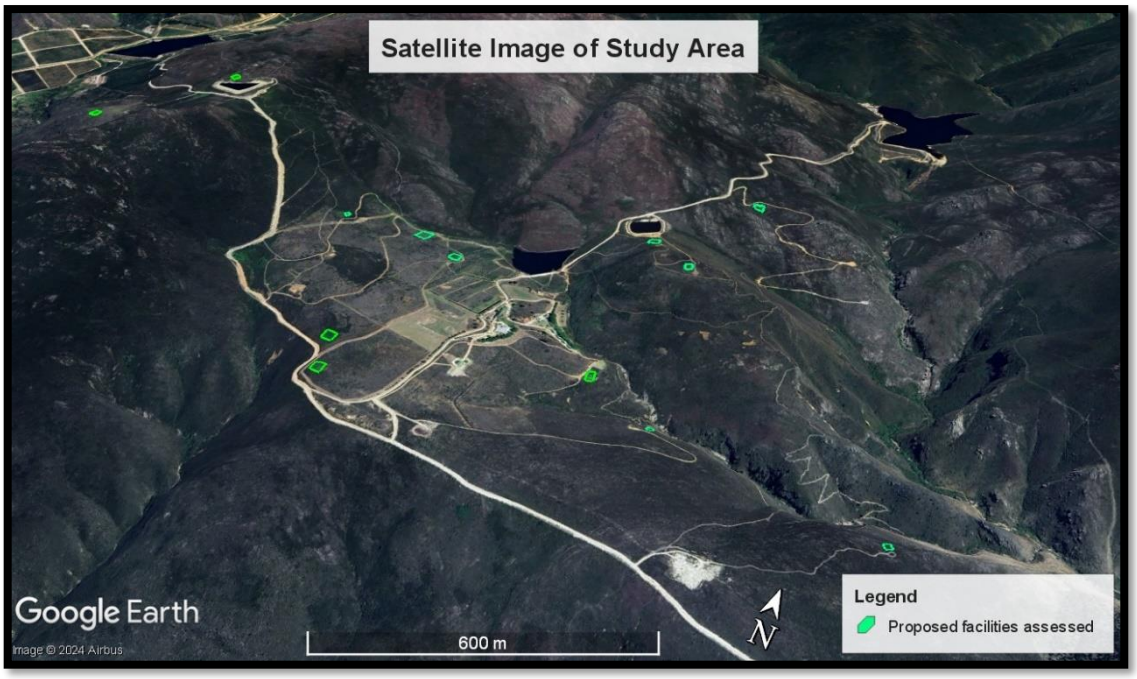

Figure 1: Tilted satellite image showing the location of the study areas. Satellite image dated May 2023.

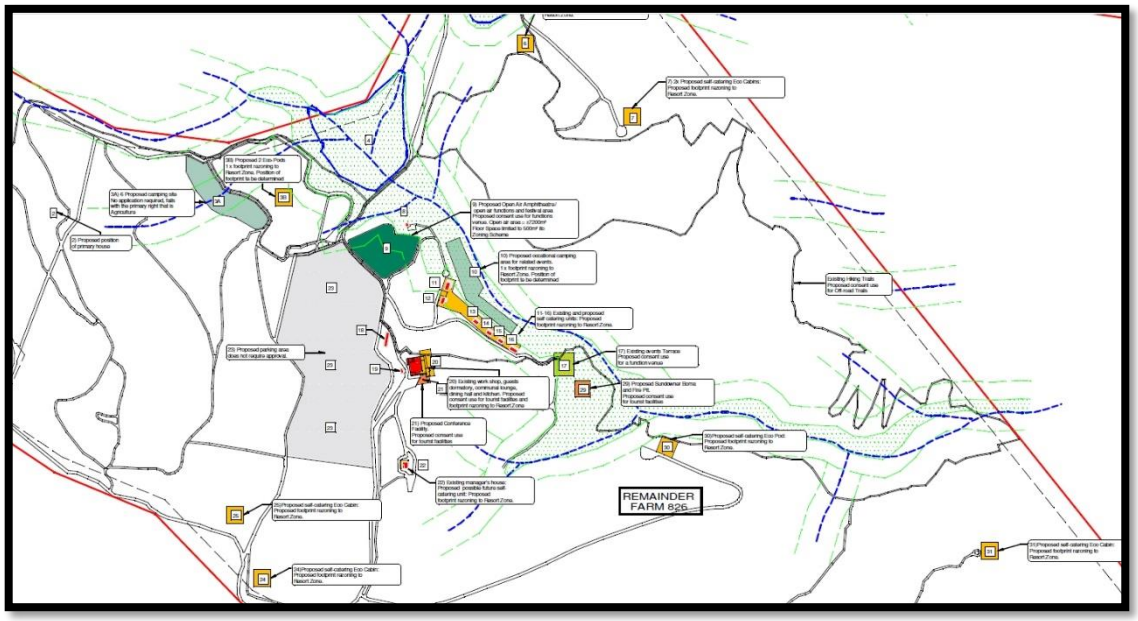

Figure 2a: Detail of original development plan for central area (Alternative 1). The primary changes between this and Alternative 2 are in the positions of units 7, 27 & 31.

