

Terrestrial Biodiversity Assessment
for the development of new cultivation areas on Farm 38/129, Uitnood, Robertson

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Date: 12 October 2020

SUMMARY

An area of approximately 120 Ha was investigated in order to identify potential development areas within remaining natural portions of Farm 38/129, Uitnood, Robertson. The surveyed areas consist of Area 1 (large area in the northern portion of the farm), Area 2 (narrow strip of land situated between the road and a canal), Area 3 (small triangular area), Area 4 (south-west of dam) and Area 5 (south-east of dam).

Two vegetation types are evident within the surveyed areas including Robertson Karoo (least threatened) and Breede Sand Fynbos (Vulnerable). Only a small portion of Area 3 is mapped as a terrestrial CBA based on the mapped occurrence of the critically endangered ecosystem Muscadel Riviere. The field survey revealed that this ecosystem is not present on site. Small drainage lines evident within the surveyed areas are considered aquatic Ecological Support Areas. There are no others CBAs or ESAs on site. The site does not form part of a Protected Area or any Protected Area Expansion Focus Areas. There are no aquatic CBAs, NFEPA's or wetland areas identified within any of the surveyed areas. The surveyed areas do not fall within any groundwater or surface Strategic Water Source Areas. The target site does not form part of a landscape corridor. The most significant biodiversity processes associated with the site relate to the presence of small drainage lines (Areas 4 and 5) and local connectivity amongst hills in the area.

Natural vegetation within Sand Fynbos areas (Portions of Area 1, Areas 2 and 3) comprises an open restioid shrubland on deep sands dominated by *Willdenowia incurvata* (besembos). The vegetation within Robertson Karoo areas (higher lying portions of Area 1, Areas 4 and 5) comprises an open karoid shrubland matrix with a high concentration of succulents and a number of thicket patches. The substrate is shale derived clays with some shallow gravelly areas in places. Some steep areas are evident within Area 1 (south facing hills slopes) which will be unsuitable for cultivation. About 137 plant species were recorded within the surveyed areas. Five plant species of conservation concern were recorded on site including *Euchaetis pungens*, a vulnerable species recorded in Sand Fynbos, two vulnerable species recorded in Robertson Karoo namely *Astroloba rubriflora* and *Eriospermum bowieanum* and two near threatened species recorded in Robertson Karoo namely *Brianhuntleya intrusa* and *Euphorbia nesemanii*.

The most significant impacts on biodiversity associated with the proposed development include the following:

- Impact on plant species of conservational concern
- Small watercourses evident within Areas 4 and 5.
- Loss of natural vegetation within a Vulnerable ecosystem (Breede Sand Fynbos)

A layout plan is recommended which should significantly reduce impacts associated by the development.

- It will exclude highest densities of plant species of conservational concern recorded on site as well as areas with the highest likelihood of containing colonies of these species.
- It will preserve a significant portion of pristine Breede Sand Fynbos on the farm.
- Natural connectivity will be maintained on the property. All hills and vegetation patches containing significant colonies of plant species of conservational concern will be well connected to each other and to other natural areas in the surrounding area.

A detailed Terrestrial Biodiversity Impact Assessment will be conducted as part of the EIA when alternative layout options for the cultivation areas are established. Such layout alternatives will be informed by the current report, Freshwater Specialist Report as well as soil potential etc.

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APPENDIX B – SPECIES LIST

SPECIALIST DETAILS, EXPERTISE AND DECLARATION

In terms of Chapter 5 of the National Environmental Management Act of 1998, specialists involved in Impact Assessment processes must declare their independence.

I, J. Krige, do hereby declare that I am financially and otherwise independent of the client and their consultants. All opinions expressed in this document are substantially my own.

I confirm that this report meets the content requirements prescribed by NEMA for specialists reports.



J. Krige

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Since 2010 I have been working as an Environmental Assessment Practitioner and Botanical & Ecological Specialist at Boland Environmental Consultants in Worcester. I have been involved in various EIA Projects and Environmental Management Programs. In additions I have conducted numerous Botanical & Ecological Impact Assessments in the local area (Breede River Valley). Since 2013 I have been based in Robertson and working at a free-lance basis, trading under my own name, focussing on Specialised Botanical & Ecological Surveys, predominantly within the Breede River Valley. Most of my work relates to new farming development (cultivation areas, construction of dams and agri related infrastructure) or small-scale mining applications in the area. I am currently (since 2017) based in Ceres continuing with Botanical Impact Assessments throughout the Western Cape.

1. INTRODUCTION

This botanical / terrestrial biodiversity assessment was commissioned in order to provide an informed decision regarding the development of new cultivation areas on the Farm 38/129, Uitnood, Robertson. The property is located about 4.5 km south of Robertson and 9 km north of McGregor (Figure 1).

The entire property is 390 Ha in extent of which about 200 Ha (eastern portion) is currently developed (vineyards, dams, housing and agricultural infrastructure). An area of approximately 120 Ha was investigated in order to identify potential development areas within remaining natural portions of the property (Figure 2).

The surveyed areas consist of:

Area 1 – large area in the northern portion of the farm

Area 2 – narrow strip of land situated between the road and a canal.

Area 3 – small triangular area

Area 4 – south-west of dam

Area 5 – south-east of dam

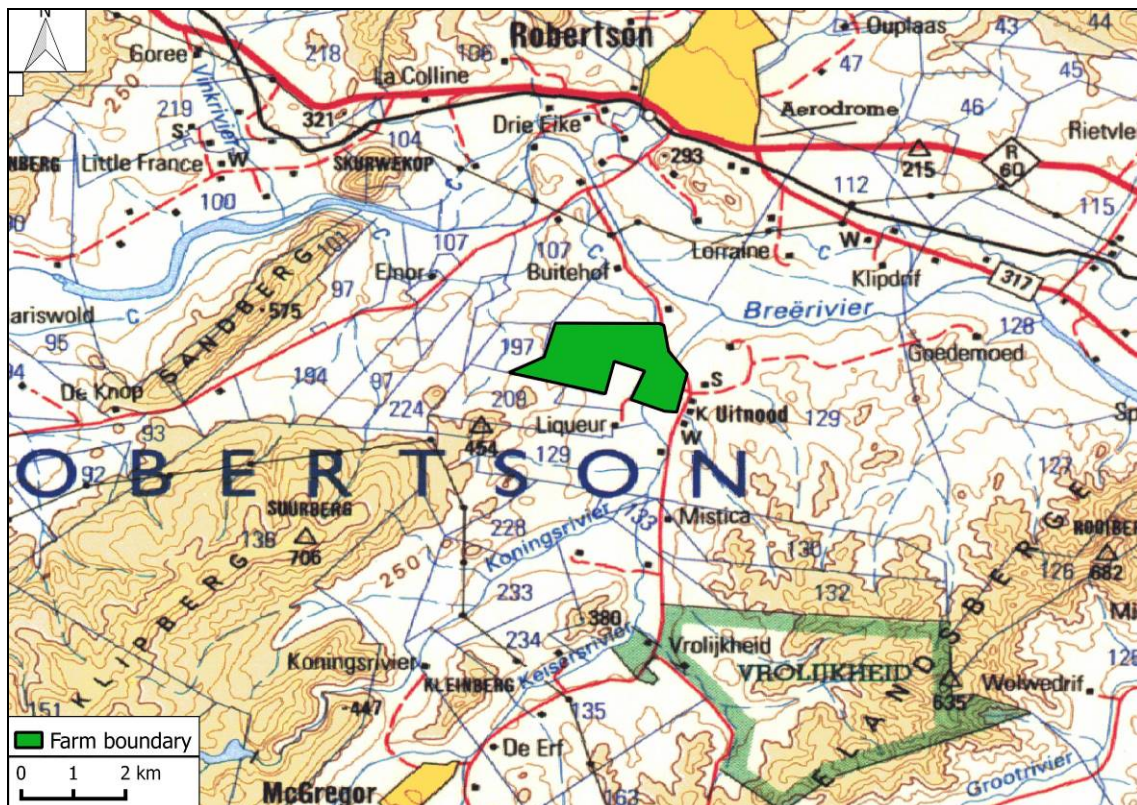


Figure 1. Location of Uitnood Farm 38/129 (green polygon) south of Robertson.

