Botanical Impact Assessment, Erf 3122 Mossel Bay (Hartenbos Hills Garden Estate), Mossel Bay Municipality Western Cape Province

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National Legislation and Regulations governing this report

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

Appointment of Specialist

David J. McDonald of Bergwind Botanical Surveys & Tours CC was appointed by Cape EAPrac to provide specialist botanical consulting services for the proposed development of Erf 3122, Mossel Bay (Hartenbos Hills Garden Estate), Western Cape Province. The consulting services comprise a study of the vegetation to determine botanical 'Red Flags' and to provide a constraints analysis, scoping assessment and finally an impact assessment in terms of the flora and vegetation.

Details of Specialist

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Expertise

Dr David J. McDonald:

- Qualifications: BSc. Hons. (Botany), MSc (Botany) and PhD (Botany)
- Botanical ecologist with over 40 years' experience in the field of Vegetation Science
- Founded Bergwind Botanical Surveys & Tours CC in 2006
- Has conducted over 400 specialist botanical / ecological studies
- Has published numerous scientific papers and attended numerous conferences both nationally and internationally (details available on request)

Conditions relating to this report

The content of this report is based on the author's best scientific and professional knowledge as well as available information. Bergwind Botanical Surveys & Tours CC, its staff, and appointed associates, reserve the right to modify the report in any way deemed fit should new, relevant, or previously unavailable or undisclosed information become known to the author from on-going research or further work in this field, or pertaining to this investigation.

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Declaration of Independence:

The views expressed in the document are the objective, independent views of Dr McDonald and the survey was carried out under the aegis of, Bergwind Botanical Surveys and Tours CC. Neither Dr McDonald nor Bergwind Botanical Surveys and Tours CC have any business, personal, financial or other interest in the proposed development apart from fair remuneration for the work performed.

I David Jury McDonald, as the appointed Specialist hereby declare/affirm the correctness of the information provided or to be provided as part of the application, and that I:

- in terms of the general requirement to be independent:
  - other than fair remuneration for work performed in terms of this application, have no business, financial, personal or other interest in the development proposal or application and that there are no circumstances that may compromise my objectivity;
- in terms of the remainder of the general requirements for a specialist, have throughout this EIA process met all of the requirements;
- have disclosed to the applicant, the EAP, the Review EAP (if applicable), the Department and I&APs all material information that has or may have the potential to influence the decision of the Department or the objectivity of any report, plan or document prepared or to be prepared as part of the application; and
- am aware that a false declaration is an offence in terms of Regulation 48 of the EIA Regulations, 2014 (as amended).

Signature of the specialist:
Company: Bergwind Botanical Surveys & Tours CC Date: 16 January 2023

Curriculum Vitae: Appendix 3.

CONTENTS

1. Introduction

Since prior to 2006 there have been plans to develop Erf 3122, Mossel Bay at Hartenbos. Initially, it was the intention of ATKV Sake (Pty) Ltd that was the applicant for Environmental Authorisation to develops the property that was called Hartenbos Heuwels. Bergwind Botanical Surveys & Tours CC (Bergwind) [Dr D.J. McDonald] has been involved with botanical scoping studies and constraints analysis almost from the outset. The project has been transferred to new owners, Hartenbos Hills Propco (Pty) Ltd (HH Propco) and the project name has been changed to Hartenbos Hills garden Estate. CapeEAPrac has been and continues to be the environmental consultant company responsible for the environmental compliance applications.

The botanical studies that have been concluded are: McDonald 2006; Helme 2016; McDonald, 2018.

Now that many iterations of proposed development layouts and constraints have been considered, Bergwind Botanical Surveys & Tours CC has once again been appointed to carry out the final phase of the assessment process, namely the botanical impact assessment and the terrestrial biodiversity impact assessment (a separate report).

This botanical impact assessment takes careful note of the requirements and recommendations of CapeNature and the Botanical Society of South Africa for proactive assessment of the biodiversity of proposed development sites and follows published guidelines for evaluating potential impacts on the natural vegetation in an area earmarked for some form of development (Brownlie 2005, Cadman *et al.* 2016). The requirements and recommendations of CapeNature for assessment of biodiversity of proposed development sites have also been considered and the 2020 Species Environmental Assessment Best Practice Guideline and protocols for terrestrial biodiversity specialists (Government Gazette, 2020; Enviro Insight, 2020) have been applied.

2. Terms of Reference

- Consider the existing botanical reports that were used to inform the development of a layout that would accommodate the identified constraints ;
- Conduct a botanical impact assessment of the proposed Hartenbos Hills Garden Estate development that take the following into consideration:
    1. Sensitive habitats and / or plant communities;
    2. Any plant species of conservation concern (SCC);
    3. Relevant environmental regulations / policies / plans stipulated by the Department of Environmental Affairs and CapeNature in terms of, amongst others, the National

Environmental Management Act (NEMA) and the National Environmental Management Biodiversity Act (NEMBA);

4. Comments from Cape Nature.

3. Location and Physiography

Erf 3122, Mossel Bay is located on the moderate elevation inland hills to the west and above Hartenbos, near Mossel Bay, on the Garden Route of the Southern Cape coast, Garden Route District Municipality, Western Cape Province (Figure 1). It lies west of the N2 national road through Hartenbos, immediately west of the existing Hartenbos Heuwels and to the southwest of the R328 road between Hartenbos and Oudtshoorn.

Figure 1. Locality of Erf 3122 Mossel Bay

Erf 3122, Mossel Bay, is approximately 310 ha in extent and is presently zoned for agriculture but it has not been used for agriculture for some time. The proposed development would take up approximately 50 ha of the erf, situated mainly on the high-lying plateau.

There are two points of access to the site. One is situated at the gate on the southeast side (S 34° 07' 41.4" E 22° 05' 41.4"; elevation 99 m a.m.s.l.) and the second is from the R328 road on the north side of the property at S 34° 06 50.1 E 22° 04' 57.9. The southern access point was used for this study and would be used as the official entrance to the envisaged development.

3.2 Topography

Erf 3122 Mossel Bay, has a central plateau area that is fairly flat and has an average elevation of 120 m a.m.s.l. To the south, the plateau drops away as uniform slopes with a moderate gradient to the southern boundary near the railway line. On the southeast to northeast side the landscape is dissected by some valleys that are not very deep but do have slopes with distinctly north- and south-facing aspects. The elevation in the valleys is around 60 m a.m.s.l. so the difference in altitude between the deepest valley floor and the central plateau is approximately 60 m. The Hartenbos water reservoir is situated at the highest point on the property at 139.6 m a.m.s.l. The slopes north of the reservoir, with a northerly aspect, are moderately steep, dropping evenly to the northern boundary of the property near the R328. The western slopes drop away from the central plateau also with a moderate gradient, and also have a series of valleys that drain to the west into a stream which eventually flows into the Hartenbos River.

The exposure of the central plateau is uniform but the slopes and valleys that drain from the central plateau to the east, north and west result in some complexity to the topography. Together with the variability of the soils the complexity of the topography produces a terrain with a variety of habitats and microclimates to which the vegetation responds. Watercourses and limited 'wetlands' occur mainly on the south-facing slopes.

A series of gravel roads and tracks that are aligned mainly on the central plateau and along the ridges and crests above the valleys link the different parts of the area and provide ready access to them. Some of the tracks have been constructed to provide access for the maintenance of the high voltage power line that traverses the property from south to north close to the eastern boundary. The roads and tracks are in good condition and there is no evidence of erosion resulting from them.

3.3 Geology

Erf 3122, Mossel Bay lies on sediments of the Kirkwood Formation, Uitenhage Group. These sediments consisting of variegated mudstone, lithic sandstone and sporadic conglomerates were deposited under fluvial conditions at or near the sea. The Kirkwood Formation lies above the Enon Formation that consists of silty mudstones interspersed with rounded cobbles of quartz and gravels that were deposited by rivers into a marine environment on the coastline during the Cretaceous (Figure 4) (Norman & Whitfield 2006). The geology over the whole of the study area is fairly uniform and erosion through the gravely conglomerates has resulted in the valleys that are seen in the area today.

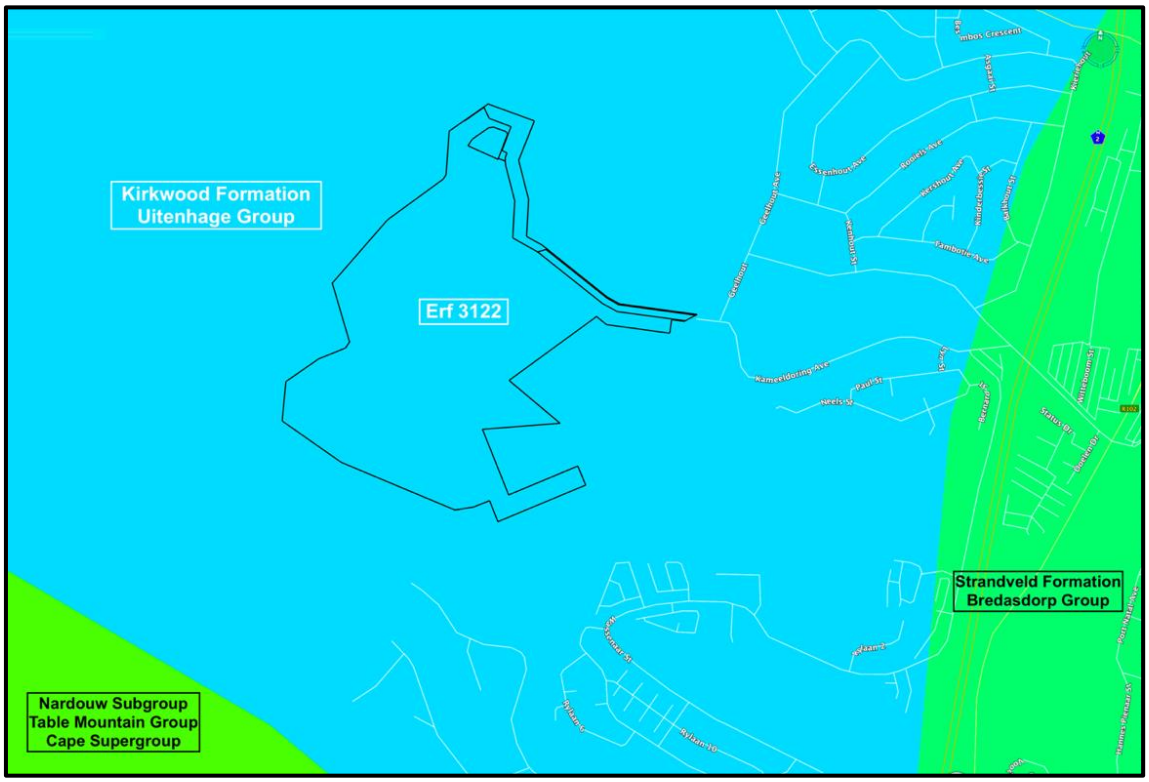


Figure 2. Erf 3122, Mossel Bay is underlain entirely by sediments of the Uitenhage Group, Kirkwood Formation.

3.4 Climate

Hartenbos Garden Estate has a climate transitional between the Mediterranean-type climate of the far Western Cape Province and the zone of all-year-round rainfall along the Garden Route. The climate is similar to that of nearby Mossel Bay. The average annual rainfall is 425--460 mm *per annum*. The distribution of rainfall shows a tendency towards being bimodal with peaks in April and August. Average temperatures do not range widely with the June, July and August being the coolest

months (daily minimum ± 0° C, daily maximum ± 7° C) and December and January the hottest (daily minimum ± 16° C, daily maximum ± 27° C) (Figures 3a & 3b).

Average temperature and precipitation: Hartenbos

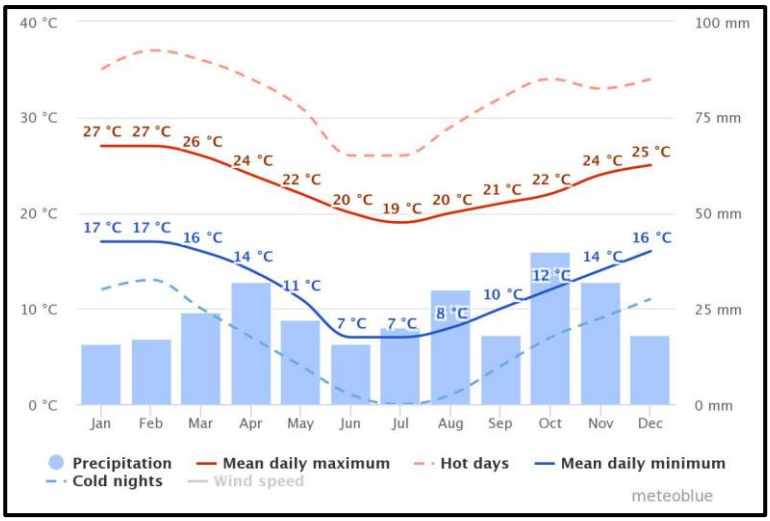


Figure 3a. Average temperature (°C) and average rainfall (mm) for Hartenbos.

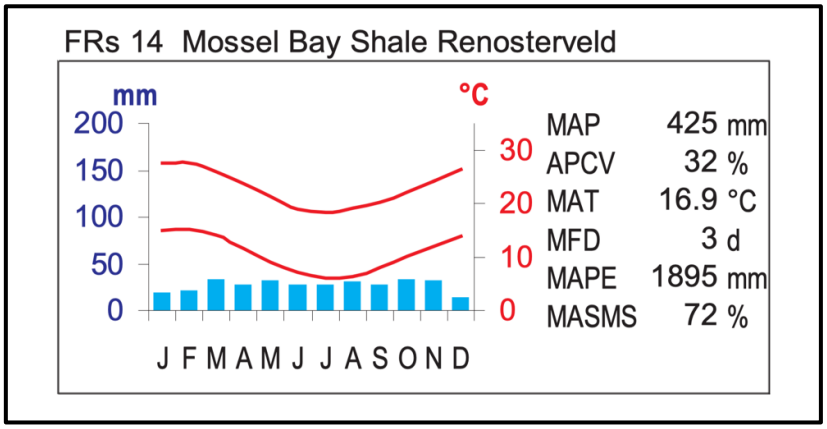


Figure 3b. Climate diagram of Mossel Bay Shale Renosterveld. Blue bars show the median monthly precipitation. The upper and lower red lines show the mean daily maximum and minimum temperature respectively. MAP: Mean Annual Precipitation; APCV: Annual Precipitation Coefficient of Variation; MAT: Mean Annual Temperature; MFD: Mean Frost Days (days when screen temperature was below 0°C); MAPE: Mean Annual Potential Evaporation; MASMS: Mean Annual Soil Moisture Stress (% of days when evaporative demand was more than double the soil moisture supply) (Rebelo *et al.* 2006 in Mucina & Rutherford, 2006).

4. Methods

Erf 3122 was first visited and surveyed in **December 2006**. At that time there was an ambitious scheme to develop more than only Erf 3122 so the survey included areas to the **northeast of the municipal reservoir** as well, **outside the boundaries of Erf 3122**. Later, the proposed development was restricted to Erf 3122 and so for the purposes of the scoping study, Erf 3122 Mossel Bay was **re-visited for two days on 24 and 25 August 2017.**

Since the Specialist Protocols came out in October 2020, given the time lapse since the previous site inspections, as well as the wild fire that came through the site in 2018, a **third site inspection** was undertaken on **23 September 2022** and records again collected at the 19 sample waypoints (see Figure 5). The records included of lists of plant species, descriptions of the physiognomy of the respective waypoint sites, photographs of the sites as well as any specific plant species that were of importance.

For the 2006 study (McDonald, 2006), colour aerial photography and Google Earth ™ satellite imagery was used to **interpret the distribution of plant communities**. This method was **repeated in 2017/2022** when a sequence of satellite images was available which showed changes in the vegetation of the site over time.