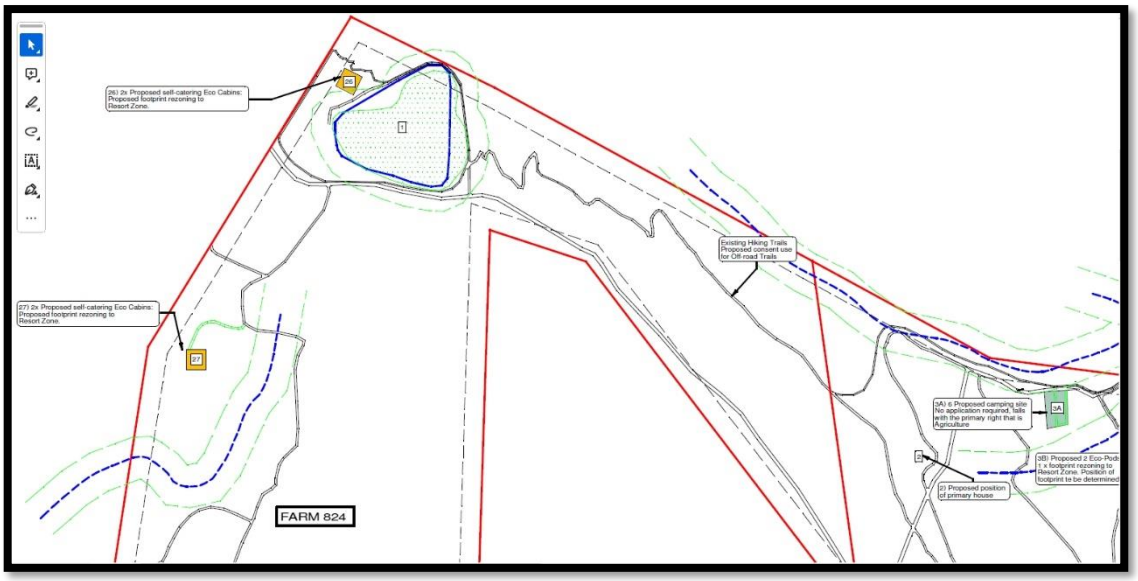

Figure 2b: Detail of development plan for western area (Alternative 2).

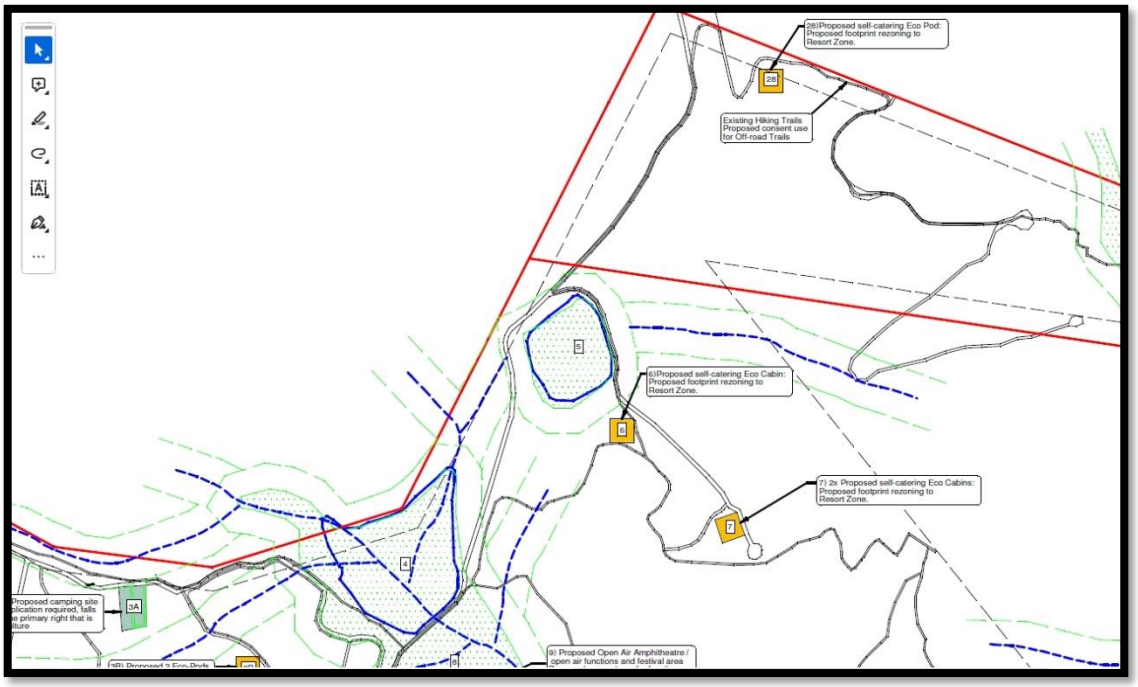

Figure 3: Detail of development plan for northern area (Alternative 2).