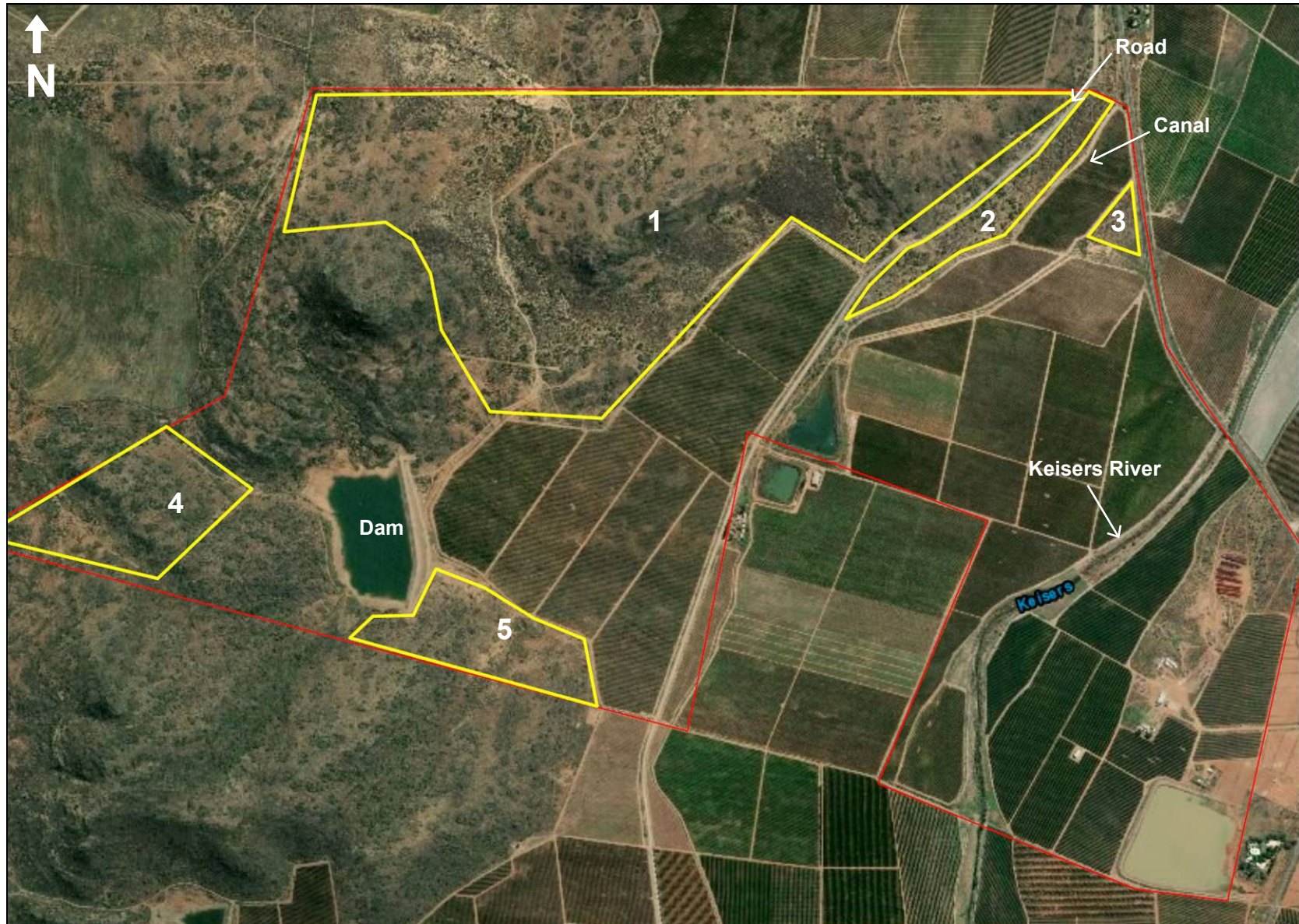


Figure 2. Map showing the property boundaries (red) and areas investigated in this assessment (yellow).

2. TERMS OF REFERENCE

The basic terms of reference drawn from the Ecosystem Guidelines for Environmental Assessment in the Western Cape (Cadman 2016) were considered in this assessment. In addition the NEMA Protocol for the Specialist Assessment of Environmental Impacts on Terrestrial Biodiversity (GN 320 of 20 March 2020) was followed.

3. METHODOLOGY

An overview of the existing land use, vegetation, ecosystem status and occurrence of sensitive areas on the identified land were obtained through SANBI GIS, The National Vegetation Map (Mucina and Rutherford 2006 & 2018 update), the National Ecosystem Status Maps (2011), National Biodiversity Assessment (NBA 2018) Ecosystem Threat Status Map, Google Earth Imagery and Cape Farm Mapper. In addition the Cape Fine-Scale Plan – Integrated Vegetation Map (Helme, N. A. and Freshwater consulting Group, 2007) and the Western Cape Biodiversity Spatial Plan (Cape Nature 2017) for the Langeberg Municipal Area were consulted. Maps used in this report were configured in Cape Farm Mapper, Google Earth and Quantum GIS.

The proposed development area was visited on the 12th of October 2020 to confirm vegetation types. Potential development areas were surveyed for habitat quality and the presence of rare species. The site was walked, and various reference points marked using a handheld GPS while aspects such as the condition of the vegetation and levels of disturbance were noted and photographed.

4. LIMITATIONS AND ASSUMPTIONS

Field work was conducted on the 12th of October (spring) which is the optimal timing for conducting field surveys in the area. There were therefore no significant seasonal constraints to the assessment.

5. MAIN FINDINGS

5.1 BIODIVERSITY IMPORTANCE IN A LANDSCAPE CONTEXT

5.1.1 Mapped CBAs, ESAs and Protected Areas

Figure 3 represents Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) identified through the systematic biodiversity planning assessment as per the 2017 Western Cape

Biodiversity Spatial Plan (WCBSP). These areas require safeguarding to ensure the continued existence and functioning of species, ecosystems and ecological processes, including the delivery of ecosystem services, across terrestrial and freshwater realms (Pool-Stanvliet *et al.* 2017). CBAs are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure. ESAs play an important role in supporting the functioning of Protected Areas or CBAs, and are often vital for delivering ecosystem services.

- The north-western triangular area (Area 3) overlaps with a terrestrial CBA (0.3 Ha) (Figure 3).
- Small drainage lines occurring within Area 1 (large northern area) and Areas 4 and 5 (south-west and south-east of the dam) are recognised as aquatic ESAs (Figure 3).
- The site does not form part of a Protected Area or any Protected Area Expansion Focus Areas.

The reason for a portion of the small triangular area being identified as a CBA is the mapped occurrence of the critically endangered ecosystem Muscadel Riviere. The field survey revealed that this ecosystem is not present on site (refer to Section 5.3 Vegetation and Habitat Condition on site).

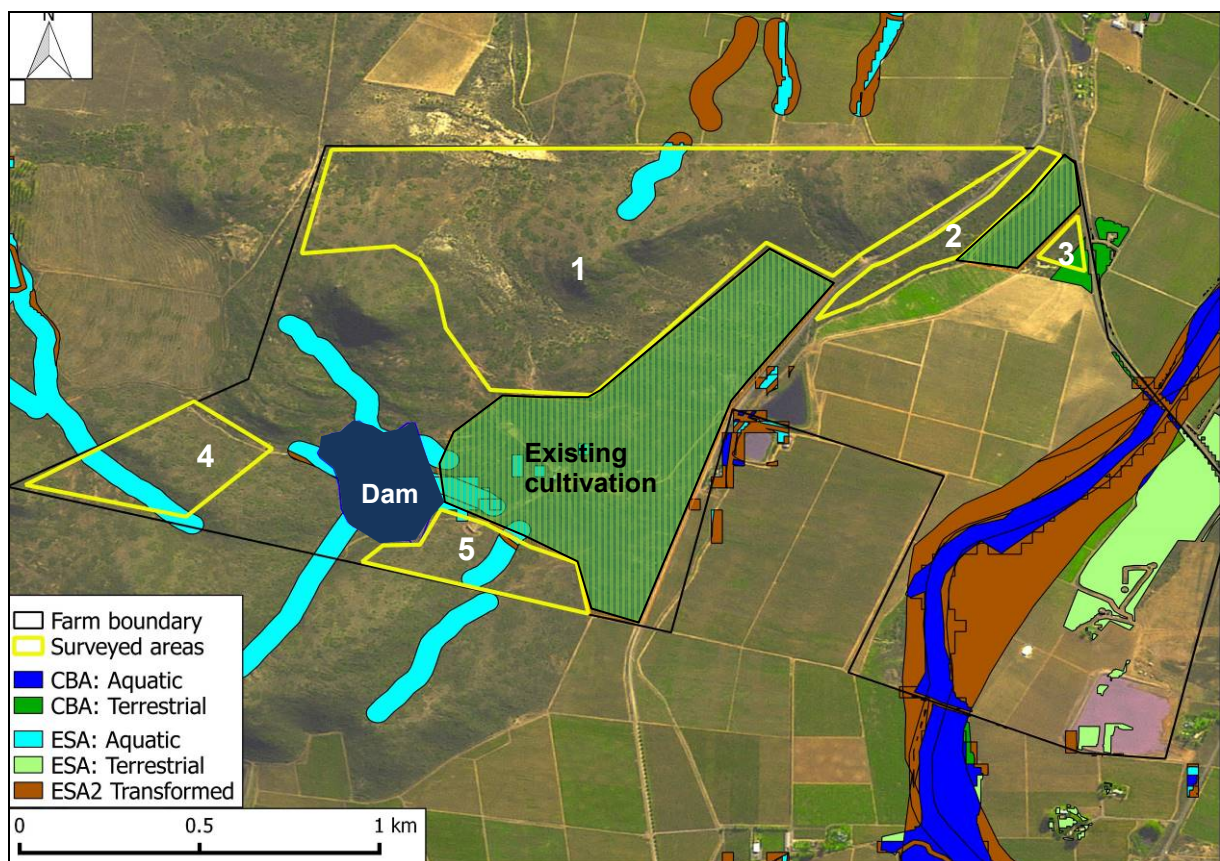


Figure 3. Extract from the WC Biodiversity Spatial Plan (2017) Map for the Langeberg Municipality showing the extent of CBAs in the area. The surveyed areas are shown in yellow.

5.1.2 Wetlands / aquatic features

- One ephemeral drainage line is evident within the south-western corner of the property, crossing the surveyed area south-west of the dam (Area 4) (Figure 4 & 5).
- A very small drainage crosses the surveyed area south-east of the dam (Area 5) (Figs 4 & 5).
- Another small drainage is mapped within Area 1 (large area within northern portion of the farm). This area comprises deep aeolian sand and there is no evidence of any runoff in this area (Figure 4 & 6).
- There are no aquatic CBAs, NFEPA wetland areas identified within any of the surveyed areas.
- The surveyed areas do not fall within any groundwater or surface Strategic Water Source Areas.
- The Keisers River, located within the eastern portion of the property is a perennial river. It is recognised as an aquatic CBA with associated floodplain NFEPA wetland areas. This area will be excluded from any development or disturbances.