One of the important revelations that was not noted in 2006 and that could be determined from the 2011 satellite image (after a fire had burnt the site) was the historical ploughing of the site (Figure 5). This agriculture has had long-lasting effects on the vegetation.

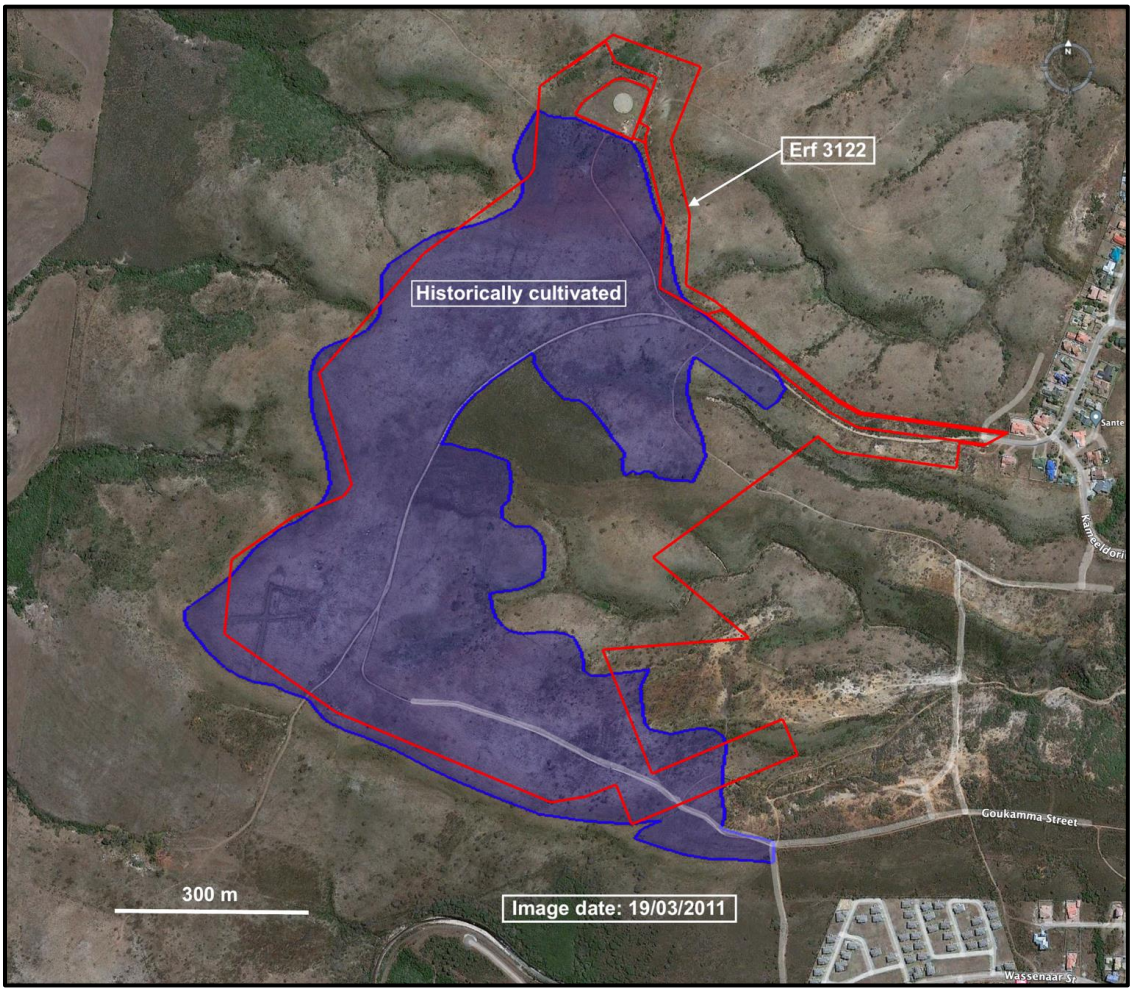


Figure 4. Aerial image of Erf 3122, Mossel Bay (Hartenbos Garden Estate) (red boundary). The image was taken in March 2011 and shows the areas of the property that were historically ploughed (blue shading).

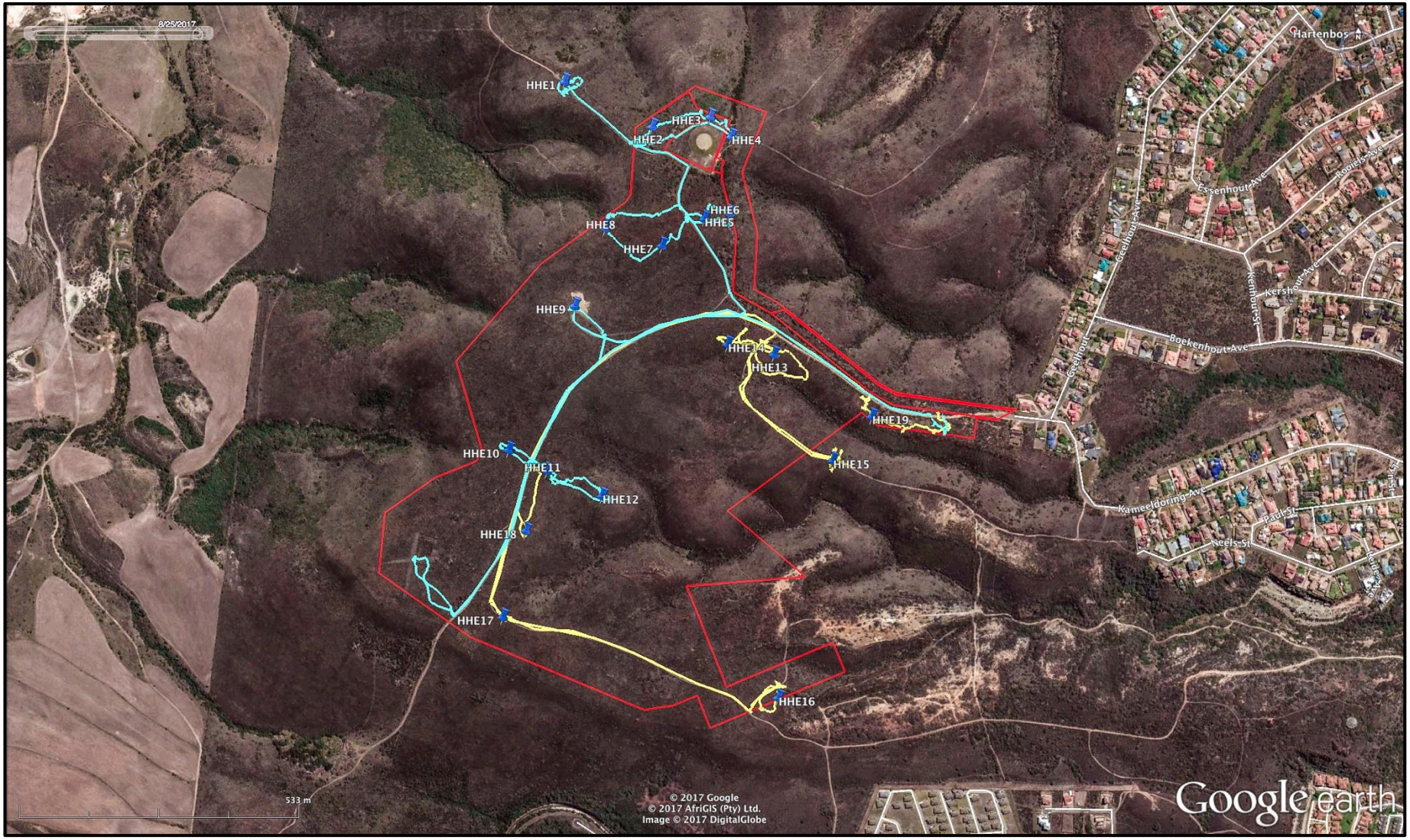


Figure 5. Aerial image of Erf 3122, Mossel Bay (Hartenbos Garden Estate) (red boundary) with sample track (light blue: 24 /08/2017; yellow: 25/08/2017) and waypoints HHE#. The aerial image was taken in March 2017.

5. The Vegetation

According to the national vegetation classification published in 2005 (Mucina, Rutherford & Powrie 2005) the vegetation occurring inland of the coast at Hartenbos is Groot Brak Dune Strandveld. This broad classification was not accurate and was subsequently corrected to Mossel Bay Shale Renosterveld (SANBI, 2018) (Figure 6). From field-observations this classification appears to be inadequate to describe the variation in the vegetation of Erf 3122, Mossel Bay, despite it being more accurate than the 2005 classification. Low & Rebelo (1996) refer to the vegetation as South Coast Renosterveld, which would be more in keeping with what was found on Erf 3122, Mossel. These authors point out that the major difference between South Coast Renosterveld and other renosterveld vegetation types is the high proportion of grasses. Cowling *et al*. (1999), refer to this vegetation as Riversdale Coast Renosterveld which was adopted by C.A.P.E. (Cape Action for People and the Environment) for fine-scale planning. Cowling & Heijnis (2001) referred to Coastal Renosterveld as forming part of the Fynbos/Renosterveld Mosaic. A more detailed local classification could be made based on the type of substrate and the topography of the land units but what is critical is that at a broad scale the vegetation is renosterveld, not strandveld.

In the work of Vlok *&* de Villiers (2007) for the Gouritz Initiative project, the vegetation from the Breede River to the Groot Brak River was surveyed and the vegetation at Erf 3122, Mossel Bay was included in the unit *PetroSa Fynbos / Renosterveld Mosaic*, and more specifically mainly in Herbertsdale Renoster Thicket (Figure 7a). The investigation at Erf 3122, Mossel Bay in 2017 indicates that the vegetation found on Erf 3122 fits well with the definition of this mosaic vegetation type. However, Helme (2016) pointed out that Erf 3122 actually lies within the unit Brandwag Fynbos – Renoster Thicket, delimited by Vlok & De Villiers (2007) according to the map extracted from Helme's (2016) report (Figure 7b).

Although there may be some confusion about the naming of the vegetation unit concerned, in essence all the more recent classifications recognize this unit as predominantly renosterveld in a mosaic with fynbos communities.

The renosterveld at Erf 3122, Mossel Bay, occurs on the warmer, drier north- and west-facing slopes and the plateau whereas on the cooler and moister, south- and south-east-facing slopes fynbos communities are found. On the mesic north- to north-east-facing slopes there are also remnant stands of very dense and thorny scrub that Acocks (1988) described as part of 'Coastal Renosterveld' but related to the Gouritz River Scrub.

For purposes of this project the vegetation units recognized follow those of Vlok & de Villiers (2007) but with the distinction that there is grassy fynbos akin to that of North Langeberg Sandstone Fynbos on the

south-facing slopes. The latter vegetation is more sensitive than the renosterveld, which at Erf 3122, Mossel Bay, is largely secondary, due to the historical cultivation. Renosterbos (*Dicerothamnus rhinocerotis*, formerly *Elytropappus rhinocerotis*), strongly colonizes disturbed substrates, particularly shale substrates, once they have been disturbed e.g., by ploughing. The result is that what is now mostly seen at Erf 3122, Mossel Bay is secondary vegetation (renosterveld) where D. rhinocerotis is the dominant shrub and the plant community is not diverse since many of the other plant species were lost due to the historical ploughing and have not returned.

Details of the vegetation found at the waypoints in the re-survey of the site in August 2017 are given in Table 1.

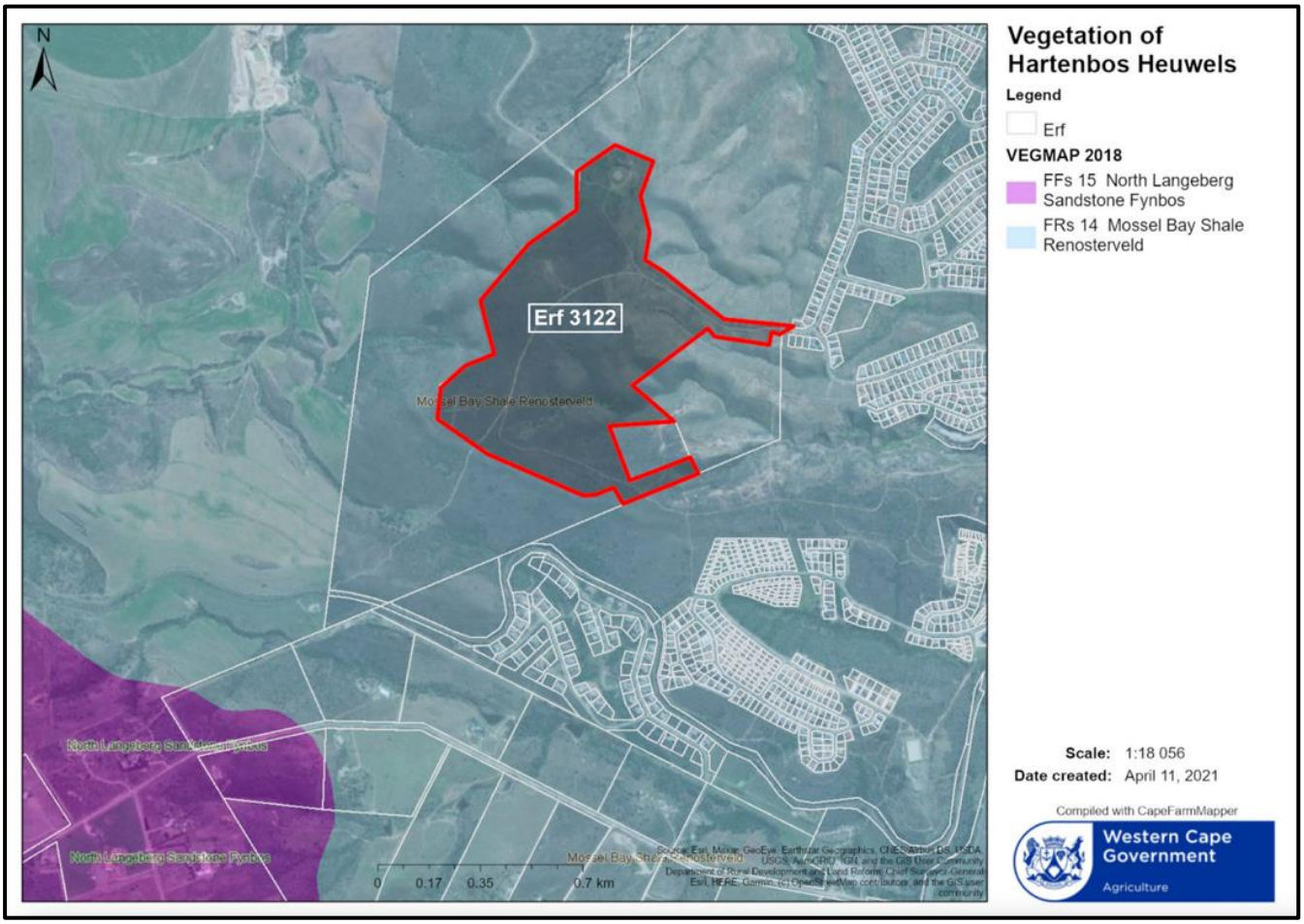


Figure 6. Portion of the Vegetation Map of South Africa, Lesotho & Swaziland (SANBI, 2018) overlaid on aerial imagery using Cape Farm Mapper. It shows that according to this classification, Erf 3122, Mossel Bay (red outline) is in Mossel Bay Shale Renosterveld.

