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Pri.Sci.Nat # 400045/08

ECOLOGICAL IMPACT ASSESSMENT OF PROPOSED DEVELOPMENT PORTION OF PORTION 134 OF FARM 559, ROOIELS.

Prepared for: PHS Consulting, Hermanus

Clients: G. Joubert & A. Redelinghuys

28 Nov 2022

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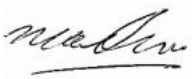
DECLARATION OF INDEPENDENCE

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

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



NA Helme (Sole Proprietor: Nick Helme Botanical Surveys)

The author believes that the information presented in this report complies with the PROTOCOL FOR THE SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS FOR ENVIRONMENTAL IMPACTS ON TERRESTRIAL PLANT SPECIES (Government Gazette No. 43855 of 30 October 2020).

ABRIDGED CV:

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Since the end of 2001 I have been the Sole Proprietor of Nick Helme Botanical Surveys, and have undertaken over 1800 site assessments, specialising in the diverse flora of the south-western Cape.

A selection of relevant previous botanical work is as follows:

- Botanical assessment of Ptn 9 of Farm 429 Gabrielskloof, Caledon (Infinity Environmental 2021)
- Baseline ecological assessment of Karwyderskraal 584, Caledon (Terramanzi 2021)

- Botanical impact assessment of proposed development of Ptn 29 of Farm 410, Caledon (PHS Consulting 2021)
- Botanical assessment of proposed new cultivation on Welbedacht farm, TraTra Mountains (Footprint Environmental 2020)
- Biodiversity Compliance Statement - Philippi erf 1/1460 (Infinity Environmental 2020)
- Botanical assessment of Kleinmond WWTW expansion (Aurecon 2020)
- Botanical assessment of Mooreesburg WWTW expansion (Aurecon 2020)
- Botanical assessment of Struisbaai cemetery sites (Infinity Environmental 2020)
- Botanical assessment of MoPama development site, Swellendam (Landscape Dynamics 2020)
- Botanical assessment of proposed new cultivation on Portion of Wittewater 148, Piketberg (Cornerstone Environmental 2019)
- Botanical assessment of Droogerivier farm Leipoldtville (Footprint Environmental 2018)
- Botanical assessment of Sebulon farm, Redelinghuys (Natura Libra Environmental Services 2018)
- Botanical assessment of proposed new cultivation on Ptn 2 of farm Groenevalley 155, Piketberg (Cederberg Environmental Assessment Practise 2017)
- Botanical assessment of proposed new cultivation on Groot Patrysvlei, Clanwilliam (Cederberg Environmental Assessment Practise 2017)
- Botanical assessment of proposed new cultivation on farm Rosendal, Koue Bokkeveld (Cederberg Environmental Assessment Practise 2016)
- Botanical assessment of proposed cultivation on farm Kransvlei, Clanwilliam (Cederberg Environmental Assessment Practise 2016)
- Botanical assessment of proposed cultivation on farm Erfdeel, Bo-Swaarmoed, Ceres (Cederberg Environmental Assessment Practise 2016)
- Botanical assessment of proposed cultivation on farm Kransvlei and Kriedouberg, Clanwilliam (Cederberg Environmental Assessment Practise 2016)
- Botanical assessment of proposed prospecting areas on Raskraal 255, Vanrhynsdorp (Venatouch 2016)
- Botanical assessment of proposed dam expansion on farm De Vlei, De Doorns (Cederberg Environmental Assessment Practise 2015)
- Botanical assessment of proposed cultivation on Rem. Andriesgrond 204, Clanwilliam (Cederberg Environmental Assessment Practise 2015)

- Botanical assessment of proposed dam on Modderfontein farm, Citrusdal (Cederberg Environmental Assessment Practise 2015)
- Botanical assessment of proposed cultivation on farms Laastedrif & Kleinvlakte, Bo Swaarmoed, Ceres (Cederberg Environmental Assessment Practise 2014)
- Botanical assessment of Remainder of Farm Rietfontein 244, Piketberg (Cederberg Environmental Assessment Practise 2014)
- Botanical Assessment of farm Draaihoek 293, Vredendal (Cederberg Environmental Assessment Practise 2013)
- Botanical Assessment of farm Gideonsoord 303, Klawer (Cederberg Environmental Assessment Practise 2013)

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1. INTRODUCTION

This botanical and ecological impact assessment was commissioned as part of the environmental authorisation process being undertaken for a potential development on a portion of Portion 134of Farm 559, in the Rooi-Els area, Western Cape. The study area is about 1km southeast of Rooi-Els (Figure 1), and borders on the Kogelberg Nature Reserve (to the east). The study area (about 5ha of the 22ha property) includes a tarred access road to what is now just a platform of the house burnt in a wildfire in April 2017, and a sand track to a small excavated dam. The proposed development layout is shown in Figure 1b.