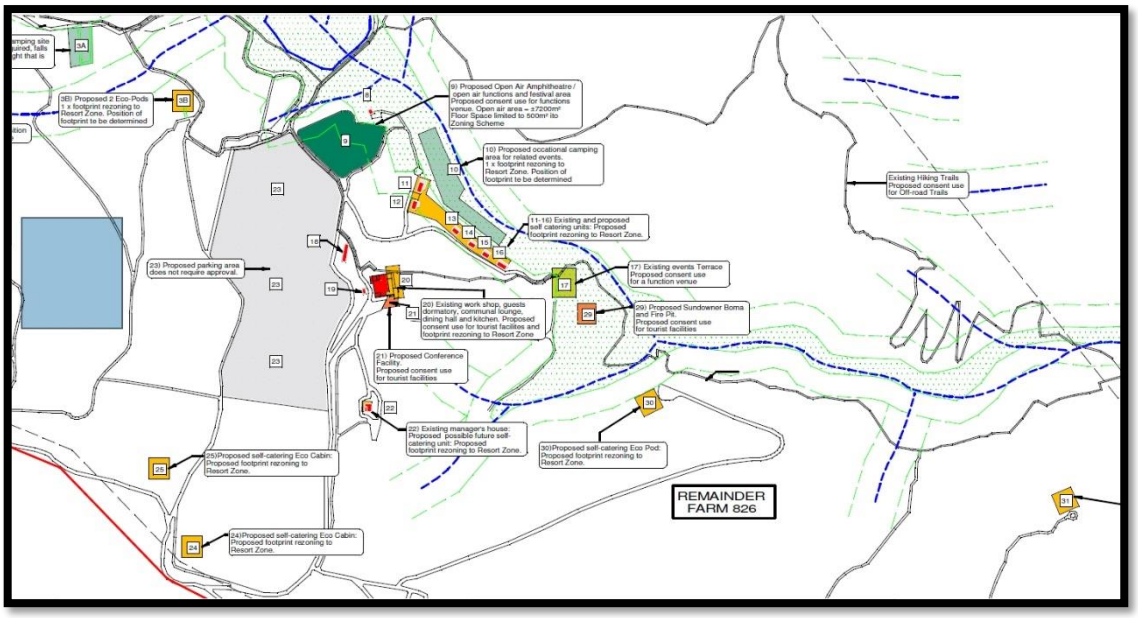

Figure 4: Detail of development plan for eastern area (Alternative 2).

2. TERMS OF REFERENCE

The proposed ToR are as follows:

- Undertake a site visit to assess the vegetation in the study areas
- Identify and describe the vegetation in the study areas and place it in a regional context, including its status in terms of the CapeNature Spatial Biodiversity Plan (CBA/ESA/ONA, etc)
- Identify and locate any (likely) plant Species of Conservation Concern in the study areas, based on observation, literature and iNaturalist website review
- Provide an overview and map of the botanical conservation significance (sensitivity) of the sites
- Identify and assess (according to standard IA methodology) the potential impacts of the project components, using the current development layout provided
- Indicate the acceptability of the project proposal from an ecological perspective
- Identify and describe the potential cumulative impacts of the proposed development in relation to proposed and existing developments in the surrounding area
- Recommend mitigation measures to avoid and/or minimise impacts and/or optimise benefits associated with the proposed project, including layout change.

3. LIMITATIONS, ASSUMPTIONS AND METHODOLOGY

The site was visited on 5 November 2023. This was slightly past the optimal winter – spring flowering season in this mainly winter rainfall area, and some of the likely geophytes and annuals may thus have not been evident, whilst all perennial plants were identifiable. There were thus some minor seasonal constraints on the accuracy of the botanical findings, but given the heavy dominance of perennials in this area – which can be used as indicators of habitat sensitivity - the confidence in the accuracy of the botanical findings is high. The author has undertaken extensive work within the region and even on this property, which facilitates the making of local and regional comparisons and inferences of habitat quality and conservation value.

The study areas were all surveyed, and walked where possible, although in some cases very old, tall, dense vegetation made it difficult to access the sites. All plants on site were noted, and photographs of certain plant species were made (using a Fuji mirrorless slr camera), and uploaded to the inaturalist.org website. Satellite imagery dated January 2023 (and earlier) was used to inform this assessment, and for mapping. It is assumed that infrastructure development would result in the permanent loss of all natural or partly natural vegetation in that footprint, with limited temporary to long-term construction related disturbance in the adjacent areas. Some of the original proposed footprints were shifted prior to my site visit, due to specialist input from other specialist, and some of the final footprints shown in this report are the result of specialist botanical input and recommendations made during my site visit.

The botanical sensitivity of a site is a product of plant species diversity, plant community composition, rarity of habitat, degree of habitat degradation, rarity of species, ecological viability and connectivity, restorability of habitat, vulnerability to impacts, and reversibility of threats.

The exact meaning of the No Go alternative in this case is not known, but presumably it would be no additional development, with low to moderate alien invasive plant density (but currently being managed by the landowners), implying persistence of the natural or partly natural vegetation on the proposed development footprints.

4. REGIONAL CONTEXT OF THE VEGETATION

The study area is part of the Southwest Fynbos bioregion (Mucina & Rutherford 2006), and is part of the Fynbos biome, located within what is now known as the Core Region of the Greater Cape Floristic Region (GCFR; Manning & Goldblatt 2012). The GCFR is one of only six Floristic Regions in the world, and is the only one largely confined to a single country (the Succulent Karoo component extends into southern Namibia). It is also by far the smallest floristic region, occupying only 0.2% of the world's land surface, and supporting about 11500 plant species, over half of all the plant species in South Africa (on 12% of the land area). At least 70% of all the species in the Cape region do not occur elsewhere, and many have very small home ranges (these are known as narrow endemics). Many of the lowland habitats are under pressure from agriculture, urbanisation and alien plants, and thus many of the range restricted species are also under severe threat of extinction, as habitat is reduced to extremely small fragments. Data from the nationwide plant Red Listing project indicate that 67% of the threatened plant species in the country occur only in the southwestern Cape, and these total over 1800 species (Raimondo *et al* 2009). It should thus be clear that the southwestern Cape is a major national and global conservation priority, and is quite unlike anywhere else in the country in terms of the number of threatened plant species.

The Southwest Fynbos bioregion is characterised by relatively high winter rainfall, strong rainfall gradients, mostly poor, sandy soils, very high topographic diversity, and some areas with high levels of alien invasive vegetation. The loss of natural vegetation in the montane parts of this bioregion has not been as extensive as in many other Fynbos areas, but the bioregion does have a high number of threatened plant species, partly due to localised threats, and partly due to very high diversity of naturally rare species (Raimondo *et al* 2009).

The CapeNature Spatial Biodiversity Plan (Pence 2017; Figure 5) indicates that that there is a mix of planning categories in the area. Units 30 and 31, in the eastern part of the property, are the only units located within mapped areas of CBA1 terrestrial vegetation. Most units are located in unmapped areas, which is largely a result of these areas being South Sonderend Sandstone Fynbos (a Least Concern habitat, well conserved and with low level of loss) or the units being in previously disturbed areas that were not deemed conservation priorities.