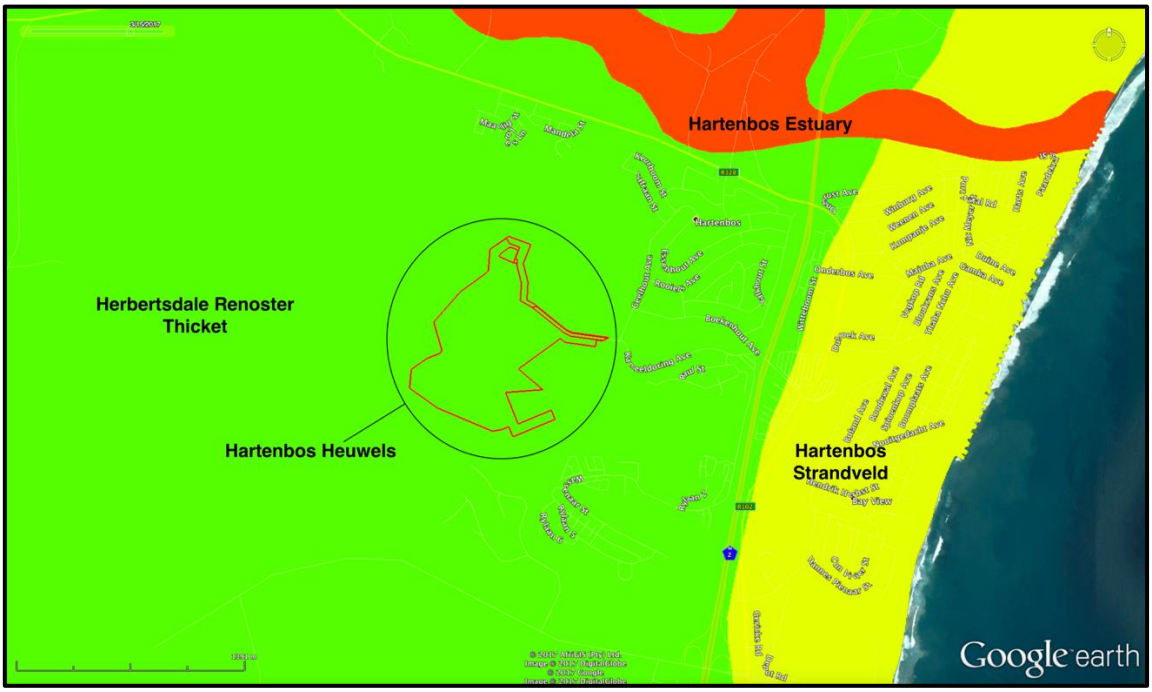


Figure 7a. Portion of the fine-scale map for the Gouritz Initiative (Vlok) showing that Erf 3122, Mossel Bay (red outline) is located in Herbertsdale Renoster Thicket.

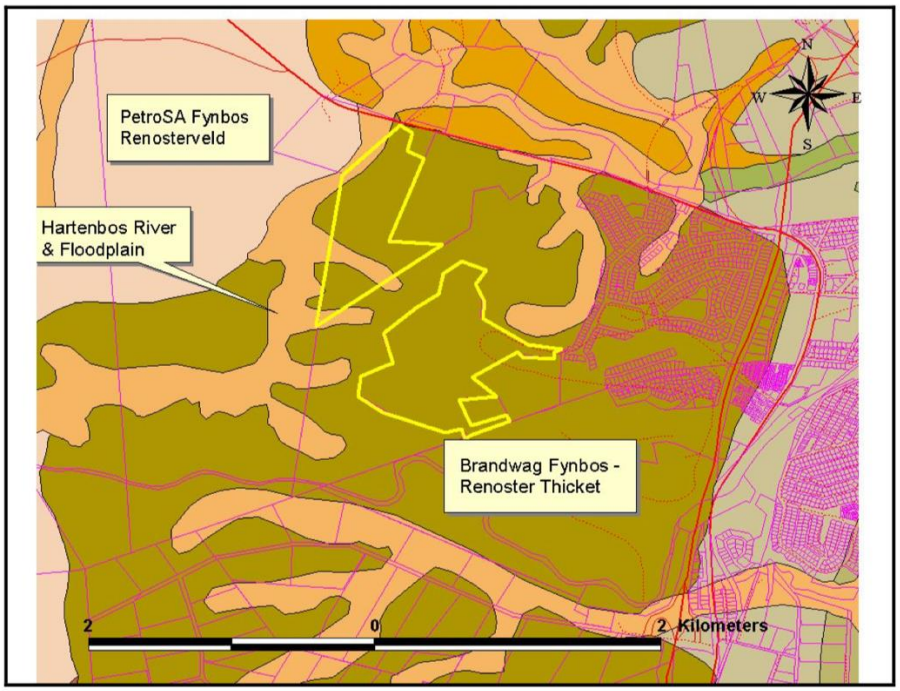


Figure 4: Extract of the Fine Scale Vegetation Map for the Riversdale Plain (Vlok & de Villiers 2007), showing the two Helme (2012) study area properties (yellow outline). Brandwag Fynbos Renoster Thicket is the primary vegetation type within the study areas, and the only vegetation unit in the proposed development area here assessed.

Figure 7b. The map referred to by Helme (2016: Figure 4) indicating that Erf 3122, Mossel Bay lies in a vegetation unit described by Vlok & De Villiers (2007) as Brandwag Fynbos – Renoster Thicket.

5.1 Renosterveld

5.1.1 Renosterveld on the central plateau and warm, dry west- and north-facing slopes

Renosterveld is the dominant vegetation type on Erf 3122, Mossel Bay (Hartenbos Hills Garden Estate). It is found on the central plateau and on the warm, dry westerly and northerly slopes. The soils are gravelly and have a clay-rich matrix. This vegetation type has a grey appearance due to the colour of the dominant shrub species, *Elytropappus rhinocerotis*, the renosterbos. Shrubs of this species are from 1—1.5 m tall and generally, but not always, form a mid-dense to dense canopy over other lower shrubs. The cover of renosterbos is from 80 – 90 % with other shrubs forming a much lower proportion of the cover. Low & Rebelo (1996) describe the physiognomy of South Coast Renosterveld as 'open to mid-dense, cupressoid and small-leaved, low to mid-high shrubland, with emergents generally absent' and the renosterveld vegetation at Hartenbos fits this description well.

The understorey of the renosterveld can range from being a sparse covering of low shrubs, forbs and grasses to a dense grassy sward with some shrublets and forbs. The pattern in the renosterveld at Erf 3122 is that dominance can change and renosterbos can be completely absent in which case grasses, particularly *Hyparrhenia hirta* (Figure 25), dominate. This results in either a patchy mosaic of small grass-dominated patches within larger renosterbos-dominated stands of vegetation or the opposite where grasses dominate over wide areas with renosterbos either absent completely or occurring in varying density but usually sparsely.

Renosterveld, wherever it occurs, is well-known for its diversity of species and the renosterveld when the author surveyed Erf 3122, Mossel Bay in 2006, it was found that there was a fair species richness in the renosterveld. An exhaustive species list was not compiled for the renosterveld at Erf 3122 but genera and species that were found to occur include, *Asparagus africanus*, *Asparagus* cf. *falcatus*, *Berkheya* sp., *Boophone disticha*, *Brachiaria serrata*, *Bulbine* sp., *Carissa bispinosa*, *Carpobrotus acinaciformis*, , *Chrysocoma ciliolata*, *Commelina africana*, *Cynanchum viminale, Dianthus caespitosus*, *Digitaria eriantha*, *E. rhinocerotis, Ehrharta* sp., *Eragrostis curvula*, *Eriocephalus africana, Euclea undulata*, *Glottiphyllum depressum*, *Gnidia* cf. *polystachya*, *Hermannia flammea, Hibiscus sp., Indigofera* sp., *Jamesbrittennia argentea*, *Lobelia* sp., *Merxmuellera stricta*, *Ornithogalum dubium*, *Osteospermum moniliferum, Polygala myrtifolia*, *Pteronia* spp., *Rhus glauca*, *Ruschia* cf. *hamata*, *Selago* spp., *Tephrosia* sp., *Themeda triandra*, *Ursinia* cf. *nudicaulis* and species in the Acanthaceae (cf. *Blepharis* sp.).

One misinterpretation of McDonald (2006) was that the lack of geophytes found in the 2006 survey was attributed to season. Subsequently it was realized that the lack of geophytes is more likely due to a large area of the central plateau having been cultivated and the geophytic flora lost (see above).

The grassveld encountered at Hartenbos Hills Garden Estate is considered to be a 'sub-community' of the renosterveld. Species composition of the grassveld is very similar to that of the renosterveld proper except that there is a dominance of grasses, especially *Hyparrhenia hirta.* The grassveld has a different signature on aerial photographs and is clearly distinguishable in the field from the true renosterveld. The grassveld tends to occur on well-drained north-facing and some west-facing slopes where it occurs as pure stands over fairly large areas as opposed to the renosterveld which has its best expression on the relatively flat table-land or plateau. As described above the grassveld can also be in a patchy mosaic with renosterveld. This is particularly so when the renosterveld has been disturbed and the renosterbos is removed either mechanically, such as alongside roads or by fire. Grasses aggressively colonize these gaps in the renosterveld. Additional species found in the grassveld that were not noted by McDonald (2006) in the renosterveld include *Albuca* sp., *Aristida junciformis*, *Aspalathus* spp., *Berkheya armata*, *Brunsvigia* sp. (cf. *orientalis*), *Crassula* sp. (2), *Ehrharta scabra*, *Eragrostis capensis*, *Pentaschistis eriostoma*, *Senecio* sp. (succulent leaves).

5.2 Scrub thicket

Both Acocks (1988) and Low & Rebelo (1996) recognized the incidence of thicket patches within the renosterveld. Acocks judged that these thickets were probably relics of a once more widespread vegetation type whereas Low & Rebelo suggested that thicket occurs where the relief is greater, rainfall is low and fire cannot spread easily into these protected microhabitats.

The thicket vegetation is dense, thorny and impenetrable and at Erf 3122 Mossel Bay (Hartenbos Hills Garden Estate) the thicket community includes species such as, *Aloe ferox*, *Bulbine* sp., *Carissa bispinosa* (Num num), *Crassula* sp. *Cussonia spicata* (Cabbage tree), *Cynanchum viminale, Diospyros lycioides*, *Gymnosporia buxifolia* (Common spike-thorn), *Olea europaea* subsp. *africana* (Wild Olive), *Rhus lucida*, *Schotia afra* (Boerboon), *Sideroxylon inerme* (Milkwood).

5.3 Fynbos on the cool, south-facing slopes

In contrast to the renosterveld on the dry slopes, the cooler south-facing slopes, that are probably also moister, support fynbos vegetation. Even though certain elements of fynbos such as some

restios (Restionaceae) and *Bobartia robusta* (Iridaceae) occur in the renosterveld, the clue to the presence of true fynbos communities is the presence of Ericaceae, Restionaceae and Proteaceae growing together. The substrate is similar to that on which the renosterveld is found; the surface of the soil is covered (80%) with round pebbles of varying sizes (10 mm – 200 mm) but is probably gravellier, with a lower clay fraction, than where renosterveld is found. This, however, was not confirmed. The fynbos community has a cover of 80% with two layers and emergent shrubs up to 2 m. *Erica hispidula* is dominant in the upper stratum, <1 m high, with a cover of 60 %. The lower stratum < 50 cm high is graminoid and dominated by grasses and restios. Depending on the location, emergent shrubs such as *Leucadendron salignum*, *Protea lanceolata* and *Erica discolor* var. *speciosa* have variable cover. *L. salignum* and *E. discolor* var. *speciosa* generally have a low cover whereas *P. lanceolata* can form dense stands of a large number of individuals. Another striking aspect of the fynbos vegetation is the occurrence of a large number of plants of *Bobartia robusta* (Iridaceae) which have a relatively low cover but high abundance and are very obvious in the overall appearance of the fynbos in this area.

The bright red geophyte, *Tritoniopsis antholyza*, was in flower at the time of sampling in December 2006. At that time, it was abundant, and from the evidence of porcupine digging it was concluded that the corms are obviously much sought after by these animals. No other geophytes were found while searching through the fynbos and this was most likely because the season was well advanced into summer as opposed to possible historical ploughing as in the renosterveld.

The most important aspect of the fynbos vegetation is the occurrence of *Protea lanceolata* (Lance-leaved Protea). According to Rebelo (1995) this species occurs on Potberg (De Hoop) and the Riversdale Flats and at the fynbos / thicket ecotone at Mossel Bay on gravels from 0 – 200 m. It was listed in the Red Data list as VULNERABLE (Hilton-Taylor 1996; Raimondo *et al.* 1999) and Rebelo (1995) attributed this to the invasion of its habitat by rooikrans (*Acacia cyclops*). However, in the most recent appraisal (http://redlist.sanbi.org/species.php?species=799-68) it is Least Threatened. At Hartenbos Hills Garden Estate, three distinct stands of *P. lanceolata* were found on south-facing slopes in fynbos vegetation by McDonald (2006). At one of these sites the stand of *P. lanceolata* is being heavily impacted by invasive rooikrans (*A. cyclops*) and this situation needs to be remedied. Only one part of the current study area i.e. near the eastern entrance gate, supports *P. lanceolata*.

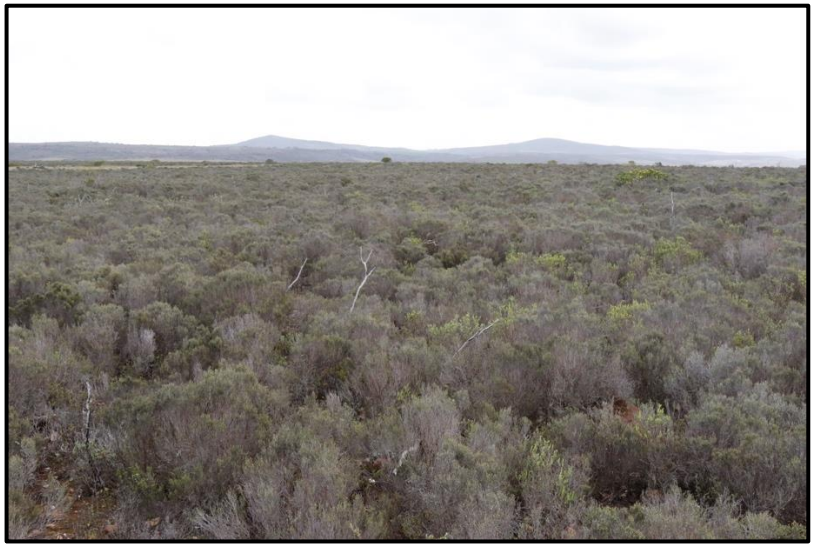
5.4 Vegetation recorded at specific waypoints

Table 1. Vegetation found at 19 sample waypoints during the survey of Erf 3122, Mossel Bay, in August 2017.

