

INTEGRATED RESERVE MANAGEMENT PLAN HELDERBERG NATURE RESERVE

June 2011



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AUTHORIZATION PAGE

This Integrated Management Plan for the Helderberg Nature Reserve was drafted by the Area Manager and recommended by the Reserve Planning Team, a multi-disciplinary team consisting of:

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DOCUMENTED

Integrated Reserve Management Plan	
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Compiled by

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Environmental Resource Management Department

City of Cape Town

Helderberg Nature Reserve

June 2011

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List of abbreviations used

APO	annual plan of operations
C.A.P.E	Cape Action for People and the Environment
CARA	Conservation of Agricultural Resources Act
CDF	Conservation Development Framework
CFR	Cape Floristic Region
EIA	environmental impact assessment
GIS	geographic information system
IDP	Integrated Development Plan
IMEP	Integrated Metropolitan Environmental Policy
IRMP	Integrated Reserve Management Plan
LBSAP	Local Biodiversity Strategy and Action Plan
METT-SA	Management Effectiveness Tracking Tool South Africa
MOU	memorandum of understanding
MPA	marine protected area
NEMA	National Environmental Management Act
NEM:PA	National Environmental Management: Protected Areas Act, Act 57 of 2003
NEM:BA	National Environmental Management: Biodiversity Act, Act 10 of 2004
NGO	non-governmental organisation
PAR	protected-area review
RPC	Reserve Planning Committee
SAAQIS	South African Air Quality Information System
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
SG	Surveyor-General
SWOT	strengths, weaknesses, opportunities, threats analysis
ToR	terms of reference
WPSDP	Workplace Skills Development Plan
WWF	Worldwide Fund for Nature

PART 1

DESCRIPTION

1. INTRODUCTION

Helderberg Nature Reserve covers an area of 402 ha, and is located on the slopes of the Helderberg mountains in Somerset West. The reserve extends to a height of 1 137 m, from where spectacular views of False Bay can be enjoyed.

To date, 613 plant species have been recorded, of which 13 are threatened with extinction. In addition to this high plant diversity, a large number of bird, mammal, reptile, amphibian and fish species inhabit the area.

The reserve has a large area set aside for visitors, including picnic sites, an information centre, a small restaurant as well as an extensive footpath network. These features, combined with the spectacular natural features, make the area a highly desirable destination for local and international visitors. The reserve provides unparalleled opportunities for environmental education, to which the nearly 6 500 children visiting the reserve every year can attest. It is in the interest of the local communities, landowners and the general public that this area is maintained in as natural a condition as possible, and that the area is used sustainably.

The strategic management planning process – resulting in the development of an Integrated Reserve Management Plan (IRMP) – for Helderberg Nature Reserve, which includes Silberboomkloof Natural Heritage Site, began with the definition of the vision, followed by the purpose of the reserve. This purpose is then supported by desired states for the reserve. The reserve objectives contribute to the realisation of the purpose and desired states. For each desired state, a number of management objectives are identified. These management objectives are then implemented through the identification of outputs. Objectives for each desired state are prioritised for the five-year time horizon of the plan. Time frames, deliverables, performance indicators and targets are then allocated to each objective or a group of linked outputs contributing to the desired state.

1.1 Aim of the Integrated Reserve Management Plan

The aim of the IRMP is to ensure that Helderberg Nature Reserve has clearly defined objectives and activities to direct the protection and sustainable use of its natural, scenic and heritage resources over a five-year period. The IRMP thus provides the medium-term operational framework for the prioritised allocation of resources and capacity in the management, use and development of the reserve. The IRMP intends to add value and

continuity by clearly stating management objectives, scheduling action, and providing management guidelines. The reserve planning process for Helderberg Nature Reserve takes place against the backdrop of (i) the City of Cape Town’s Integrated Development Plan (IDP) (Anon 2010); (ii) the City of Cape Town’s Integrated Metropolitan Environmental Policy (IMEP) (Anon, 2003¹); (iii) the City of Cape Town’s Biodiversity Strategy (Anon, 2003²) and Local Biodiversity Strategy and Action Plan (LBSAP) (Anon 2009¹), and (iv) the bioregion (Cape Action for People and the Environment, or C.A.P.E). The major elements of the IRMP are this document (overall strategy, vision and context), the detailed subsidiary plans (as required), and an annual plan of operations (APO). The IRMP for Helderberg Nature Reserve is supported by a State of Biodiversity report (Holmes *et al.* 2008), operational guidelines and a monitoring and evaluation framework to ensure ongoing implementation and review of protected-area management activities (see figure 1).

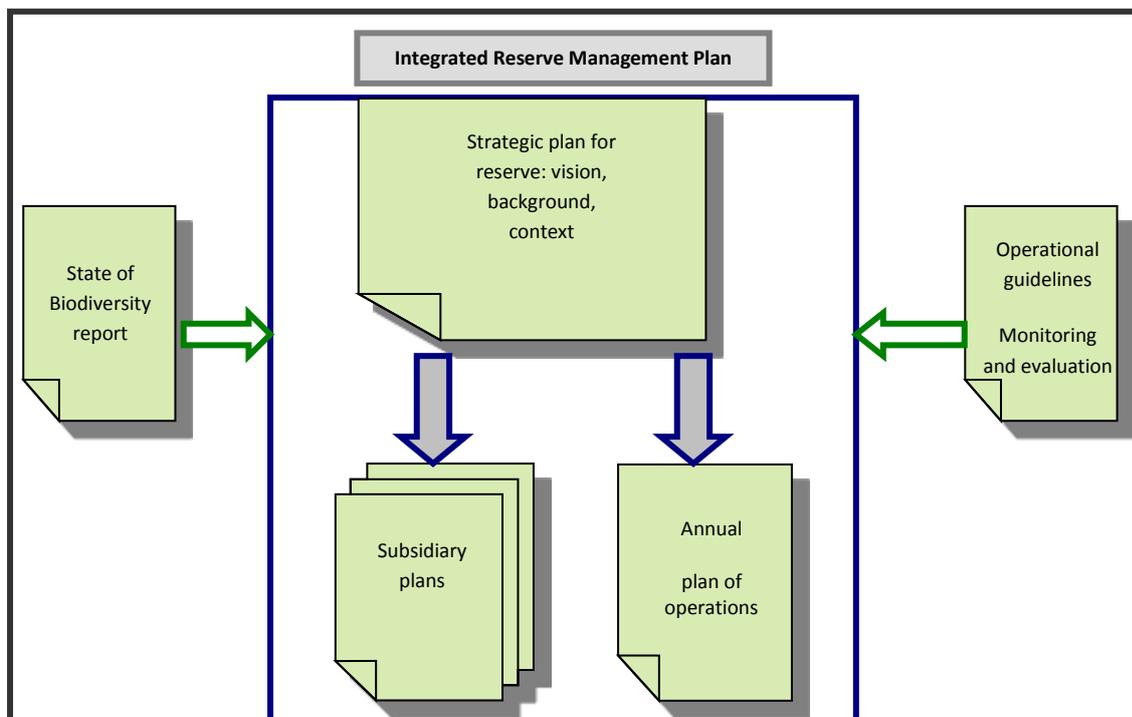


Figure 1: The elements of the IRMP

The IRMP for Helderberg Nature Reserve forms part of a tiered series of policies, legislation and related planning documents at the sector, institutional, agency and local level (see figure 2).

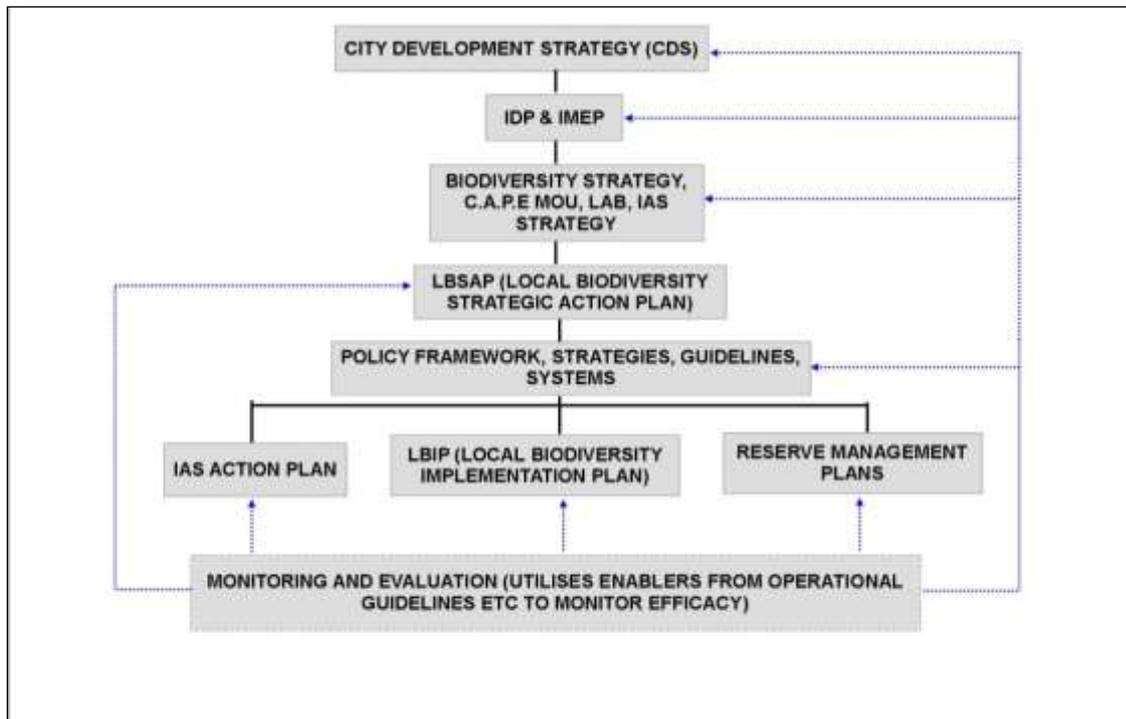


Figure 2: Legal and planning framework for the IRMP

Where possible, emphasis has been placed on the following:

- Assigning responsibility for management interventions
- Scheduling said management interventions
- Quantifying management costs

This approach is specifically intended to create a mechanism whereby management intervention can be monitored and audited on an annual basis.

In context, this IRMP is a dynamic document, and the detailed subsidiary plans should be updated on an annual basis or as soon as new information comes to light that may better inform decisions on responsible land management. The IRMP should be updated every five years.

The drafting of this management plan has been guided by a small interdisciplinary Reserve Planning Committee (RPC) comprising the branch manager, the regional manager, the area manager, various specialists, and other interested and affected persons. Repeated drafts of the IRMP were presented to, and discussed by, the RPC before broader circulation for public participation.

Pre-engagement workshops were held with community partners from March to May 2010. This afforded key community partners an opportunity to give their input at an early stage. Where practically possible, the ideas and outputs from the workshops have been incorporated into the IRMP.

1.2 Location and extent

Helderberg Nature Reserve is situated in Somerset West, on the slopes of the Helderberg mountain, overlooking False Bay. The reserve was proclaimed on 23 September 1960 as Land-en-Zeezicht Nature Reserve, Proclamation No. 3268 in Provincial Gazette No. 3047, primarily to protect the water catchment for the Somerset West area. The reserve is known locally as Helderberg Nature Reserve, and is managed by the City of Cape Town's Biodiversity Branch. In 1995, two portions of land (Farm Erinvale No. 722 and remainder of erf 3059) to the east of the reserve were leased to the City of Cape town, and included in the reserve management area. The centre of the reserve is approximately 50 km west of Cape Town city centre (see map 1).

Helderberg Nature Reserve covers an area of approximately 402 ha in extent (which includes the 4,97 ha of Silwerboomkloof), and is located at the following grid reference (see map 2):