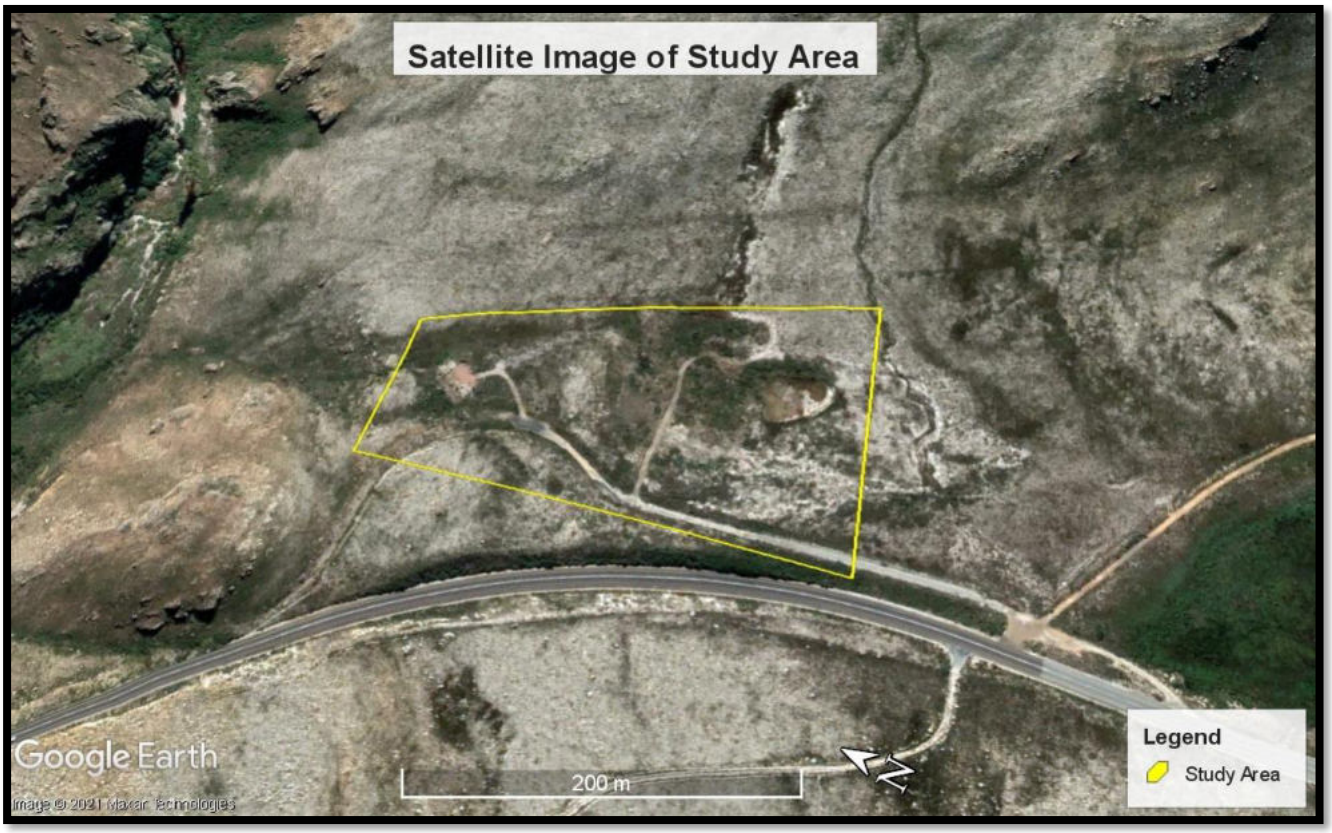

Figure 1: Satellite image showing study area. The old house and driveway footprint is clearly visible in the left hand side of the study area, with the dam on the right of the study area.

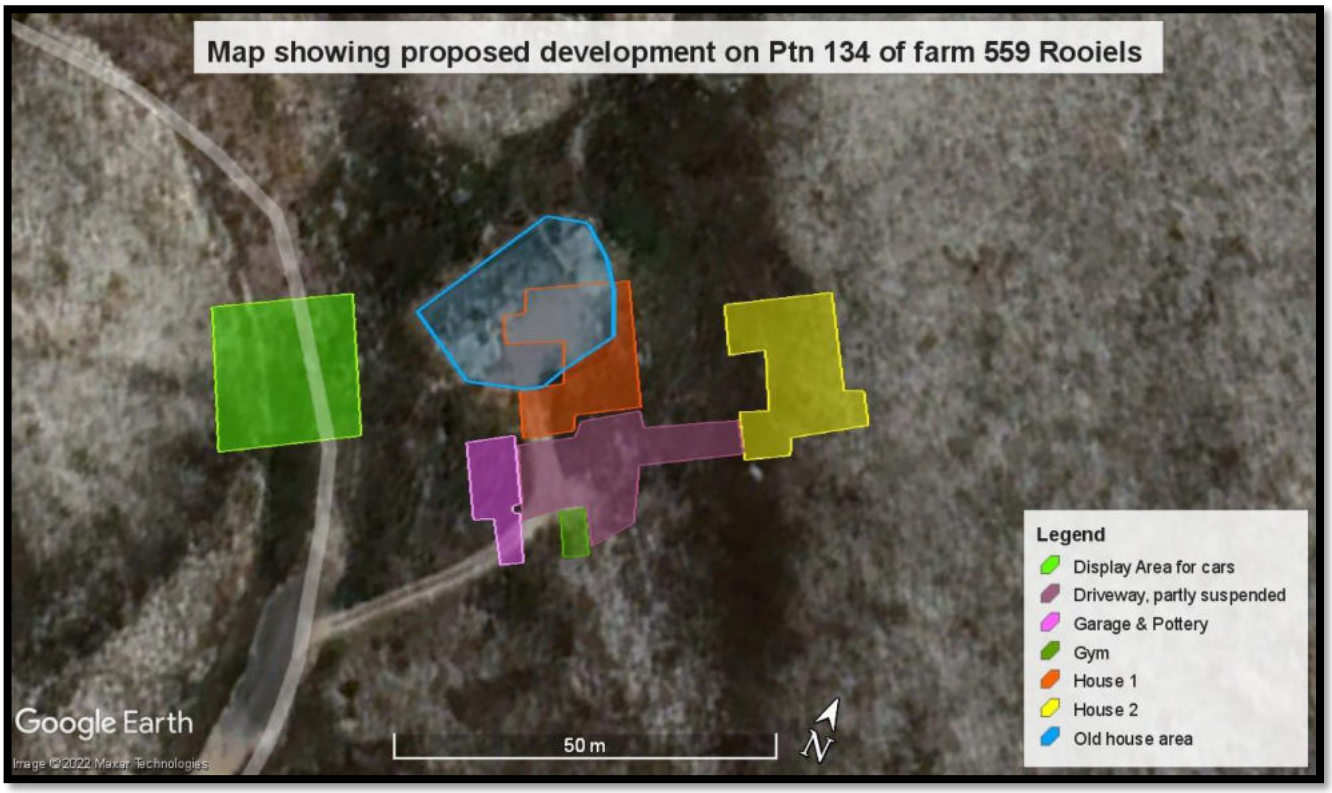

Figure 1b: Satellite image of part of study area with proposed development footprint overlaid (as of January 2022). Areas of wetland vegetation appear darker in this image, dated February 2021.