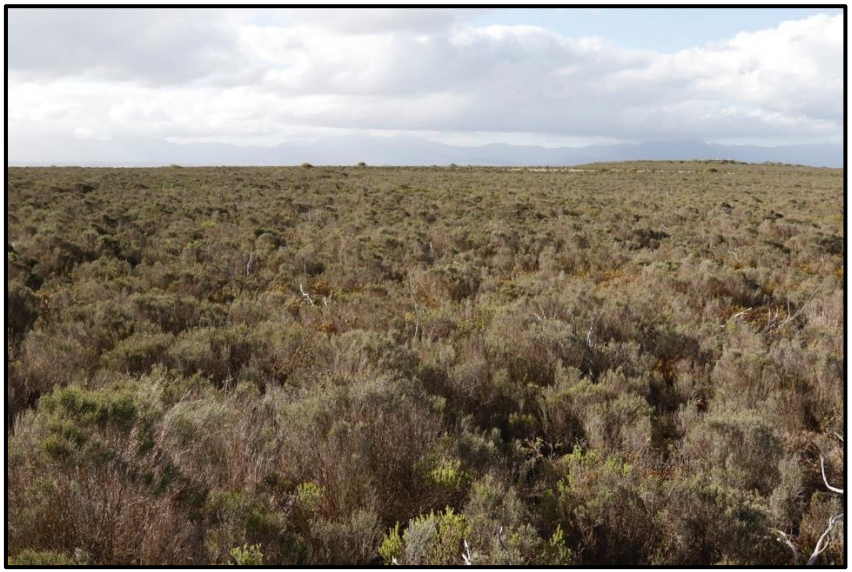
Waypoints and Co-ordinates	Descriptive Notes	Illustration
HHE1 **S 34° 07' 21.2"** **E 22° 04' 59.8"**	Dense grassy slope. Grasses < 30 cm tall with emergent shrubs to 50 cm. Soil gravelly, conglomerate-derived. Species: *Acacia cyclops*, Acacia mearnsii*, Aspalathus* sp. (low, grey shrub), *Asparagus* cf. *aethiopicus, Asparagus rubicundus, Bobartia robusta, Commelina* sp., *Crassula muscosa, Crassula* sp. (1), *Crassula* sp. (2), *Cynodon dactylon, Diospyros dichrophylla, Drosanthemum hispidum, Elytropappus rhinocerotis, Eragrostis curvula, Erica* sp., *Eriospermum* sp., *Euphorbia* sp., *Ficinia filiformis, Helichrysum* cf. *cymosum, Hermannia althaeifolia*, *Hermannia saccifera, Hermannia* sp. (red flowers), *Hypoxis* sp., *Indigofera* sp. (1), *Indigofera* sp. (2), *Ischyrolepis* cf. *capensis, Metalasia* sp. (2), *Metalasia* sp. (dominant), *Oedera genistifolia, Oxalis* sp., *Pentaschistis eriostoma, Satyrium* sp., *Searsia* sp. (low shrub), *Senecio* sp. (succulent), *Tenaxia stricta, Themeda triandra.* *Note: This waypoint is outside the study area but is representative of the north-west-facing slopes.*	

HHE2 **S 34° 07’ 23.92”** **E 22° 05’ 06.3”**	On NW-facing slop below the reservoir approximately at the boundary of the study area. The location has been disturbed by dumping of rubble which appears to have caused a thicket to form.	
HHE 3 **S 34° 07’ 23.3”** **E 22° 05’ 10.6”**	Dense thicket of *Acacia cyclops* with thicket species. Abundant *Eriocephalus africanus*. This waypoint is located just below the reservoir.	

HHE4 **S 34° 07' 24.68"** **E 22° 05' 12.29"**	On SE side of reservoir. *Acacia cyclops* found on mid-dense stands. *Elytropappus rhinocerotis* is dominant with *Polygala myrtifolia* common.	
HHE5 **S 34° 07' 29.6"** **E 22° 05' 10.2"**	On plateau south of the reservoir, along the track, i.e. between the track and the pipeline route which is heavily infested with *Acacia cyclops*. This area is dominated by *Elytropappus rhinocerotis* with emergent, scattered shrubs of *Osteospermum moniliferum*. Pteronia sp. is co-dominant with *E. rhinocerotis.* Other species recorded include: *Cymbopogon* sp., *Ehrharta* sp., *Eragrostis curvula, Helichrysum pandurifolium, Hermannia althaeifolia, Hermannia saccifera, Metalasia densa, Oxalis* sp., *Oxalis* sp. – very small, *Searsia pterota* and *Tenaxia stricta.*	

HHE6 **S 34° 07' 29.3"** **E 22° 05' 12.0"**	The waypoint is amongst mid-dense to dense Acacia cyclops on the pipeline route from the reservoir. Understorey shrubs include *E. rhinocerotis, Hermannia althaeifolia, Hermannia saccifera, Oedera genistifolia, Osteospermum moniliferum, Oxalis* sp., *Oxalis* sp. (2) and *Pteronia* sp. Grasses are also present but were not identified.	
HHE7 **S 34° 07' 31.3"** **E 22° 05' 07.0"**	On upland plateau covered with renosterveld. The shrubland is < 1m tall with a few emergent *Osteospermum moniliferum* shrubs. E. rhinocerotis is dominant, forming a mid-dense to closed stratum with uniform appearance. The soil is reddish clay-loam. Species include: *Drosanthemum* sp., *Hermannia althaeifolia, Hermannia saccifera, Metalasia densa, Oedera genistifolia, Pentaschistis eriostoma, Pteronia* sp. (common) and *Searsia pterota.* This entire area burnt as indicated by skeletons of burnt shrubs.	

HHE8 **S 34° 07' 30.2"** **E 22° 05' 02.8"**	This waypoint is at the edge of the plateau where the slope breaks (132 m above mean sea level). This is the transition zone from renosterveld to 'grassy fynbos'. It is recommended that no development should occur below this elevation.	
HHE9 **S 34° 07' 35.0"** **E 22° 05' 00.5"**	An old (closed) land-fill or dump is located at this waypoint. The area is highly disturbed and visible on aerial photographs.	

HHE10 **S 34° 07' 43.8"** **E 22° 04' 55.6"**	Renosterveld on upland plateau. This area was ploughed historically but has reverted to shrubland dominated by E. rhinocerotis which was burnt in 2009 or 2010. The location has an abundance of *Muraltia* sp. as well as *Asparagus aethiopicus, Erica* sp., *Hermannia lavandulifolia*, *Hermannia saccifera, Metalasia densa, Oedera genistifolia*, *Oxalis* sp. and *Pteronia* sp. The vegetation has a low species diversity and is generally not sensitive.	
HHE11 **S 34° 07' 45.1"** **E 22° 04' 58.5"**	This waypoint is on the SE side of the 'main track'. This area did not burn in the last fire. The renosterbos is much taller – up to 1.2 m – than on the NW side of the track. A dense grassy sward is found under the renosterbos with some open grassy patches present. The species complement is the same as that at waypoint HHE10 with a few additional species such as *Syncarpha* sp. and *Satyrium* sp.	

HHE12 **S 34° 07' 46.7"** **E 22° 05' 02.6"**	Waypoint HHE12 is located on a convex crest that is visible on aerial photos. The dominant species is an unidentified tussock grass. Other species include, *Babiana* sp., *Bobartia robusta, Brunsvigia orientalis, Bulbine* sp., cf. *Acrodon bellidiflorus*, *Diospyros* sp. (low shrub), *Drosanthemum sp, E. rhinocerotis, Indigofera* sp. (dwarf shrub), *Eriospermum* sp., *Ehrharta* sp., *Eragrostis curvula*, *Erica* sp., *Helichrysum* cf. *cymosum, Hermannia althaeifolia, Ischyrolepis* sp. and *Muraltia* sp.,	
HHE13 **S 34° 07' 38.0"** **E 22° 05' 15.4"**	South-east side of main track on south-facing slopes. The veld is 'grassy fynbos' in good condition – low grassy shrubland with dense cover. Species recorded here include *Aspalathus sp., Asparagus aethiopicus, Babiana sp., Bobartia robusta, Diospyros dichrophylla, E. rhinocerotis, Ehrharta cf. scabra, Erica discolor, Erica hispidula, Hakea sericea*, Hermannia althaeifolia, Hermannia saccifera, Hermannia* sp. (red flowers), *Indigofera* sp. (low shrub), *Ischyrolepis* sp., *Metalasia densa* (dominant shrub), *Metalasia sp. (2), Oedera genistifolia, Osteospermum moniliferum, Searsia pterota, Tarchonanthus littoralis, Tenaxia stricta* and Tussock grass – unidentified.	

HHE14 **S 34° 07' 37.3"** **E 22° 05' 11.9"**	Waypoint HHE14 is in an area where there is abundant invasive exotic *Hakea sericea* present. The shrubs are estimated to be 10 to 12 years old. This area also has *E. rhinocerotis* dominant, however, it is fynbos in general character	
HHE15 **S 34° 07' 44.5"** **E 22° 05' 19.7"**	Waypoint HHE15 was recorded as a 'checkpoint' to sample grassy fynbos on the ridge. *Erica hispidula* is dominant on the south-facing slope. Other species recorded include, *Babiana* sp., *Bobartia robusta, E. rhinocerotis, Erica discolor, Hermannia althaeifolia, Hermannia lavandulifolia, Hermannia saccifera, Indigofera* sp. (low shrub), *Ischyrolepis* sp., *Leucadendron salignum, Metalasia densa, Metalasia* sp. (2), *Oedera genistifolia, Osteospermum moniliferum, Satyrium* sp., *Selago* sp., *Senecio* sp. – succulent leaves, *Syncarpha* sp. and Tussock grass – unidentified. Thicket elements such as *Aloe ferox* and *Schotia afra* were also recorded here.	

HHE16 **S 34° 07' 59.1"** **E 22° 05' 15.7"**	At the edge of a highly eroded area heavily invaded by *Acacia cyclops*. An apparent quarry is found at this location and the upper, relatively flat, are above the eroded valley supports shrubland dominated by renosterbos. Species recorded include, *Aspalathus* sp. – low grey shrub, *Babiana* sp., *Bulbine* sp., *Crassula* sp. – rugose leaves, *Drosanthemum* sp., *E. rhinocerotis* – dominant, *Eragrostis curvula, Eriospermum* sp. *Hermannia althaeifolia, Metalasia* sp. (2), *Osteospermum moniliferum, Pteronia* sp. – abundant, *Ruschia* sp. and *Searsia pterota*.	
HHE17 **S 34° 07' 54.1"** **E 22° 04' 55.2"**	Shrubland dominated by *E. rhinocerotis* with skeletons of *Osteospermum moniliferum* from the last fire. The vegetation has the same complement of species as recorded elsewhere in the renosterveld at the site.	

HHE18 **S 34° 07' 48.8"** **E 22° 04' 56.9"**	Renosterveld dominated by *E. rhinocerotis*. *Pteronia* sp. is prominent. Skeletons of shrubs burnt in the last fire are commonly found. Species recorded include, *Aspalathus* sp. – low grey shrub, *Berkheya armata, Eragrostis curvula, Hermannia althaeifolia, Hermannia saccifera, Metalasia* sp. (2), *Muraltia* sp., *Satyrium* sp. *Themeda triandra* and Tussock grass – unidentified.	
HHE19 **S 34° 07' 41.8"** **E 22° 05' 22.6"**	Waypoint HHE19 was located in an area of fynbos along the SW side of the entrance road to the site. The soil is pebbly with round cobbles and gravel. The vegetation is mid-high, mid-dense to closed shrubland. Species recorded include *Aspalathus* sp. – erect shrublet, *Bobartia robusta, E. rhinocerotis, Ehrharta scabra, Erica discolor* – dominant, *Erica hispidula* – dominant, *Leucadendron salignum, Lobelia* cf. *coronopifolia, Metalasia densa,* Metalasia sp. (2), *Muraltia* sp., *Oedera genistifolia, Osteospermum moniliferum, Phylica* sp., *Syncarpha paniculata* and *Tenaxia stricta.*	

5.5 Vegetation Map of Erf 3122, Mossel Bay.

In order to simplify the appraisal of the vegetation at Erf 3122, Mossel Bay, a vegetation map was compiled that recognizes only two vegetation types, renosterveld and grassy fynbos (Figure 8). The renosterveld, as mentioned above, is largely secondary, having 'restored' on areas that were once cultivated. This vegetation is considered to have **low sensitivity,** whereas the grassy fynbos which occurs on steeper slopes, and has not been historically cultivated, is considered to be mostly be **highly sensitivity.** The area along the road leading to the reservoir, and the area in the vicinity of the reservoir itself, have moderate sensitivity (Figure 9).

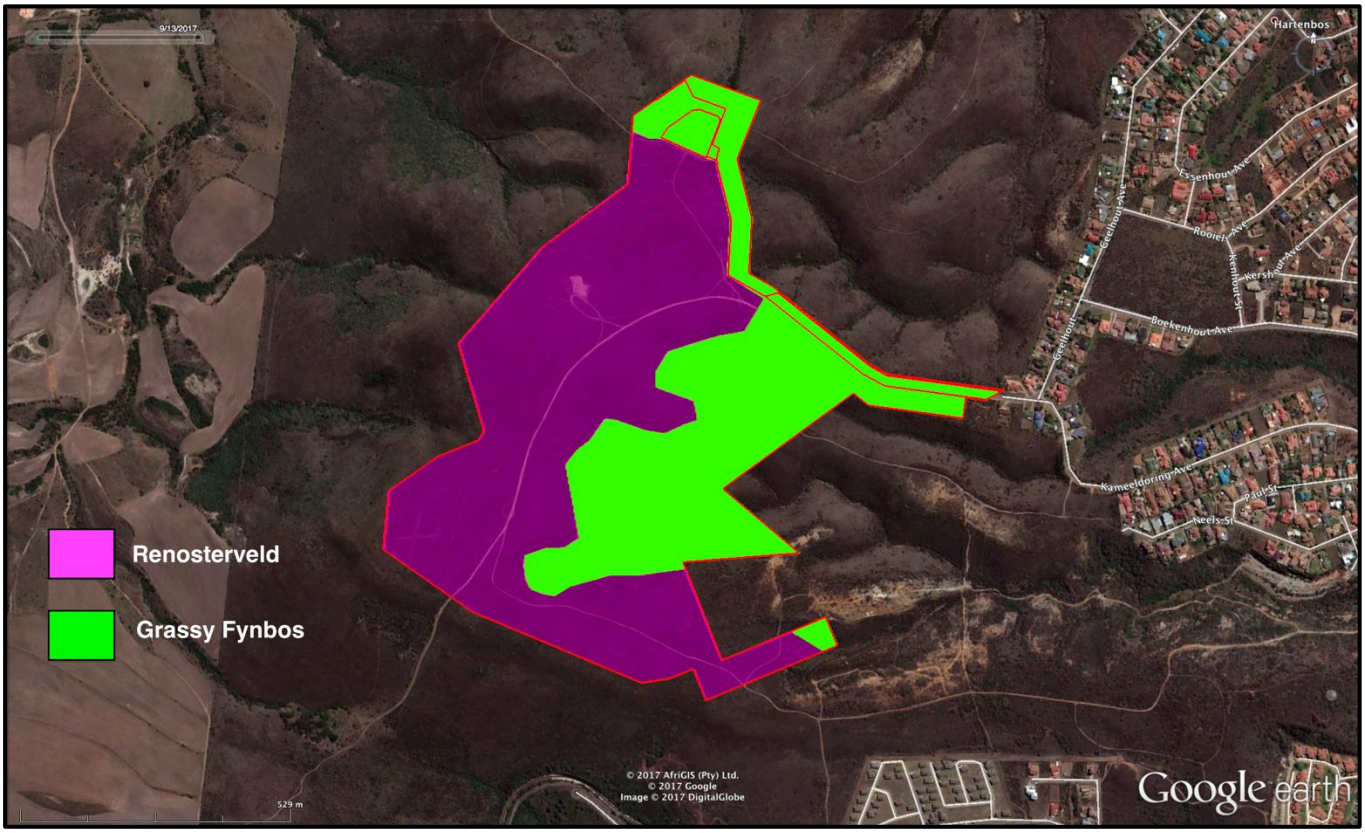


Figure 8. Simplified vegetation map for Erf 3122, Mossel Bay.