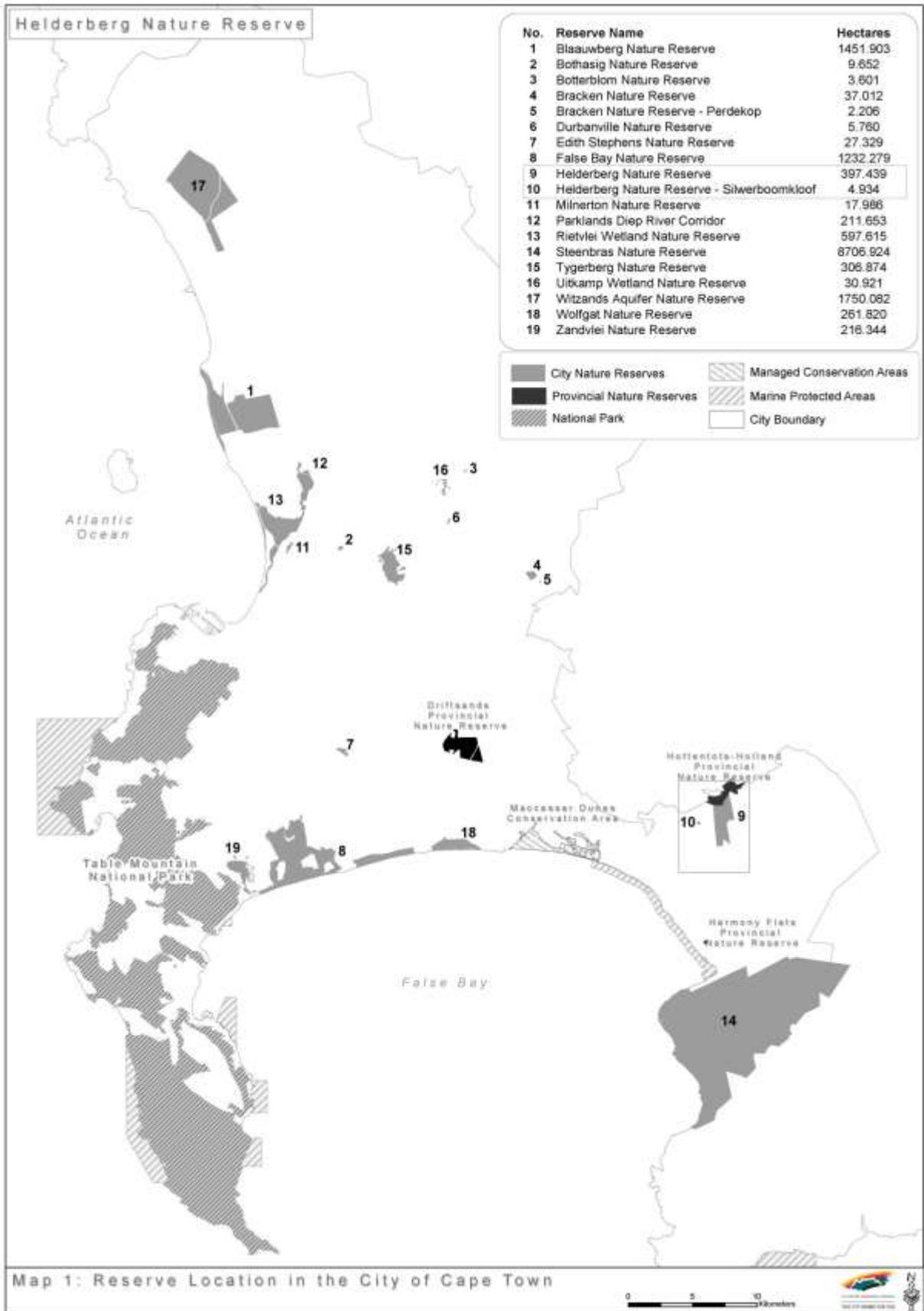
34° 03' 54.35" S

18° 52' 17.79" E

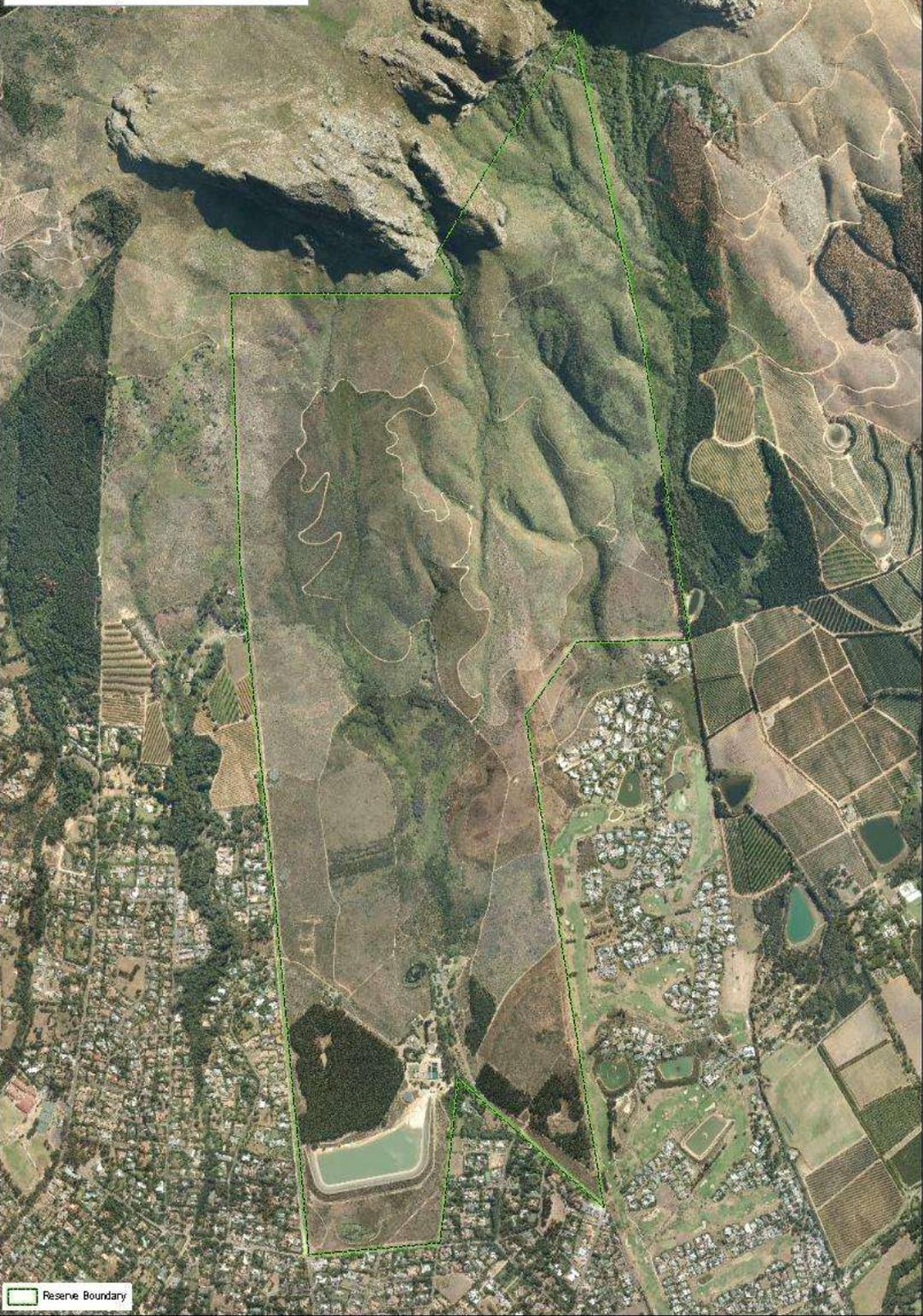
The Silwerboomkloof site is located in the Spanish Farm area of Somerset West. It was proclaimed a natural heritage site on 1 September 1992. The primary reason for this proclamation was to ensure the protection of the endangered *Leucadendron argenteum* (Silver Tree). Silwerboomkloof covers an area of 4,97 ha, and is located at the following grid reference:

34° 03' 17.65" S

18° 51' 10.69" E



Helderberg Nature Reserve



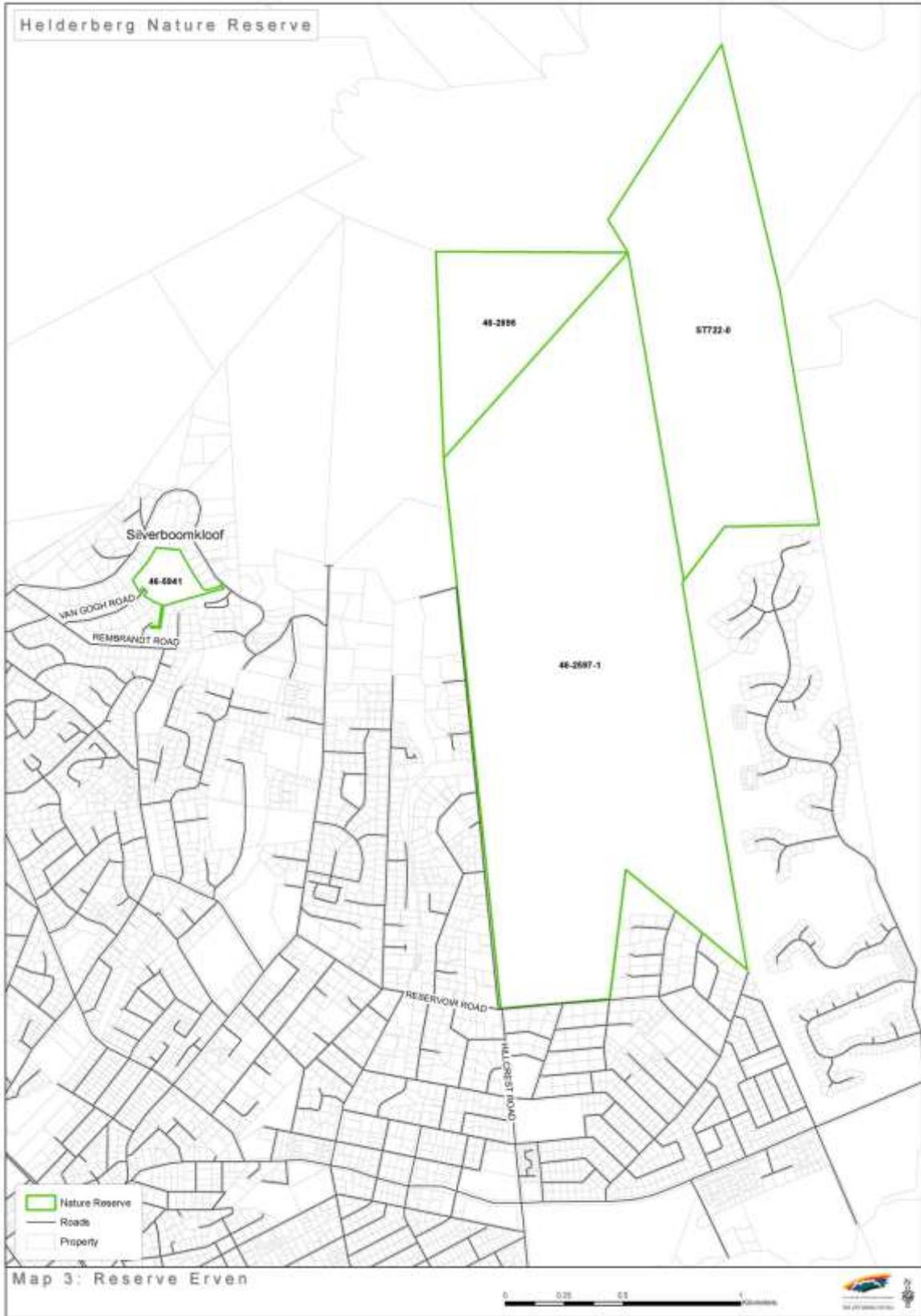
Map 2: Reserve Boundary

2. DESCRIPTION OF LANDHOLDINGS AND OWNERSHIP

2.1 Property details and title deed information

- Farm Land-en-Zeezicht No. 2597, Somerset West, situated in the City of Cape Town Municipality, Division of Stellenbosch, Western Cape Province
In extent 253,3407,1008 ha
Held by Title Deed No. T12588/1947
This erf is held by the City of Cape Town.
- The remainder of consolidated Farm Erinvale No. 722, Somerset West, situated in the City of Cape Town Municipality, Division of Stellenbosch, Western Cape Province
In extent 107,9820 ha
Held by Title Deed No. 23190/94
This erf is currently on a 99-year lease to the City of Cape Town from Erinvale Estate (see appendix 1).
- The remainder of erf 2695, Somerset West, situated as mentioned above
In extent 36,1158 ha
Held by Title Deed No. 23190/94
This erf is held by the City of Cape Town.
- Farm No. 5941, Somerset West, situated in the City of Cape Town Municipality, Division of Stellenbosch, Western Cape Province
In extent 4,9741 ha
Held by Title Deed No. T 20027/1989
This erf is held by the City of Cape Town.

Therefore, the nature reserve consists of the entire area declared as such on the properties in terms of section 23(1) of the Protected Areas Act. A survey of the full extent of the reserve still needs to be undertaken. Appendix 2 indicates the current Surveyor-General (SG) diagrams for the various portions of property. Also see map 3 for the reserve erven.



2.2 Landscape perspective

The reserve falls within the Cape Floristic Region (CFR). The South African CFR is the smallest and richest of the world's six floral kingdoms, and the only one to be found entirely within one country. This rich biodiversity is under serious threat for a variety of reasons, including the conversion of natural habitat to permanent agricultural area, inappropriate fire management, rapid and insensitive development, overexploitation of water resources, and infestation by alien species. The region has been identified as one of the world's "hottest" biodiversity hot spots (Myers *et al.* 2000).

In response to this challenge, a process of extensive consultation involving various interested parties, including local government and non-governmental organisations (NGOs) resulted in the establishment of a strategic plan (C.A.P.E Project Team 2000) referred to as the Cape Action Plan for the Environment (C.A.P.E), which identified the key threats and root causes of biodiversity losses that need to be addressed in order to conserve the floral region. This resulted in a spatial plan identifying areas in need of conservation as well as a series of broad programme activities that need to be undertaken over a 20-year period. Based on the situation assessment and analysis of threats, three overarching, mutually complementing and reinforcing themes were developed:

- To establish an effective reserve network, enhance off-reserve conservation, and support bioregional planning
- To strengthen and enhance institutions, policies, laws, cooperative governance and community participation
- To develop methods to ensure sustainable yields, promote compliance with laws, integrate biodiversity concerns with catchment management, and promote sustainable eco-tourism

The C.A.P.E partnership was formed and works together to implement the C.A.P.E vision and plan by strengthening institutions, supporting conservation efforts, enhancing education, developing tourism benefits, and involving people in conservation. The City of Cape Town was one of the 19 founding signatories of the C.A.P.E memorandum of understanding (MOU).

Helderberg Nature Reserve forms an important platform and integral link within the City of Cape Town's biodiversity network (Anon, 2009²). It is this network that ensures that parcels

of land worthy of conservation are included in a protective network, connected to other parcels of conservation-worthy land. (See map 5 for the biodiversity network.)

Helderberg Nature Reserve links the Wolfgat/Macassar area with the Somerset West area via the Lourens River Protected Natural Environment, and onto the Hottentots Holland and Kogelberg mountain ranges. Hottentots Holland Nature Reserve is managed as a provincial nature reserve by CapeNature, as are large portions of the Kogelberg. The City of Cape Town, however, also manages a large portion of the Kogelberg as part of Steenbras Nature Reserve.