2. TERMS OF REFERENCE

The terms of reference for this study were to:

- Undertake a site visit to assess the vegetation and terrestrial ecology in the study area
- Identify and describe the vegetation and terrestrial fauna in the study area and place it in a regional context, including its status in terms of the relevant CapeNature Spatial Biodiversity Plan (CBA/ESA/ONA, etc)
- Identify and locate any (likely) plant and animal Species of Conservation Concern in the study area, based on observation, literature and iNaturalist website review
- Provide an overview and map of the botanical and ecological conservation significance (sensitivity) of the study area, indicating any No Go areas for development
- Discuss the ecological constraints
- Make recommendations for future project planning
- Undertake an ecological impact assessment of the proposed project, using standard IA methodology.
- Identify all likely ecological impacts of the proposed development
- Assess the impacts at construction and operational stages
- Identify and recommend viable and appropriate mitigation to avoid, minimise or mitigate the identified impacts to an acceptable level.

3. LIMITATIONS, ASSUMPTIONS AND METHODOLOGY

The site was visited on 7 September 2021, which is within the optimal spring flowering season in this winter rainfall area, and thus most of the likely annual and geophytic species were evident or identifiable. Most (but not all) of the potential localised and threatened species in the area can still be identified when not flowering, provided that the observer has experience with the species concerned, and is able to identify sterile or fruiting material. Virtually all perennials were identifiable. The seasonal constraints on the comprehensiveness of the botanical observations and findings are thus believed to be relatively unimportant. Time series Google Earth imagery was examined, showing changes over time. The confidence levels in the botanical findings are considered to be high in terms of seasonality. It is always possible that certain cryptic species and populations could have been missed during a once off survey, some of which may be rare or threatened. It is thus possible that some of the areas were assessed as being of lower conservation value/sensitivity than they in fact are. This ecological study is not a detailed freshwater or wetland assessment, and a separate freshwater specialist study has been undertaken at the baseline and EIA stages, and all wetland mapping and description on site is thus deferred to the wetland specialist.

In order to supplement the species data I used a habitat based approach, in which overall habitat quality, as determined by species richness and presence of key indicator species, is used to determine conservation value (aka quality) – which is a term often used interchangeably (but incorrectly) with "sensitivity". Because the term sensitivity is generally better understood and is more widely used I will continue to use it in this report. Conservation value and sensitivity of habitats are a product of species diversity, plant community composition, rarity of habitat, degree of habitat degradation, rarity of species, ecological viability and connectivity, vulnerability to impacts, and reversibility of threats (which in this case generally refers to the rehabilitation potential of the habitat; high sensitivity habitats having low rehabilitation potential).

During the field visit I walked various transects across the study area. I noted the condition of the veld and habitats present, using community structure, species abundance and floristics (species present, notably the Species of Conservation Concern; SoCC) as indicators. Numerous (>100) localised plant species and plant SoCC have been recorded from within 2km of the study area, as per the national Screening Tool, and these were all considered and looked for during the site visit. I recorded all plant species in a notebook, and took various digital photographs and coordinates using a handheld GPS. Certain plant collections were made, which have been turned into voucher specimens and deposited at the Compton Herbarium at Kirstenbosch for future reference, and photos of all of the SoCC and many of the species observed on site are available on the website iNaturalist.org. Faunal observations were purely incidental, and no camera trapping or pitfall trapping was undertaken, and habitat quality is deemed to be a key surrogate for faunal sensitivity.

The GIS based South African National Biodiversity Institute (SANBI) vegetation map for South Africa (Mucina & Rutherford 2012 and online updates) was consulted, the CapeNature Spatial Biodiversity Plan (Pence 2017), along with the National Spatial Biodiversity Assessment (NSBA; Rouget *et al* 2004; Skowno *et al* 2019), and the National List of Threatened Ecosystems (DEA 2011). Conclusions were drawn based on this documentation and twenty five years of professional experience in the area and the region.

Google Earth satellite imagery dated September 2021 (and earlier time series going back to 2004) was used to verify prior vegetation patterns, and for mapping purposes. Google Earth was used to measure polygon areas.

The proposed development as assessed is shown in Figure 1b (and see Figure 3 for November 2022 version). Total proposed development is at least 1029m^2, plus new driveway and road sections of approximately 300m^2, and thus the total new development footprint is less than 1500m^2, of which about 40% is on existing disturbed footprints (old house and driveway). Thus, about 800m^2 can be considered as "new" development footprint. No disturbance of the wetlands and dams to the southeast of the site is proposed or assessed.

4. STUDY AREA AND REGIONAL CONTEXT

The study area is within a primarily winter rainfall area, with moderate to high total annual rainfall (450-750mm/yr), and moderate temperatures in the summer. Soils in the study area are acid sands derived from the underlying Table Mountain Group sandstones. Some areas have high levels of manganese and ferricrete, especially where seaonally wet. There are various wetlands, seeps and drainage lines, although some are artificial (dams, dug channels, etc.). The site spans something of a watershed, with water flowing both south and north from the central part of the site.