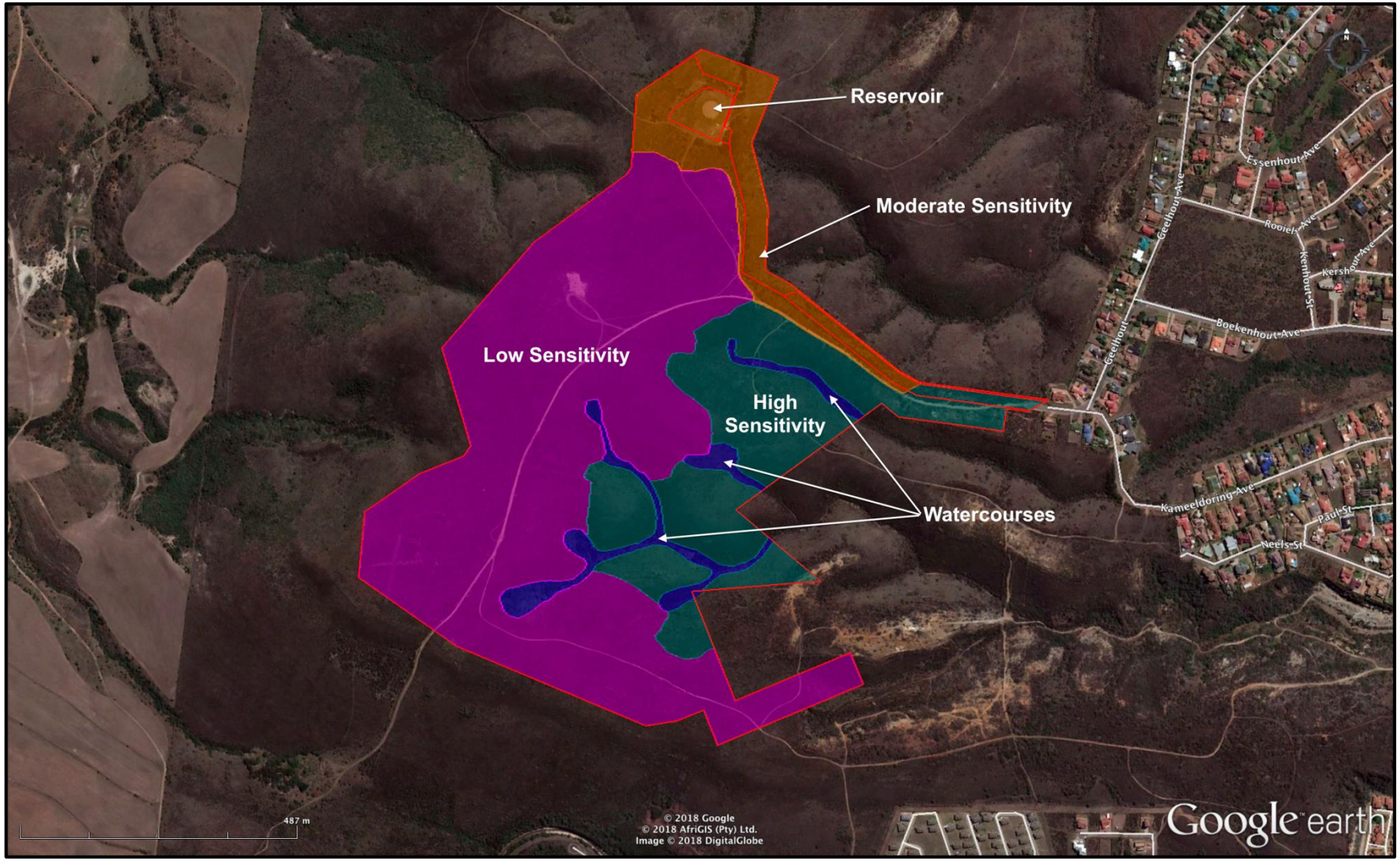


Figure 9. Habitat sensitivity map for Erf 3122, Mossel Bay.

6. Conservation Status

6.1 The Western Cape Biodiversity Spatial Plan

The Western Cape Biodiversity Spatial Plan [WCBSP] (CapeNature 2017, Pool-Stanvliet *et al.* 2017) was consulted for determination of conservation status and critical biodiversity areas. The required shapefiles were obtained from the South African National Biodiversity Institute (SANBI) BGIS website and then the critical biodiversity areas (CBA) map for the Hartenbos Hills Garden Estate study area was overlaid on a Google Earth ™ image and carefully examined to compare what was observed in the field with the aerial image when overlaid with the CBA map. The presence of CBAs (and ESAs -- Ecological Support Areas) suggests that areas where they have been mapped are ecologically sensitive. However, that is not always the case. Part of the objective of the ground-truthing was to determine the veracity of the units mapped as CBAs and ESAs in the WCBSP as applicable to Erf 3122, Mossel Bay.

Virtually the entire area of Erf 3122, Mossel Bay is mapped as CBA1 with small areas mapped as CBA2 and even fewer areas mapped as ESA1 (Figure 10). From field observations there is poor correlation between the WCBSP map and the sensitivity of the vegetation. The areas covered by renosterveld are, in my opinion, not botanically sensitive and have low plant species diversity. I thus contend that the renosterveld area should be mapped as ESA1 and not CBA1 or CBA2. This contention is taken into account when determining the constraints on the site (see Figure 13).

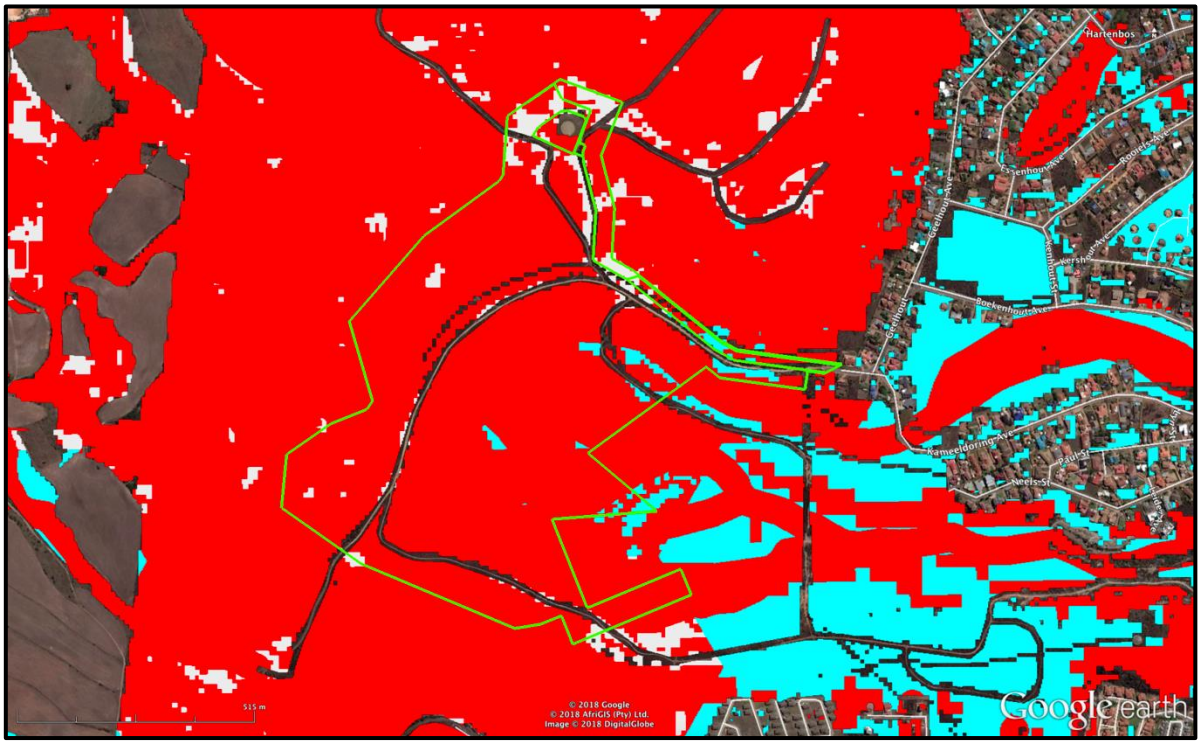
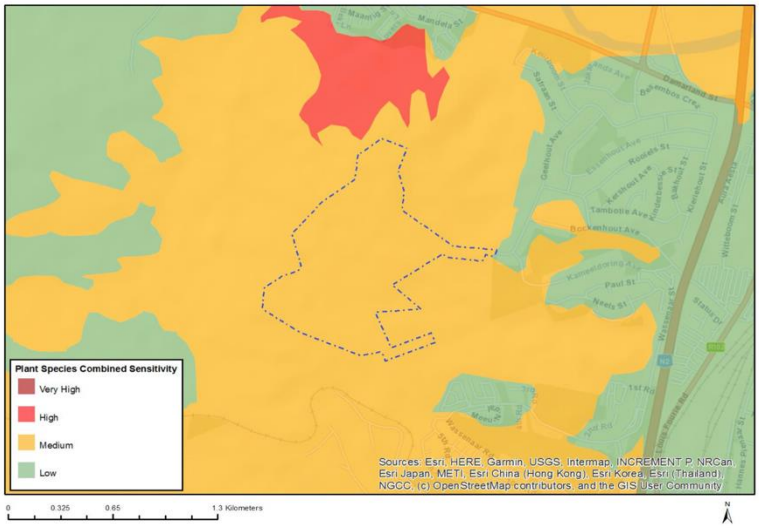


Figure 10. Critical Biodiversity Areas map for Erf 3122, Mossel Bay (green boundary). Red=CBA1; White = CBA2 and Light blue = ESA1.

6.2 The National Web-based Environmental Screening Tool

The National We-based Screening Tool was applied for Erf 3122, Mossel Bay and the result was that the site has a **MEDIUM** sensitivity with respect to the relative plant species theme (Figure 11). There are also not many sensitive species and regarded as sensitive in the species list (the names of those species not listed were obtained from SANBI but as per protocol are not published here). However, it is known that *Hermannia lavandulifolia* is an important species since it is the food plant for the rare endemic butterfly *Aloeides trimeni southeyae* (Dr Dave Edge pers. comm.) As for other plants of conservation concern, a number of those listed in Figure 11 were not recorded in the study area and that is attributed to the historical disturbance of the site.

MAP OF RELATIVE PLANT SPECIES THEME SENSITIVITY



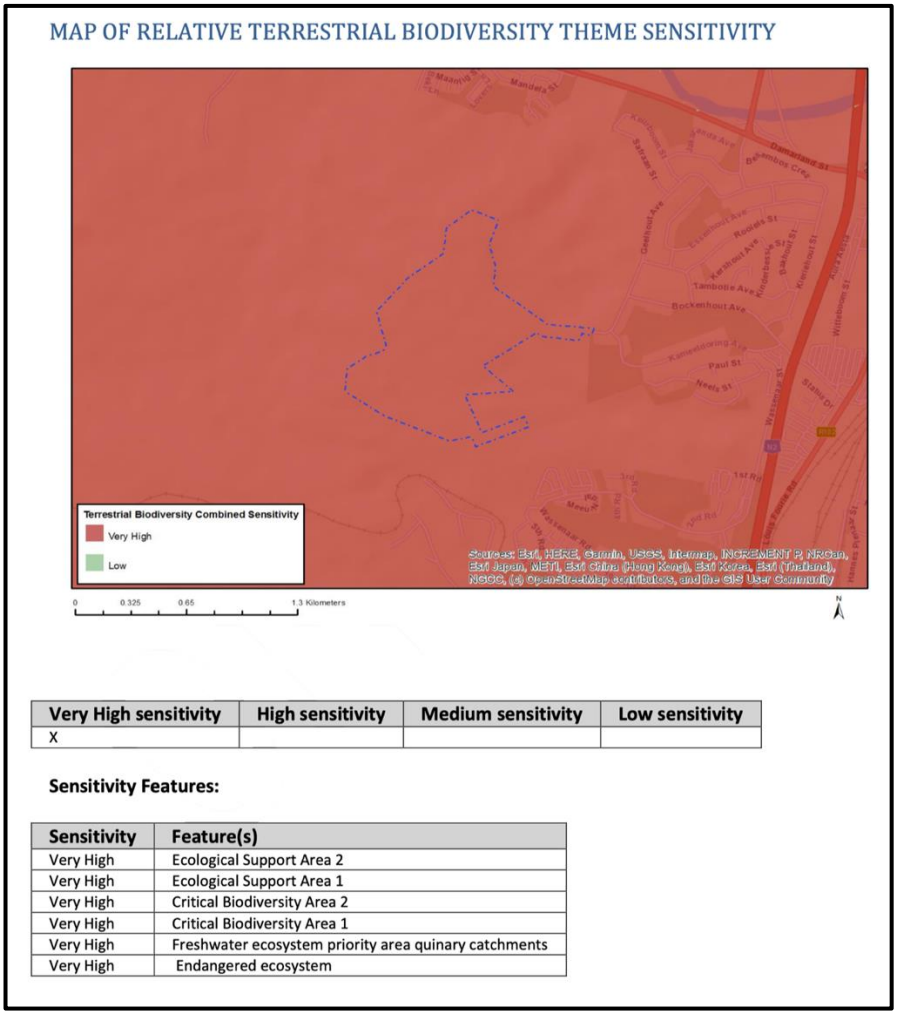
Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity
Medium	Ruschia leptocalyx
Medium	Aspalathus campestris
Medium	Selago ramosissima
Medium	Freesia fergusoniae
Medium	Hermannia lavandulifolia
Medium	Sensitive species 633
Medium	Sensitive species 268
Medium	Marsilea schelpeana
Medium	Sensitive species 1024
Medium	Athanasia cochlearifolia
Medium	Relhania garnotii
Medium	Muraltia cliffortiifolia
Medium	Polygala pubiflora
Medium	Sensitive species 980
Medium	Ruellia pilosa
Medium	Sensitive species 516
Medium	Sensitive species 800
Medium	Sensitive species 763
Medium	Diosma passerinoides
Medium	Agathosma microcarpa

Figure 11. Extract from the report generated for the Relative Plant Species Theme Sensitivity for Erf 3122, Mossel Bay.

The relative terrestrial biodiversity theme sensitivity is given as VERY HIGH in Figure 12. Both Helme (2016) and this author do not agree with the assigning of CBA1 to Erf 3122, Mossel Bay in the Western Cape Biodiversity Spatial Plan (Pence, 2017; Pool-Stanvliet, 2017). The sensitivity of the erf is over-stated and this has been drawn down into the National Web-based Screening Tool where the 'error' has been perpetuated (Figure 12). The sensitivity is more realistically **MEDIUM**.



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Very High	Ecological Support Area 2
Very High	Ecological Support Area 1
Very High	Critical Biodiversity Area 2
Very High	Critical Biodiversity Area 1
Very High	Freshwater ecosystem priority area quinary catchments
Very High	Endangered ecosystem

Figure 12. Extract from the report generated for the Relative terrestrial Biodiversity Theme Sensitivity for Erf 3122, Mossel Bay (blue dotted polygon).

6.3 The Red Listed Ecosystems

An appraisal of remnants of important ecosystems of South Africa was carried out by Skowno *et al.* (2019) and published by SANBI (2021) as the 'Red List of Ecosystems' (RLE). The available shapefile was overlaid and a Google Earth Pro ™ image together with a boundary outline of the proposed Hartenbos Hills Garden Estate development footprint and an outline with shading of the areas mapped as having been ploughed in the past. The resulting composite image (Figure 13) shows that the proposed development footprint is mostly within or in places marginally outside the historically ploughed areas. The Critically

Endangered Mossel Bay Shale Renosterveld RLE as mapped by SANBI (2021) overlaps on the ploughed area at the areas enclosed by the ovals at '1' and '2' in Figure 13. At the oval labeled '3' the RLE overlaps with the entrance corridor to the proposed development. In addition, the greater part of the area within Oval 1 is to be set aside as a conservation area for the endangered butterfly, *Aloeides trimeni southeyae.*

It must be concluded, therefore, that the proposed development at Erf 3122, Mossel Bay would have a very low impact, and practically speaking, very little at all, on the mapped RLE.