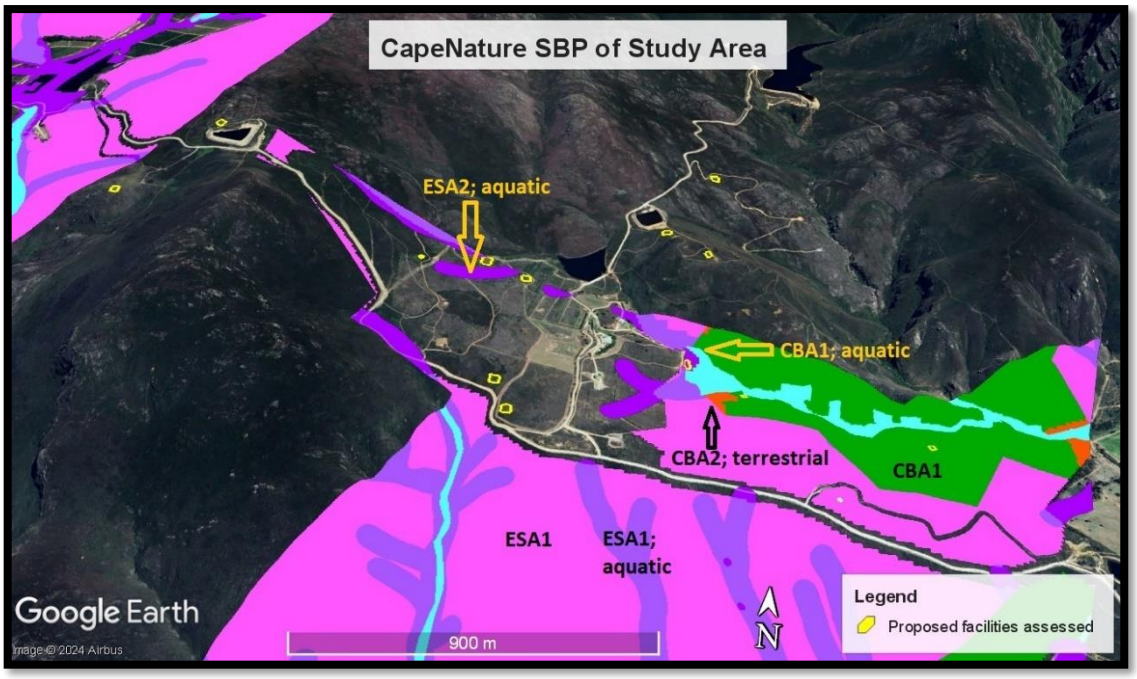

Figure 5: Extract of CapeNature Spatial Biodiversity Plan (Pence 2017) showing the mix of planning categories in the area. Units 30 and 31 are the only units located within mapped areas of CBA1 terrestrial vegetation. Most units are located in unmapped areas.

5. THE VEGETATION AND ITS SENSITIVITY

According to the SA Vegetation Map the original natural vegetation in the study area is mostly **South Sonderend Sandstone Fynbos**, but with a strip of **Western Coastal Shale Band Vegetation** running through the site (Mucina & Rutherford 2018; see Figure 6). Based on my groundtruthing I would largely agree with this, although the shale soils are in fact more widespread than one might assume form the vegetation mapping.

South Sonderend Sandstone Fynbos has recently been uplisted and gazetted as **Critically Endangered** on a national basis (Government of South Africa 2022). About 93% of its total original extent remains intact, about 39% is formally conserved, and the national conservation target is 30% (Rouget *et al* 2004), and the reason this is listed as Critically Endangered is not because it has lost extent, but rather due to a high number of plant SoCC, growing threats (mainly severe pine invasion) and restricted distribution. The unit is known to support a large number of plant Species of Conservation Concern (Raimondo *et al* 2009), many of which are threatened by habitat loss to alien invasive vegetation. This unit occurs mostly on nutrient poor, acid sands on the moist south facing

slopes of the Riviersonderend mountains, and the vegetation type needs fire for optimal ecological functioning (Helme & Rebelo 2016).

Western Coastal Shale Band Vegetation is gazetted as **Endangered** on a national basis (Government of South Africa 2022). About 94% of its total original extent remains intact, about 48% is conserved, and the national conservation target is also 30% (Rouget *et al* 2004), and the reason this is listed as Endangered is not because it has lost extent, but rather due to growing threats (mainly severe pine invasion) and restricted distribution. The unit is known to support a fair number of plant Species of Conservation Concern (Raimondo *et al* 2009), many of which are threatened by habitat loss to alien invasive vegetation. This unit occurs mostly on nutrient rich shale derived soils on the moist upper slopes of the western mountains, and the vegetation type also needs fire for optimal ecological functioning (Helme & Rebelo 2016).

The vegetation in most of the study areas has not burnt for many years (>15; see Plates 1, 2, 3 & 5), and can thus be regarded as being senescent (Helme & Rebelo 2006). Structural diversity ranges from low to high, with a mix of tall shrubs, grasses, restios and herbs being typical. Soils are variable, but are generally acid to neutral sands, often with a high peat (organic) content, but in some cases the soils are rich, shale derived clays and loams.