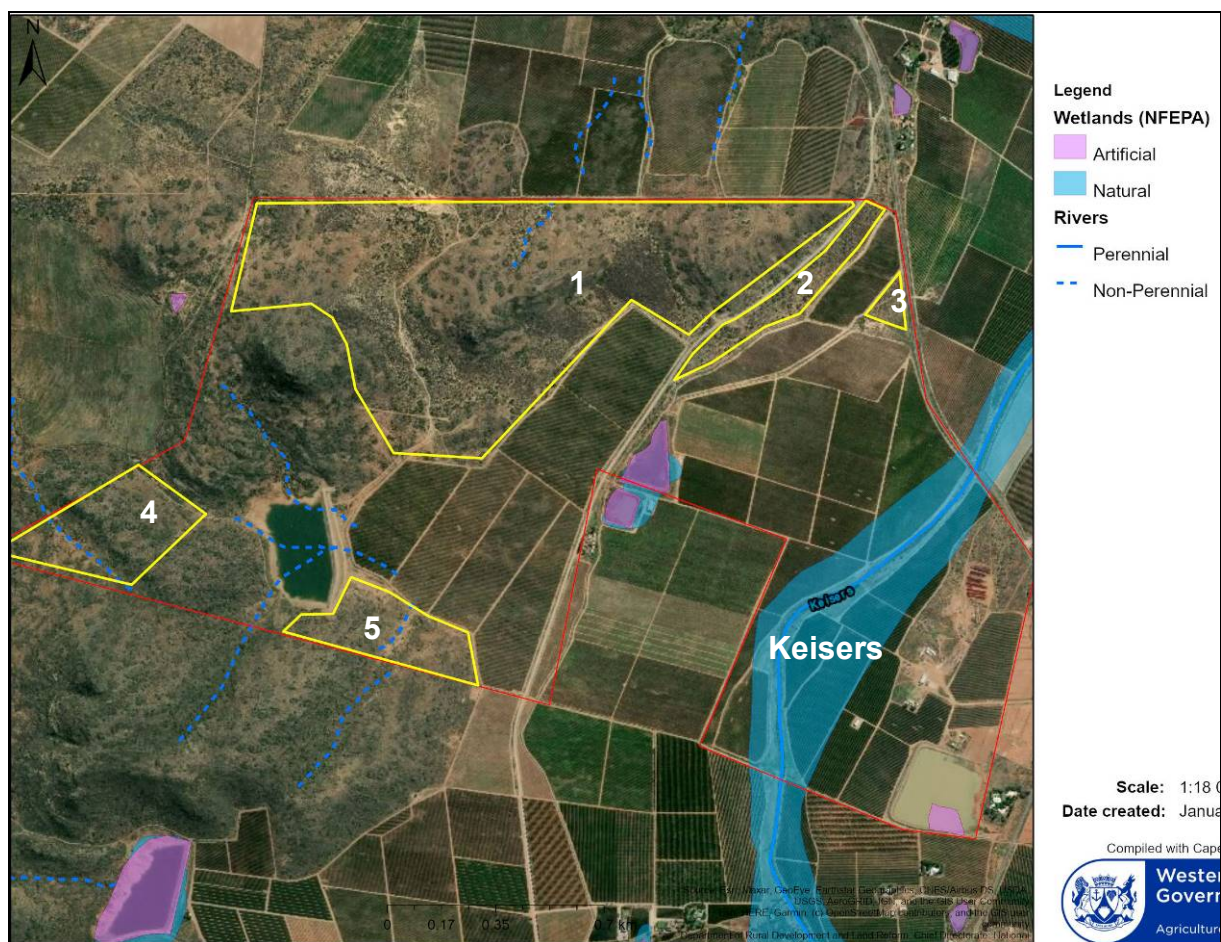


Figure 4. Extract from the Cape Farm Mapper NGI Rivers and NFEPA wetlands layer showing mapped watercourses and wetlands within the surveyed areas and surroundings.



Figure 5. Satellite image showing drainage lines within areas south-west and south-east of the dam.



Figure 6. Satellite image showing deep sandy area within the vicinity of the mapped drainage line within the large surveyed area in the north of the farm.

5.1.3 Connectivity and Corridors

Corridors are important to ensure habitat connectivity for plant and animal migrations and interactions between Protected Areas, CBAs and other landscape features (rivers, mountains etc).

- The target site does not form part of a corridor (Figure 7).

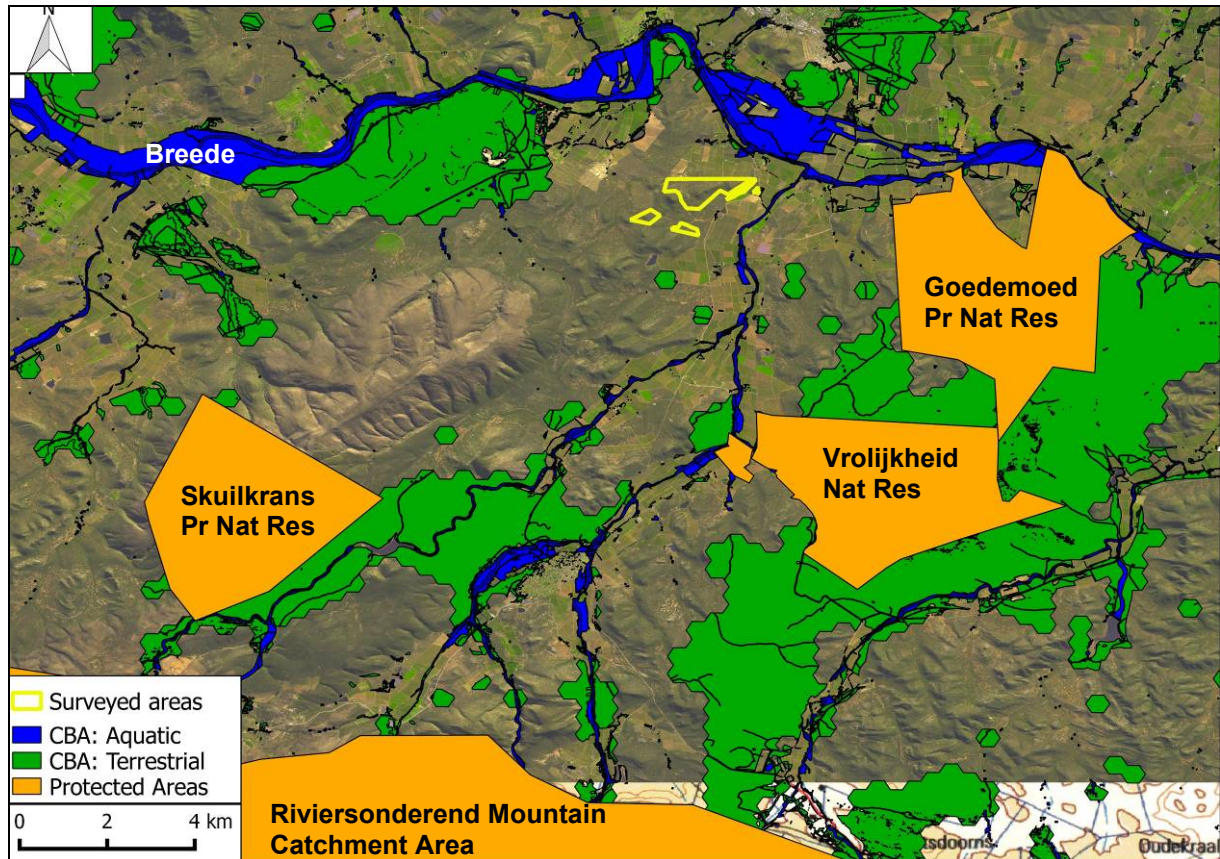


Figure 7. Extract from the WC Biodiversity Spatial Plan (2017) Map for the Langeberg Municipality showing the extent of CBAs and Protected Areas in the broader context. The target site is shown in yellow.

5.2 MAPPED VEGETATION TYPES AND ECOSYSTEM THREAT STATUS

According to the SA Vegetation Map (Mucina and Rutherford 2018 update) Area 1 (large area in northern portion of the farm) comprises Robertson Karoo vegetation with a strip of Breede Sand Fynbos running through the area. Area 2 (strip of land between the road and canal) comprises Breede Sand Fynbos. Area 3 (triangular area) comprises Breede Sand Fynbos with a small portion overlapping with Muscadel Riviere vegetation. Area 4 and 5 (south-west and south-east of the dam) comprise Robertson Karoo vegetation (Figure 8).

- Robertson Karoo is Least Threatened
- Breede Sand Fynbos is considered Vulnerable in the National List of Threatened Ecosystems (DEA 2011) as well as the recent National Biodiversity Assessment (NBA 2018).
- Muscadel Riviere is Critically Endangered (DEA 2011) as it is primarily converted into vineyards. The more recent National Biodiversity Assessment (NBA) of 2018 lists this ecosystem as Endangered (NBA 2018).

The CAPE Fine-Scale Integrated Vegetation Map also recognises a strip of Breede Sand Fynbos within Areas 1, 2 and 3, with Bonnievale Renosterveld Thicket (Gwarrieveld) within the remaining portions of Areas 1, 4 and 5 mapped as Robertson Karoo in the SA Vegetation Map. Bonnievale Renosterveld Thicket is a form of Robertson Karoo (Figure 9).

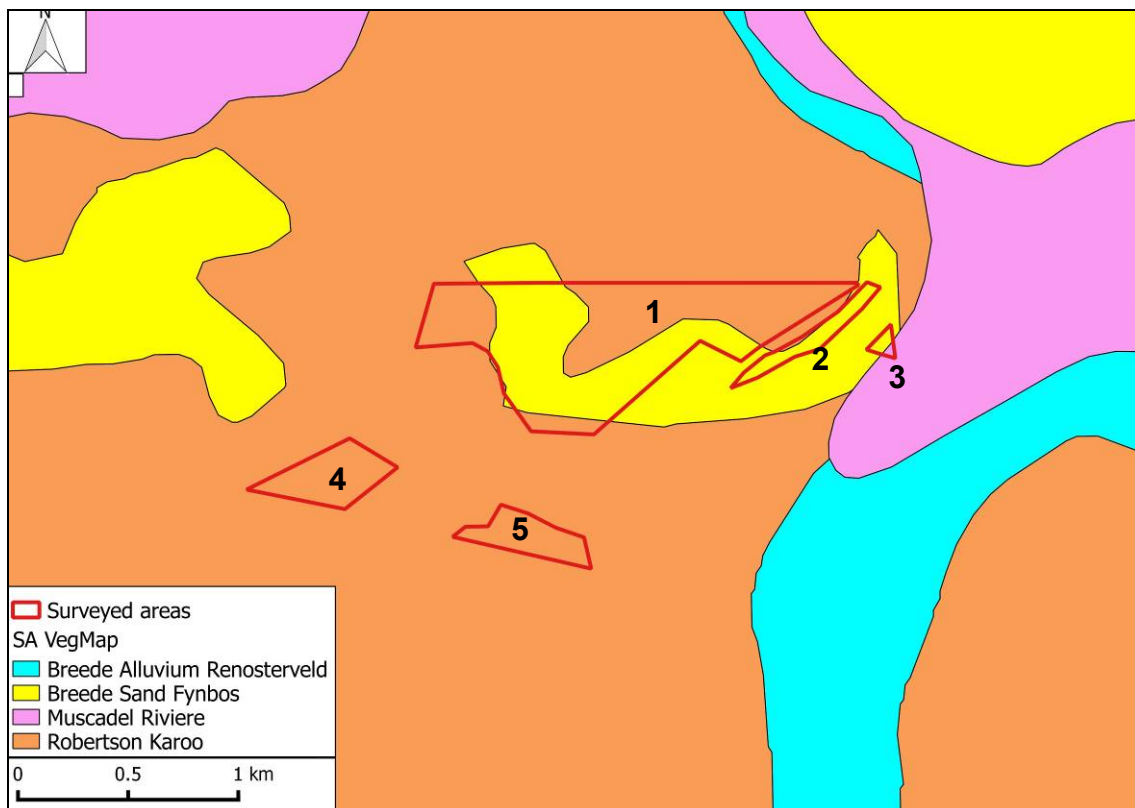


Figure 8. Extract from the SA Vegetation Map (Mucina & Rutherford 2018 update) indicating the surveyed areas (red).