4.1 National and Regional Context

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

Red Listing process undertaken is that 67% of the threatened plant species in the country occur only in the southwestern Cape, and these total over 1800 species (Raimondo *et al* 2009)! It should thus be clear that the southwestern Cape is a major national and global conservation priority, and is quite unlike anywhere else in the country in terms of the number of threatened plant species.

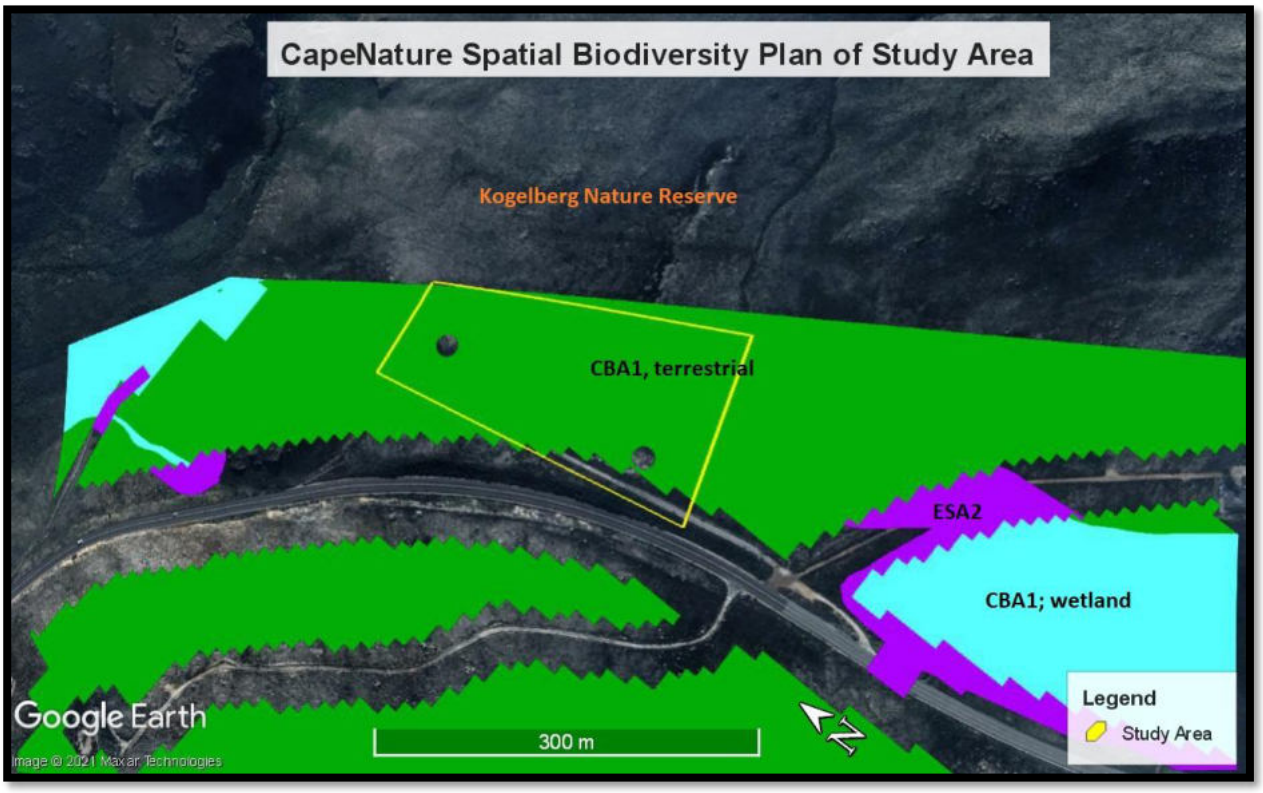

Figure 2: Extract of CapeNature Spatial Biodiversity Plan for the area. Essentially the entire site is mapped as CBA1 (terrestrial), with the exception of the old house footprint and the access road.

The CapeNature Spatial Biodiversity Plan(Pence 2017) has identified both aquatic and terrestrial Critical Biodiversity Areas (CBAs) throughout the region, plus other categories such as Ecological Support Areas (ESAs). Figure 2 shows the relevant section for the study area, and the map indicates that essentially the entire site is mapped as CBA1 (terrestrial), with the exception of the old house footprint and the access road, which highlights the conservation value of the area. The CapeNature SBP mapping in this area is largely supported by the results of this study, although there are more degraded areas that should rather be mapped as CBA2 (poor condition).

The extensive areas mapped as CBA1 are defined in the BSP as ”Areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure. The management objective is to maintain these in a natural or near-natural state, with no further loss of natural habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate”(Pence 2017). The current proposal for these areas (permanent hard surfaces) cannot be regarded as low-impact, biodiversity-sensitive land uses.

5. THE VEGETATION ON SITE

5.1 Background

According to the SA Vegetation map (Mucina & Rutherford, 2018 update) **Kogelberg Sandstone Fynbos**) covers the study area and surrounds, and no copy of this map is included as it adds little value. This mapping is supported by the site observations.

Kogelberg Sandstone Fynbos is currently gazetted as a **Critically Endangered** habitat on a national basis (DEA 2011) and this is maintained by the latest study, which is not yet gazetted(Skowno *et al* 2019). The unit has 83% of its original total extent still remaining, 59% is conserved, with a national conservation target of 30% (Rouget *et al* 2004). Even though very well conserved this vegetation type is exceptionally species rich, with many local endemics, and this is the reason for listing it as Critically Endangered, not because it has lost a lot of its original extent. The main focus of surveys in this unit should thus be to establish what, if any, SoCC occur within the footprint, and how significant this might be. The primary threat to this unit is alien invasive plants, followed by cultivation and urbanisation.