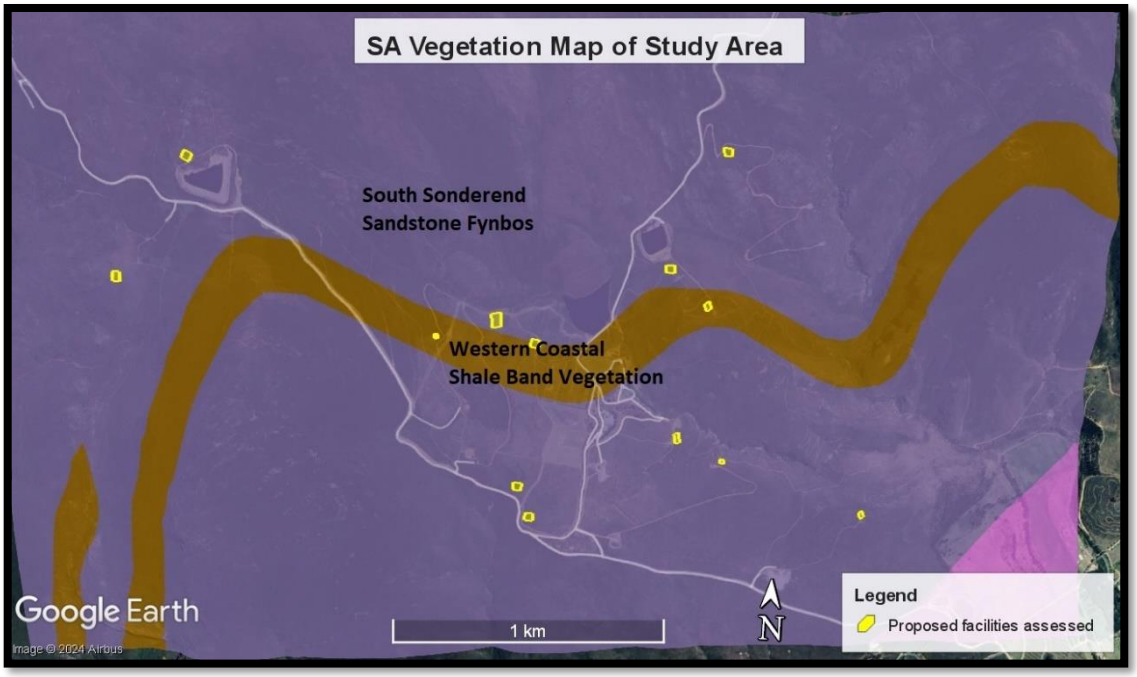

Figure 6: Extract of SA vegetation Map for the study area, showing mapped distribution of the two vegetation types in the area.

Plate 1: View of the very old vegetation on site 24, with *Protea neriifolia* and *Psoralea (*previously *Otholobium) spicata*.

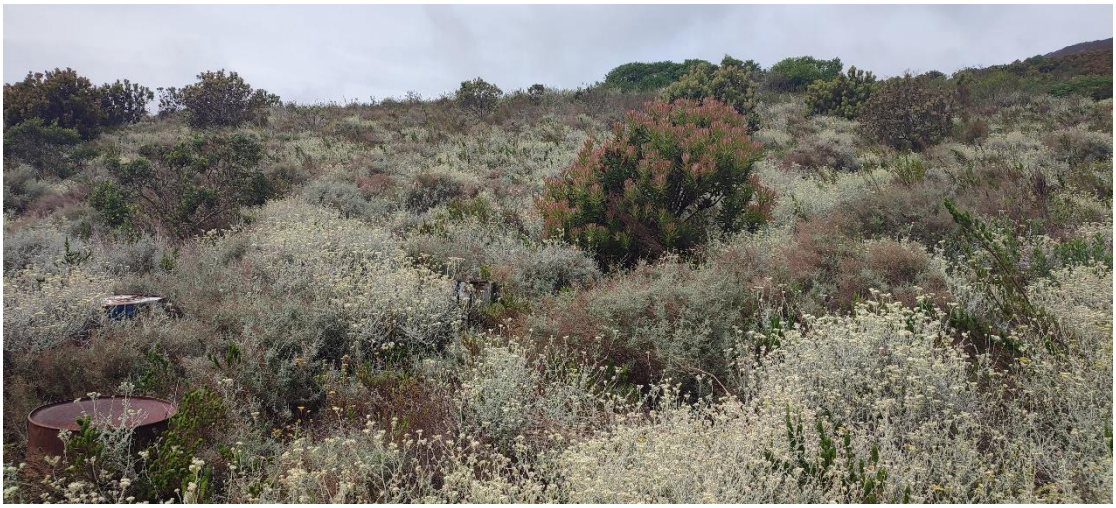

Plate 2: View of secondary vegetation on previously disturbed land in the proposed campsite area. *Helichrysum patulum* (kooigoed) and *Seriphium plumosum* (slangbos) dominant.

Plate 3: Dense, old stand of *Protea neriifolia* dominant in proposed main residence footprint.

Plate 4: View of vegetation in footprint 31, looking west.

Plate 5: View of dense, old stands of *Protea neriifolia* in footprint 28, looking south.

The following brief site description is arranged from west to east.

Site 27

Thin, rocky sandstone soils on low outcrop, with fairly diverse vegetation typical of the area. Common species include *Cliffortia atrata, Tetraria thermalis, Elegia hookeriana, Restio egregius, Penaea mucronata, Helichrysum felinum, Protea cynaroides, Erica fascicularis, Erica serrata, Erica imbricata, Erica hispidula, Metalasia densa, Tenaxia stricta, Muraltia heisteria, Ursinia pilifera, Seriphium plumosum, Hippia frutescens*. Road access through a previously disturbed area dominated by *Tenaxia stricta, Seriphium plumosum* and *Erica hispidula*. No plant Species of Conservation Concern (SoCC). Medium botanical sensitivity.

Site 26

A south facing site on shallow, sandstone soils, with moderate diversity of species. Common species include *Erica serrata, E. imbricata, E. hispidula, E. plukenetii, Pteridium aquilinum, Protea neriifolia, Cliffortia atrata, Muraltia heisteria, Anaxeton asperum, Elegia asperifolia, Geochloa rufa, Restio caespitosus, Metalasia densa* and *Corymbium africanum*. No plant Species of Conservation Concern (SoCC). Medium botanical sensitivity.