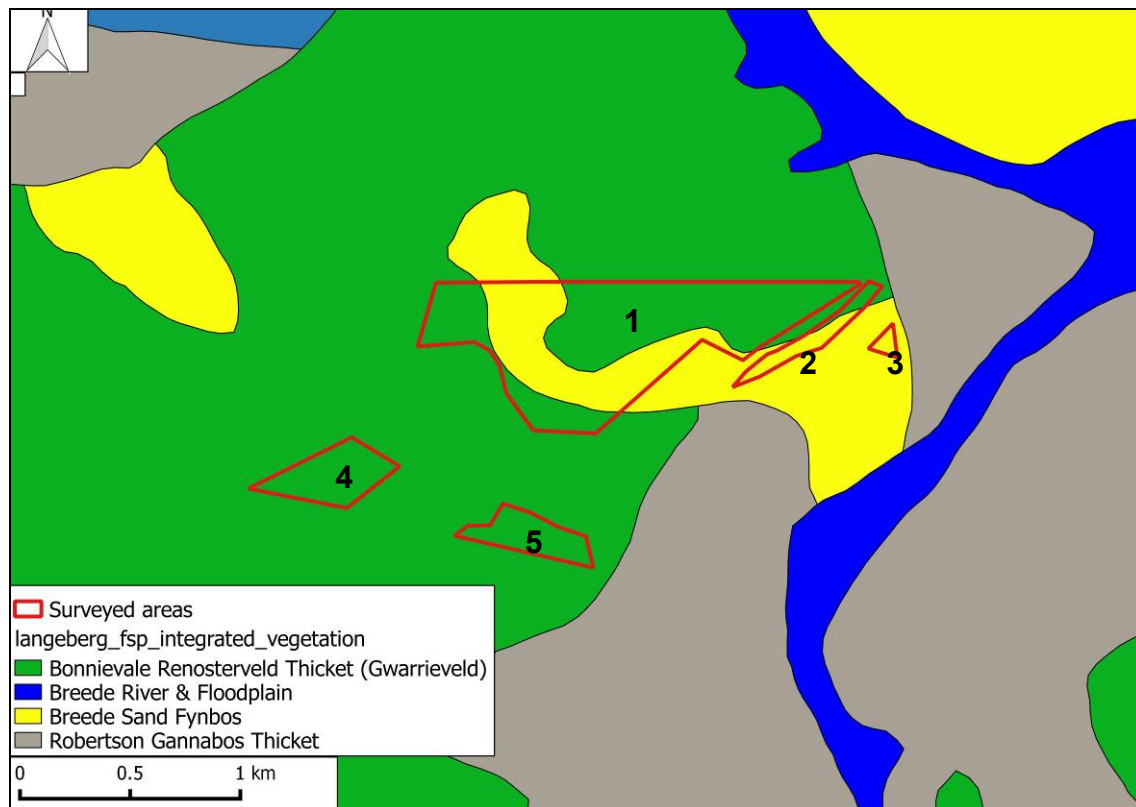


Figure 9. Extract from the CAPE Fine Scale Project: Integrated Vegetation Map indicating the surveyed areas (red).

5.3 HABITAT CONDITION AND VEGETATION ON SITE

The vegetation on site corresponds closely to the Vegetation Map of SA. Area 1 consists of deep sandy areas supporting Breede Sand Fynbos with shallower, shale areas supporting Robertson Karoo (Figure 10). Areas 2 and 3 comprise Breede Sand Fynbos exclusively. There is no representation of Muscadel Raiviere (CR) vegetation within Area 3. Areas 4 and 5 comprise Robertson Karoo.

Robertson Karoo is least threatened and Breede Sand Fynbos is considered a vulnerable ecosystem. According to the Western Cape State of Biodiversity 2017, 46.4% (4529.93 Ha) of the original area of Breede Sand Fynbos is currently remaining (Jacobs et al 2017). The transformation of all of the surveyed areas will result in the transformation of approximately 27 Ha of Breede Sand Fynbos which will reduce the remaining extent of this habitat by 0.6 %,

Natural vegetation within Sand Fynbos areas comprises an open restioid shrubland on deep sands dominated by *Willdenowia incurvata* (besembos). Other prominent elements include:

- Annual and perennial herbs: *Arctotis incisa* (botterblom), *Grielum humifusum* (pietsnot), *Helichrysum moesianum*, *Heliophila coronopifolia* (blousporrie), *Leypera tristis*

(traanblommetjie), *Nemesia bicornis* (leeubekkie), *Pelargonium senecioides* and *Pelargonium lobatum* (kaneelbol).

- Shrubs: *Anthospermum aethiopica*, *Anthospermum spathulatum*, *Leucadendron salignum* (tolbos), *Leysera gnaphalodes* (teringteebos), *Dodonaea angustifolia* (sandolien), *Euchaetis pungens*, *Hermannia trifurcata* (broodbos), *Metalsia densa* (blombos), *Muraltia spinosa* (skilpadbessie) and *Wiborgia mucronata* (groot-wolfdoring).
- Succulents: *Carpobrotus edulis* (suurvy), *Conococlea pugioniformis* (groot vetkousie), *Ruschia caroli* and *Ruschiella henricii*.
- Geophytes: *Babiana tubiflora*, *Brunsvigia orientalis* (koningskandelaar), *Lapeirousia anceps*, *Tritonia pallida* subsp. *pallida* (katjietee) and *Trachyandra* spp. (veldkool).
- Graminoids: *Aristida diffusa* (koperdraadgras), *Ficinia* sp., *Ischyrolepis gaudichaudiana*, *Pentaschistis pallida*, *Thamnochortus* sp. and *Willdenowia incurvata* (besembos/sonkwasriet).

Scattered karoo elements were also recorded amongst sand fynbos areas. All sand fynbos areas are in a good condition except for the north-westernmost portion extending north of the property boundaries which is subjected to past sand mining and the strip of land situated between the road and canal (Area 2) which is subjected to low to medium density alien Port Jackson infestation. Area 3 shows some level of disturbance which can be related to edge effects (surrounding cultivation).

The vegetation within Robertson Karoo areas comprises an open karoid shrubland matrix with a high concentration of succulents and a number of thicket patches. The substrate is shale derived clays with some shallow gravelly areas in places.

- The most dominant karoid shrubs include *Elytropappys rhinocerotis* (renosterbos), *Hirpicium integrifolium* (haarbossie), *Oedera squarrosa* (vierkantperdekaroo), *Osteospermum scariosum* (skaapbos), *Pteronia fasciculata* (paraffienbos), *Pteronia paniculata* (gombossie) and *Tetragonia fruticosa* (kinkelbossie).
- The dominant succulents include *Drosanthemum speciosum* (rooi vygie) and *Ruschia caroli*, *Crassula* spp., *Euphorbia burmanii* (steenbokmelkbos), *Euphorbia mauritanica* (geel melkbos), *Lampranthus haworthii* (persvygie), *Mesembryanthemum longistylum*, *Senecio radicans* (kraaltjies), *Senecio sarcoides* (soetkop dikblaar) and *Tylecodon paniculatus* (botterboom) are also common.
- Thicket patches are common and typically consist of *Carissa haematocarpa* (noem-noem), *Euclea undulata* (gwarriebos), *Lycium oxycarpum* (wolwedoring), *Searsia pallens* (bleekkoeniebos), *Zygophyllum morgazana* (slaai-bos) and *Asparagus capensis* (katdoring).
- Annuals and perennial herbs: *Gazania rigida* (karoobotterblom), *Helichrysum moeserianum*, *Oncosiphon piluliferum* (karoostinkkruid) and *Ursinia anthemoides* (magriet).

- The most common geophytes recorded include *Albuca cooperi*, *Albuca glandulosa* (taaitamarak), *Bulbine frutescens*, *Bulbine mesembryanthemoides* (waterglasie), *Cyanella hyacinthoides* (blouraaptol), *Ferraria divaricata* (spinnekopblom), *Lapeirousia pyramidalis* (naeltjie), *Moraea miniata* (tulp), *Moraea polyanthos* (bloutulp), *Ornithogalum dubium* (chinchinchee) and *Trachyandra* spp.

Overall the vegetation and habitat within Robertson Karoo areas are in a good condition.

Some steep areas are evident within Area 1 (south facing hills slopes) which will be unsuitable for cultivation (Figure 10). About 137 plant species were recorded within the surveyed areas. For a detailed list refer to Appendix B.



Figure 10. Aerial photograph showing the distribution of Breede Sand Fynbos (yellow polygons) amongst Robertson Karoo (unshaded areas) within the property. Landscape features including hills, steep areas and drainages are also shown.



Plate 1: Looking south showing Robertson Karoo vegetation with thicket patches within the southern portion of Area 1.



Plate 2: Looking south showing Breede Sand Fynbos vegetation along the main track accessing the northern portions of Area 1.



Plate 3: Looking west showing Breede Sand Fynbos within the central portion of Area 1 with Robertson Karoo on the hills in the back (west).



Plate 4: Looking south-east showing Breede Sand Fynbos within Area 1. Robertson Karoo is also evident on the hills in the left (east).