2.3 Physical environment

2.3.1 Climate

The climate is described as Mediterranean, characterised by warm, dry summers from November to March, and mild, rainy winters from June to August. The reserve is situated 86–600 m above sea level.

Rainfall varies between 600 mm and 1 000 mm per annum, although accurate rainfall figures have been recorded only since 1991. Table 1 provides a summary of the mean monthly rainfall.

The prevailing summer wind comes from the southeast, and the winter winds from the north and northwest. The strongest winds are mainly from the north and northwest, and persist for much of the winter season.

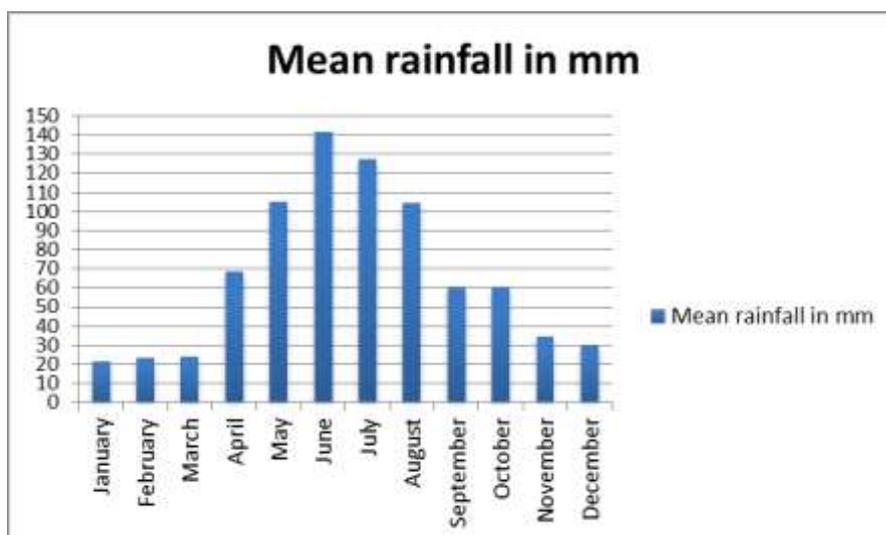


Table 1: Summarised average monthly rainfall 1991–2009 (South African Weather Services 2009)

2.3.2 Geology, geomorphology, soils and land types

The geology of Helderberg Nature Reserve consists of rocks that underlie the lower and middle reaches, and the cliffs of the Helderberg. The lower and middle reaches are underlain by rocks of the Malmesbury group, probably some 900 million years old, while the cliff rocks were formed some 400 million years ago. In parts of Somerset West, there are outcrops of the Cape granite that was intruded into the rocks of the Malmesbury group some 600 million years ago. The Cape granite does not outcrop in the reserve, but does underlie part of the reserve in depth, and outcrops just to the northwest.

The Malmesbury group

Rocks of the Malmesbury group can be seen in several places in the reserve, such as along the road next to the pine forest above the herbarium. These rocks form part of the Tygerberg formation of the Malmesbury group, and consist of phyllitic shales, siltstones and fine-grained greywackes. It is from these rocks that much of the soils in the lower and middle reaches of the reserve have been derived. The Malmesbury group of rocks is about 900 million years old.

The Cape supergroup

The cliffs of the Helderberg are formed of rocks of the Peninsula formation of the Table Mountain part of this supergroup, and can be described as coarse-grained quartzitic sandstones. These rocks are of the Silurian age (based on fossils elsewhere), and are probably about 400 million years old.

Geological weathering processes over many thousands of years have resulted in parts of the Helderberg cliffs breaking off, and washing and rolling down the slopes, causing the extensive scree deposits that today cover the underlying Malmesbury group rocks in the middle and lower reaches of the reserve. It is upon these scree slopes that much of the fynbos grows today.

2.3.3 Hydrology and aquatic systems

2.3.3.1 Catchments

Helderberg Nature Reserve falls within the Hottentots Holland, and, more specifically, the Lourens River catchment (see map 4). The Disa River, a tributary of the Lourens River, originates in the upper reaches of the reserve, and is channelled to the Land-en-Zeezicht bulk-water storage dam further down. This augments water sources from the Lourens River and the Steenbras and Theewaterskloof dams, to be used as domestic supply to the Erinvale and Lourensford estates.

2.3.3.2 Rivers

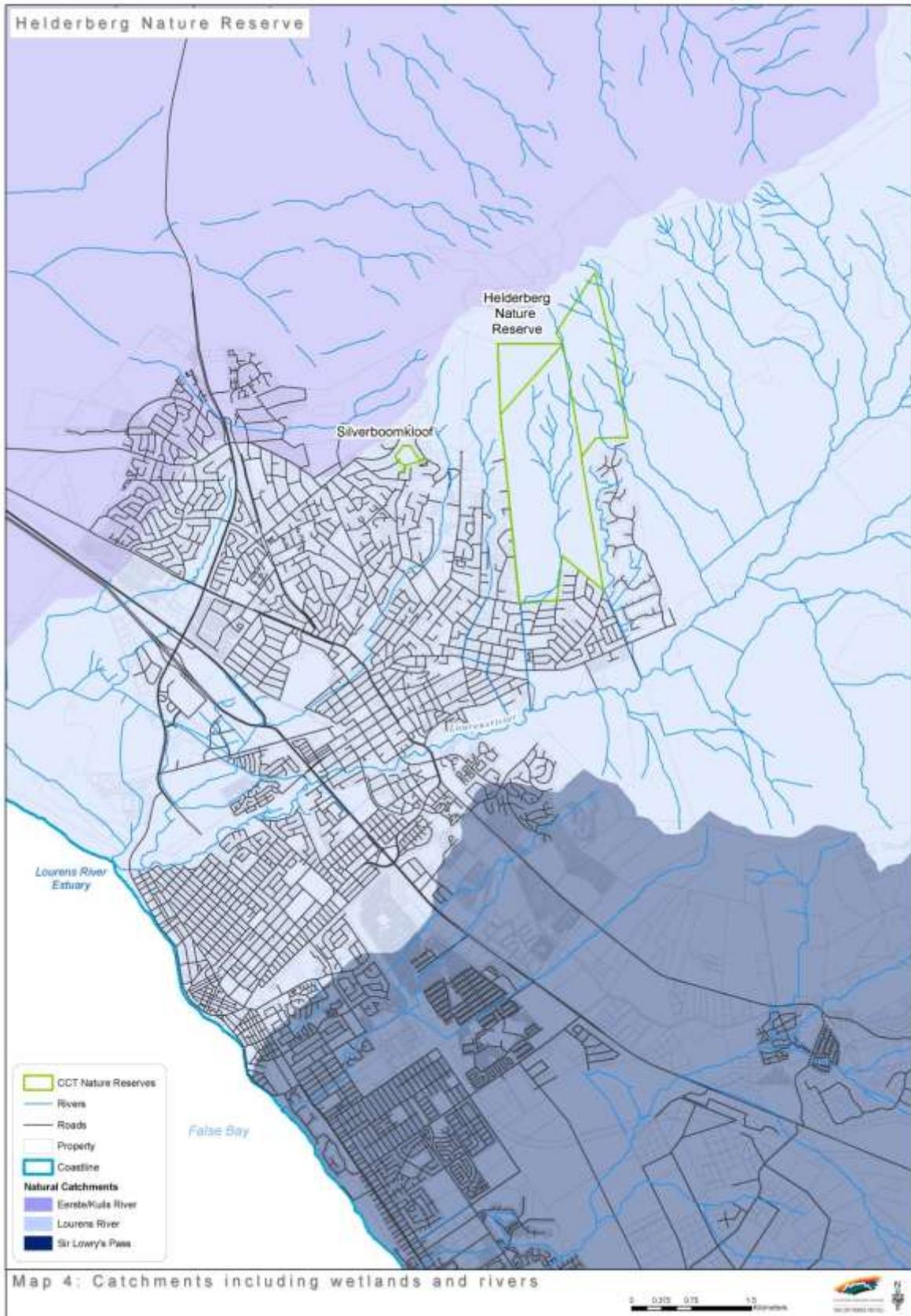
The Disa River is approximately 4 km in length, and runs from the top of the mountain in the vicinity of the dome, to the water treatment plant situated lower down the slope. The river receives most of its water during the winter months, when precipitation is received in the form of rainfall.

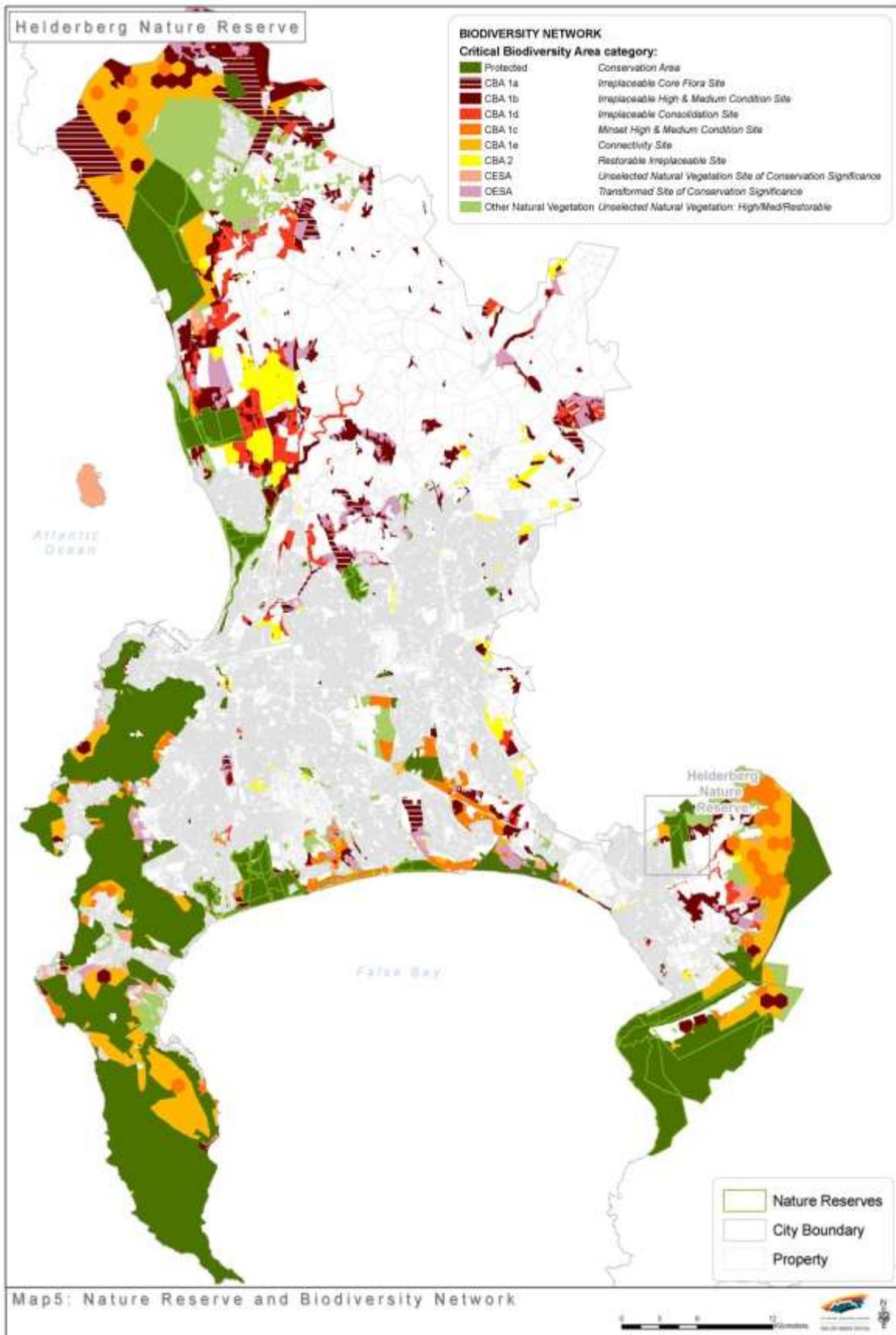
The Disa River discharges the majority of its water into the Land-en-Zeezicht dam. However, there are periods when the water is bypassed, in which case it flows via Pete's Pond into an overflow channel, eventually discharging into the stormwater drain.

Also, the reserve has several unnamed streams, which flow during heavy rainfall periods (see map 4).

2.3.3.3 Wetlands and seeps

Several seepage areas are associated with the seasonal drainage lines and perennial rivers within the reserve.





2.4 Biological environment

2.4.1 Vegetation

The natural vegetation in Helderberg Nature Reserve consists of three major vegetation types, namely Cape Winelands Shale Fynbos, Swartland Shale Renosterveld, and Southern Afro temperate Forest. Within these three major vegetation types, a total of 15 shrubland (fynbos and renosterveld) plant communities are mapped. The Southern Afro temperate Forest is the one plant community in the upland ravines. Kogelberg Sandstone Fynbos (comprising a small area at the upper end of the reserve) is not differentiated into different communities. The area forming the original planted garden within the reserve remains difficult to assign to a plant community, but is assigned to one of the wetter communities on shale (Holmes, 2010). A total of 613 plant species have been recorded within the Helderberg Nature Reserve boundaries. (See appendix 5 for a comprehensive plant species list.) The 2008 national ecosystem status for the vegetation types is as follows:

- Cape Winelands Shale Fynbos – Vulnerable
- Swartland Shale Renosterveld – Critically Endangered
- Southern Afro temperate Forest – Least Threatened
- Kogelberg Sandstone Fynbos – Critically Endangered

Helderberg Nature Reserve's vegetation is located predominantly on weathered clay and soils of the Malmesbury group. Furthermore, the reserve conserves Swartland Shale Renosterveld on the lower mountain slopes, which vegetation has been largely destroyed elsewhere due to urban and/or agricultural development in the Western Cape. A complete description of the vegetation communities within Helderberg Nature Reserve, compiled by Dr Patricia Holmes, follows below.