Fire is a key driver of Fynbos dynamics and is necessary once every ten to fifteen years in most areas in order to maintain optimal ecological functioning (Helme *et al* 2016). However, the natural habitat remnants in most of the Cape lowlands are now so fragmented that fire cycles are no longer natural and are entirely at the whims of the landowners, with the result that many areas are not burnt often enough, and others too often. In the absence of fire, grazing, soil moisture, soil depth, and soil type are instead often the primary plant community drivers. Fire cycles in the study area are still largely natural, albeit perhaps slightly more frequent than they would have been, due to more regular ignition by humans. The study area was last burnt in 2017, and can be expected to burn again every decade or so.

There are various spatial elements of ecological processes on the site, including soil type gradients (ecotones or edaphic interfaces), where rocky sands meet the deeper soils, water catchments and drainage lines, and various soil moisture gradients. The area has very good ecological connectivity, and is adjacent to a large formal nature reserve (Kogelberg Nature Reserve).

5.2. Habitat description

Soil disturbance in the study area is concentrated around the existing old house and driveway footprint (see Plate 1), along the road and tracks, and in the previously disturbed area between the dam and the old house footprint (Plate 2). This soil disturbance is the only factor that has degraded parts of the study area, and a fair degree of natural rehabilitation of these areas has taken place since the fire in 2017, and is likely to continue, unless further disturbed. The most

disturbed areas are currently of lower sensitivity than the rest of the site(see Section 6 and Figure 3).

Indigenous plant diversity is fairly high throughout most of the study area, and species noted in the High sensitivity, non-wetland areas include *Leucadendron laureolum, L. gandogeri, L. xanthoconus, L. salicifolium, L. salignum, Restiofestuciformis, R. egregius, Hypodiscusaristatus, Passerinacorymbosa, Erica serrata, E. corifolia, E. imbricata, Searsia lucida, Pelargonium cucullatum, Cymbopogon plurinodis, Osteospermummoniliferum, Elegiafilacea, E. stipularis, Cliffortiaruscifolia, Anthospermumaethiopicum, Merxmuelleracincta, Aspalathus cymbiformis, Phaenocomaprolifera, Lanarialanata, Protea repens, Syncarphavestita, Edmondiasesamoides, Schoenus sp., Serruriaelongata* (NT), *S. adscendens*(NT), *Struthiolaciliata, Tetrariathermalis* and *Elegiajuncea*.

The only plant **Species of Conservation Concern** recorded on site were *Serruriaelongata* and *S. adscendens*, both of which are Red listed as Near Threatened (Raimondo *et al* 2004). Both these species are fairly common(>50 plants each) in the better drained areas on site, in the least disturbed areas. No evidence of the locally endemic *Haemanthus canaliculatus* (Endangered) was seen on site, although it does occur in wetlands just 200m to the south.

Species	**Redlist Status**
Serruriaelongata	Near Threatened
Serruriaadscendens	Near Threatened

Table 1: List of the 2 plant Species of Conservation Concern recorded in the study area.

Species noted in the previously disturbed areas include *Pentameris pallida, Muraltiafiliformis, Pelargonium capitatum, P. cucullatum, Cynodondactylon, Carpobrotus edulis, Searsia laevigata, Senecio burchelli, Passerinacorymbosa* and *Metalasia muricata*. Woody alien invasives such as rooikrans (*Acacia cyclops*) and Port Jackson (*Acacia saligna*) are most common in the previously disturbed areas, but do not make up more than 5% of the cover.

Typical species in the wetland areas include *Restiofestuciformis, Psoralea pinnata, P.affinis, Scirpoidesnodosus, Typha capensis, Phragmites australis, Plecostachysserpyllifolia, Elegia nuda* and *Fuirenacoerulescens*.