Primary residence site (Site 2)

This site is on east facing shales, and has not been previously cultivated. The vegetation on site is old (>12yrs), and is heavily dominated by a dense stand of *Protea neriifolia* (see Plate 3). Additional species noted include *Printzia polifolia, Cullumia setosa, Cannomois robusta, Erica hispidula, Metalasia densa, Podalyria biflora, Helichrysum cymosum, Berkheya armata, Erica vestita, Aristea major, Ursinia paleacea, Erica serrata* and *Cliffortia polygonifolia*. No plant Species of Conservation Concern (SoCC). Medium botanical sensitivity.

Proposed campsite (Site 3A)

This site is on northeast facing shales, and has been previously disturbed (Plate 2). The site is heavily dominated by *Seriphium plumosum, Helichrysum cymosum* and *H. patulum,* with *Anthospermum aethiopicum, Searsia angustifolia, Protea neriifolia, Nidorella ivifolia, Cliffortia polygonifolia, Osteospermum moniliferum* and *Watsonia borbonica*. No plant Species of Conservation Concern (SoCC). Low to Medium botanical sensitivity.

Site 3B

This site is on east facing shales, and has been previously disturbed. The site is heavily dominated by *Seriphium plumosum, Helichrysum cymosum* and *H. patulum,* with *Anthospermum aethiopicum, Searsia angustifolia, Protea neriifolia, Nidorella ivifolia, Cliffortia polygonifolia, Osteospermum moniliferum* and *Watsonia borbonica*. No plant Species of Conservation Concern (SoCC). Low to Medium botanical sensitivity.

Site 25

Southeast facing, on loamy shale soils. Very old, dense vegetation dominated by *Protea neriifolia, Passerina corymbosa, Psoralea spicata, Osteospermum moniliferum, Metalasia densa, Leucadendron tinctum, L. laureolum, Erica hispidula, E. plukenetii* and *E. vestita*. *Leucadendron tinctum* is Redlisted as Near Threatened, and about ten plants on site, but is very widespread (Worcester to George), but no other SoCC. Medium botanical sensitivity.

Site 24

Southeast facing, on loamy shale soils. Very old, dense vegetation dominated by *Protea neriifolia, Passerina corymbosa, Psoralea spicata, Osteospermum moniliferum, Metalasia densa, Leucadendron tinctum, Erica hispidula, E. plukenetii* and *E. vestita*. *Leucadendron tinctum* is Redlisted as Near Threatened, about ten plants on site, but is very widespread (Worcester to George), but no other SoCC. Medium botanical sensitivity.

Parking area

This is a previously disturbed (cultivated) area that has now been grassed over and is regularly mown. No plant Species of Conservation Concern (SoCC). Low botanical sensitivity.

Area 6

Loamy soils, with *Dicerothamus rhinocerotis, Helichrysum patulum, H. cymosum, Anthospermum aethiopicum, Erica cruenta, Searsia angustifolia, Osteospermum moniliferum, Tetraria* sp., and *Athanasia trifurcata*. No plant Species of Conservation Concern (SoCC). Medium botanical sensitivity.

Area 7

Original proposed area below track was deemed to be of High sensitivity so was moved to Medium sensitivity above track. Loamy soils, dominated by *Protea neriifolia* and *Tenaxia stricta*. No plant Species of Conservation Concern (SoCC). Medium botanical sensitivity.

Area 28

This outlying area is located on shallow sandstone soils, with a more typical montane plant community than elsewhere. Common species include *Protea neriifolia, Hypodiscus aristatus, Elegia hookeriana, Penaea mucronata, Cliffortia obovata, Erica corifolia, E. vestita, Mimetes cucullatus, Protea repens, Dilatris pillansii, Leucadendron salignum* and *Wachendorfia paniculata*. No plant Species of Conservation Concern (SoCC). Medium botanical sensitivity.

Area 29

Flat area of disturbed clays. Low diversity, dominated by *Passerina corymbosa, Seriphium plumosum* and *Osteospermum moniliferum*. No plant Species of Conservation Concern (SoCC). Low botanical sensitivity.

Area 30

Undisturbed, northeast facing slope with loamy sands. Common species include *Leucadendron salignum, Searsia rosmarinifolia, Protea repens, Berkheya herbacea, Erica sp., Phaenocoma prolifera, Hypodiscus aristatus, H. striatus, Asparagus rubicundus, Serruria phylicoides and Penaea mucronata*. No plant Species of Conservation Concern (SoCC). Medium botanical sensitivity.

Area 31

An area of thin sandstone soils on a spur overlooking the river (see Plate 4). The initial site chosen was moved to the west, due to the presence of three SoCC discovered in the initial area. The site supports a fairly high diversity of species, including *Protea repens, P. neriifolia, Erica* sp., *Hypodiscus aristatus, Anthospermum aethiopicum, Tetraria sp., Otholobium spissum, Berkheya herbacea, Thamnochortus lucens, Lobelia chamaepitys* and *Senecio pinifolius*.

Three SoCC were observed nearby, all of which are present in the final footprint, but less than 15% of the immediate site populations of each of these species is likely to be impacted by the development footprint, whereas upwards of 50%

would have been impacted by the original proposed footprint (prior to survey). *Otholobium spissum* is Redlisted as Vulnerable, and is found from Botriver to Tulbagh and Barrydale. *Osteospermum aciphyllum* is Redlisted as Near Threatened, and is found on the Piketberg and the Drakenstein Mts to Caledon. *Pteronia tenuifolia* is a cryptic species Redlisted as Endangered, and is known from Grabouw to Bredasdorp, and this is thus a range extension to the northeast.

Given the confirmed presence of at least three SoCC this site has a High botanical sensitivity.

6. IMPACT ASSESSMENT

6.1 Construction Phase Botanical Impacts

It can safely be assumed that the primary construction phase botanical impact of the proposed development would be permanent loss of all of the existing natural and partly natural vegetation in the development footprints (gazetted as Critically Endangered and Endangered vegetation types). Four different plant Species of Conservation Concern were recorded within the proposed footprints.