2.4.1.1 Cape Winelands Shale Fynbos on Shale

- (i) Mesotrophic proteoid fynbos with *Protea coronata* (Green Sugarbush) as a dominant overstorey, with a *Pteridium aquilinum* (Bracken Fern) or fynbos understorey

Protea coronata (Green Sugarbush) forms very dense stands across most of this community. Locally, the understorey varies, from species-poor Bracken stands, to richer communities dominated by Bracken fern and *Brunia noduliflora* (Fountain Bush), to very species-rich communities with *Erica nudiflora*, *Ischyrolepis gaudichaudiana* and *Tetraria cuspidata* prominent in the understorey, often with *Leucadendron sessile* (Sun Conebush)

and *Leucospermum gueinzii* (Kloof Mountain Pincushion) as co-dominants in the overstorey. The distribution of these variants in the reserve is not obvious. Although the western boundary of this type has a sharp boundary that has been accurately mapped to the geological boundary, the eastern extent of this type ignores the geological map completely, extending across all substrata.

- (ii) Mesotrophic proteoid fynbos with *Protea coronata* (Green Sugarbush) sparse and occasional as an emergent, with *Cliffortia phillipsii* and *Aspalathus willdenowiana* dominant as part of the overstorey in young (<10 years) vegetation

In older stands, *Pteridium aquilinum* (Bracken Fern) dominates, and may form the only visible understorey. This is found in wetter places, usually on seeps, adjacent streams and drainage lines. Isolated plants of Southern Afro temperate Forest trees and *Brabejum stellatifolium* (Wild Almond) occur sporadically in the gulleys.

- (iii) Scrub fynbos, apart from *Virgilia oroboides* (Keurboom), as the dominant overstorey, and, locally, in the centres of stands, the only species

It is not clear if this is natural, although the monospecific stands appear to have been disturbed, perhaps by previous gardening. This community occurs on the lower courses of the drainage lines and streams at the break of slope, where stream profiles flatten out. *Brabejum stellatifolium* (Wild Almond) is prominent in streams. Most of this community has been converted for formal gardening purposes or protection from fire, so Southern Afro temperate Forest trees are prominent along the watercourses.

- (iv) Mesotrophic restioid fynbos, with *Leucospermum conocarpodendron* (Green Tree Pincushion), *Tetralix bromoides* community on Malmesbury formation colluviums; *Cullumia ciliaris*, *Bobartia indica* (Biesroei), *Elegia juncea* (Duineriet), *Merxmuellera stricta* (Bokbaardgras), *Restio triticeus* and *Ischyrolepis gaudichaudiana* dominant in the understorey

Protea coronata (Green Sugarbush) is largely absent. This community occurs on what is mapped as scree on the geology map, but which is a Malmesbury type silt rather than typical shale. It may be more extensive than mapped, but the veld is still too young to be accurately delimited.

- (v) Waboomveld with *Protea nitida* (Waboom) dominant, with an understorey

This community occurs on sandstone boulder fields, and is otherwise embedded in the surrounding communities. It appears to be determined primarily by fire intensity, defined by large boulders rather than soils. Although mapped as scree on the geology map, the understorey communities do not appear to reflect this change in substrate.

2.4.1.2 Cape Winelands Shale Fynbos on screes over shale

(i) Mesotrophic restioid fynbos with *Erica coccinea*, and either *Leucadendron salignum* (Common Sunshine Conebush) or *Leucadendron spissifolium* (Common Spear-Leaved Conebush) present.

Dominant graminoids are *Ischyrolepis gaudichaudiana*, *Restio cuspidatus*, *Staberoha cernua*, *Pentaschistis colorata* and *Cymbopogon marginatus* (Motwortel Turpentine Grass). This is a high-altitude community on gritty soils, which somewhat resemble granite soils in texture.

(ii) Waboomveld with *Protea nitida* (aboom) dominant, and *Ischyrolepis gaudichaudiana* dominant in the understorey on sandstone rocky outcrops.

This is a relatively restricted community, confined to sandstone outcrops in screes over shale.

(iii) Ericoid fynbos with *Cliffortia polygonifolia* (Paddabos) dominant, with *Erica hispidula*, *Brunia noduliflora* (Fountain Bush), *Cullumia setosa* (Steekhaarbos), *Ehrharta ramosa*, *Tetraria cuspidata*, *Restio triticeus* and *Ischyrolepis gaudichaudiana* locally dominant

Infrequent, scattered plants of *Protea coronata* (Green Sugarbush) and *Protea nitida* (Waboom) occur as emergents, but these are never dominant.

(iv) Oligotrophic restioid fynbos with *Merxmuellera stricta* (Bokbaardgras) and *Montinia caryophyllacea* communities on deep sands over shale; *Leucadendron spissifolium* (Common Spear-Leaved conebush) present

(v) Mesotrophic asteraceous fynbos with *Searsia (Rhus) angustifolia* (Willowey Korentebos), *Metalasia densa* (Blombos), *Merxmuellera stricta* (Bokbaardgras) dominant, and *Cliffortia ruscifolia* (Climbers Friend), *Leucadendron rubrum* (Tolletjebos) and *L. salignum* (Common Sunshine Conebush) locally prominent

This community occurs on the less steep slopes. The lower portions of this community are relatively degraded and poorer in species.

2.4.1.3 Cape Winelands shale fynbos on Quaternary gravels

(i) Oligotrophic proteoid fynbos with *Anthospermum aethiopicum*, *Metalasia densa* (Blombos), *Erica globosa*, *Stoebe cinerea*, *Cliffortia ruscifolia* (Climber's Friend), *Pteridium aquilinum* (Bracken Fern), *Ficinia filiformis* and *F. trichodes* dominant, and *Elytropappus rhinocerotis* (Renosterbos) and *Seriphium plumosum* locally prominent.

Protea coronata (Green Sugarbush) and *P. burchellii* are present, but at low levels, with *Protea repens* (Sugarbush) locally prominent. Stands of invasive *Protea aurea*, *P. punctata* (and hybrids) and *P. neriifolia* (Narrow-leaf Sugarbush) are also locally prominent. The community appears to lack an understorey, especially in areas that used to be under plantations. In one area in the extreme south never planted with pines, a dense and diverse restio and sedge understorey persists. This is confined to the Quaternary gravels, which present as a thin veneer over the Malmesbury shales.

(ii) Oligotrophic asteraceous fynbos with *Passerina corymbosa*, *Helichrysum patulum* community on Quaternary gravels.

Elytropappus rhinocerotis (Renosterbos), *Cliffortia ruscifolia* (Climber's Friend) and *Leucadendron salignum* (Common Sunshine Conebush) are prominent in the community. Generally, the understorey is absent: No bulbs or graminoids are present. This area was repeatedly bushcut and heavily grazed in the past, but the absence of bulbs is surprising. Parts have been planted to *Protea* orchards, which are flourishing, with a few spreading.

(iii) Oligotrophic ericoid fynbos, overwhelmingly dominated by *Watsonia borbonica* (Suurkanol), with scattered *Anthospermum aethiopicum* and *Erica* species on gravelly shale

The scarcity of shrubs suggests shallow soil and/or an impervious layer below the surface.

2.4.1.4 Swartland shale renosterveld on Quaternary gravels

Passerina corymbosa, *Helichrysum patulum*, and *Elytropappus rhinocerotis* dominant, with *Searsia (Rhus) angustifolia* (Willoway Korentebos), *Cymbopogon marginatus* (Motwortel Turpentine Grass) and *Gnidia laxa* are present. *Themeda triandra* (Red Grass) and *Leucadendron salignum* (Common Sunshine Conebush) are locally prominent, with the latter in a species-poor area. *Calopsis paniculata* is present in the seepage area below the dam and around the ponds.

2.4.1.5 Southern Afro temperate forest

In the kloofs and gulleys and on the deeper screes, *Cunonia capensis* (Rooiels), *Halleria lucida*, *Ilex mitis*, *Maytenus acuminata* (Sybas) and *Schoenoxiphium lanceum* are dominant.

2.4.1.6 Kogelberg sandstone fynbos

Limited distribution in the reserve, with subtypes not mapped.

2.4.2 Mammals

2.4.2.1 Helderberg

The mammal fauna of Helderberg Nature Reserve comprises mostly smaller mammals, many of which are nocturnal and inconspicuous, and are therefore seldom recorded. The only evidence of the occurrence of many of the mammal species in the reserve is the middens, scat and spoor that betray their presence.

There is a large population of *Sylvicapra grimmia* (Common Duiker) within the lower section of the reserve. *Raphicerus melanotis* (Cape grysbok), *Pelea capreolus* (Grey Rhebok), *Raphicerus campestris* (Steenbok) and *Oreotragus oreotragus* (Klipspringer) have all also been recorded here. The reserve has a small herd of *Damaliscus pygargus pygargus* (Bontebok) – an extra limital species – that inhabits the lower sections. An internal fence prohibits these Bontebok from leaving the boundaries of the reserve.

Both scat and spoor of *Panthera pardus* (Cape Leopard) are an indication of their presence in the reserve. *Aonyx capensis* (Cape Clawless Otter), *Felis caracal* (Caracal), *Mellivora capensis* (Honey Badger), *Genetta genetta* (Small Spotted Genet), *Ictonyx striatus* (Striped Polecat), *Galerella pulverulenta* (Small Grey Mongoose) and *Herpestes ichneumon* (Large Grey Mongoose) are the predator species that occur in the reserve.

Hystrix africaeaustralis (Porcupine) is a prominent species that can be found in all areas of the reserve. *Lepus capensis* (Cape hare) is a common nocturnal mammal that frequents the

picnic site. The *Papio ursinus* (Chacma Baboon) is fairly elusive, and prefers the higher outcrops of the reserve.

An array of mice, rat and shrew species are found in the reserve, including *Aethomys namaquensis* (Namaqua Rock Mouse), *Dendromus melantois* (Grey Climbing Mouse), *Rhabdomys pumilio* (Striped Field Mouse), *Otomys irroratus* (Vlei Rat), *Myosorex varius* (Forest Shrew) and *Crocidura flavescens* (Greater Musk Shrew).

2.4.2.2 Silwerboomkloof

Mammals that are likely to occur within the Silwerboomkloof area have been adapted from the fauna species list of Helderberg Nature Reserve.

Many small mammals occur in Silwerboomkloof. These include *Mus minutoides* (Pygmy Mouse), *Acomys subspinosus* (Cape Spiny Mouse) and *Mastomys verreauxii* (Verreaux's Mouse).

Predators of the area include *Atilax paludinosus* (Water Mongoose), *Genetta genetta* (Small Spotted Genet) and *Caracal caracal* (Caracal), which is the top predator. *Hystrix africaeaustralis* (Porcupine) and *Raphicerus melanotis* (Grysbok) occur in the area as well.

See appendix 6 for a complete mammal species list for Helderberg Nature Reserve.

2.4.3 Birds

2.4.3.1 Helderberg

Helderberg Nature Reserve has a rich bird fauna, and 175 species have been recorded to date. Of these, seven are endemic to the fynbos region, namely *Promerops cafer* (Cape Sugarbird), *Crithagra totta* (Cape Siskin), *Chaetops frenatus* (Cape Rock-Jumper), *Crithagra leucoptera* (Protea Seed-Eater), *Cryptillas victorini* (Victorin's Warbler), *Anthobaphes violacea* (Orange-Breasted Sunbird) and *Turnix hottentottus* (Hottentot Buttonquail).

Various water fowl inhabit the watercourses of the reserve, including *Anas undulata* (Yellow-Billed Duck), *Gallinula chloropus* (Common Moorhen) and *Anas sparsa* (African Black Duck).

2.4.3.2 Silwerboomkloof

A total of 109 bird species are anticipated to be found in the area, but only 32 have been recorded to date. Of the seven endemic birds of the fynbos region, two have been recorded, namely *Crithagra totta* (Cape Siskin) and *Promerops cafer* (Cape Sugarbird).

See appendix 7 for a comprehensive bird species list.

2.4.4 Reptiles

2.4.4.1 Helderberg

Thirty reptile species are known to occur within Helderberg Nature Reserve, including 12 lizards, 13 snake species and four Chelonians (tortoises and terrapins) species. The large and conspicuous *Stigmochelys pardalis* (Leopard Tortoise) is not locally indigenous, and has been introduced to the site.

Of the lizard species, the most common are *Agama atra* (Southern Rock Agama), *Bradypodion pumilum* (Cape Dwarf Chameleon) and *Pseudocordylus microlepidotus* (Cape Crag Lizard). The snake species occurring in the reserve are *Bitis arietans* (Puff Adder), *Naja nivea* (Cape Cobra), and *Bitis atropos* (Berg Adder). Of the non-venomous snake species, *Lamprophis aurora* (Aurora House Snake), *Duberria lufrix* (Common Slug Eater), *Lamprophis inornatus* (Olive House Snake) and *Pseudaspis cana* (Mole Snake) are present. *Pelomedusa subrufa* (Marsh Terrapin) and *Cherisna angulata* (Angulate Tortoise) also occur in the reserve.

2.4.4.2 Silwerboomkloof

No detailed herpetological surveys have been carried out in this area. The species noted have either been recorded or are likely to occur. Literature records, sight records and CapeNature specimen records were used to compile this list. Snakes occurring in the area are *Bitis arietans* (Puff Adder) *Naja nivea* (Cape Cobra) and *Dispholidus typus* (Boomslang). *Agama atra* (Southern Rock Agama) and *Trachylepis homalocephala* (Red-Sided Skink) are also common.