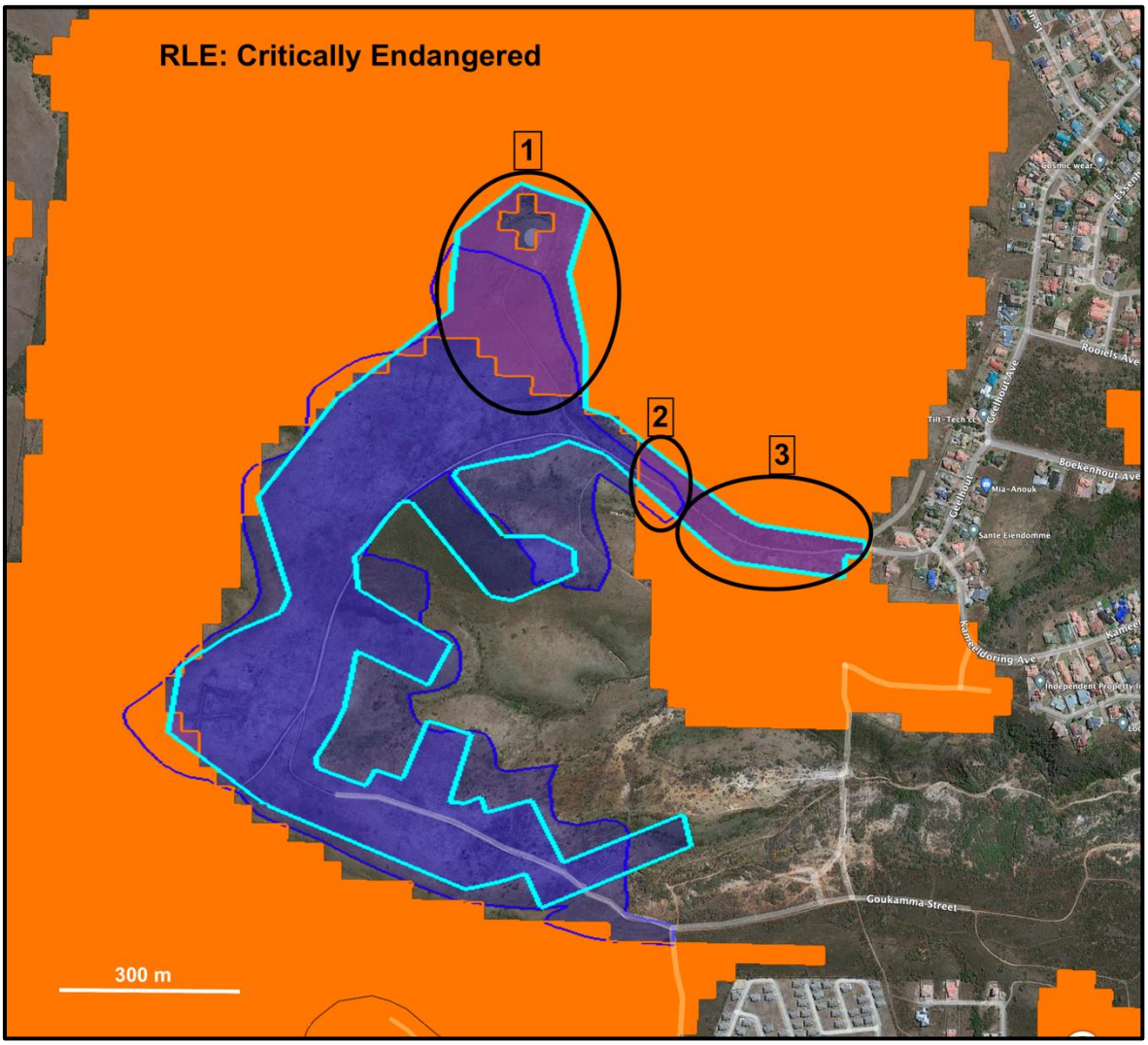


Figure 13. Google Earth Pro ™ with the mapped historically ploughed areas at Erf 3122, Mossel Bay (dark blue outline with dark blue shading); the development footprint, light blue outline and the Red List Ecosystem (RLE) [Critically Endangered] mapped as orange shading. Ovals 1, 2 & 3 are overlap zones of the three indicators; historical ploughing, development footprint and RLE.

6.4 Plant Species of Conservation Concern

As for the study by Helme (2016) no species of conservation concern were found on the site in this study. Helme (2016) made observations of endangered species and regional endemics that occur in the near vicinity of the study area. He speculated that these species could occur on the site but that the probability of their occurrence is low. The following is an extract from Helme (2016):

"No rare or localised plant species were recorded on Erf 3122, but this does not mean that none are present, and there is deemed to be a medium to high likelihood that a few such species are in fact present on site, most likely within the undisturbed parts of the site. The likelihood of there being any such species within the proposed development footprint is low.

Mossel Bay Shale Renosterveld is known to support a number of rare and threatened *Haworthia* species (Bayer 1999; Mucina & Rutherford 2006), and these small, highly cryptic succulent plants could well be present on the undisturbed parts of Erf 3122. *Ruschia leptocalyx* (Plate 6) is a rare succulent Red Listed as Endangered (Raimondo *et al.* 2009), and was recorded along the edges of thicket patches some 1km north of the study area, but is not present on site (see Plate 6). A still unidentified *Lotononis* (Fabaceae) was also recorded just north of the study area, and may prove to be a localised, undescribed species (Dr. S. Boatwright – pers. comm.). *Ruellia pilosa* is a regional endemic (Swellendam to Mossel Bay) and is Red Listed as Vulnerable (Raimondo *et al* 2009), and may be present in low numbers on the undisturbed parts of the site."

7. Botanical Constraints

Notwithstanding the classification of the entire Erf 3122, Mossel Bay, as CBA1 in the Western Cape Biodiversity Spatial Plan (Pence 2017) (Figure 10), the field observations indicate differently. Taking all the relevant indicators into consideration, a constraints map was compiled. The constraints map reflects my view that the renosterveld has **low sensitivity** and the grassy fynbos has **high sensitivity** with consequent low and high constraints as mapped in Figure 13.

The constraints map was used to inform the iterative process of the site layout. It was recommended at a team workshop (31 October 2017) that any proposed development of Erf 3122, Mossel Bay, should only take place in areas identified as 'Low Constraints'; mostly areas occupied by secondary renosterveld.

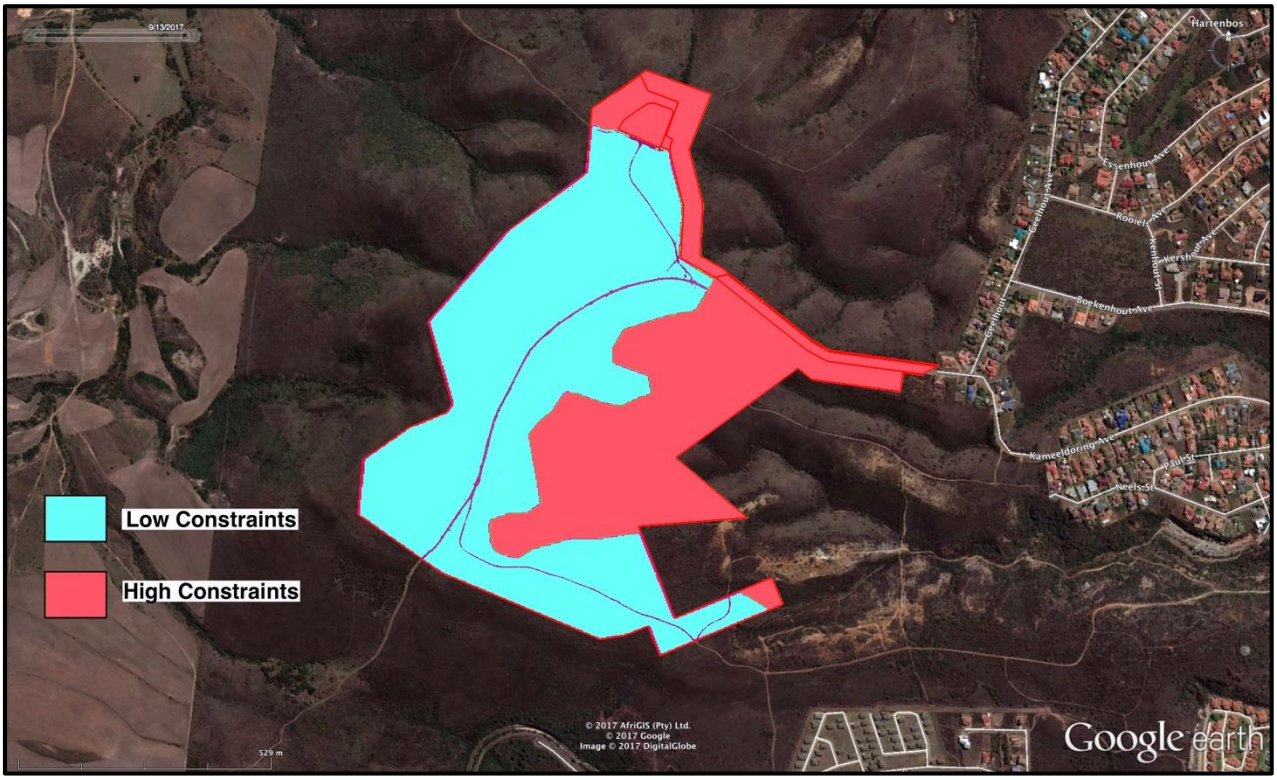


Figure 13. Botanical constraints for Erf 3122, Mossel Bay.

8. Responses to Cape Nature's comments

The comments in the letter from Cape Nature dated 08 March 2022, Ref LE14/2/6/1/6/6/ERRF3122_development_hartenbos, have been thoroughly considered. If the constraints of Critical Biodiversity Areas and Ecological Support Area are applied as intimated in this letter, the development as proposed at Erf 3122, Mossel Bay, may as well be halted immediately. Notwithstanding the comments about the merits or demerits of CBAs and ESAs, and the respective definitions and objectives of these classifications, a considerable effort has been made on the part of numerous specialists over a long period of time to arrive at an acceptable development proposal. The proponents of the development proposal, under the guidance of biological specialists, has sought to address the constraints published in the Western Cape Biodiversity Spatial Plan, with respect to botanical, entomological, faunal, and fresh-water considerations in great detail. In addition, a 'fire study' to develop a fire management plan has also been carried out.

The comments and recommendations in the letter are, in essence, a summarised version of all the aspects that have been thoroughly investigated and do not bear repeating. Reference is also made to Hartenbos Heuwels Erf 1852; Erf 1853; Portion 59 of Farm 217 and Portion 4 of Farm 217 and the

recommendation of Biodiversity Stewardship and involvement with Cape Nature's Protected Area Expansion Strategy. The above properties are not of concern in the Hartenbos Hills Garden Estate development and so this is completely irrelevant to this project and is not considered any further here, suffice to say that the Hartenbos Hills Garden Estate aspires to be as eco-friendly as possible e.g. to allow for corridors, and for ecosystem processes to persist.

9. Impact assessment of the proposed development

The 'no-development' or 'No-Go' scenario is labelled **Alternative 1** in this assessment. Under this alternative, the site remains as is with no specific use of the land, no active fire management or burning regime, no alien vegetation clearing nor management of pedestrian and/or vehicular traffic.

The process followed to reach an 'acceptable' site development plan has integrated **numerous factors**, not only vegetation. Fauna (vertebrate and invertebrate), aquatic aspects and habitat, and ecological processes have also been taken into account. There is an intentional strong relationship between the first iteration of the SDP (Figure 2, referred to further as **Alternative 2**) and the botanical constraints map (Figure 16) since the vegetation on the site underpins most of the other interacting aspects of the ecology. Further refinement of the site development plan (SDP) took place as a result of the outcome of the scoping phase This happened under the direction of Hartenbos Hills Propco (Pty) Ltd. The SDP has responded to the landscape and ecology (secondary renosterveld that has returned after historical ploughing, including other associated biota) and it is predicted that with further mitigation, the resultant impact on the ecology is likely to be **Low Negative** to **Very Low Negative** (Tables 3—8) since only the low sensitivity areas would be directly affected. The areas where fynbos (as opposed to renosterveld) occurs, are likely to be affected very little, hence very low **direct** impacts and similarly very low to negligible **indirect** impacts.

The site development plan developed as a result of the scoping outcome, is the most recent SDP. The changes are seen in Figure 3 and this is referred to as **Alternative 3**.

13.1 Direct Impacts

The 'No Go' (Alternative 1) would result in no change to the *status quo*. In this case the target area would be left undeveloped with no management and scant protection. It is speculative to suggest that the habitat would improve or degrade but it is possible that it may degrade in the future due to continued invasion by alien invasive plants. Uncontrolled fires could also result in problems due to a lack of implementation of a fire management plan to control aging biomass. On the other hand, if left undeveloped, the ecological processes currently in play on the site would continue unhindered except if there were negative influences

such as alien invasion, lack of suitable fire management and indiscriminate use by trespassing people with vehicles. To determine how the ecology would be affected would take concerted research investigation over many years, so no valid comment can be put forward here as to the future of the site. This underscores the need for informed assumptions given the location of the site (close to other Hartenbos suburbs), the already invading *Acacia* spp. and *Hakea sericea* and the risk of spread of wild fires either from the site to the neighbouring residential areas or vice versa. Uncontrolled accessibility to pedestrians, vehicles, bicycles and motorcycles could lead to erosion and further illegal dumping. Poaching of small mammals and reptiles could also take place as has happened on the adjacent Mossel Bay Municipality 'conservation area' that is not being managed adequately. It can be reasonably assumed that these negative factors could occur if the 'No Go' or *Status Quo* (Alternative 1) is followed. Assuming the above, the 'No Go' alternative could be **Medium Negative** (Table 3).

Direct impacts of Alternative 2 and 3, the alternative assessed during the Scoping and Impact Assessment phases, are given in Tables 4 and 5. Direct impacts would be **Medium Negative** without mitigation in the construction phase and **Low Negative** with mitigation. The **direct impact** of the operational phase would be Low Negative without mitigation and *Very Low Negative* with mitigation. Alternative 2/3 equates to the assumed impact of Alternative 1, the 'No Go' option. No irreplaceable resources would be lost but once the development is in place, any direct impacts would be irreversible. The impact on the vegetation, habitat and biota present would not be much different between Alternative 1, Alternative 2 and Alternative 3.

The lowering of the height of the frail care facility (for visual impact reasons) would have no effect on the footprint as relevant to the habitat and flora.

Direct impacts are assessed in Tables 3—6.

There would be some difference between the impacts of Alternative 2 and Alternative 3 as they pertain to the movement of wildlife, but not the habitat/flora. The only difference is that there would be improved corridors for movement of fauna.

Therefore the impacts given in Tables 3—6 are much the same with respect to the habitat with its resident biota i.e. flora, with the post-mitigation for the construction phase being **Low Negative** and the post-mitigation for the operational phase being **Very Low Negative**.