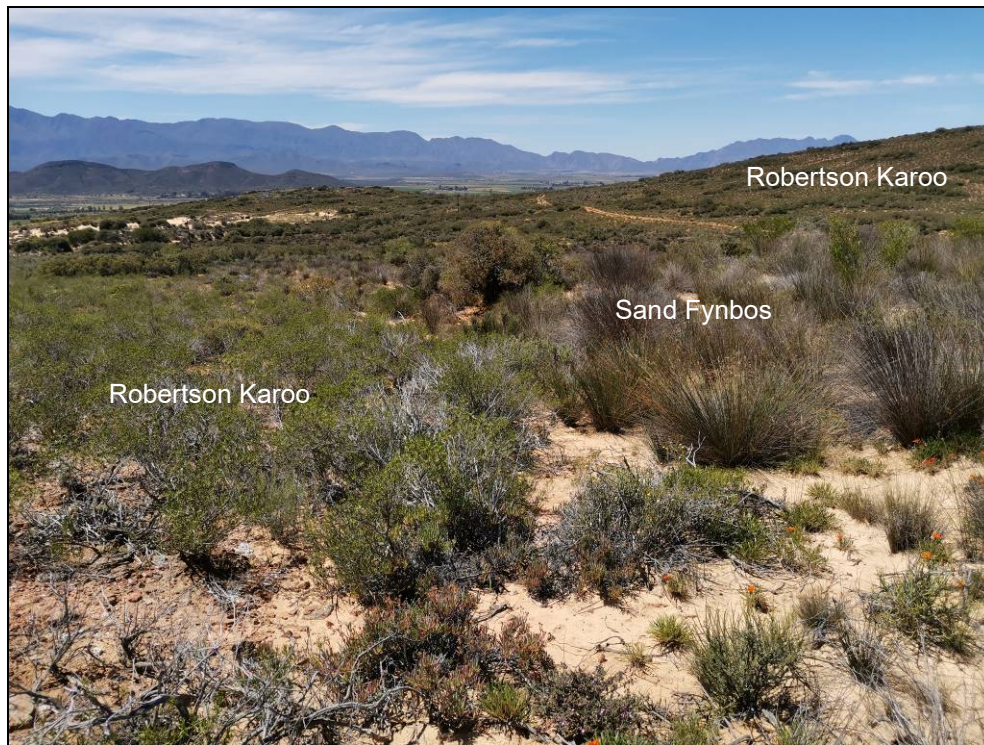


Plate 5: Looking north showing Robertson Karoo and Breede Sand Fynbos within Area 1.



Plate 6: Breede Sand Fynbos with scattered alien Port Jackson within Area 2.



Plate 7: Breede Sand Fynbos within Area 3.



Plate 8: Robertson Karoo within Areas 4 and 5.

5.4 THREATENED PLANT SPECIES

Five plant species of conservational concern were recorded within the surveyed areas namely:

- *Euchaetis pungens* – Vulnerable
- *Astroloba rubriflora* – Vulnerable
- *Brianhuntleya intrusa* – Near Threatened
- *Euphorbia nesemanii* – Near Threatened
- *Eriospermum bowieanum* – Vulnerable

***Euchaetis pungens* (VU)** (boegoe family) occurs in the Upper Breede River Valley, on flats and low slopes in the mountains of the Worcester district. This species is considered Vulnerable. A population reduction of at least 30% is estimated based on habitat loss to vineyard and deciduous fruit orchard expansion, drainage of seasonal wetlands, and alien plant invasion in the past 30 years (generation length 10 years). Habitat loss is ongoing. (Helme, N.A. & Victor, J.E. 2006).

- *E. pungens* was recorded in very high numbers (hundreds of individuals) within the sand fynbos habitat within the central portion of Area 1 (Figure 11).
- Less than 10 individuals were recorded within the small triangular area (Area 3).



Plate 9: *Euchaetis pungens*, a Vulnerable plant species recorded within Sand Fynbos areas.

***Astroloba rubriflora* (VU)** is a succulent with sprawling stems, densely covered in sharply-pointed waxy blue-green leaves (that go brown/red on exposure to sun). It produces a long, thin inflorescence with red flowers. It is considered Vulnerable and occurs in the range from Robertson, Bonnievale and McGregor. Its habitat is rocky karroid flats and low hills, nearly always under bushes. This species is declining due to past and ongoing habitat loss to expanding fruit orchards and vineyards (Raimondo & Helme2008).

- *A. rubriflora* was recorded in low densities (mainly consisting of small colonies of 3-10 individuals each underneath thicket patches) within the northern hill-slopes of Area 1.
- Scattered individuals were also recorded within the western portion of Area 5, amongst the 2 Near Threatened species *Brianhuntleya intrusa* and *Euphorbia nesemanii* (Figure 11). These colonies extend well into natural areas within the neighbouring property towards the south.



Plate 10: *Astroloba rubriflora*, a Vulnerable plant species recorded within north-facing hills slopes of Robertson Karoo mainly underneath thickets.

***Brianhuntleya intrusa* (NT)** is a vygie that forms small clumps and produces pink flowers in winter. It is considered Near Threatened as it is range-restricted, but it is locally abundant. Its extent of occurrence (EOO) is 556 km² in the range from Worcester, Robertson to McGregor. This species is threatened in places by habitat loss to expanding crop cultivation but most of its shale habitat is too shallow and rocky to plough (Klak et. al. 2012).

- Scattered small colonies of this species (± 50 individuals per colony) were found throughout the northern hill-slopes of Area 1, typically occurring within open, rocky areas with shallow soils.
- Many individuals were also recorded within the western portion of Area 5, extending well into natural areas on the neighbouring property towards the south (Figure 11).
- *Brianhuntleya intrusa* is commonly recorded and locally abundant in the surrounding natural areas with similar habitat, throughout the Le Chasseur and Agterkliphoogte valleys, Nuy Valley, Scherpenheuvel, Uitnood and near McGregor (J. Krige personal observation).

***Euphorbia nesemannii* (NT)** is a perennial shrublet with a noors-like growth form. It has spines along ridges on the thick stems. It is a regionally endemic species considered to be Near Threatened. Its extent of occurrence (EOO) is 2320 km² in the range from Worcester to Robertson and Swellendam. This species is declining due to ongoing habitat loss to vineyard expansion (Helme et. al. 2007). It typically occurs within karoid scrub on low gravel slopes.

- A few scattered individuals (< 10) of *E. nesemannii* were recorded within the central-northern portion of Area 1.
- A large colony of *E. nesemannii* (> 100 individuals) is evident within the western portion of Area 5. This colony extends well (hundreds more individuals) into natural areas on the neighbouring property towards the south (Figure 11).

***Eriospermum bowieanum* (VU)** is a small geophyte that produces flowers when the leaves are dormant. This plant comprises a single leaf with several branched outgrowths. This Worcester Karoo endemic is considered Vulnerable and is currently threatened by wheat and vineyard expansion. It occurs on clay soils amongst low karroid bushes. Its extent of occurrence (EOO) is <2500 km² in the range from Worcester to Ashton (Helme 2006).

- *E. bowieanum* was recorded in low numbers (3 small colonies / circular patches of about 30 plants each) within the northern hill-slopes of Area 1 (Figure 11).



Plate 11: *Brianhuntleya intrusa*, a Near Threatened plant species recorded within gravelly areas with shallow soil in Robertson Karoo.



Plate 12: *Euphorbia nesemannii*, a Near Threatened plant species recorded in Robertson Karoo.



Plate 13: *Eriospermum bowieanum*, a Vulnerable plant species recorded within small colonies in Robertson Karoo.

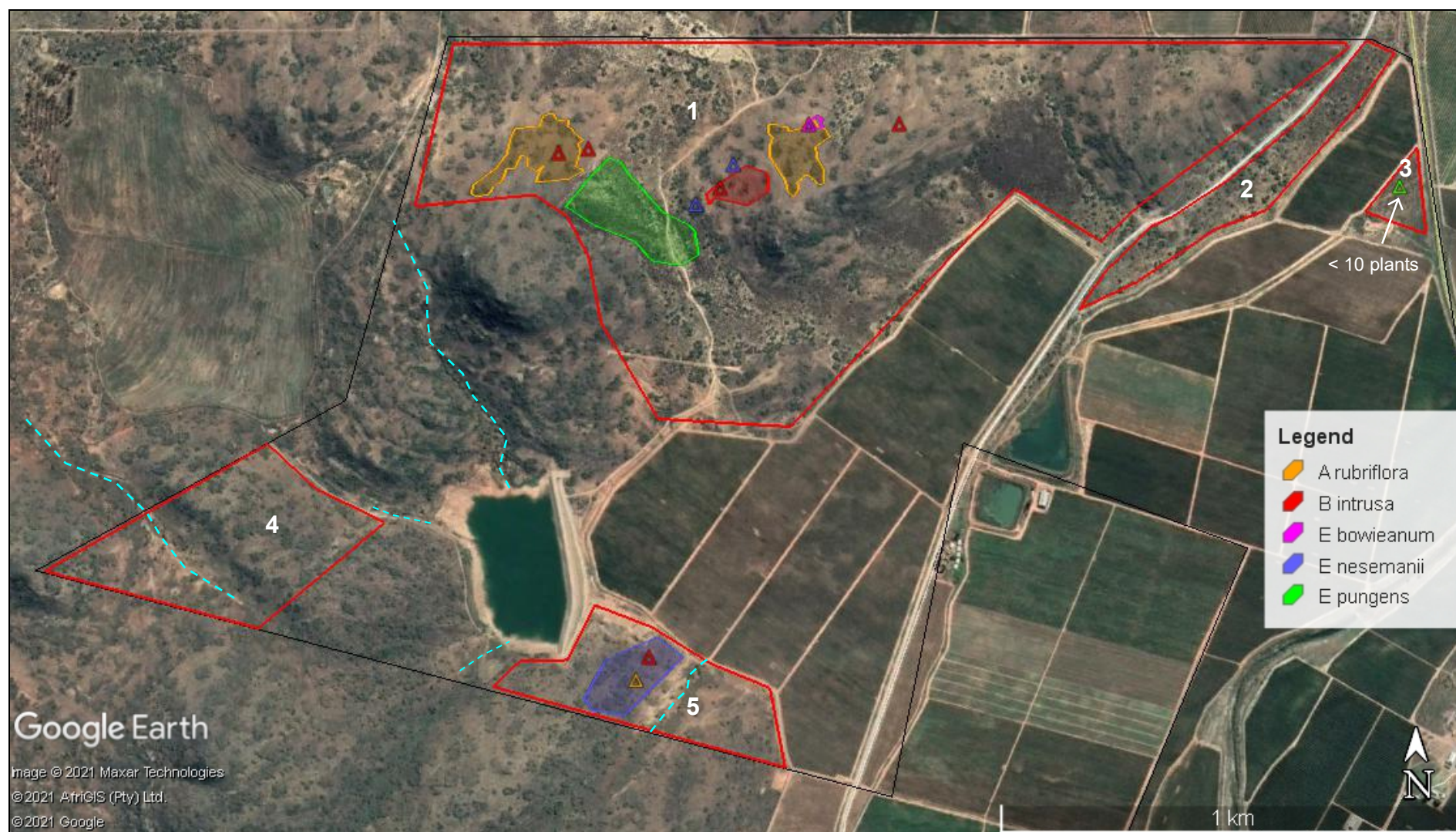


Figure 11. Aerial photograph showing the distribution of Red Data List plants species recorded within the surveyed areas.