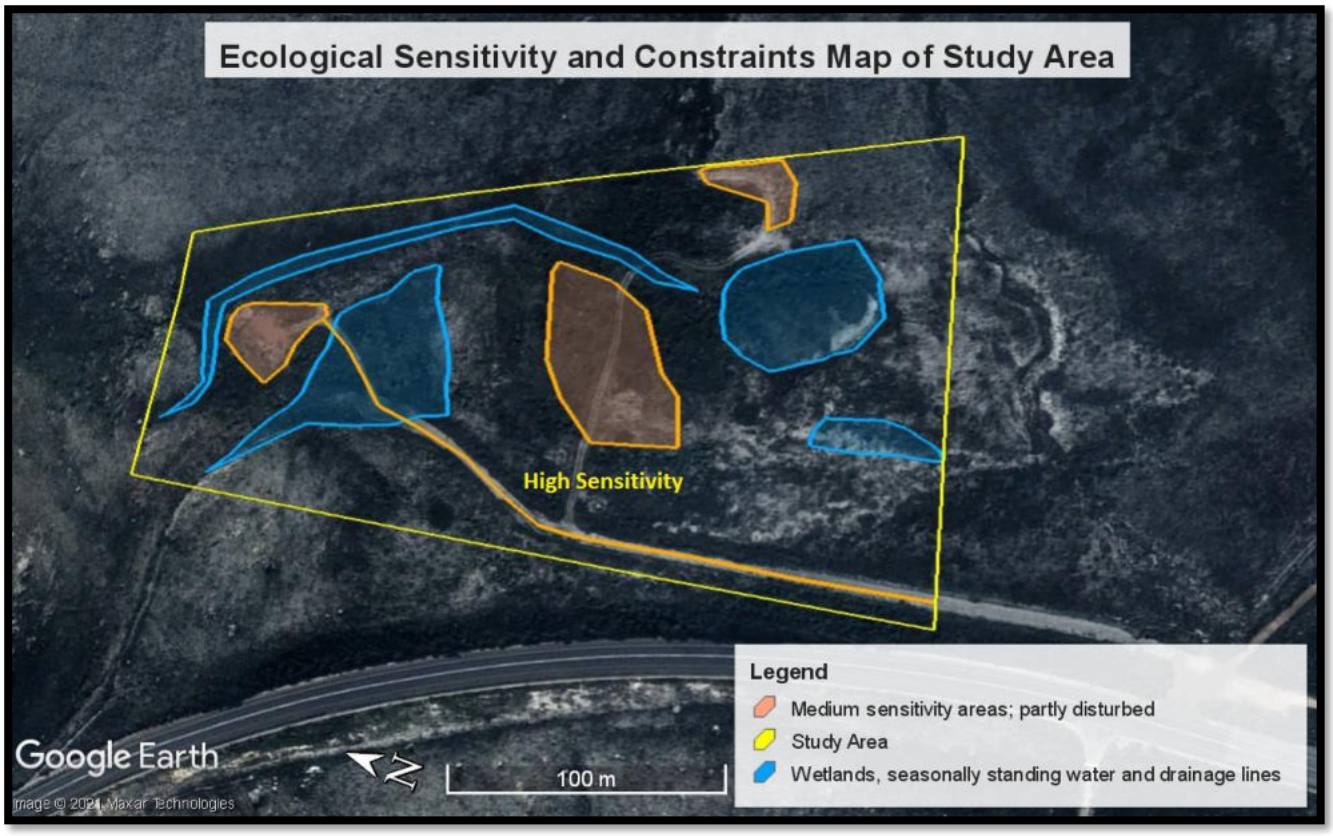

Figure 3: Ecological sensitivity and constraints map of the study area. All unshaded areas within study area are of High botanical sensitivity. All blue shaded areas are regarded as some sort of wetland and have High ecological sensitivity, but note that these are not definitively mapped or categorised, and readers should refer to the specialist freshwater report for greater accuracy and detail.

Plate 1: View looking northwest, showing old house platform, driveway and access road.

Plate 2: View looking southeast, showing previously disturbed area between dam and old house footprint, now partly rehabilitated.

Plate 3: View showing the existing excavated dam and surrounding vegetation. The dam supports a population of the Southern Dainty Frog (*Cacosternum australis*) – here at its western limit - and the more common Clicking Stream Frog (*Strongylopusgrayii*).

Plate 4: View of the seasonally wet area close to the access road, looking northeast towards the dam shown in Plate 3. The vegetation indicates that this is not really a wetland, but rather just a short-lived accumulation of surface water.

6. BOTANICAL SENSITIVITY

Botanical sensitivity has been outlined, mapped(see Figure 3) and essentially described in the previous section, but is summarised here.

The bulk of the vegetation in the study area is of High sensitivity (high quality), and is characterised by relatively high indigenous plant diversity, large and viable populations of 2 different plant Species of Conservation Concern, and intact ecological integrity. The underlying vegetation type is considered Critically Endangered on a national basis (as currently gazetted).

All wetlands and drainage lines should be considered to be of High ecological sensitivity (irrespective of botanical sensitivity), but these have not specifically been surveyed or delineated for this report and readers should refer to the specialist freshwater report for greater accuracy and detail.

The Medium sensitivity area supports notably lower plant diversity than the High sensitivity area, with no recorded plant Species of Conservation Concern, and rehabilitation potential is moderate to good. Ecological integrity has been compromised, but is still fairly intact, being surrounded by High sensitivity vegetation.

7. FAUNA

Given the intact habitat the site still probably supports a largely intact Fynbos fauna.

The avifauna is currently fairly typical of the Fynbos landscape in this region, and one Species of Conservation Concern (SoCC) has been recorded foraging in the vicinity of the study area. The only avian SoCC recorded (pers. obs.) foraging nearby (but not actually on site)is Cape Rockjumper (*Chaetopsfrenatus*; Regionally Near Threatened, Globally Least Concern; Taylor *et al* 2015).Additional Fynbos endemics like Cape Sugarbird (*Promeropscafer*) and Orange breasted Sunbird (*Anthobaphesviolacea*) are present and common in the area.

There are few confirmed records of threatened reptiles from this particular property, but some may be present. The following Species of Conservation Concern could potentially occur on site, essentially anywhere on site: Cape Dwarf Chameleon (*Bradypodionpumilum*; Vulnerable; Bates *et al* 2014). No tortoises were seen on site, but the region supports large populations of Angulate Tortoise (*Chersinaangulata*; Least Threatened).

Steenbok (*Raphicerus campestris*) and Grysbok (*Raphicerus melanotis*) are probably the most prominent wild mammals that may still occur on site, and it is very likely that lynx (*Felis caracal*) is still present as the second largest predator. The only threatened mammal likely to occur on site occasionally is the Cape leopard (*Panthera pardus pardus*; Vulnerable). Individuals have very wide ranges and large territories, but are known to move through the area. White-tailed Rat *Mystromysalbicaudatus*(Endangered) and Cape Golden Mole *Chrysochloris asiatica* (Data Deficient) could potentially occur, but both are unlikely to be present as the habitat is not suitable.

The site supports populations of at least two frog species, both heard calling in the dam: the common Clicking Stream Frog (*Strongylopusgrayii)*and the more range restricted(but not threatened) Southern Dainty Frog (*Cacosternum australis*), which is here at its western known limit (extends east to Cape Agulhas).

No threatened butterfly species are likely to occur within the habitat on site (Mecenero*et al* 2013), but the site may support a high diversity of moths and butterflies, in addition to many other insects, some of which could be rare or localised, as insect diversity patterns in the Fynbos region often parallel plant diversity patterns. Most other insect groups have not been assessed nationally for Red list status.

Faunal sensitivity is expected to largely mirror the botanical sensitivity (see Figure3), as it is usually dependant on available habitat.