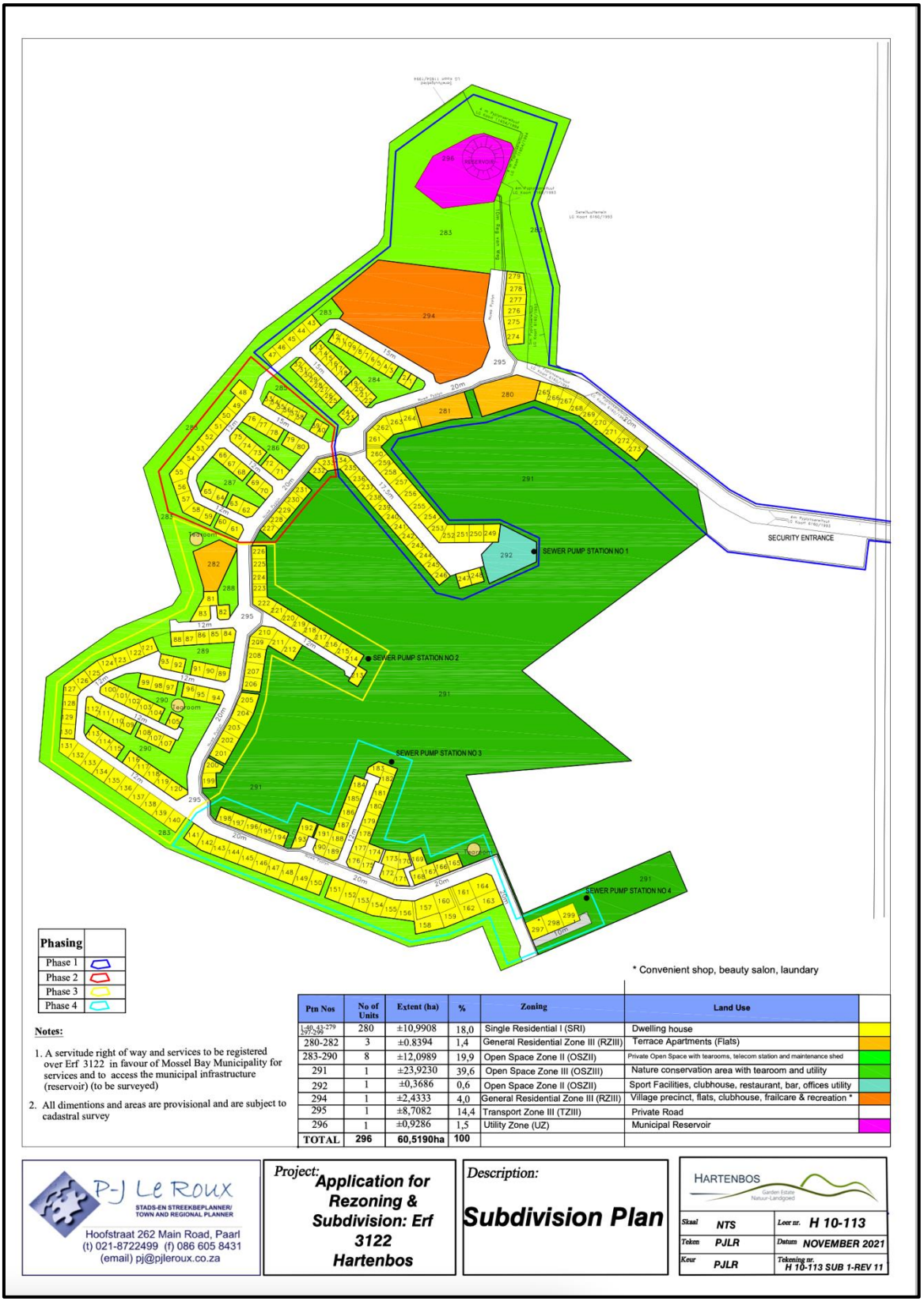
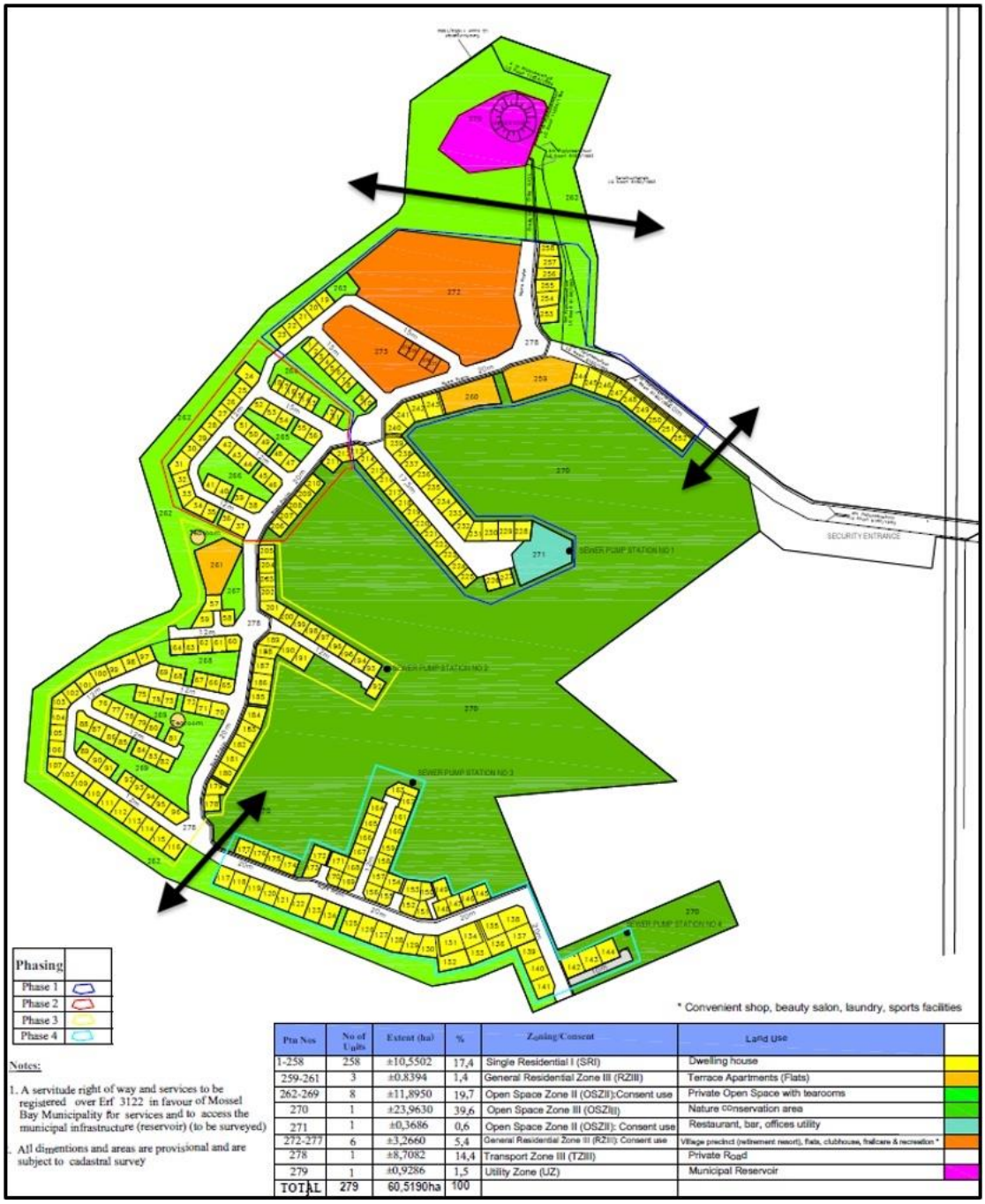


Figure 16. The Refined SDP for Erf 3122, Mossel Bay dated 21 November 2021. Alternative 2.



Plan Nos	No of Units	Extent (ha)	%	Zoning/Consent	Land Use	
1-258	258	±10,5502	17,4	Single Residential I (SRI)	Dwelling house	
259-261	3	±0.8394	1,4	General Residential Zone III (RZIII)	Terrace Apartments (Flats)	
262-269	8	±11,8950	19,7	Open Space Zone II (OSZII):Consent use	Private Open Space with tearooms	
270	1	±23,9630	39,6	Open Space Zone III (OSZIII)	Nature conservation area	
271	1	±0,3686	0,6	Open Space Zone II (OSZII): Consent use	Restaurant, bar, offices utility	
272-277	6	±3,2660	5,4	General Residential Zone III (RZIII): Consent use	Village precinct (retirement resort), flats, clubhouse, frailcare & recreation *	
278	1	±8,7082	14,4	Transport Zone III (TZIII)	Private Road	
279	1	±0,9286	1,5	Utility Zone (UZ)	Municipal Reservoir	
TOTAL	279	60,5190ha	100			

Figure 17. The Preferred SDP for Erf 3122, Mossel Bay dated October 2022. Alternative 3.

Table 2. Impact of the loss of degraded Mossel Bay Shale Renosterveld due to the development of Hartenbos Hills Garden Estate

NO LOSS OF VEGETATION (Status Quo – Alternative 1)				
PROJECT PHASE	*N/A*			
DIRECT IMPACT	*Non-removal of natural vegetation: degraded renosterveld; spread of alien invasive plants, illegal dumping and risk of wildfire etc.*			
INDIRECT IMPACT	*None determined*			
CUMULATIVE IMPACT	*None*			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*4*	*Long-term*	*-8*	*2*
EXTENT	*2*	*The non-development impacts would be localized to the designated footprint as described.*		
SEVERITY	*-2*	*The severity of the potential impact will be moderate (medium) negative.*	***Slightly Detrimental***	***Likely***
IMPACT ON IRREPLACEBLE RESOURCES	*0*	*No irreplaceable resources would be impacted.*		
SIGNIFICANCE	***-16***	***Very Low Negative***		
PROPOSED MITIGATION MEASURES				
None				
POST-MITIGATION				
DURATION	4	*Long Term*	*-6*	*2*

EXTENT	2	*The extent of the impact is treated as 'Site' as if it would be developed, and adjacent properties*		
SEVERITY	-1	*The severity of the impact is rated as **Low Negative** as the impact would affect the environment in such a way that it would mostly be restricted to secondary renosterveld – i.e. the veld that returned after ploughing and then left fallow.*	***Negligible***	***Definite***
IMPACT ON IRREPLACEBLE RESOURCES	0	*No irreplaceable resources would be impacted.*		
SIGNIFICANCE	**-12**	***Very Low Negative***		
CONFIDENCE LEVEL				
High				

LOSS OF VEGETATION: Alternative 2 & 3				
PROJECT PHASE	***Construction Phase***			
DIRECT IMPACT	*Removal of natural vegetation: degraded Mossel Bay Shale Renosterveld*			
INDIRECT IMPACT	*None determined*			
CUMULATIVE IMPACT	Loss of degraded Mossel Bay Shale Renosterveld			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*4*	*The duration of the activity associated with the impact will be phased with each year estimated to take 3—4 years.*	*-10*	*3*
EXTENT	*1*	*The impacts will be localized to the designated footprint as described*		

SEVERITY	*-2*	*The severity of the potential impact will be moderate (medium) negative.*	***Slightly Detrimental***	***Definite***
IMPACT ON IRREPLACEBLE RESOURCES	*0*	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	***-30***	***Low - negative***		
PROPOSED MITIGATION MEASURES				
*The mitigation measures necessary would be the relocation of geophytes from the development footprint. Ideally the bulbs should be lifted when they dormant (summer) but that would mean traversing the entire area of the proposed development in the preceding winter and marking every occurrence of these plants. A more practical approach would be to unearth the bulbs during the construction phase and to then relocate and plant them soon after removal. (**Note: A clearing permit as well as a permit for removal of and relocation of plants would be required from Cape Nature**).* *Secondly, all construction activities must take place within the footprint of the development. Areas outside the development footprint (except for access roads) MUST be avoided. Any areas within the development footprint that will not be used later should rehabilitated wit natural vegetation native to the area.*				
POST-MITIGATION				
DURATION	4	*The duration of the activity associated with the impact will last at least 5 years and therefore it is considered to be Long Term.*	*-10*	*3*
EXTENT	3	*The extent of the impact is treated as 'Site' as it affects the development area and adjacent properties*		
SEVERITY	-2	*The severity of the impact is rated as **Moderate negative** as the impact would affect the environment in such a way that it would mostly be restricted to secondary renosterveld – i.e. the veld that returned after ploughing and then being left fallow.*	***Slightly Detrimental***	***Definite***
IMPACT ON IRREPLACEBLE RESOURCES	0	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	**-30**	**Low - negative**		

CONFIDENCE LEVEL
High

Table 3. Impact of the loss of Mossel Bay Shale Renosterveld in the operational phase of Hartenbos Hills Garden Estate.

LOSS OF VEGETATION: Alternative 2 & 3				
PROJECT PHASE	***Operational Phase***			
DIRECT IMPACT	*Removal of natural vegetation: degraded Mossel Bay Shale Renosterveld*			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	Loss of degraded Mossel Bay Shale Renosterveld			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*4*	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term*	*-6*	*3*
EXTENT	*2*	*The extent of the impact is rated as 'footprint' as it will only affect the area in which the proposed activity will occur.*		
SEVERITY	*-1*	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Likely***
IMPACT ON IRREPLACEBLE RESOURCES	*0*	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	***-18***	***Very Low negative***		
PROPOSED MITIGATION MEASURES				
Undertake vegetation clearing during the dry season; Keep vegetation cut low but not eradicated along firebreaks.				
Only clear vegetation where absolutely necessary.				

POST-MITIGATION				
DURATION	4	*The duration of the activity associated with the impact will last > 5 years and as such is rated as Long term*	*-2*	*1*
EXTENT	1	*The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur*		
SEVERITY	-1	*The severity of the impact is rated as Low negative since the impact during the operational phase will not affect the environment in such a way that natural, cultural and social functions and processes will be affected any more than in the construction phase.*	***Negligible***	***Unlikely***
IMPACT ON IRREPLACEBLE RESOURCES	0	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	**-2**	**Very Low negative**		
CONFIDENCE LEVEL				
Medium				

9.2 Indirect impacts

By definition, indirect impacts occur away from the 'action source' i.e., away from the development site. The impact assessed here is specifically how the proposed Hartenbos Hills Garden Estate would have negligible and insignificant indirect impacts on vegetation and flora away from the development area.

9.3 Cumulative impacts

The proposed development of the Hartenbos Hills Garden Estate would be in an area of the Garden Route known for its natural beauty. It will also be placed in an area mapped as CBA1. However, as has been demonstrated above, the footprint of the development would be restricted to substrates that were historically ploughed. The actual loss of undisturbed renosterveld would be limited and there would be no further loss of any undisturbed Mossel Bay Shale renosterveld in the future due to the development. Cumulative impacts would thus be Very Low Negative (Table 2 & 3).

10. General Assessment and Recommendations

- A single vegetation type, Mossel Bay Shale Renosterveld, is found in the footprint of the proposed Hartenbos Hills Garden Estate. A second, poorly described vegetation type, named here as grassy fynbos, lies outside the development footprint but still on erf 3122, Mossel Bay.
- Mossel Bay Shale Renosterveld is considered to be Critically Endangered and not conserved in any formal conservation area.
- No rare or threatened plant species were found during the survey. The probability of the occurrence of species of conservation concern (SCC) in the development footprint is low due to historical disturbance by ploughing.
- The National Web-based Environmental Screening Tool for the vegetation overestimates the sensitivity specifically of the development footprint which has been determined by on-site evaluation to have low sensitivity.
- The sensitivity of terrestrial biodiversity according to the National Web-based Environmental Screening Tool is **Very High**. This is based on there being CBA1 areas within and adjacent to the development footprint. The data collected in this study does not support the output of the screening tool and the terrestrial biodiversity sensitivity is rated here as **Medium** at the most.
- Base on the data collected and analyzed for the target area for the development of Hartenbos Hills Garden Estate, no fatal flaws or any other obstacles were found with respect to the flora, vegetation as a whole and terrestrial biodiversity.

11. Conclusions

From a botanical perspective Erf 3122, Mossel Bay can be divided into two main vegetation types, **low sensitivity renosterveld** and **high sensitivity grassy fynbos**. These vegetation types occupy two distinct areas with the **renosterveld** being found on the **upland plateau**. It was **historically farmed and despite recent wild fires (2018),** this **disturbance has carried through** despite the greater area having apparently restored to 'good' vegetation.

- Analyses of collected data at waypoints, shows that the **renosterveld remained with relatively poor plant species diversity,** with a significant complement of the **original species having been lost**.
- The fynbos, on the other hand, is relatively **undisturbed and has much higher sensitivity**.

The latter vegetation would be completely unaffected by the proposed development.

Despite virtually the entire area of Erf 3122, Mossel Bay (Hartenbos Hills Garden Estate) being classified as CBA1 in the WCBSP (2017), it has been determined from field studies (ground-truthing) that the ***development area specifically*** is occupied by **renosterveld** that should at best be **re-classified as ESA1.** The renosterveld in the proposed development area has **low botanical constraints.**

The results of this detailed impact assessment show that the proposed development in its preferred proposal, would **have low negative direct and cumulative impacts** before and after mitigation, due to the low sensitivity of the terrain that would be displaced by the development. (**This does not apply to areas outside the development footprint not previously disturbed**). Therefore, the proposed Hartenbos Hills Garden Estate development in its preferred development proposal is supported from a botanical perspective.

12. References

Acocks, J.P.H. 1988. Veld Types of South Africa, 3rd edn. *Memoirs of the Botanical Survey of South Africa* No. 57:1-146.

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

Cadman, M. 2016. (ed.) Fynbos Forum Ecosystem Guidelines for Environmental Assessment in the Western Cape, Edition 2. Fynbos Forum, Cape Town, 201pp.

Cowling, R.M., Pressey, R.L., Lombard, A.T., Heijnis, C., Richardson, D.M. & Cole, N. 1999. *Framework for a conservation plan for the Cape Floristic Region, South Africa*. IPC Report 9902, prepared for WWF-SA.