Recommendations:

It is recommended that the upper northern hill slopes of Area 1 as well as two pristine natural Breede Sand Fynbos patches amongst these hills be excluded from the development (Figure 12). This should preserve the largest densities of *Astroloba rubriflora*, *Brianhuntleya intrusa*, *Euchaetis pungens* and the small colony of *Eriospermum bowieanum* recorded on site as well as areas with a very high likelihood of containing these species (eastern portions of the site). Furthermore it is most desirably that the western portion of Area 5 be excluded from the development in order to preserve the large colony of *Euphorbia nesemanii* as well as high numbers of *Astroloba rubriflora* and *Brianhuntleya intrusa* recorded in that area, although these colonies are all well represented within natural areas on the neighbouring property towards the south. Furthermore all steep areas, hills and watercourses should be excluded from the development (Refer to Figure 12 – Recommended layout).

5.5 ALIEN VEGETATION COVER

Low densities of alien Port Jackson (*Acacia saligna*) are evident within sand fynbos areas that were subjected to previous sand mining (north of Area 1) and within the strip of land between the road and canal (Area 2).

5.6 BIODIVERSITY PROCESSES

The most significant biodiversity processes associated with the site relate to the presence of small watercourses (Section 5.1.2) and local connectivity amongst hills in the area. These drainage lines are important for delivering ecosystem services (water resource, natural drainage, animal movement and animal refuge areas).

- It is recommended that all watercourses be excluded from the development with adequate buffers as recommended by the Freshwater Assessment.

6. SENSITIVE / NO GO AREAS AND RECOMMENDED LAYOUT

6.1 BIODIVERSITY CONSTRAINTS

The most significant constraints associated with the surveyed areas include the following:

- Impact on 3 vulnerable plant species (*Euchaetis pungens*, *Astroloba rubriflora* and *Eriospermum bowieanum*)
- Impact on 2 Near Threatened plant species (*Brianhuntleya intrusa* and *Euphorbia nesemanii*)
- Small watercourses evident within Areas 4 and 5.

- Loss of natural vegetation within a Vulnerable ecosystem (Breede Sand Fynbos)

6.2 CONSIDERATION OF ALTERNATIVES

The entire property is 390 Ha in extent of which about 200 Ha (eastern portion) is currently developed (vineyards, dams, housing and agricultural infrastructure).

A total of approximately 120 Ha remaining natural areas on the property were investigated in this assessment with the objective to establish the most desirable cultivation areas from an agricultural and environmental perspective. This report highlights the most significant botanical/ecological constraints associated with the surveyed areas and should inform the development of alternative layout-plans in combination with the findings of the other Specialists Reports as well as considering steep slopes and non-arable areas currently included in Area 1.

6.3 RECOMMENDED LAYOUT

- It is recommended that the upper northern hill slopes of Area 1 as well as two pristine natural Breede Sand Fynbos patches amongst these hills be excluded from the development (Figure 12). This should preserve the largest densities of *Astroloba rubriflora*, *Brianhuntleya intrusa*, *Euchaetis pungens* and the small colony of *Eriospermum bowieanum* recorded on site as well as areas with a very high likelihood of containing these species. This layout will maintain natural connectivity amongst hills and other remaining natural features on the property.
- Furthermore it is most desirably that the western portion of Area 5 (Figure 12) be excluded from the development in order to preserve the large colony of *Euphorbia nesemanii* as well as high numbers of *Astroloba rubriflora* and *Brianhuntleya intrusa* recorded in that area, although these colonies are all well represented within natural areas on the neighbouring property towards the south.
- All hills and steep areas should be excluded from the development.
- It is recommended that all watercourses be excluded from the development with adequate buffers as recommended by the Freshwater Assessment.

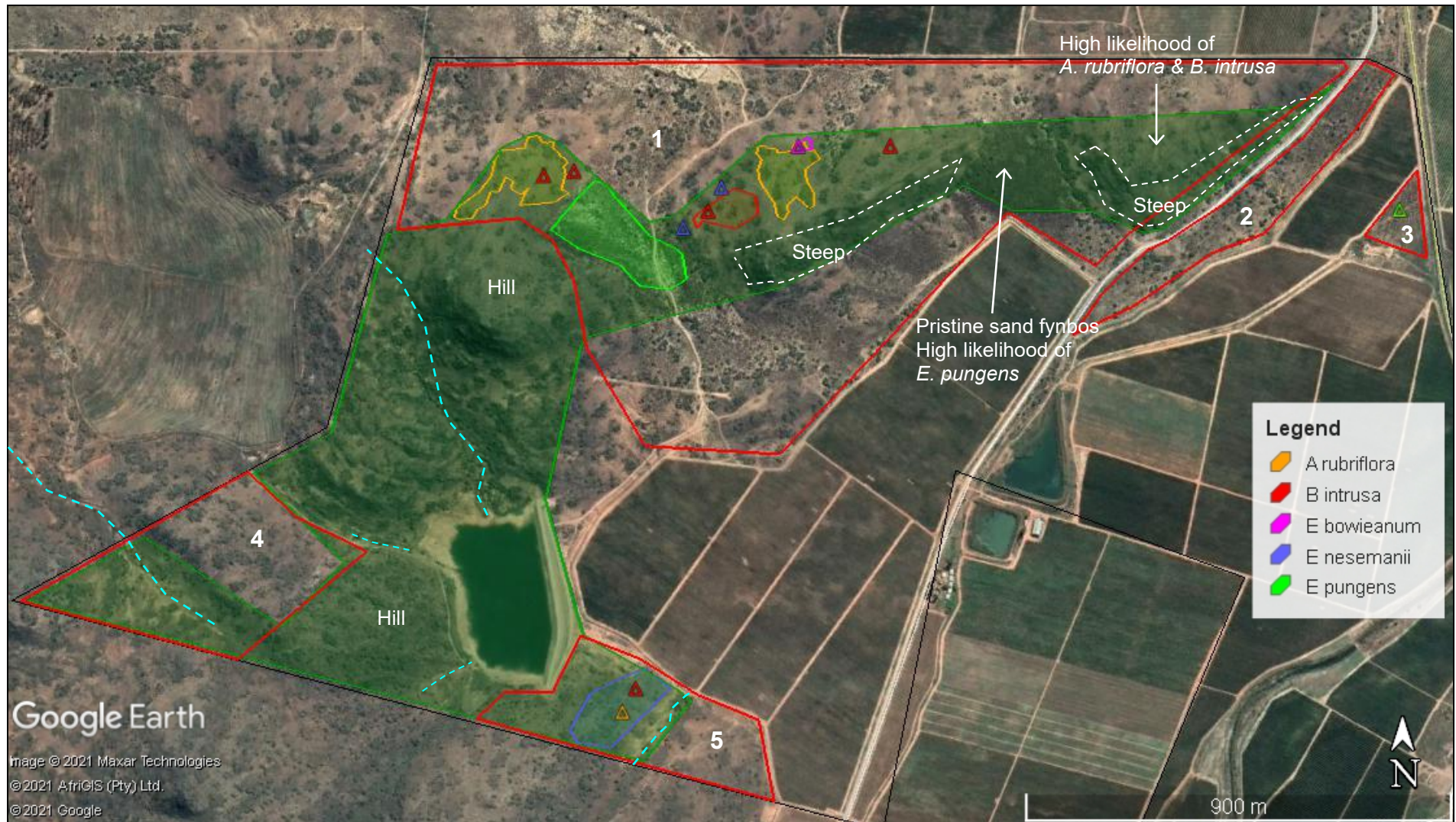


Figure 12. Aerial photograph showing the proposed No-Go areas (dark green shaded areas) and areas recommended for development (unshaded areas).

7. ASSESSMENT OF IMPACTS (TERRESTRIAL)

The most significant impacts on biodiversity associated with the proposed development include the following:

- Impact on 3 vulnerable plant species (*Euchaetis pungens*, *Astroloba rubriflora* and *Eriospermum bowieanum*)
- Impact on 2 Near Threatened plant species (*Brianhuntleya intrusa* and *Euphorbia nesemanii*)
- Small watercourses evident within Areas 4 and 5.
- Loss of natural vegetation within a Vulnerable ecosystem (Breede Sand Fynbos)

The recommended layout plan should significantly reduce impacts associated by the development.

- The recommended layout will exclude highest densities of plant species of conservational concern recorded on site as well as areas with the highest likelihood of containing colonies of these species.
- The layout will preserve a significant portion of pristine Breede Sand Fynbos on the farm.
- Natural connectivity will be maintained on the property. All hills and vegetation patches containing significant colonies of plant species of conservational concern will be well connected to each other and to other natural areas in the surrounding area.

A detailed Terrestrial Biodiversity Impact Assessment will be conducted as part of the EIA when alternative layout options for the cultivation areas are established. Such layout alternatives will be informed by the current report, Freshwater Specialist Report as well as soil potential etc.