8. IMPACT ASSESSMENT

For purposes of this assessment faunal and botanical impacts are considered together (as ecological impact), as the intact Fynbos habitat on much of the site is essentially a surrogate for the likely local fauna.

8.1 Construction Phase (Direct) Ecological Impacts

The primary construction phase ecological impact would be permanent loss of High and Medium sensitivity natural vegetation and faunal habitat in the development footprints (prior to and after mitigation). A secondary impact at the construction phase would be loss of small portions (<5%) of the site populations of at least two plant Species of Conservation Concern (*Serruriaadscendens* and *S. elongata*, both Near Threatened), both of which are still common in the region (with thousands of plants within 2km of the site).

The proposed development layout would result in loss of less than 1500m^{2}of habitat, of which about 40% is on existing disturbed footprints (old house and driveway). Thus, about 800m^2 can be considered as "new" development footprint, in High sensitivity habitat. Less than 5% of the survey site populations of the two recorded plant SoCC will be lost. Botanical significance of this loss is Low - Medium negative before and after mitigation.

Kogelberg Sandstone Fynbos is the underlying vegetation type throughout the study area and is listed as **Critically Endangered** on a national basis (DEA 2011; Skowno *et al* 2019), but it must be noted that this listing is driven by occurrence of many local endemic and SoCC in the unit (very few of which occur in the development footprint) rather than habitat loss.

Virtually all of the proposed development area is mapped as **CBA1** in the CapeNature Spatial Biodiversity Plan (Pence 2017, Figure 2). Loss of areas mapped as CBA1 is highly undesirable from a conservation perspective, as these areas are considered irreplaceable.
The extent of the impacts is deemed to be local and regional, but also national, in that the vegetation types and threatened species are also assessed at a national level.

Development Component	Extent of impact	Duration of impact	Intensity	Probability of impact	Irreplaceable loss of biodiversity	Significance before mitigation	Significance after mitigation
<1500m2 development footprint	Mainly local	Permanent	Medium	Definite	None	Low to Medium-ve	Low to Medium -ve
No Go	Local	Unknown and variable	Neutral to low negative	Likely	Very Low	Neutral to Very Low negative	Neutral to Very Low negative

Table A: Summary table for construction phase ecological impacts associated with the proposed development. The primary construction phase impacts would be loss of about 800m^2 of High

sensitivity vegetation in the development footprints, associated with loss of footprint populations of 2 plant Species of Conservation Concern, and areas mapped as CBA1.

8.2 Operational Phase Ecological Impacts

Operational phase impacts will take effect as soon as the natural or partly natural vegetation on the site is lost, and will persist in perpetuity, or as long as the area is not rehabilitated. Operational phase impacts include minor loss of ecological connectivity across the overall property, and associated habitat fragmentation, and the new development is likely to result in fire suppression of adjacent areas, and may result in alien Argentine ant introduction, with associated negative ecological impacts.

There will be some habitat fragmentation and associated loss of ecological connectivity in the study area as a result of the new development, but ecological connectivity will remain good across most of the site. The habitat fragmentation impact is likely to be **Low negative** before and after mitigation.

Alien invasive Argentine ants(*Linepithemahumile*) impact negatively on the adjacent natural vegetation. It is very difficult to accurately assess the impact, as this would require detailed pre and post construction surveys of the vegetation and ant fauna over some years, but it is well known that these alien ants are strongly associated with human residences and forage up to 50m away from their nests (in houses). The Argentine ants outcompete and displace the indigenous ants, which disperse 30% of all Fynbos plants, and their presence thus typically leads to seed dispersal failure in 30% of the surrounding Fynbos. The likely ecological impact of these ants in the surrounding vegetation is **Low – Medium negative**, and mitigation is virtually impossible, other than limiting disturbance and built footprints.

Fire at ecologically appropriate intervals (every 8 – 15 years) is necessary in Fynbos for optimal ecological functioning of this fire dependant vegetation type (Helme *et al*2016). The disruption of natural fire regimes in the natural veld surrounding the site is a potential impact of concern, as deliberate fire-suppression is likely in the vicinity of the development. On balance the increased likelihood of longer fire return intervals (versus what would occur naturally in the area), way beyond what is ecologically optimal, is likely to have a **Low – Medium negative** botanical impact at a local scale, before and after mitigation (no mitigation likely). This is however only likely to impact a small area say within 50m of the development, as wildfires are likely elsewhere.

No significant positive ecological impacts of the proposed development are likely during the operational phase.

Development Component	Extent of impact	Duration of impact	Intensity	Probability of impact	Irreplaceable loss of biodiversity	Significance before mitigation	Significance after mitigation
<1500m2 development footprint	Mainly local	Permanent	Medium	Definite	None	Low to Medium-ve	Low to Medium -ve
No Go	Local	Unknown and variable	Neutral to low negative	Likely	Very Low	Neutral to Very Low negative	Neutral to Very Low negative

Table B: Summary table for operational phase ecological impacts associated with proposed development components. The operational phase impacts would be loss of current ecological connectivity across the site and associated habitat fragmentation, as well as possible disruption of optimal fire regimes, and of ant-based seed dispersal in the surrounding area.

8.3 The No Go Alternative

The No Go alternative (continuation of the *status quo*) is likely to involve only very low levels of ongoing habitat degradation (due mainly to fairly minor alien plant invasion associated with previous site disturbance) and thus it is likely that the No Go alternative will have a **Neutral to Very Low negative botanical impact** in the long term (see Tables A & B).

8.4 Cumulative Impacts

The cumulative ecological impacts are in many ways equivalent to the regional ecological impacts, in that the vegetation type/s likely to be impacted by the proposed developments have been, and will continue to be, impacted by numerous developments and other factors (the cumulative impacts) within the region. The primary cumulative impacts in the Hottentots Holland region are loss of natural vegetation and threatened plant species to ongoing alien plant invasion, plus urban development and agriculture in the lower lying areas (Mucina & Rutherford 2012; Helme & Rebelo 2016).