Cowling, R. & Heijnis, C. 2001. The identification of Broad Habitat Units as biodiversity entities for systematic conservation planning in the Cape Floristic Region. *South African Journal of Botany* 67: 15 – 38.

Helme, N. 2016. Botanical impact assessment of proposed development on Erf 3122, Hartenbos, Western Cape. Unpublished report for Strategic Environmental Focus, Pretoria.

Hilton-Taylor, C. 1996. Red Data List of South African Plants. *Strelitzia* 4. National Botanical Institute, Pretoria.

Low, A.B. & Rebelo, A.G. 1996. (eds) Vegetation of South Africa, Lesotho and Swaziland – A companion to the Vegetation Map of South Africa, Lesotho and Swaziland. Department of Environmental Affairs & Tourism, Pretoria.

McDonald, D.J. 2006. Botanical Survey and Sensitivity Assessment of Erf 3122, Mossel Bay (Hartenbos Heuwels), Western Cape. Unpublished report for EcoBound.

McDonald, D.J. 2018 updated in 2021. Botanical Scoping Assessment, Erf 3122 Mossel Bay (Hartenbos Hills Garden Estate), Mossel Bay Municipality, Western Cape Province. Unpublished report, CapeEAPrac, George.

Mucina, L., Rutherford, M.C., & Powrie, L.W. (Eds.). 2005, 2009. Vegetation map of South Africa, Lesotho, and Swaziland 1:1 000 000 scale sheet maps. South African National Biodiversity Institute, Pretoria. ISBN 1-919976-22-1.

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

Norman, N. & Whitfield, G. 2006. Geological Journeys: A traveler's guide to South Africa's rock and landforms. Struik, Cape Town.

Pence, G.Q.K. 2017. The Western Cape Biodiversity Spatial Plan: Technical Report. Unpublished report. Western Cape Nature Conservation Board (CapeNature), Cape Town.

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

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

Rebelo, A.G. 1995. *SASOL Proteas: A field guide to the Proteas of Southern Africa*. Fernwood Press, Cape Town. pp. 224.

Skowno, A.L., Poole, C.J., Raimondo, D.C., Sink, K.J., Van Deventer, H., Van Niekerk, L., Harris, L.R, Smith-Adao, L.B., Tolley, K.A., Zengeya, T.A., Foden, W.B., Midgley, G.F., and Driver, A., 2019. National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity. Synthesis Report. Pretoria, South Africa, 214 pp.

South African National Biodiversity Institute (SANBI) 2012, Vegetation Map of South Africa, Lesotho and Swaziland [vector geospatial dataset] 2012. Available from the Biodiversity GIS website http://bgis.sanbi.org/SpatialDataset/Detail/18.

South African National Biodiversity Institute (SANBI). 2021 Red List of Ecosystems (RLE) for terrestrial realm for South Africa - remnants [Vector] 2021. Available from the Biodiversity GIS website, downloaded on 30 August 2022

Vlok, J.H.J. & de Villiers, M.E. 2007. Vegetation map for the Riversdale domain. Unpublished 1:50 000 maps and report supported by CAPE FSP task team and CapeNature.

Report submitted: 30 August 2022

Appendix 1: Impact Assessment Methodology (from GIBB Environmental)

The objective of the assessment of potential impacts is to identify and assess all the significant, potential impacts that may arise as a result of the project.

For each of the main project phases the existing and potential future impacts and benefits (associated only with the project) will be described using the criteria listed below. The assignment of ratings has been undertaken based on past experience of the team, as well as through research. Subsequently, mitigation measures will be identified and considered for each impact and the assessment repeated in order to determine the significance of the residual impacts (the impact remaining after the mitigation measure has been implemented).

Table 1: Impact Assessment Criteria

Criteria	Rating Scales	Notes
Nature	Positive	An evaluation of the effect of the impact related to the proposed development
	Negative	
Extent	Footprint	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur
	Site	The extent of the impact is rated as site as it will affect only the development area
	Local	The extent of the impact is rated as Local as it affects the development area and adjacent properties
	Regional	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries
	National	The extent of the impact is rated as National as the effects of the impact extends beyond more than 2 regional/ provincial boundaries
	International	The extent of the impact is rated as International as the effect of the impact extends beyond country borders
Duration	Temporary	The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary
	Short term	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term
	Medium term	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term
	Long term	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term
Severity	High negative	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.

Criteria	Rating Scales	Notes
	Moderate negative	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected
	Low negative	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected
	Low positive	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved
	Moderate positive	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected
	High positive	The severity of the impact is rated as High positive as the natural, cultural or social functions and processes are altered to the extent that valued, important, sensitive or vulnerable systems or communities are substantially positively affected.
Potential for impact on irreplaceable resources	No	No irreplaceable resources will be impacted.
	Yes	Irreplaceable resources will be impacted.
Consequence	Extremely detrimental	A combination of extent, duration, intensity and the potential for impact on irreplaceable resources
	Highly detrimental	
	Moderately detrimental	
	Slightly detrimental	
	Negligible	
	Slightly beneficial	
	Moderately beneficial	
	Highly beneficial	
	Extremely beneficial	
Likelihood of the impact occurring	Unlikely	It is highly unlikely or less than 50 % likely that an impact will occur.
	Likely	It is between 50 and 75 % certain that the impact will occur.
	Definite	It is more than 75 % certain that the impact will occur or it is definite that the impact will occur.
Significance	Very high - negative	A function of Consequence and Likelihood
	High - negative	

Criteria	Rating Scales	Notes
	Moderate - negative	
	Low - negative	
	Very low	
	Low - positive	
	Moderate - positive	
	High - positive	
	Very high - positive	

Table 2: Impact Assessment Criteria and Rating Scales

Duration		Extent		Irreplaceable Resources		Severity		Consequence = (Duration + Extent + Irreplaceable Resources) x Severity		Likelihood		Significance (Consequence x Likelihood)		Confidence
1	Temporary	1	Footprint	1	Yes	-3	High - negative	-25 to -33	Extremely detrimental	1	Unlikely	-73 to -99	Very high - negative	Low
2	Short term	2	Site	0	No	-2	Moderate - negative	-19 to -24	Highly detrimental	2	Likely	-55 to -72	High - negative	Medium
3	Medium term	3	Local			-1	Low -negative	-13 to -18	Moderately detrimental	3	Definite	-37 to -54	Moderate - negative	High
4	Long term	4	Regional					-7 to -12	Slightly detrimental			-19 to -36	Low - negative	
		5	National			1	Low -positive	0 to -6	Negligible			0 to -18	Very low - negative	
		6	International			2	Moderate - positive							
						3	High - positive	0 to 6	Negligible			0 to 18	Very Low - positive	
								7 to 12	Slightly beneficial			19 to 36	Low - positive	
								13 to 18	Moderately beneficial			37 to 54	Moderate - positive	
								19 to 24	Highly beneficial			55 to 72	High - positive	
								25 to 33	Extremely beneficial			73 to 99	Very high - positive	

Ascribing Significance for Decision-Making

The best way of expressing these cost benefit implications for decision-making is to present them as risks. Risk is defined as the consequence (implication) of an event multiplied by the probability (likelihood)1 of that event. Many risks are accepted or tolerated on a daily basis because even if the consequence of the event is serious, the likelihood that the event will occur is low. A practical example is the consequence of a parachute not opening, is potentially death but the likelihood of such an event happening is so low that parachutists are prepared to take that risk and hurl themselves out of an airplane. The risk is low because the likelihood of the consequence is low even if the consequence is potentially severe.

It is also necessary to distinguish between the event itself (as the cause) and the consequence. Again using the parachute example, the consequence of concern in the event that the parachute does not open is serious injury or death, but it does not necessarily follow that if a parachute does not open that the parachutist will die.

Various contingencies are provided to minimise the likelihood of the consequence (serious injury or death) in the event of the parachute not opening, such as a reserve parachute. In risk terms this means distinguishing between the inherent risk (the risk that a parachutist will die if the parachute does not open) and the residual risk (the risk that the parachutist will die if the parachute does not open but with the contingency of a reserve parachute) i.e. the risk before and after mitigation.

Consequence

The ascription of significance for decision-making becomes then relatively simple. It requires the consequences to be ranked and likelihood to be defined of that consequence.

In **Table 3** below a scoring system for consequence ranking is shown. Two important features should be noted in the table, namely that the scoring doubles as the risk increases and that there is no equivalent 'high' score in respect of benefits as there is for the costs. This high negative score serves to give expression to the potential for a fatal flaw where a fatal flaw would be defined as an impact that cannot be mitigated effectively and where the associated risk is accordingly untenable. Stated differently, the high score on the costs, which is not matched on the benefits side, highlights that such a fatal flaw cannot be 'traded off' by a benefit and would render the proposed project to be unacceptable.

Table 3: Ranking of Consequence

Environmental Cost	Inherent risk
Human health – morbidity/ mortality, loss of species	High
Material reductions in faunal populations, loss of livelihoods, individual economic loss	Moderate – High
Material reductions in environmental quality – air, soil, water. Loss of habitat, loss of heritage, amenity	Moderate
Nuisance	Moderate – Low
Negative change – with no other consequences	Low
Environmental Benefits	**Inherent benefit**
Net improvement in human health and welfare	Medium – High
Improved environmental quality – air, soil, water. Improved individual livelihoods	Moderate
Economic development	Moderate – Low

[1] Because 'probability' has a specific mathematical/empirical connotation the term 'likelihood' is preferred in a qualitative application and is accordingly the term used in this document.

Positive change – with no other benefits	Low

Likelihood

Although the principle is one of probability, the term 'likelihood' is used to give expression to a qualitative rather than quantitative assessment, because the term 'probability' tends to denote a mathematical/empirical expression. A set of likelihood descriptors that can be used to characterise the likelihood of the costs and benefits occurring, is presented in **Table 4** below.

Table 4: Likelihood Categories and Definitions

Likelihood Descriptors	Definitions
Highly unlikely	The possibility of the consequence occurring is negligible
Unlikely but possible	The possibility of the consequence occurring is low but cannot be discounted entirely
Likely	The consequence may not occur but a balance of probability suggests it will
Highly likely	The consequence may still not occur but it is most likely that it will
Definite	The consequence will definitely occur

It is very important to recognise that the likelihood question is asked twice. The first time the question is asked is the likelihood of the cause and the second as to the likelihood of the consequence. In the tables that follow the likelihood is presented of the cause and then the likelihood of the consequence is presented. A high likelihood of a cause does not necessarily translate into a high likelihood of the consequence. As such the likelihood of the consequence is not a mathematical or statistical 'average' of the causes but rather a qualitative estimate in its own right.

Residual Risk

The residual risk is then determined by the consequence and the likelihood of that consequence. The residual risk categories are shown in **Table 5** below where consequence scoring is shown in the rows and likelihood in the columns. The implications for decision-making of the different residual risk categories are shown in **Table 6** below.

Table 5: Residual Risk Categories

Consequence	High	Moderate	High	High	Fatally flawed	
	Moderate – high	Low	Moderate	High	High	High
	Moderate	Low	Moderate	Moderate	Moderate	Moderate
	Moderate – low	Low	Low	Low	Low	Moderate
	Low	Low	Low	Low	Low	Low
		Highly unlikely	Unlikely but possible	Likely	Highly likely	Definite
		Likelihood				

Table 6: Implications for Decision-Making of the different Residual Risk Categories

Rating	Nature of implication for Decision – Making
Low	Project can be authorised with low risk of environmental degradation
Moderate	Project can be authorised but with conditions and routine inspections
High	Project can be authorised but with strict conditions and high levels of compliance and enforcement
Fatally Flawed	The project cannot be authorised

Appendix 2: Minimum Content Requirements for Botanical and 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	**Botanical and Terrestrial Biodiversity Specialist Assessment Report Content**	**Section / Page**
3.1.1.	contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	Cover & Pages 2 & 4
3.1.2.	a signed statement of independence by the specialist;	Page 4
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;	Pages 10 & 11
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;	Pages 10--12
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;	N/A
3.1.6.	a location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);	Pages 29, 30, 35,36
3.1.7.	additional environmental impacts expected from the proposed development;	N/A
3.1.8.	any direct, indirect and cumulative impacts of the proposed development;	Pages 41--42
3.1.9.	the degree to which impacts and risks can be mitigated;	Pages 41--42
3.1.10.	the degree to which the impacts and risks can be reversed;	Pages 41--44
3.1.11.	the degree to which the impacts and risks can cause loss of irreplaceable resources;	Pages 41--44
3.1.12.	proposed impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	N/A
3.1.13.	a motivation must be provided if there were development footprints identified as per paragraph 2.3.6 above that were identified as having a "low" terrestrial biodiversity sensitivity and that were not considered appropriate;	N/A
3.1.14.	a substantiated statement, based on the findings of the specialist assessment, regarding the acceptability, or not, of the proposed development, if it should receive approval or not; and	Pages 45 & 46
3.1.15.	any conditions to which this statement is subjected.	N/A

Appendix 3. Curriculum Vitae

Dr David Jury McDonald Pr.Sci.Nat.

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Profession: Botanist / Vegetation Ecologist / Consultant / Tour Guide

Date of Birth: 7 August 1956

Employment history:

- 19 years with National Botanical Institute (now SA National Biodiversity Institute) as researcher in vegetation ecology.
- Five years as Deputy Director / Director Botanical & Communication Programmes of the Botanical Society of South Africa
- Fifteen years as private independent Botanical Specialist consultant (Bergwind Botanical Surveys & Tours CC)

Nationality: South African (ID No. 560807 5018 080)
Languages: English (home language) – speak, read and write
Afrikaans – speak, read and write

Membership in Professional Societies:

- South Africa Association of Botanists
- International Association for Impact Assessment (SA)
- South African Council for Natural Scientific Professions (**Ecological Science, Registration No. 400094/06**)
- Field Guides Association of Southern Africa

Key Qualifications :

- Qualified with a M. Sc. (1983) in Botany and a PhD in Botany (Vegetation Ecology) (1995) at the University of Cape Town.
- Research in Cape fynbos ecosystems and more specifically mountain ecosystems.
- From 1995 to 2000 managed the Vegetation Map of South Africa Project (National Botanical Institute)

- Conducted botanical survey work for AfriDev Consultants for the Mohale and Katse Dam projects in Lesotho from 1995 to 2002. A large component of this work was the analysis of data collected by teams of botanists.
- **Director: Botanical & Communication Programmes** of the Botanical Society of South Africa (2000—2005), responsible for communications and publications; involved with conservation advocacy particularly with respect to impacts of development on centres of plant endemism.

- Further tasks involved the day-to-day management of a large non-profit environmental organisation.

- **Independent botanical consultant** (2005 – to present) over 300 projects have been completed related to environmental impact assessments in the Western, Southern and Northern Cape, Karoo and Lesotho. A list of reports (or selected reports for scrutiny) is available on request.

Higher Education

Degrees obtained
and major subjects passed:

B.Sc. (1977), University of Natal, Pietermaritzburg
Botany III
Entomology II (Third year course)

B.Sc. Hons. (1978) University of Natal, Pietermaritzburg
Botany (Ecology /Physiology)

M.Sc. - (Botany), University of Cape Town, 1983.
Thesis title: 'The vegetation of Swartboschkloof, Jonkershoek, Cape Province'.

PhD (Botany), University of Cape Town, 1995.
Thesis title: 'Phytogeography endemism and diversity of the fynbos of the southern Langeberg'.

Certificate of Tourism: Guiding (Culture: Local)
Level: 4 Code: TGC7 (Registered Tour Guide: WC 2969).

Employment Record:

January 2006 – present: Independent specialist botanical consultant and tour guide in own company:
Bergwind Botanical Surveys & Tours CC
August 2000 - 2005 : Deputy Director, later Director Botanical & Communication Programmes, Botanical Society of South Africa
January 1981 – July 2000 : Research Scientist (Vegetation Ecology) at National Botanical Institute
January 1979—Dec 1980 : National Military Service

Further information is available on website: www.bergwind.co.za