The following Criteria, adapted from the DEA&DP Guidelines for involving Biodiversity Specialists in EIA Processes, 2005 and latest Basic Assessment Report template, will be used in the assessment of impacts:

Nature of the impact

This is an appraisal of the type of effect (positive or negative) the construction, operation and maintenance of a development would have on the affected environment. This description should include what is to be affected.

Extent of the impact

Extent defines the physical extent or spatial scale of the impact. The impact could:

- **Site specific:** limited to the site.
- **Local:** limited to the site and the immediate surrounding area (1-10km)
- **Regional:** covers an area that includes an entire geographic region or extends beyond one region to another.
- **National:** across national boundaries and may have national implications.

Duration of the impact

- **Short term:** 0-5 years.
- **Medium term:** 5-15 years.
- **Long term:** beyond the operational phase, but not permanently).
- **Permanent:** where mitigation either by natural processes or by human intervention will not occur in such a way or in such time span that the impact can be considered transient.

Consequence of Impact

Indicate how the activity will affect the environment.

Probability of occurrence

- **Improbable/unlikely:** low likelihood of the impact occurring.
- **Probable:** distinct possibility the impact will occur.
- **Highly probable:** most likely that the impact will occur.
- **Definite:** impact will occur regardless of any prevention measures.

Irreplaceable loss of resources

The degree to which resources will be irreplaceably lost due to the proposed activity. It can be **no loss of resources**, **marginal loss**, **significant loss** or **complete loss of resources**.

Reversibility

This refers to the degree to which an impact can be reversed.

- **Fully reversible:** where the impact can be completely reversed.
- **Partly reversible:** where the impact can be partially reversed.
- **Irreversible:** where the impact is permanent.

Indirect impacts

Indirect impacts are secondary impacts and usually occur at a different place or time.

Cumulative impact

An effect which in itself may not be significant but may become significant if added to other existing or potential impacts that may result from activities associated with the proposed development.

The cumulative effect can be:

- **Negligible:** the impact would result in negligible to no cumulative effect.
- **Low:** the impact would result in insignificant cumulative effects.
- **Medium:** the impact would result in minor cumulative effects.
- **High:** the impact would result in significant cumulative effects.

Degree to which impact can be avoided

The degree of avoidance can either be **high** (impact is completely avoidable), **moderate** (impact is avoidable with moderate mitigation), **low** (the impact is difficult to avoid and will require significant mitigation measures) or **unavoidable** (the impact is cannot be avoided even with significant mitigation measures).

Degree to which impact can be managed

This indicates the degree to which an impact can be managed over time. The degree of management can either be **high** (impact is completely manageable), **moderate** (impact is manageable with moderate mitigation), **low** (the impact is difficult to manage and will require significant mitigation measures) or **unmanageable** (the impact is cannot be managed even with significant mitigation measures).

Degree to which an impact can be mitigated

This indicates the degree to which an impact can be reduced. The degree of mitigation can either be **high** (the impact can be **fully** mitigated), **moderate** (the impact can be **partly mitigated**) or **not mitigated at all**.

Significance

Based on a synthesis of the information contained in the above-described procedure, the significance of the potential impacts can be assessed (prior and post mitigation) in terms of the following significance criteria:

- **No impact.**
- **Low negative:** where it would have negligible effects, and would require little or no mitigation.
- **Medium negative:** the impact will have moderate negative effects and will require moderate mitigation.
- **High negative:** the impact will have significant effects and will require significant mitigation measures to achieve an accepted level of impact.
- **Very high negative:** the impact will have highly significant effects and are unlikely to be able to be mitigated adequately.

8. PRELIMINARY MITIGATION

- The distribution ranges of the Vulnerable and Near Threatened plant species recorded on site should be avoided as far as possible.
- Natural connectivity between the hills within Area 1 and the hill and natural areas north of the dam should be maintained.
- No-Go areas should be clearly established and demarcated prior to the commencement of any vegetation clearance.
- A buffer as recommended by the Freshwater Specialist should be maintained between the disturbed footprint and all watercourses.
- Rocks and vegetation debris should not be dumped onto natural vegetation.
- Effective measure must be implemented to manage run-off and prevent soil erosion within the new cultivated areas.
- Effective measures should be implemented to prevent the establishment of alien plant species within remaining natural areas on the property.
- Any animals encountered during the land clearing activities should be left unharmed and allowed to safely move to adjacent natural areas. Where practical (e.g. tortoises), animals should be relocated to adjacent natural areas.

9. CONCLUSION

The most significant impacts on biodiversity associated with the proposed development include the following:

- Impact on 3 vulnerable plant species (*Euchaetis pungens*, *Astroloba rubriflora* and *Eriospermum bowieanum*)
- Impact on 2 Near Threatened plant species (*Brianhuntleya intrusa* and *Euphorbia nesemanii*)
- Small watercourses evident within Areas 4 and 5.
- Loss of natural vegetation within a Vulnerable ecosystem (Breede Sand Fynbos)

The recommended layout plan should significantly reduce impacts associated by the development.

- The recommended layout will exclude highest densities of plant species of conservational concern recorded on site as well as areas with the highest likelihood of containing colonies of these species.
- The layout will preserve a significant portion of pristine Breede Sand Fynbos on the farm.
- Natural connectivity will be maintained on the property. All hills and vegetation patches containing significant colonies of plant species of conservational concern will be well connected to each other and to other natural areas in the surrounding area.

A detailed Terrestrial Biodiversity Impact Assessment will be conducted as part of the EIA when alternative layout options for the cultivation areas are established. Such layout alternatives will be informed by the current report, Freshwater Specialist Report as well as soil potential etc.

10. 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, A (ed.). 2016. *Ecosystem Guidelines for Environmental Assessment in the Western Cape, Ed.2* Fynbos Forum, Fish Hoek, South Africa.
- CapeNature. 2017 WCBSP Langeberg [vector geospatial dataset] 2017. Available from the Biodiversity GIS website.
- DEA. 2011. Threatened Terrestrial Ecosystems in South Africa. *Government Gazette* Vol. 1002: No. 34809. National Printer, Pretoria.
- DEA 2014. National Environmental Management Act – EIA Regulations – App 6 of GN R982. Minimum requirements for specialist studies, as amended by GN 326 of April 2017.
- DEA 2020. National Environmental Management Act, 1998 (Act no. 107 of 1998): 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 [G 43110 – GN 320]
- Goldblatt, P. & Manning, J. 2000. Cape Plants, a conspectus of the Cape Flora of South Africa. Strelitzia 9. National Botanical Institute, Pretoria.
- Helme, N.A. 2006. *Eriospermum bowieanum* Baker. National Assessment: Red List of South African Plants version 2017.1.
- Helme, N.A. & Victor, J.E. 2006. *Euchaetis pungens* (Bartl. & H.L.Wendl.) I.Williams. National Assessment: Red List of South African Plants version 2014.1
- Helme, N.A., van Jaarsveld, E. & Raimondo, D. 2007. *Euphorbia nesemannii* R.A.Dyer. National Assessment: Red List of South African Plants version 2017.1.

- Helme, N.A. 2007. Botanical report: Fine scale vegetation mapping in the Upper Breede River Valley. Report for CapeNature, as part of the C.A.P.E. program.
- Jacobs, L.E.O., Koopman, R., Schutte-Vlok, A. & Forsyth, T. 2017. Plants and Vegetation. In: Turner, A.A.(ed.) Western Cape Province State of Biodiversity 2017. CapeNature, Scientific Services, Stellenbosch.
- Klak, C., Raimondo, D., Helme, N.A. & von Staden, L. 2012. *Brianhuntleya intrusa* (Kensit) Chess., S.A.Hammer & I.Oliv. National Assessment: Red List of South African Plants version 2013.1.
- Manning, J. 2007. Field Guide to Fynbos. Struik Publishers, Cape Town.
- Mucina, L. & Rutherford, M.C. (eds). 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria, and 2018 update on bgis.sanbi.org.
- Pool-Stanvliet, R., Duffell-Canham, A., Pence, G. & Smart, R. 2017. The Western Cape Biodiversity Spatial Plan Handbook. Stellenbosch: CapeNature.
- Raimondo, D. & Helme, N.A. 2008. *Astroloba rubriflora* (L.Bolus) Gideon F.Sm. & J.C.Manning. National Assessment: Red List of South African Plants version 2013.1.
- Raimondo, D., von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C., Kamundi, D.A. and Manyama, P.A. 2009. Red List of South African Plants. Strelitzia 25. South African National Biodiversity Institute, Pretoria.
- Rebelo, A. G., Boucher, C., Helme, N., Mucina, L., & Rutherford, M.C. 2006. Fynbos Biome. In: L. Mucina & M.C. Rutherford (eds). The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19: 194. South African National Biodiversity Institute, Pretoria.
- South African National Biodiversity Institute. 2018. Terrestrial ecosystem threat status and protection level - remaining extent [Vector] 2018. Biodiversity GIS website.
- Vlok, J. and Schutte-Vlok, A. 2010. Plants of the Klein Karoo. Umdaus Press, Hatfield, SA.