The overall cumulative ecological impacts at the regional scale are likely to be Very Low negative for the proposed development, as the footprint is very small, and the vegetation unit is well conserved.

8.5 Positive Impacts

No significant positive ecological impacts of the proposed development are likely during either the construction or the operational phase.

9. REQUIRED MITIGATION

Other than reducing the development footprint little additional mitigation is possible. The following mitigation is however considered, essential, feasible and reasonable, and is factored into the assessment:

- All approved development footprints should be surveyed and clearly demarcated on site prior to any site preparation. An additional maximum of 2m working space around these footprints should be allowed for, and this working area should be temporarily fenced off form the natural areas, to limit disturbance of the latter. This temporary fencing should be sturdy and clearly visible – such as coloured rope attached to poles. No disturbance or dumping of materials outside this working area should be allowed.
- Firebreaks around the development should be cut annually in early November. These firebreaks should be a maximum of 5m wide, and should be within 15m of the units. No soil disturbance may be caused during firebreak cutting, which should be undertaken with handheld brush cutters.
- Alien invasive plant management should be undertaken on the entire property as soon as possible, and again within two years of any development, using only appropriate methodology (see Martens *et al* 2021).
- No herbicide should be sprayed anywhere on site.

10. CONCLUSIONS AND RECOMMENDATIONS

- The study area supports High sensitivity vegetation, of a Critically Endangered type, with at least 2 plant Species of Conservation Concern recorded (both Near Threatened and with >50 plants on site, but with <5 plants within the proposed development footprint). Most of the undisturbed part of the site is a CBA1 (vegetation).
- The proposed development footprint (see Figure 3 for version as per November 2022) will be less than 1500m^2, of which only about 800m^2 will be in undisturbed High sensitivity vegetation.
- Overall ecological impact of the proposed development is likely to have an acceptable Low to Medium negative ecological impact, before and after mitigation.

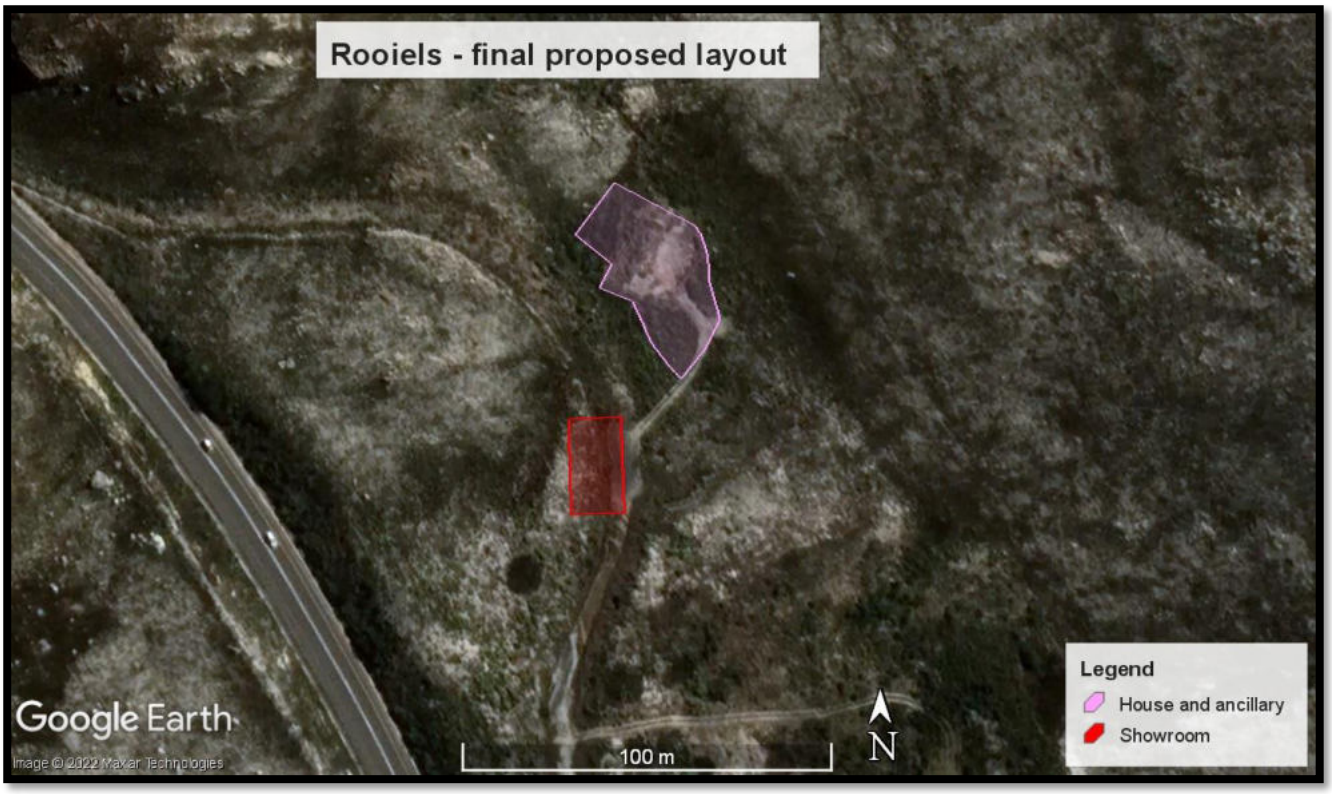

Figure 3: Final proposed total development footprint, as of November 2022. This layout is slightly more compact than the original proposed layout (see Figure 1b) and the overall ecological impact of the proposed development is as per the assessment.

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