See appendix 8 for a comprehensive reptile species list.

2.4.5 Amphibians

2.4.5.1 Helderberg

Eight amphibian species have been recorded, of which *Arthroleptella landdrosia* (Landroskop Moss Frog) is Near Threatened. *Amieta fuscigula* (Cape River Frog), *Amietophrynus rangeri* (Raucous Toad) and *Arthroleptella villiersi* (De Villiers Moss Frog) can be found along watercourses and in seep areas. *Hyperolius marmoratus* (Painted Reed Frog), which did not occur in this area previously, has recently been recorded in the reserve. This species has been introduced to Cape Town from other parts of South Africa.

2.4.5.2 Silwerboomkloof

Amphibian species likely to occur in the area are *Strongylopus grayii* (Clicking Stream Frog), *Amieta fuscigula* (Cape River Frog) and *Amietaphrynus rangeri* (Raucous Toad).

See appendix 9 for a comprehensive amphibian species list.

2.4.6 Invertebrates

2.4.6.1 Helderberg

Various baseline surveys as well as research and monitoring projects still need to be done within the reserve to obtain sufficient data for documentation purposes. However, aquatic invertebrates recorded in the past are *Allocnemis leucosticte* (Feather Leg Nymph), *Baetis harrisoni*, *Dinuetes* spp. (Small Minnow Mayfly), *Micronecta* spp. and *Planaria dugesia* (Water Boatman).

2.4.6.2 Silwerboomkloof

Likewise, various baseline surveys as well as research and monitoring projects still need to be done within the reserve to obtain sufficient data for documentation purposes.

2.4.7 Fish

2.4.7.1 Helderberg

Recorded aquatic organisms within the water bodies of the reserve are *Cyprinus carpio* (Carp), *Gambusia affinis* (Mosquito fish), *Micropterus salmoides* (Large Mouth Bass), *Tilapia sparrmanii* (Banded Tilapia) and *Galaxius zabratus* (Cape Galaxies). Of these species recorded, *Galaxius zabratus* is the only indigenous species.

See appendix 10 for a comprehensive fish species list.

2.5 Socio-political context

2.5.1 History

To the northeast of, and approximately 4,5 km from, the Somerset West business centre lies the estate known as Land-en-Zeezicht, which Somerset West Municipality acquired from Mrs Helena Catharina Louw (born Hendrikz) in 1947 to improve and conserve its water supply.

For many years, the Rotary Club of Somerset West felt that this land could be put to some use that would be of general benefit to the town. Many ideas were put forward and abandoned for various reasons, the foremost of which was financial. The Rotary Club

eventually approached Council with the idea of establishing a wild-flower garden on the land. Many promises of financial support were made and, to meet the initial cost, the Rotary Club undertook to raise between R6 000,00 and R10 000,00 from businessmen in Somerset West. Council accepted this proposal, and it was decided to set aside some 604,8 acres at Land-en-Zeezicht as a nature reserve. Within this area, just north of the oak plantation, which is a popular picnic spot, Council set aside approximately 30 acres (\pm 12 ha) to be developed as a wild-flower garden.

The next step was to apply to His Honour the Administrator of the Cape Province to apply the provisions of the Nature Reserves Ordinance to the municipal area of Somerset West. This request was acceded to, and, on 12 August 1960, by virtue of Proclamation No. 147 in Provincial Gazette No. 3041, the provisions of the Ordinance were applied to the municipal area. In Proclamation No. 3268, in Provincial Gazette No. 3047 dated 23 September 1960, the town clerk, Mr D.S. Sales, defined the boundaries of the Land-en-Zeezicht Nature Reserve, comprising some 244,75 ha. (See appendix 3 for the Gazette information.)

In the interim, Council had pursued this matter vigorously, and, on 18 January 1960, a meeting was held to establish the Helderberg Nature Reserve Advisory Board. This meeting was attended by councillors and representatives of public bodies in Somerset West. At this meeting, the first advisory board of nine members was appointed in terms of section 4 of the Nature Reserves Ordinance, Ordinance 18 of 1939. It was also decided to invite Dr Douglas Hey, the director of nature conservation, to advise the board on matters relating to nature reserves in general, as well as the wild-flower garden in particular. Furthermore, it was announced that Council would raise a loan of R6 000,00 to enclose the reserve. During this historic meeting, it was also reported that approved nature reserves would be subsidised by the Cape Provincial Administration.

Dr Hey, who visited the reserve area on 6 February 1960, instilled much enthusiasm in the members of the board and Council, as he was convinced that, with enough enthusiasm, the reserve could be turned into one of the finest in South Africa. Dr Hey was not alone in his resoluteness; the board members were also quite determined to achieve their objective.

A fund known as the Mayor's Wild-flower Garden Development Fund was established, and not only money, but gifts of seed, bulbs and plants indigenous to the area were welcomed. Dr Hey also very happily undertook to address a meeting to be called by the mayor to launch the fund. In the wild-flower garden, work went ahead. Invasive vegetation was cleared and the soil prepared to receive the plants and seeds. In this regard, Council was, and still is,

most grateful to Messrs Johnson, Newton-King and Maskew-Miller for their instant personal efforts and loan of mechanical equipment. Many donations were received, including ducks and geese from various sources. A pond was constructed just above the oak plantation, and a plan drawn up to develop the wild-flower garden into spring, summer, autumn and winter sections. Also laid out were contour paths, and benches were provided. The section of the hillside excavated to provide fill for the pond was converted into a succulent garden.

In January 1961, Council was fortunate to obtain the services of Mr Harry Wood for the care and development of the reserve. Prior to this appointment, the forestry officer, Mr Knipe, had been responsible for these duties. In developing the wild-flower garden, Mr Woods's enthusiasm knew no bounds.

The fencing of the reserve was delayed as a result of a boundary dispute. The magnificent gates at the entrance to the reserve were officially presented to Council in 1964. Unfortunately, Mr John Williams, who had designed the entrance gates for the Rotary Club, died three days before the official opening. Plans for the erection of a tearoom to be run by the local ladies' organisations were under consideration, as well as other amenities.

The Administrator of the Cape, His Honour Mr J.N. Malan, officially opened the reserve on 3 October 1964. In his address, Mr Malan quite clearly stated that "the Helderberg Nature Reserve should never become a botanical garden; it was a Nature Reserve and should be developed as such".

The Maskew-Miller Herbarium building, which was first commissioned in 1971, was donated to Somerset West Municipality and the people of Somerset West by Mr and Mrs Maskew-Miller in memory of their beloved daughter, Cecilia Anne, who died in 1970. The building contains the herbarium itself as well as an information centre/museum. Since June 1991, the building has been open to the public on a more regular basis, as it is now manned by volunteers from the Friends of the Helderberg Nature Reserve group. To date, some 140 000 visitors have gone through the information centre/museum.

The large earth reservoir near the reserve's southern boundary was constructed during 1974. Because of the huge escalation in building costs, the size of the reservoir had to be scaled down, leaving an area of 5 ha of land vacant. Council declared this area a bird sanctuary. The sanctuary was named after Bertie Kotze, a former town councillor and mayor. On this site, a dam with two small islands was constructed. The dam remains full throughout the year because of seepage from the reservoir.

During the formative years of the reserve, an annual average of ±22 000 visitors were received. This has now increased to over 60 000 per annum. A most unfortunate situation arose in 1973, when braai facilities were provided. Because of rowdiness and overcrowding as well as an increase in litter, regulars to the reserve were greatly upset and, consequently, started to avoid the area. On a Sunday in 1984, the situation got completely out of hand, and Council decided to remove all braai facilities from the area.

In 1971, antelope such as *Damaliscus pygargus pygargus* (Bontebok) and *Antidorcas marsupialis* (Springbok) were introduced. Large animals such as *Taurotragus oryx* (Eland) and *Connochaetes gnou* (Black Wildebeest) were also imported and accommodated in a fenced camp on the western side of the reserve. The public was not allowed access to this area. It would appear that the animals multiplied well, but no records are available in this regard. It would also appear that, ten years later, problems developed as the urban sprawl crept closer to the reserve. *Hystrix africae australis* (Porcupine), pushed out of their natural habitat, now utilised the reserve, and apparently as many as six to eight animals per night burrowed under the perimeter fence, providing easy access to dogs that set about decimating the antelope population. The Cape Provincial Administration Department of Nature Conservation translocated some of the remaining extra-limital game species to Ladysmith and Bredasdorp. However, *Damaliscus pygargus pygargus* (Bontebok) remain, and will be managed in the reserve in accordance with the City's faunal management policy.

The buck camp, as it was known, was then opened to the public, and indigenous species such as *Protea* and *Erica* were planted. It would appear that the exotic grasses and legumes that had been planted at some stage are too aggressive for these plants, as they do not seem to be doing too well.

In 2000, the Helderberg Administration and all of the other municipalities in the Cape Town area were bundled together to form the City of Cape Town. The reserve is now managed by the City of Cape Town, and continues to provide the people of Cape Town with a safe environment where biodiversity is maintained and visitor facilities are provided.

2.5.2 Socio-economic context

The socio-economic profile of the Helderberg is wide-ranging, with beautiful, affluent areas on the one hand, and poor, informal areas on the other. There are an estimated 193 000 people in the subcouncil area, with 77% of these in formal housing, and 23% in informal settlements. To cater for the underprivileged, approximately 6 000

low-cost houses have been built in the area over the past eight years, and seven high-rise apartment blocks have been constructed in the past six years. Private developers have serviced approximately 3 000 erven, and building in these land tracts is progressing steadily. Another 1 000 low-cost houses are planned for construction within the next three years.

The area has an active community life, with a number of service and ratepayers' organisations. About six neighbourhood watches operate in close cooperation with the Metro Police and South African Police Service. Sports bodies ensure that facilities are maintained to the highest standard, and there are numerous facilities for senior citizens, not to mention various support groups (such as the stroke support group, arthritis support group and Alzheimer's support group). Somerset West has a small theatre (the Playhouse Theatre), where the amateur drama society, ballet schools and music society regularly stage shows to entertain the community and capacitate learners and disadvantaged communities.

The subcouncil is the interface between the City of Cape Town and its communities, and plays an important role in promoting public participation in Council's plans and policies, such as the IDP, the Integrated Zoning Scheme and the Spatial Development Framework (SDF) and district plans. It also promotes short-term job creation by using unemployed residents for street and river cleaning, litter picking as well as alien plant removal. Various clean-up operations have been undertaken in informal areas, and upgrades and beautification of the area around Nomzamo Community Hall are far advanced. The subcouncil does its utmost to be a conduit between the community and the City of Cape Town, and to function as efficiently as possible within its delegated powers. The upliftment of communities and the continuous assessment of service delivery, community needs and budget priorities are ongoing activities.

In the 2009/10 financial year, the subcouncil has made R270 000,00 in grant-in-aid funding available to 24 benevolent and welfare community organisations to promote cultural activities, care for the aged, contribute to sports and youth development, and develop skills in disadvantaged communities.

The subcouncil is sensitive to community aspirations, needs and participation, and endorses all activities aimed at preserving the area's rich natural environment, while fulfilling its role as a facilitator of meaningful and orderly socio-economic development and good governance.

Current infrastructure projects include constructing a further phase of the Broadway Boulevard extension, and working on the upgrade of Sir Lowry's Pass Road. The Hazelden

main sewer is also being upgraded and the Strand main sewer has been partially upgraded to the Lourens River pump station.

2.6 Protected-area expansion

Helderberg Nature Reserve has the potential to expand to the north and the west. The property to the north is currently managed by CapeNature. This property is 218,12 ha in extent. The property to the west is privately owned land, and is 55,79 ha in extent.

The following guiding principles are relevant to the negotiation of contractual agreements:

- Reserve management shall seek to conclude **mutually beneficial** partnerships with the parties concerned.
- All action taken in managing the reserve shall at all times adhere and be subject to the principles of **accountability** and **transparency**.
- Based on the principles of **custodianship**, the reserve and its environmental resources are held in trust. It is the duty of all involved with the reserve to respect, protect and promote the reserve and its resources in the public interest.
- In terms of the principle of **holism**, the reserve and its surrounds form an indivisible system.
- In accordance with the principle of **common heritage**, reserve management must safeguard the public interest by conserving the reserve's ecological, cultural and scenic resources.

Landowners could by voluntary agreement contract all or portions of their land into the reserve. In return, the reserve will provide various environmental management services on their land. Both parties stand to gain from the arrangement. Some of the incentives include:

- invasive-vegetation clearing;
- fire management;
- erosion control and maintenance of footpaths;
- rates rebates;
- access to Biodiversity Management Branch specialist services; and
- legal protection in terms of the National Environmental Management: Protected Areas Act (NEMA: PA).

It must be remembered that this expansion plan is predicated on the willingness of the landowner to 'hand over' his land to the City of Cape Town, depending on the type of contract entered into.

3. PURPOSE, VISION/MISSION, SIGNIFICANCE/VALUE

3.1 Purpose of the protected area

Helderberg Nature Reserve is located in the CFR, an area of global biodiversity significance. The reserve conserves a unique combination of habitats, ecosystems and species, many of which are either rare or endemic to the area.

Therefore, the primary purpose of the reserve is the **conservation of this unique biodiversity and associated ecosystem features and functions.**

In conserving this unique biodiversity, secondary objectives will include the following:

- To develop high-quality visitor infrastructure, facilities and services
- To promote sound environmental education principles

3.2 Vision and mission

3.2.1 Vision

Integrated Development Plan vision

The vision of the City of Cape Town remains as follows:

- To be a prosperous city that creates an enabling environment for shared growth and economic development
- To achieve effective and equitable service delivery
- To serve the citizens of Cape Town as a well-governed and effectively run administration

To achieve this vision, the City of Cape Town recognises that it must:

- actively contribute to the development of its environmental, human and social capital;
- offer high-quality services to all who live in, do business in, or visit the city as tourists; and;
- be known for its efficient, effective and caring government.