APPENDIX A - LOCATION OF CONTENT PRESCRIBED BY NEMA FOR SPECIALIST REPORTS: PROCEDURES FOR ASSESSMENT AND MINIMUM CRITERIA FOR REPORTING, GN 320 DATED 20 MARCH 2020

Table 1: Minimum Requirements for Terrestrial Biodiversity Specialist Assessment 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	Section / Page
2.3	The assessment must provide a baseline description of the site which includes, as a minimum, the following aspects:	Section 5
2.3.1	a description of the ecological drivers or processes of the system and how the proposed development will impact these	Section 5.6
2.3.2	ecological functioning and ecological processes (e.g. fire, migration, pollination, etc.) that operate within the preferred site;	Section 5.6
2.3.3	the ecological corridors that the proposed development would impede including migration and movement of flora and fauna;	Section 5.1.3
2.3.4	the description of any significant terrestrial landscape features (including rare or important flora- faunal associations, presence of strategic water source areas (SWSAs) or freshwater ecosystem priority area (FEPA) sub catchments;	Section 5.1
2.3.5	a description of terrestrial biodiversity and ecosystems on the preferred site, including: a) main vegetation types; b) threatened ecosystems, including listed ecosystems as well as locally important habitat types identified; c) ecological connectivity, habitat fragmentation, ecological processes and fine - scale habitats; and d) species, distribution, important habitats (e.g. feeding grounds, nesting sites, etc.) and movement patterns identified;	Section 5.2-5.4
2.3.6	the assessment must identify any alternative development footprints within the preferred site which would be of a low" sensitivity as identified by the screening tool and verified through the site sensitivity verification; and	Section 6.2
2.3.7	the assessment must be based on the results of a site inspection undertaken on the preferred site and must identify: 1. terrestrial critical biodiversity areas (CBAs), including: a) the reasons why an area has been identified as a CBA; b) an indication of whether or not the proposed development is consistent with maintaining the CBA in a natural or near natural state or in achieving the goal of rehabilitation; c) the impact on species composition and structure of vegetation with an indication of the extent of clearing activities in proportion to the remaining extent of the ecosystem type(s); d) the impact on ecosystem threat status; e) the impact on explicit subtypes in the vegetation; f) the impact on overall species and ecosystem diversity of the site; and g) the impact on any changes to threat status of populations of species of conservation concern in the CBA; 2. terrestrial ecological support areas (ESAs), including: a) the impact on the ecological processes that operate within or across the site; b) the extent the proposed development will impact on the functionality of the ESA; and c) loss of ecological connectivity (on site, and in relation to the broader landscape) due to the degradation and severing of ecological corridors or introducing barriers that impede migration and movement of flora and fauna; 3. protected areas as defined by the National Environmental Management: Protected Areas Act, 2004 including- a) an opinion on whether the proposed development aligns with the objectives or purpose of the protected area and the zoning as per the protected area	Section 5.1

	management plan; 4. priority areas for protected area expansion, including- a) the way in which the proposed development will compromise or contribute to the expansion of the protected area network; 5. SWSAs including: a) the impact(s) on the terrestrial habitat of a SWSA; and b) the impacts of the proposed development on the SWSA water quality and quantity (e.g. describing potential increased runoff leading to increased sediment load in water courses); 6. FEPA sub catchments, including- a) the impacts of the proposed development on habitat condition and species in the FEPA sub catchment; 7. indigenous forests, including: a) impact on the ecological integrity of the forest; and b) percentage of natural or near natural indigenous forest area lost and a statement on the implications in relation to the remaining areas.	
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Table 2: 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 Report Content requirement	Section / Page
3.1.1	contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	Page 3
3.1.2.	a signed statement of independence by the specialist;	Page 3
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 3 & 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 2, 3 & 7.1
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 6.
3.1.7.	additional environmental impacts expected from the proposed development;	Section 7.
3.1.8.	any direct, indirect and cumulative impacts of the proposed development;	
3.1.9.	the degree to which impacts and risks can be mitigated;	
3.1.10.	the degree to which the impacts and risks can be reversed;	
3.1.11.	the degree to which the impacts and risks can cause loss of irreplaceable resources;	
3.1.12.	proposed impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	Section 8
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;	Section 6.2
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 9
3.1.15.	any conditions to which this statement is subjected.	Section 8 & 9

APPENDIX B – SPECIES LIST

Annual herbs: <i>Cotula turbinata</i> (ganskos) <i>Crassula dichotoma</i> <i>Dorotheanthus bellidiformis</i> (bokbaaivygie) <i>Felicia namaquana</i> <i>Grielum humifusum</i> (pietsnot) <i>Helichrysum moeserianum</i> <i>Heliophila coronopifolia</i> (blousporrie) <i>Leypera tristis</i> (traanblommetjie) <i>Nemesia bicornis</i> (leeubekkie) <i>Oncosiphon piluliferum</i> (karoostinkkruid) <i>Ursinia anthemoides</i> (magriet) <i>Wahlenbergia capensis</i> Perrenial herbs: <i>Arctopus echinatus</i> (platdoring) <i>Arctotis incisa</i> (botterblom) <i>Euphorbia tuberosa</i> (melkbol) <i>Gazania rigida</i> (karoobotterblom) <i>Indigofera heterophylla</i> <i>Microlooma sagittatum</i> (bokhorinkies) <i>Pelargonium lobatum</i> (kaneelbol) <i>Pelargonium ovale</i> subsp. <i>ovale</i> (lepelblaarmalva) <i>Pelargonium senecioides</i> <i>Pelargonium trifidum</i> (maklikbreekmalva) <i>Rumex lativalvis</i> (veldsuring) <i>Syncarpha</i> sp. (sewejaartjie) <i>Ursinia pilifera</i> (fynkrueie) Shrubs: <i>Anginon swellendamensis</i> <i>Anthospermum aethiopica</i> <i>Anthospermum spathulatum</i> <i>Aspalathus pinguis</i> subsp. <i>pinguis</i> <i>Aspalathus spinosa</i> <i>Asparagus aethiopicus</i> <i>Calobota cytisoides</i> <i>Carissa haematocarpa</i> (noem-noem) <i>Chrysocoma ciliata</i> (bitterbossie) <i>Cullumia sulcata</i> <i>Dodonia angustifolia</i> (sandolien) <i>Elytropappus rhinocerotis</i> (renosterbos) <i>Eriocephalus africanus</i> (kapokbos) <i>Eryops rehmannii</i> (harpuisbos) <i>Euchaetis pungens</i> (VU) <i>Euclea undulata</i> (gwarriebos) <i>Felicia filifolia</i> (draaibos) <i>Galeneia africana</i> (kraalbos) <i>Galenia cymosa</i> <i>Helichrysum dasyanthum</i> <i>Helichrysum revolutum</i> <i>Helichrysum teretifolium</i> <i>Hermannia althaeifolia</i> <i>Hermannia cuneifolia</i> <i>Hermannia trifurcata</i> (broodbos) <i>Hirpicium integrifolium</i> (haarbossie) <i>Leucadendron salignum</i> (tolbos) <i>Leysera gnaphalodes</i> (teringteebos)	<i>Lycium oxycarpum</i> (wolwedoring) <i>Metalasia densa</i> (blombos) <i>Muraltia spinosa</i> (skilpadbessie) <i>Oedera genistifolia</i> (kleinperdekaroo) <i>Oedera squarrosa</i> (vierkantperdekaroo) <i>Osteospermum scariosum</i> (skaapbos) <i>Othonna ramulosa</i> <i>Pentzia incana</i> (ankerkaroo) <i>Polygala microlopha</i> <i>Pteronia fasciculata</i> (paraffienbos) <i>Pteronia incana</i> (asbossie) <i>Pteronia paniculata</i> (gombossie) <i>Searsia pallens</i> (bleekkoeniebos) <i>Tetragonia fruticosa</i> (kinkelbossie) <i>Vachellia karroo</i> (doringboom) <i>Wiborgia mucronata</i> (groot-wolfdoring) <i>Wiborgia obcordata</i> <i>Zygophyllum morgzana</i> (slaaibos) Succulent herbs/shrublets: <i>Aloe microstigma</i> <i>Andromiscus filicaulis</i> <i>Astroloba rubriflora</i> (VU) <i>Brianhuntleya intrusa</i> (NT) <i>Euphorbia nesemanii</i> (NT) <i>Cotyledon orbiculata</i> (plakkie) <i>Crassula atropurpurea</i> <i>Crassula capitella</i> <i>Crassula cotyledonis</i> (bergplakkie) <i>Crassula muscosa</i> (skoenveterbos) <i>Crassula rupestris</i> (sosatiebos) <i>Crassula subaphylla</i> <i>Haworthia pumila</i> (vratjiesaalwyn) <i>Othonna filicaulis</i> (bobbejaankoolklomp) <i>Prenia pallens</i> (kruipvygie) <i>Senecio radicans</i> (kraaltjies) <i>Tylecodon paniculatus</i> (botterboom) Succulent shrubs: <i>Carpobrotus edulis</i> (suurvy) <i>Conocosia pugioniformis</i> (groot vetkousie) <i>Drosanthemum speciosum</i> (rooi vygie) <i>Euphorbia burmannii</i> (steenbokmelkbos) <i>Euphorbia mauritanica</i> (geelmelkbos) <i>Lampranthus haworthii</i> (persvygie) <i>Mesembryanthemum longistylum</i> <i>Pelargonium carnosum</i> (vetplantmalva) <i>Ruschia caroli</i> <i>Ruschia multiflora</i> (kraalvygie) <i>Ruschiella henricii</i> <i>Senecio sarcoides</i> (soetkop dikblaar)
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Geophytes: <i>Albuca canadensis</i> (wittamarak) <i>Albuca cooperi</i> <i>Albuca glandulosa</i> (taaitamarak) <i>Albuca longipes</i> <i>Babiana tubiflora</i> <i>Brunsvigia orientalis</i> (koningskandelaar) <i>Bulbine frutescens</i> <i>Bilbine praemorsa</i> <i>Bulbine mesembryanthemoides</i> (waterglasie) <i>Cyanella hyacinthoides</i> (blouraaptol) <i>Eriospermum bowieanum</i> (VU) <i>Eriospermum capense subsp. capense</i> <i>Eriospermum lanceifolium</i> <i>Ferraria divaricata</i> (spinnepkopblom) <i>Lapeirousia anceps</i> <i>Lapeirousia pyramidalis</i> (naeltjie) <i>Massonia depressa</i> (bobbejaanboek) <i>Moraea miniata</i> (tulp) <i>Moraea polyanthos</i> (bloutulp) <i>Ornithogalum dubium</i> (chinchierinchee) <i>Ornithoglossum vulgare</i> (slangkop) <i>Oxalis convexula</i> <i>Oxalis flava</i> <i>Trachyandra falcata</i> (veldkool) <i>Trachyandra muricata</i> <i>Trachyandra revoluta</i> <i>Tritonia pallida subsp. pallida</i> (katjietee)	Graminoids and restios: <i>Aristida diffusa</i> (koperdraadgras) <i>Cynodon dactylon</i> (kweek) <i>Ehrharta calycina</i> (rooisaadgras) <i>Eragrostis curvula</i> (oulandsgras) <i>Ficinia</i> sp. <i>Ischyrolepis gaudichaudiana</i> <i>Pentaschistis pallida</i> <i>Thamnochortus</i> sp. <i>Tribolium hispidum</i> <i>Willdenowia incurvata</i> (besembos/sonkwasriet)
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