The Near Threatened *Leucadendron tinctum* was found in footprints 24 & 25. This species is very widespread (Worcester to George), and has a large population on the property (>300 plants), so that the significance of the loss of the approximately 20 plants in the two footprints is deemed to be Low negative at regional scale.

Three SoCC were observed in the final footprint of Unit 31 (*Pteronia tenuifolia,* Endangered; *Osteospermum aciphyllum,* Near Threatened; *Otholobium spissum,* Vulnerable), but less than 15% of the immediate site populations of each of these species is likely to be impacted by the final development footprint, whereas upwards of 50% would have been impacted by the original proposed footprint (Alternative 1; prior to survey).

Only Unit 31 is deemed to be in an area mapped as High ecological sensitivity, with all the others in areas of Low, Medium, and Low to Medium botanical sensitivity.

The overall botanical significance of the direct vegetation loss (species and vegetation type) for the Alternative 2 layout is **Low - Medium negative before (and after) mitigation.** For the original Alternative 1 layout the construction

phase botanical impact would be slightly higher – thus **Medium negative before mitigation.**

Mitigation in this case needs to invoke the mitigation hierarchy - *viz.* avoidance first, then minimising of impact, and then mitigation. Avoidance is the first step, and this was done at the first opportunity after the site visit, and is now reflected in the difference between the Alternative 1 layout and the Alternative 2 layout. Units 7, 27 and 31 were all moved out of their original proposed locations, which were discovered to be more sensitive than the final proposed areas.

The No Go alternative would clearly have a much lower direct (construction phase) ecological impact than the proposed development - presumably best rated as Neutral, and would thus be preferred from a botanical perspective.

The extent of the impacts are deemed to be local and regional, but also national, in that the vegetation types and threatened species are also assessed at a national level.

Development Alternative	Extent of impact	Duration of impact	Intensity	Probability of impact	Irreplaceable loss of biodiversity	Significance before mitigation	Significance after mitigation
Alternative 1	Mainly local	Permanent	High	Definite	High	Medium -ve	Low to Medium -ve (see Alt 2)
Alternative 2	Mainly local	Permanent	High	Definite	High	Low to Med -ve	Low to Medium -ve
No Go	Local	Unknown and variable	Neutral to low negative	Not likely	Low	Neutral	Neutral

Table A: Summary table for construction phase botanical impacts associated with the proposed development layout. The primary construction phase impacts would be permanent loss of natural and partly natural vegetation (gazetted as Critically Endangered and Endangered vegetation types).

6.2 Operational Phase Botanical Impacts

Operational phase impacts will take effect as soon as any of the natural vegetation on the sites is lost or disturbed, and will persist in perpetuity, or as long as those areas are not rehabilitated. Operational phase impacts include loss of current mostly high levels of ecological connectivity across the footprints,

associated habitat fragmentation, invasive Argentine ant introduction and their effects, and the likely alteration of optimal fire regimes. There will not be any operational phase differences between the two development alternatives.

Loss of current mostly high levels of ecological connectivity across the footprints, and associated habitat fragmentation is likely to be relatively minor for all the proposed development areas, as only very small areas of the greater property will be lost to development. Botanical significance of this is likely to be **Low negative** before and after mitigation.

The new developments may result in alien Argentine ant introduction, as these ants are typically associated with houses, rubbish and rubble. These alien ants outcompete the local indigenous ants, and rather than burying certain seeds like the indigenous ants do, they leave them on the surface, where they are then predated by rodents. This can impact up to 30% of the plant species within 50m of an Argentine ant nest, leading to local recruitment failure for these species. This may have a **Medium negative** local impact, and cannot easily be mitigated. Basic mitigation involves minimising disturbance of all development sites, and not leaving food, rubbish or rubble lying around at any stage during building or operation.

Perhaps the most important indirect (operational phase) botanical impact is the likely impact on the optimal natural fire regime in the immediate vicinity of the infrastructure. Fire is an obvious major risk to many of the proposed (and existing) units in this area, and is consequently likely to be suppressed and actively fought in the vicinity of any infrastructure, which may mean that areas around many of the units do not burn at the optimal 10-15 year fire interval, leading to long term loss of species diversity in these areas (Helme *et al* 2016). This botanical impact is likely to be of **Medium negative significance** before and after mitigation, but may be less significant than this if wildfires overwhelm the defences and vegetation is burnt right up to most of the units, as is often the case these days.

There are (or were) quite a number of invasive alien species on the property, and on the adjacent properties, and without management these will densify and threaten the biodiversity on site. However, the proponent has already cleared many of the pines on his property, and has thus already had a significant positive impact, but ongoing management is required to keep them under control,

especially when these are spreading in from neighbouring land where there is little or no control. Before mitigation this could thus have a **Low negative** impact, and it could be **Low positive** after mitigation.

Overall the operational phase ecological impacts of the proposed development here are likely to be **Medium negative** before mitigation. This could be reduced to **Low to Medium negative** by implementing ongoing alien invasive plant management, as proposed in Section 7.

The No Go alternative would clearly have a much lower indirect (operational phase) ecological impact than the proposed development, and would thus be preferred.

Positive ecological impacts could be realised at this stage if the applicant/HOA undertakes proper ongoing invasive alien vegetation management in the remaining areas of natural and partly natural vegetation.

Development Alternative	Extent of impact	Duration of impact	Intensity	Probability of impact	Irreplaceable loss of biodiversity	Significance before mitigation	Significance after mitigation
Alts 1 & 2	Mainly local	Permanent	Med to High	Definite	Med	Medium -ve	Low to Medium -ve
No Go	Local	Unknown and variable	Neutral to low negative	Likely	Low	Neutral to Low negative	Neutral to Low negative

Table B: Summary table for operational phase botanical impacts associated with the proposed layout. The operational phase impacts would be loss of current ecological connectivity across the sites, associated habitat fragmentation, as well as edge effects like alien plant invasion, fire regime disruption and disruption of ant-based seed dispersal in the surrounding natural areas.