C.A.P.E vision

We, the people of South Africa, are proud to be the custodians of our unique Cape Floral Region and share its full ecological, social and economic benefits now and in the future.

Environmental Resource Management Department vision

To ensure that sustainable and equitable development is combined with sound environmental practice for a healthy local environment, which sustains people and nature, provides protection for our unique resources, and results in an enhanced quality of life for all.

Biodiversity Management Branch vision

To be a City that leads by example in the protection and enhancement of biodiversity; a City within which biodiversity plays an important role, and where the right of present and future generations to healthy, complete and vibrant biodiversity is entrenched; a City that actively protects its biological wealth, and prioritises long-term responsibility over short-term gains.

Helderberg Nature Reserve vision

To manage and protect the natural assets of Helderberg Nature Reserve through local partnerships for present and future generations.

3.2.2 Mission

Biodiversity Management Branch mission

- To manage biodiversity proactively and effectively
- To ensure an integrated approach to biodiversity between City of Cape Town line functions and departments, and actively pursue external partnerships
- To adopt a long-term approach with regard to biodiversity
- To ensure the sustainability of our rich biodiversity
- To adopt a holistic and multifaceted approach to biodiversity
- To continue to measure and monitor the City of Cape Town's performance in the protection and enhancement of biodiversity
- To continue to measure and monitor the state of biodiversity in Cape Town

Helderberg Nature Reserve mission

To restore and maintain the natural environment and its associated ecological processes and services through the implementation of the management objectives of Helderberg Nature Reserve.

3.3 Significance of property (biodiversity, heritage and social)

Helderberg Nature Reserve accommodates four national vegetation types, two of which are critically endangered, one vulnerable and one of least concern. It forms an integral part of the City of Cape Town's biodiversity network within the area.

The reserve has a confirmed bird species list of 170, which includes all seven endemic fynbos species, a plant species list of 613 and a mammal list comprising 42 species. The reserve is home to near-threatened *Panthera pardus* (Cape Leopard) and *Mellivora capensis* (Honey Badger), and has a resident population of introduced, vulnerable *Damaliscus pygargus pygargus* (Bontebok). The data-deficient *Paragaleus leucomatus* (Striped Weasel) has also been sighted in the area.

The reserve has an active Friends group of some 2 000 members. The Friends group is currently responsible for environmental education, provision of information to visitors, as well as running and maintaining an indigenous plant nursery.

Below is a summary of qualifying site assessment criteria:

- The reserve hosts a mosaic of four different vegetation types, of which two are critically endangered and one is vulnerable.
- The reserve is home to over 600 plant species, of which 13 are threatened with extinction.
- Through open space, the reserve is well connected to extensive natural areas to the north and east.
- Silwerboomkloof is home to the endangered *Leucadendron argenteum* (Silver Tree).
- Silwerboomkloof is the source of the Geelsloot River.
- The reserve has an abundance of recreation, education and tourism potential.

PART 2

MANAGEMENT POLICY FRAMEWORK

4. ADMINISTRATIVE AND LEGAL FRAMEWORK FOR THE MANAGEMENT AUTHORITY

4.1 Legal framework

Table 2: Legal Framework

The following is a list of legislation applicable to the management of the City of Cape Town's Biodiversity Management Branch.

Repealed legislation has been included as greyed-out text for information purposes only.

Legislation: Acts, ordinances, bylaws	Relevance: Description	Amendment: Latest amendment date	Comment: Other notes
Constitution of the Republic of South Africa, Act 108 of 1996	Lists South African citizens' environmental rights	N/A	Chapter 2: Bill of Rights assigns citizens with particular rights
ENVIRONMENTAL LEGISLATION			
National legislation			
National Environmental Management Act (NEMA), Act 107 of 1998	One of the most important environmental laws relating to most aspects of the environment, including environmental impact assessments (EIAs), environmental information and legal standing, etc.	<ul style="list-style-type: none"> Amendment Act 56 of 2002 Amended by GN 26018, Vol 464 of 13 February 2004 	Provides for cooperative environmental governance
National Environmental Management: Biodiversity Act, Act 10 of 2004	<p>The objectives of the Act are to provide for:</p> <ul style="list-style-type: none"> the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998; the protection of species and ecosystems that warrant national protection; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources; and the establishment and functions of a South African National Biodiversity Institute. 	N/A	The development of the IRMP will assist in ensuring that the objectives of this Act are achieved in the reserve.

	In essence, the Act was put in place to safeguard the important biodiversity attributes in the country, while allowing people to benefit equally from the natural resources. In order to achieve these goals, the Act made provision for the South African National Biodiversity Institute (SANBI), which has been designated certain functions and afforded powers and duties in respect of this Act.		
National Environmental Management: Protected Areas Act, Act 57 of 2003	To provide for: <ul style="list-style-type: none"> the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and natural landscapes and seascapes; the establishment of a national register of all national, provincial and local protected areas; the management of those areas in accordance with national norms and standards; intergovernmental cooperation and public consultation on matters concerning protected areas; and matters in connection therewith. 	<ul style="list-style-type: none"> Amendment Act 62 of 2008 Amendment Act 15 of 2009 	Regulations Notice 1029 of 2009 lists specific regulations for reserves proclaimed by the Member of the Executive Council (MEC) (draft August 2009).
Conservation of Agricultural Resources Act (CARA), Act 43 of 1983	The CARA regulations contain a list of alien invasive vegetation categorised according to their legal status. The Act regulates the sale, position and use of listed species.	<ul style="list-style-type: none"> Amended by GN R 2687 of 6 December 1985 and GN R 280 of 30 March 2001 	Alien invasive plant legislation to be included under the Biodiversity Act in future
National Veld and Forest Fire Act, Act 101 of 1998	Relates to veld fire prevention, fire protection associations, fire danger indexing, enforcement of fire legislation, and the fighting of fires	N/A	A detailed fire management plan will be developed.
Marine Living Resources Act, Act 18 of 1998	Regulates conservation of the marine ecosystem and the long term sustainable utilisation of marine living resources		
Environment Conservation Act, Act 73 of 1989	The Environment Conservation Act is the other law that relates specifically to the environment. Although most of this Act has been replaced by NEMA, some important sections still remain in operation. These sections relate to: <ul style="list-style-type: none"> protected natural environments; littering; 	<ul style="list-style-type: none"> Environment Conservation Amendment Act 98 of 1991 Environment Conservation Amendment Act 79 of 1992 Environment Conservation Second Amendment Act 115 of 	

	<ul style="list-style-type: none"> • special nature reserves; • waste management; • limited-development areas; • regulations on noise, vibration and shock; and • EIAs. 	<ul style="list-style-type: none"> • 1992 Environment Conservation Amendment Act 94 of 1993 • Environment Conservation Second Amendment Act 52 of 1994 • Proclamation R27 of 1995 • Proclamation R43 of 1996 • National Environment Management Act 107 of 1998 	
National Water Act, Act 36 of 1998	Relates to all use of water and the management of all water resources in South Africa	•	
National Environmental Management: Air Quality Act, Act 39 of 2004	To provide for enhancing the quality of ambient air for the sake of securing an environment that is not harmful to the health and well-being of the people		Promulgated to give effect to section 24(b) of the Constitution. The South African Air Quality Information System is a web-based system that provides information on the quality of ambient air across the country.
Animal Protection Act, Act 71 of 1962	To consolidate and amend the laws relating to the prevention of cruelty to animals	Animal Matters Amendment Act, Act 42 of 1993	
Animal Diseases Act, Act 35 of 1985	Provides for control measures relating to animal diseases		
Animal Health Act, Act 7 of 2002	Regulates animal health		
Game Theft Act, Act 105 of 1991	Regulates the ownership and protection of game		
Mountain Catchment Areas Act, Act 63 of 1970	Provides for catchment conservation		Administered under the Western Cape Nature Conservation Board Act, Act 15 of 1998
National Heritage Resources Act 25 of 1999	Provides for the protection of heritage resources		N/A
World Heritage Conservation Act 49 of 1999	Incorporates the World Heritage Convention into South African law		N/A
Problem Animal Control Ordinance, Ordinance 26 of 1957	Regulates problem animals		Administered under the Western Cape Nature Conservation Board Act, Act 15 of 1998
Mineral and Petroleum Resources Development	Provides for equitable access to, and sustainable development		

Act, Act 28 of 2002	of, mineral and petroleum resources		
Atmospheric Pollution Prevention Act, Act 45 of 1965		Entire Act repealed on 1 April 2010 in favour of the National Environmental Management: Air Quality Act, Act 39 of 2004	
Provincial legislation			
Land Use Planning Ordinance, Ordinance 15 of 1985	The purpose of the Ordinance is to regulate land use and to provide for incidental matters related to land use.	<ul style="list-style-type: none"> Assented to on 22 November 1985 Western Cape Land Use Planning Ordinance, 1985, Amendment Act, 2004 	Although it might not have a direct application in the management of nature reserves, it does affect the surrounding properties, and could possibly be used to control activities/developments around the reserves to minimise negative effects, for example in applying zoning restrictions.
Cape Nature and Environmental Conservation Ordinance, Ordinance 19 of 1974	The purpose of this Ordinance is to regulate wild animals and plants, and the establishment of nature reserves.	Publication date 1 September 1975	Administered under the Western Cape Nature Conservation Board Act, Act 15 of 1998
Western Cape Nature Conservation Board Act, Act 15 of 1998	The purpose of this Act is to promote and ensure nature conservation, render services and provide facilities for research and training and to generate income		Biodiversity agreements are signed under this Act.
Municipal legislation			
Integrated Metropolitan Environmental Policy (IMEP), 2001	Envisages a set of Citywide aligned strategies dealing with all aspects of the environment.		Influenced the Biodiversity Strategy, 2003
Biodiversity Strategy, 2003	To be a city that leads by example in the protection and enhancement of biodiversity	<ul style="list-style-type: none"> Draft amendment for 2009–2019 	Influenced the development of the IRMP
City of Cape Town Bylaw relating to Stormwater Management, LA 31420	To provide for the regulation of stormwater management in the area of the City of Cape Town, and to regulate activities that may have a detrimental effect on the development, operation or maintenance of the stormwater system	<ul style="list-style-type: none"> Publication date 23 September 2005 	Communication strategy and action plan will take effect to address the issues with the relevant departments
City of Cape Town Air Pollution Control Bylaw, LA 12649	The purpose of this bylaw is to give effect to the right contained in section 24 of the Constitution of the Republic of South Africa	<ul style="list-style-type: none"> Publication date 4 February 2003 	

	Act (Act 108 of 1996) by controlling air pollution within the area of the Council's jurisdiction; to ensure that air pollution is avoided, or, where it cannot be altogether avoided, is minimised and remedied.		
Bylaw relating to Community Fire Safety, Province of the Western Cape, LA 11257	The purpose and scope of the bylaw is to promote the achievement of a fire-safe environment for the benefit of all persons within the municipality's area of jurisdiction, and to provide for procedures, methods and practices to regulate fire safety within the municipal area.	<ul style="list-style-type: none"> • Publication date 28 February 2002 	A fire management plan to be designed
City of Cape Town Draft Animal Bylaw, 2009	The purpose of the Bylaw is to formulate a new single bylaw, including ten different municipal dog bylaws and the Animal Protection Act of 1962. The Bylaw includes chapters on dogs, cats, poultry and working equines.	<ul style="list-style-type: none"> • Draft, 2009 	
HUMAN RESOURCES/ADMINISTRATION LEGISLATION			
National legislation			
Occupational Health and Safety Act, 1993	To provide for the health and safety of persons at work, and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work; to establish an advisory council for occupational health and safety, and to provide for matters connected therewith.	Occupational Health and Safety Amendment Act, No 181 of 1993	
Basic Conditions of Employment Act, Act 3 of 1997	Provides for control measures pertaining to employment	<ul style="list-style-type: none"> • Amendment Act 11 of 2002 	
Labour Relations Amendment Act, Act 66 of 1995	The Act aims to promote economic development, social justice, labour peace and democracy in the workplace.	<ul style="list-style-type: none"> • Labour Relations Amendment Act, 42 of 1996 • Afrikaans Labour Relations Amendment Act, 1998 • Labour Relations Amendment Act, 127 of 1998 • Labour Relations Amendment 	

		Act, 2000 • Amendment Act 12 of 2002	
Local Government Municipal Systems Act, Act 32 of 2000	Establishes core principles, processes and mechanisms relating to local government		
Promotion of Equality/Prevention of Unfair Discrimination Act, Act 4 of 2000	Provides for the prevention of discrimination and other related matters		
Criminal Procedure Act, Act 51 of 1977	Makes provision for procedures and related matters in criminal proceedings	• Criminal Procedure Amendment Act, Act 65 of 2008	
Firearms Control Act, Act 60 of 2000	To establish a comprehensive and an effective system of firearms control and, to provide for matters connected therewith		
Civil Aviation Act, Act 13 of 2009			
Fencing Act, Act 31 of 1963	Regulates all matters relating to fencing		
Hazardous Substances Act, Act 15 of 1973	Controls substances that may cause injury or ill health to, or death of, human beings by reason of their toxic nature		
Land Survey Act, Act 8 of 1997	Regulates land surveying, beacons and other related matters		
Promotion of Access to Information Act, Act 2 of 2000	Promotes access to information		
Promotion of Administrative Justice Act, Act 3 of 2000	Provides for the promotion of administrative justice	• Amendment Act 53 of 2002	
Regional Services Council Act, Act 109 of 1985	Regulates and controls land, land use and other related matters		
Skills Development Act, Act 97 of 1998	Promotes the development of skills		
State Land Disposal Act, Act 48 of 1961	Regulates the disposal of state-owned land		
Subdivision of Agricultural Land Act, Act 70 of 1970	Regulates the subdivision of agricultural land		
Tourism Act, Act 72 of 1993	Provides for the promotion of tourism, and regulates the tourism industry		A tourism strategy is envisaged.
Public Resorts Ordinance, Ordinance 20 of 1971	Regulates nuisance and pollution control		
Municipal Ordinance, Ordinance 20 of 1974	Regulates pollution and waste management		
South African National Road Agency Limited and National Roads Act, Act 7 of 1998			
Aviation Act, Act 74 of 1962	Provides for the control, regulation and encouragement of aviation activities in the Republic of South Africa	• Repealed in favour of the Civil Aviation Act, Act 13 of 2009	
Provincial legislation			