6.3 The No Go Alternative

The No Go alternative (continuation of the *status quo)* on this site would have clearly lower construction and operational phase ecological impact (Neutral to Low negative) than the possible development, and would thus be the preferred alternative from an ecological perspective. The primary negative of the No Go is likely to be insufficient alien invasive vegetation management, leading to possible

biodiversity loss, although the proponent has already been undertaking quite substantial management in this regard, and may continue to do so.

6.4 Cumulative Impacts

The cumulative ecological impacts are in many ways equivalent to the regional ecological impacts, in that the vegetation type/s to be impacted by the proposed development have been, and will continue to be, impacted by numerous developments and other factors (the cumulative impacts) within the region. The primary cumulative impact in this habitat is loss of natural vegetation and threatened plant species to ongoing alien plant invasion, with some limited cultivation impacts (Mucina & Rutherford 2012; Helme *et al* 2016).

The overall cumulative ecological impact of development of these sites at the local scale is Low, and at the regional scale is likely to be Very Low negative, as the footprints are very small in a regional context.

6.5 Positive Impacts

No significant positive ecological impacts of the proposed development are likely during the construction phase, but if the applicant undertakes further proper (see Martens *et al* 2021 for methodology) ongoing invasive alien plant removal on the remaining natural areas this will have a small positive ecological impact.

7. MITIGATION REQUIREMENTS

The following mitigation is considered feasible, reasonable and essential, and is factored into this assessment:

- Alternative 2 is the preferred development alternative from a botanical perspective, and incorporates changes made to the original Alternative 1 layout.
- All invasive alien vegetation on the property must be removed within three years of any project approval, using proper methodology (see Martens *et al* 2021. Annual alien vegetation removal around all new units must be undertaken, so that these sites do not act as sources of alien spread.
- No plant species that are not locally indigenous may be planted around any of the new units.
- Rubbish, building rubble and household refuse must not be stored or disposed of outdoors on any of the sites as this may encourage spread of

alien invasive Argentine ants. Rubbish and refuse should be kept indoors for responsible disposal later, and building sites should be kept as free of rubble and building material as far as is possible, during construction and operational phases.

- Firebreaks should be brushcut annually around all isolated units, using handheld brushcutters. These firebreaks should extend from the edge of the building platforms outwards for at least 5m, and this brushcutting will then at least partially simulate regular fires in these areas within 5m of the buildings, whilst minimising likely fire damage to the infrastructure.

8. CONCLUSIONS AND RECOMMENDATIONS

- The vegetation in the various sites ranges from heavily disturbed to pristine, and is mostly South Sonderend Sandstone Fynbos (Critically Endangered), although some sites are located within Western Coastal Shaleband Vegetation (Endangered). Four different plant SOCC were recorded within two of the footprints (one in sites 24 & 25, and three in site 31).
- The majority of the proposed sites are in areas of Low and Medium botanical sensitivity area, and pose no constraints to the proposed development.
- A few of the sites (notably 7 & 31) are in higher sensitivity areas, and in both these sites changes were made to the original proposed footprints (Alternative 1) to minimise botanical impacts. For site 31 the impact on the three recorded SoCC in the area should now be within acceptable limits (Low - Medium negative botanical impact at a farm scale; Alternative 2).
- Additional mitigation as outlined in Section 7 is considered mandatory.
- The proposed development Alternative 2 is not likely to have more than an overall Low to Medium negative construction phase botanical impact prior to mitigation, and Low negative after mitigation. For the operational phase this is Medium negative before mitigation, and Low to Medium negative after mitigation. The development alternative is thus likely to be acceptable from a botanical perspective, and is preferred over Alternative 1.

7. REFERENCES

Government of South Africa. 2022. South African Red List of Terrestrial Ecosystems: assessment details and ecosystem descriptions. Government Notice 2747, Gazette 4526. Technical Report #7664, SANBI Pretoria, South Africa.

Helme, N., P. Holmes & A. Rebelo. 2016. Mountain Fynbos Ecosystems. In: Cadman, A (ed.). *Ecosystem Guidelines for Environmental Assessment in the Western Cape, Ed*.2. Fynbos Forum, Fish Hoek, South Africa.

Manning, J. and P. Goldblatt. 2012. Plants of the Greater Cape Floristic Region 1: The Core Cape flora. *Strelitzia 29*. South African National Biodiversity Institute, Pretoria.

Martens, C., Deacon, G., Ferreira, D., Auret, W., Dorse, C., Stuart, H., Impson, F., Barnes, G. and C. Molteno. 2021. *A practical guide to managing invasive alien plants: A concise handbook for land users in the Cape Floral Region.* WWF South Africa, Cape Town, South Africa.

Mucina, L. and M. Rutherford. *Eds.* 2018 online update. Vegetation map of South Africa, Lesotho, and Swaziland. *Strelitzia 19*. South African National Biodiversity Institute, Pretoria.

Pence, G. 2017. Western Cape Biodiversity Spatial Plan. CapeNature, Cape Town, South Africa.

Raimondo, D., Von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C., Kamundi, D.A., and Manyama, P.A. (eds.) 2009 and online updates at redlist.sanbi.org. Red List of South African Plants 2009. *Strelitzia 25*. South African National Biodiversity Institute, Pretoria.

Rouget, M., Reyers, B., Jonas, Z., Desmet, P., Driver, A., Maze, K., Egoh, B. & Cowling, R.M. 2004. *South African National Spatial Biodiversity Assessment 2004: Technical Report. Volume 1: Terrestrial Component.* Pretoria: South African National Biodiversity Institute.