Western Cape Land Administration Act, Act 6 of 1998	Regulates land and land use		
Western Cape Planning and Development Act, Act 7 of 1999	Regulates planning and development within the province		
Municipal legislation			
City of Cape Town Bylaw relating to Filming, LA30441	The purpose of the Bylaw is to regulate and facilitate filming in Cape Town.	<ul style="list-style-type: none"> • Provincial Gazette 6277, 24 June 2005 	
City of Cape Town Bylaw relating to Streets, Public Places and the Prevention of Noise Nuisances, 2007	The purpose of the Bylaw is to regulate activities in streets and public places, and to prevent excessive noise nuisance	<ul style="list-style-type: none"> • Promulgated 28 September 2007, PG 6469; LA 44559 	
City of Cape Town Bylaw relating to signage		<ul style="list-style-type: none"> • 	

4.2 Administrative framework

Helderberg Nature Reserve is managed by the City of Cape Town’s Biodiversity Management Branch in the Environmental Resource Management Department of the Strategy and Planning Directorate. The reserve is located in the eastern region, and falls under the oversight of the regional manager. Helderberg Nature Reserve is the management responsibility of the area manager, assisted by ten operational staff members. The operational management of the reserve is supported by various other City of Cape Town departments, including, but not limited to, Law Enforcement, Bulk Water, Water and Sanitation, City Parks, Human Resources and Finance.

Table 3: The current staffing complement:

Designation	Number of staff	Workweek	Supervisor
Area manager	1	40 hours, Mondays–Fridays	District manager
Senior field ranger	1	40 hours, Mondays–Fridays	Area manager
Visitor controller	3	40 hours, shifts	Area manager
Field ranger	6	40 hours, Mondays–Fridays	Senior field ranger
Experiential training student	Varies	40 hours, Mondays–Fridays	Area manager
Intern	Varies	40 hours, Mondays–Fridays	Area manager

The regionally based administrative officer operates from Helderberg Nature Reserve, as does the regional manager. The City veterinarian also operates from Helderberg Nature Reserve, and has offices and a laboratory in the reserve.

5. PROTECTED-AREA POLICY FRAMEWORK & GUIDING MANAGEMENT PRINCIPLES

5.1 Management objectives

The following two tables list Helderberg Nature Reserve’s management objectives.

Table 4: Biodiversity and Heritage Objectives

<i>High-level objective</i>	<i>Objective</i>	<i>Sub-objective</i>	<i>Initiative</i>	<i>Low-level plan</i>
<p>CONSERVATION OF REPRESENTATIVE, FUNCTIONAL ECOSYSTEMS</p> <p>To conserve a representative sample of the region’s ecosystems in a linked landscape, and maintain or restore environmental processes to enable natural spatial and temporal variation in structural, functional and compositional components of biodiversity</p>	<p>Representative ecosystems</p> <p>To incorporate a spectrum of viable aquatic and terrestrial ecosystems characteristic of Helderberg Nature Reserve, and to re-introduce missing elements where possible</p>	<p>Consolidation and expansion of land areas</p> <p>Consolidation of protected areas, focusing on underrepresented ecosystems, functional linkages and processes</p>	<p>(1) Identify underrepresented habitats/ecosystems</p> <p>(2) Consolidate reserve boundaries</p> <p>(3) Incorporate untransformed fynbos</p> <p>(4) Establish corridors linking Helderberg Nature Reserve with mountain catchments and neighbouring conservation areas</p> <p>(5) Investigate conservation stewardship options with key landowners</p>	Reserve expansion plan
		<p>Re-introduction of biota</p> <p>Re-establishment, where possible, of locally extinct or depleted biodiversity components and populations in accordance with the principles and guidelines of the International Union for Conservation of Nature and the City draft policy on fauna management</p>	<p>(1) Re-establish indigenous herbivore complement within constraints of reserve size and urban setting</p>	Faunal management plan
		<p>Fire management</p> <p>Apply appropriate fire regime in fynbos areas (frequency, season, intensity, size)</p>	<p>(1) Implement a fire management plan in accordance with objectives of conserving biodiversity and threatened biota</p> <p>(2) Monitor impact of fire management regime</p>	Fire management plan
		<p>Threatened biota</p> <p>Maintain viable populations of threatened species in order to meet obligations in terms of international agreements and conventions</p>	<p>(1) Maintain viable populations of rare/threatened plant and animal species (identify, locate and monitor populations of priority species)</p>	Incorporate into Biodiversity Management Branch’s monitoring plan

		<p>Monitoring plan Implement and maintain an approved reserve monitoring plan</p>	(1) Implement and maintain a biological monitoring programme for the reserve	Monitoring plan
	<p>Rehabilitation Rehabilitate degraded areas, including the re-establishment of natural biodiversity patterns, and the restoration of key processes that support the long-term persistence of biodiversity</p>	<p>Vegetation Re-establishment of physical, chemical and biological processes in degraded vegetation areas</p>	(1) Rehabilitate all old, degraded sites	Vegetation rehabilitation plan
		<p>Alien plants and other alien biota Control and, where possible, eliminate alien biota to facilitate re-establishment of natural biodiversity patterns and processes in invaded areas</p>	(1) Establish the distribution and density of invasive species (2) Prioritise areas and species for alien removal, focusing on biodiversity restoration (3) Implement removal programmes for priority species and areas	Invasive plant management plan; invasive biota management plan
<p>MITIGATE INTERNAL and EXTERNAL PRESSURES To reduce threats and pressures, and limit environmental impacts resulting from non-biodiversity management aspects and operations on surrounding land and resource use</p>	<p>Reconciling biodiversity with other reserve objectives To ensure that non-biodiversity management aspects of reserve operations (revenue generation, including visitor, resource use, developments, management activities, etc.) are informed and constrained by biodiversity conservation objectives, and that the impacts of these activities on biodiversity are minimised.</p>	<p>Internal developments Minimise the impacts associated with the development of visitor and reserve management infrastructure, and ensure that such developments do not compromise biodiversity objectives</p>	<p>(1) Reserve zoning (2) Develop and implement Conservation Development Framework (CDF) (3) Developments in accordance with EIA process (National Environmental Management Act) and corporate policies (4) Establish visitor carrying capacities (5) Implement green standards and environmental best practice based on corporate policy</p>	CDF
		<p>Internal activities Minimise the impacts associated with visitor and reserve management activities, and ensure that such activities do not compromise biodiversity objectives.</p>		
		<p>Extractive resource use Minimise the impacts of extractive resource use, and ensure that such activities are aligned with corporate guidelines, are within management capacity constraints, and do not compromise biodiversity objectives.</p>	<p>(1) Quantify current extractive resource activities (2) Define opportunities and constraints in line with corporate guidelines</p>	Feasibility study to be initiated

	<p>Reconciling biodiversity with external threats</p> <p>To reduce external threats and pressures, and limit impacts of surrounding land and resource use on biodiversity conservation within the reserve</p>	<p>External developments</p> <p>Minimise the impacts associated with inappropriate developments outside the reserve</p>	<p>(1) Engage with regional land management authorities, including IDPs and SDFs at local and regional level</p> <p>(2) Align with bioregional planning, including explicitly identified areas for the maintenance of important biodiversity patterns and processes with appropriate land use guidelines</p> <p>(3) Provide input into planning and decision-making processes for external development that may compromise reserve and biodiversity network objectives</p> <p>(4) Negotiate to ensure that external developments are not visually obtrusive or out of character with the park</p>	<p>Biodiversity Management Branch communication strategy and action plan</p>
		<p>External activities</p> <p>Negotiate to ensure that external resource and land use does not detrimentally affect ecological processes within the reserve</p>	<p>(1) Negotiate to mitigate or improve the management of external, potentially detrimental impacts</p> <p>(2) Encourage eco-friendly resource use and land management practices on adjacent properties</p> <p>(3) Mitigate the impacts of oil and other pollution events through appropriate contingency planning</p>	<p>Hazardous material contingency plan</p>
		<p>Hydrological and water chemistry changes</p> <p>Participate in activities for the maintenance of river flow regimes and water chemistry within limits for the maintenance of ecosystem processes in aquatic ecosystems within the reserve</p>	<p>(1) Lobby for appropriate catchment categorisation (currently general authorisation)</p> <p>(2) Encourage enforcement of legislation applicable to the management and protection of aquatic resources</p> <p>(3) Facilitate regular assessments of river health</p> <p>(4) Address the issue of sewage and other point-source pollution of aquatic systems</p>	<p>Biodiversity Management Branch communication strategy and action plan</p>

		Illegal harvesting of resources Prevent the illegal collection, removal and destruction of physical and biological resources	(1) Public liaison (2) Law enforcement	Reserve protection plan; safety and security programme
WILDNESS/ REMOTENESS To maintain and restore wildness/remoteness in Helderberg Nature Reserve so that the spiritual and experiential qualities of wildness are maintained, enhanced or, where necessary, restored	Range of experiences Provide a range of visitor experiences		(1) Reserve zoning (2) Develop CDF and sensitivity-value analysis	(1) CDF (2) Reserve expansion plan (3) Invasive plant management plan
	Sense of place Maintain or restore appropriate sense of place		(1) Implement and update CDF (2) Establish and apply appropriate visitor carrying capacity (3) Negotiate to ensure that external developments are not visually obtrusive or out of character with the reserve.	
CULTURAL HERITAGE MANAGEMENT To investigate and manage all cultural assets	Conserve and manage cultural heritage assets	N/A	(1) Develop a database of all tangible and intangible cultural assets, including inventory, maps and relevant documentation (2) Develop site management plans for each cultural heritage site, with monitoring systems in place for management priorities and prescripts (3) Facilitate appropriate interpretation of cultural heritage associated with the reserve	

Table 5: Socio-economic objectives:

High level-objective	Objective	Sub-objective (where required)	Initiative	Low-level plan
Nurture productive and mutually beneficial partnerships that result in gains in economic and/or biodiversity equity	Enhance socio-economic benefits to local communities	N/A	(1) Contribute to local community development by supporting the Expanded Public Works Programme/poverty relief initiatives (2) Contribute to local skills development by supporting the skills and learnership programmes (3) Identify and facilitate the creation of business opportunities in association with the reserve (4) Support community-based social development initiatives	Biodiversity Management Branch development plan
	Increase environmental awareness and encourage participation in conservation initiatives	Inspire visitors and communities towards considering the environment as an interrelated and interdependent system, of which they are an integral part	(1) Develop and implement an interpretation plan that feeds into both the education and zoning plans (2) Implement environmental education and youth development programmes suited to the needs of each focus group (i.e. tailor-made programmes for each focus group)	Biodiversity Management Branch environmental education plan
		Educate learners, educators and other community focus groups to be able to take environmental action		
		Support educators and community leaders with resource and information materials	(1) Establish and market an environmental resource centre and outdoor classrooms with a range of interpretive and information resources	
Support cooperative governance that will build custodianship	Maintain good reserve/community/stakeholder relations	N/A	(1) Identify and involve all relevant stakeholders for participation in the reserve's advisory forum (2) Develop effective communication mechanisms and responsibilities for representatives	Biodiversity Management Branch stakeholder plan

	Effective cooperative governance	Minimise degrading impact and consequences of inappropriate development in and around the reserve	(1) Establish and maintain good working relationships with relevant government departments as well as internal City of Cape Town departments	
		Ensure support/buy-in for management decisions through participatory decision-making processes	(1) Define roles and responsibilities with stakeholder groups, partners and government through written agreements/terms of reference (ToRs) and MoUs	
<i>Become the nature-based visitor destination of choice in the region</i>	To develop, manage and enhance a range of sustainable visitor products		(1) Design a customer satisfaction survey (2) Analyse current product usage and identify opportunities	Visitor plan
			(1) Plan for visitor infrastructure and facilities, as identified by the CDF (2) Develop and implement the infrastructure management plan (in compliance with state of infrastructure report) (3) Compile a state of infrastructure report	Infrastructure programme
	Conserve and manage cultural heritage assets		(1) Develop a database of all tangible and intangible cultural assets, including inventory, maps and relevant documentation (2) Develop management plans for each cultural heritage site, with monitoring systems in place for management priorities and prescriptions (3) Facilitate appropriate interpretation of cultural heritage associated with the reserve	Cultural heritage management plan

Grow the domestic visitor profile to be representative of the South African society	Grow the domestic visitor profile of the reserve to be representative of regional demographics	N/A	(1) Promote and manage access to the reserve (2) Develop and support dedicated access programmes, or incorporate a 'dedicated access' element into existing programmes (3) Actively market reserve resources and services	Biodiversity Management Branch marketing plan
Enhance the City of Cape Town's reputation	Enhance the reserve's reputation	N/A	(1) Develop and implement a communication plan to promote reserve activities	Biodiversity Management Branch communication programme
Advance strategic human resource management	To ensure good human resource management	N/A	(1) Implement and support learnership and volunteer programmes (2) Ensure all staff have access to training initiatives as per the Workplace Skills Development Plan (WSPDP) (3) Ensure all corporate human resource policies are adhered to	City of Cape Town staff capacity-building programme/institutional development and staff capacity-building programme
Financial management	To ensure sound financial management practices are applied to and underpin the reserve	N/A	Manage cost spending appropriately	Biodiversity Management Branch Business Plan
Achieve good corporate governance management	Effective management of risk profile	N/A	Conduct a legal review	Risk management programme

5.2 SWOT analysis

Strengths

- Local knowledge and expertise of areas under its jurisdiction
- Proclaimed as a local authority nature reserve
- Reserve not ecologically isolated, but connected to large natural areas to the north
- Staff buy-in, and positive attitude of neighbouring landowners
- Strong community involvement
- Active Friends group
- Good radio and telephonic communication systems in place
- Good information technology infrastructure and communications platform
- Management commitment to compiling and implementing management plans and biodiversity action plans
- Legislative support: municipal bylaws, Nature Conservation Ordinance and NEMA
- Constitutional support
- All staff and management have experience and knowledge in managing protected areas
- Existing corporate support services
- Reserve entry and exit are controlled by visitor access booms and gates
- Defensible boundaries
- Access to specialist services and databases
- Well-resourced reserve in terms of staff, infrastructure and equipment
- Staff determination and will to succeed
- Existing, fully functional ecosystems
- Biological monitoring systems are implemented and monitored regularly.

Weaknesses

- Insufficient appropriately trained staff to ensure that all biodiversity objectives are met, such as basic field ranger and law enforcement.
- Limited knowledge of security threats within reserve
- Few patrols during the day, and none after hours
- Operational budget needs review
- Law enforcement tends to be reactive instead of proactive
- Lack of operationally mandated staff to utilise environmental legislation adequately
- Senior City of Cape Town management's laissez faire attitude about state of area integrity management processes
- Public's ignorance of applicable environmental legislation

Opportunities

- Aesthetic beauty of the reserve attracts over 60 000 visitors per annum.
- Creating buy-in among key stakeholders and role players
- Community constituency building
- Increased community ownership
- Job creation and career succession and planning
- Accessing funds for the Expanded Public Works Programme/Sustainable Livelihoods programme to assist in job creation, reserve infrastructure maintenance and development
- Proactively engage communities bordering the reserve, and recognise their needs
- Continuous liaison with and support for Friends groups
- Linking up with surrounding landowners, sharing knowledge and resources in order to manage the biodiversity network effectively
- Promoting the reserve as a destination for outdoor eco-activities

Threats

- Unemployment in the area leads to rising crime levels.
- Threats and intimidation to conservation staff when enforcing legislation
- Lack of commitment from stakeholders
- Lack of appropriate training
- Personal safety of staff
- Growing external communities with increasing needs
- Increased incidents of crime and other illegal activities
- Lack of sustained funding for students and interns
- Lack of sustainable operational funding
- Loss of biodiversity due to inappropriate fire regimes, invasive alien species, illegal activities and bad land use practices
- Change in local government political structures

5.3 Protected-area management policy framework and guiding principles

5.3.1 Community participation

Helderberg Nature Reserve will strive to nurture productive and mutually beneficial partnerships that result in economic and/or biodiversity equity. This will be achieved through the creation of job opportunities in support of the Expanded Public Works Programme and poverty relief initiatives. The reserve will also participate in skills development and learnership programmes in order to contribute to the development of local skills. In addition, through the support of community-based social development initiatives, the reserve could enhance socio-economic benefits to local communities.

Helderberg Nature Reserve will continue to nurture the relationship with the Oak Café. This privately run enterprise operates from within the reserve, and provides locally produced cuisine to patrons. Staff of the establishment are sourced from the community, and contribute to a professionally run business. The facility is leased from the City of Cape Town, and the current lease shall be up for renewal in November 2014 (see appendix 4).

Through the development of a Biodiversity Management Branch education strategy, the reserve will contribute to raising environmental awareness and encouraging participation in conservation initiatives.

The main aims of the reserve education plan will be as follows:

- Inspiring visitors and communities to consider the environment as an interrelated and interdependent system, of which they are an integral part
- The education of learners, educators and community focus groups to take environmental action, assisted by supporting such groups with resource and information materials
- The development and implementation of environmental education programmes suited to the needs of various focus groups
- The development and implementation of an interpretation plan that complements the education plan

In order to develop and maintain good reserve/community/stakeholder relations, all relevant stakeholders need to be identified. The development of an effective communication system in order to address interested and affected parties is required. A working group will be established in order to assist reserve management with key issues.

5.3.2 Safety and security

Safety and security audits aimed at completing a rapid and verifiable analysis of the current security situation, security services, infrastructure, staffing and social context has been carried out on all of the City of Cape Town's nature reserves, including Helderberg Nature Reserve.

The audits soon revealed that the location of the various reserves, with their unique social contexts, primarily dictated the level of threat posed by each reserve. Some reserves perceived as being 'dangerous' were in actual fact found to be 'safe', with very few incidents actually occurring. Although social ills do tend to spill over into reserves, the occurrence thereof is quite localised, and relate to prostitution, substance abuse, theft and illegal plant harvesting for the muti trade.

General security observations revealed that metal infrastructure or equipment and solar panels are at greatest risk, and are stolen regularly. Trespassing vagrants traversing the reserves as well as the harvesting of plants for the commercial flower and commercially driven herbal medicine/muti industry pose a security threat to staff and visitors. However, incidents of visitors and staff being accosted by vagrants are rare.

Security activities were generally viewed as an add-on function when incidents are reported, with some area managers and field staff trying to fit security patrols and activities into their management work schedule. On the other hand, the visitor control officers are in essence access control officers, who may be called on to perform some law enforcement functions if their training enables them to do so. However, staff members do carry out combined operations with law enforcement bodies such as Marine and Coastal Management, the South African Police Service or the City of Cape Town's Law Enforcement Department when activities in the vicinity of the reserves warrant this in the interest of conservation.

One of the most evident security shortcomings found was that reserves were, for all practical purposes, 'abandoned' after hours, on weekends and on public holidays. The investigation also found that very few reserves actively patrol their property and fences on a regular basis.

The findings of each audit, including the responses received from the public interest groups, were used to determine the threat level of each reserve. The threat levels are based on a combination of factors that may affect the reserve, its staff and visitors' safety as well as security in other reserves. The threat levels low, medium and high reflect the safety threat to

visitors, staff and infrastructure. Furthermore, the threat level provides an indication of intervention priority (staffing, infrastructure and equipment).

A copy of the safety and security audit is attached as appendix 11.

5.3.3 Culture-historical, archaeological and paleontological management

Helderberg Nature Reserve currently falls within the Somerset West-Hottentots Holland culture-historical layer. This layer is currently being developed and regards the reserve as being an integral part of the *natural landscape*. The City of Cape Town's Cultural Resources Department is currently reviewing the area, and a culture-historical, archaeological and paleontological zoning will be developed.

5.3.4 Tourism development and management

A fully integrated precinct plan is being developed for Helderberg Nature Reserve. This plan will indicate suitable development nodes, and will be guided by the infrastructure and zoning management plans.

5.3.5 Infrastructure management

Helderberg Nature Reserve contains a large amount of infrastructure, for which various departments within the City of Cape Town share responsibility. A full audit of infrastructure in the reserve, its current usage and structural integrity is required. Infrastructure has been mapped.

Infrastructure that is or could be used should be included in a five-year maintenance plan. Infrastructure with no use should be demolished and the sites rehabilitated.

5.3.6 Biodiversity conservation management

5.3.6.1 Community-based natural resource management

The harvesting of natural resources in Helderberg Nature Reserve is not permitted. However, research on the amount of illegal harvesting and the species harvested across the city is currently under way. Some investigations as to the types and extent of illegal harvesting in the reserve has started, but, to date, there is no detailed or conclusive information to determine where these practices are sustainable, and/or what potential threats are foreseen should they persist.

5.3.6.2 Fire management

Fire plays an essential ecological role in the life cycle of fynbos species. Fire is crucial to the long-term conservation of species within Helderberg Nature Reserve, and is therefore considered an important component of reserve management. Fire management involves varying the season, frequency and intensity of fires, and reconciling ecological and practical requirements. Too frequent fires, or fires that burn out of phase with the natural burning regime, present a threat to slower-growing species, which may be entirely eliminated. If fire is excluded from the area, forest species could invade, resulting in fynbos species losses. Conversely, if vegetation is allowed to burn too frequently, the area becomes degraded, and alien species, especially grasses, take over. Grasses maintain a shorter fire cycle, and permanently change the vegetation structure and biodiversity value.

The fire management programme for Helderberg Nature Reserve involves the monitoring of large wildfires as well as smaller fires, both natural and unnatural, and determining the optimal fire frequency. Historic records of fire events in the reserve area as well as post-fire monitoring records assist in the documentation of veld ages, which in turn influence fire management. Minimal interference takes place in the case of naturally ignited fires. In the case of human-induced fires that would simulate natural fires, the same management responses would apply. Natural fires are limited in spread within the constraints of ecological, project and public safety requirements. All possible actions are taken to prevent the spread of fire onto the adjacent properties. All unnatural fires that threaten the reserve ecologically or pose a threat to infrastructure and/or public safety are controlled.

Prescribed burning of vegetation is a management option in areas where vegetation becomes senescent (old), and where there is a risk of species loss. The use of prescribed burning practices would assist in maintaining a vegetation mosaic that promotes plant and animal diversity. Accurate fire records and post-fire monitoring data will require the initiation of prescribed burns in the core area of the reserve. The decision to administer prescribed burns is considered on an annual basis, and, if required, planned and implemented accordingly.

Fire may be used to keep fuel loads low so as to reduce the risk of uncontrolled fires, particularly on the urban edge and in areas that become a potential risk to infrastructure and public safety. Firebreaks and other fire control measures required by law will be implemented where necessary and feasible.

The nature of the area's terrain, property boundaries and extensive areas of natural veld increase the chances of fire spreading both into and out of the reserve. Reasonable pre-fire protection measures are necessary, as well as a plan of action in the event of wildfire. Interaction with various City of Cape Town departments and independent stakeholders as well as continuous public/private landowner involvement are essential. The development of fire protection and response plans is an important component of the reserve's fire management approach.

Fire management implementation in Helderberg Nature Reserve involves:

- the application of guidelines on seasonal burning intervals and species requirements acquired from relevant documentation and biophysical specialists;
- accurate record keeping of all fires, including details and maps;
- the use of fire data and the geographic information system (GIS) for recording and mapping;
- the application of post-fire monitoring programmes;
- the application of fire data to determine prescribed burning needs; and
- the development and implementation of a fire protection and response plan that includes affected stakeholders, such as additional City of Cape Town departments and private landowners neighbouring the nature reserve.

5.3.6.3 Catchment management

Catchments

Helderberg Nature Reserve falls within the Hottentots Holland – more specifically, the Lourens River catchment. The Disa River originates in the upper reaches of the reserve, and is channelled to the Land-en-Zeezicht bulk-water storage dam further down. This water source augments water sources from the Lourens River and Steenbras and Theewaterskloof dams for use as domestic supply to the Erinvale and Lourensford estates (see map 4 earlier in this document).

Rivers

The Disa River is approximately 4 km long and runs from the top of the mountain in the vicinity of the dome to the water treatment plant situated lower down the slope. The river receives most of its water during the winter months, when precipitation is received in the form of rainfall.

The Disa River discharges the majority of its water into the Land-en-Zeezicht dam. However, there are periods when the water is bypassed, in which case it flows via Pete's Pond into an overflow channel, eventually discharging into the stormwater drain. The reserve has several unnamed streams, which flow during heavy rainfall periods.

Wetlands and seeps

There are several seepage areas associated with the seasonal drainage lines and perennial rivers in the reserve.

5.3.6.4 Soil erosion and control

Within Helderberg Nature Reserve, natural erosion processes are allowed to take their course without interference, except where necessary. In the case of human-induced and natural areas that are aggravated, appropriate management action will be taken.

Potential human impacts should be avoided through the correct planning and maintenance of infrastructure. Areas that had previously been degraded by human activities and are no longer in use will be restored as close as possible to their natural state. Disturbed areas and areas affected by unnatural accelerated erosion will be controlled by means of appropriate methods. The cause and management of problem erosion sites will also be considered.

Implementation with regard to soil management in Helderberg Nature Reserve includes:

- maintenance of all management tracks and footpaths to ensure that erosion issues do not originate from this infrastructure;
- the identification and recording of all soil erosion sighted, including the assessment and development of restoration plans where required;
- the use of soil erosion data and GIS for recording and mapping;
- the application of fixed-point monitoring programmes at identified soil erosion sites; and
- the accurate documentation of management actions applied to restoration sites, including results from areas responding to these actions.

5.3.6.5 Invasive-species management

The management of invasive and alien species is a priority in Helderberg Nature Reserve. The control and, where possible, the elimination of alien biota are necessary in order to facilitate the re-establishment of natural biodiversity and processes in invaded areas.

Invasive and alien species management within the reserve is applied in accordance with the City of Cape Town's invasive alien species strategy and in coordination with various government-funded initiatives, including Working for Water and Working for Wetlands. Invasive alien plant species could spread rapidly should management fail to continue to implement a properly planned and coordinated programme.

Until recently, invasive-species management focused on woody alien plant species, such as *Acacia saligna* (Port Jackson), *Hakea sp* and *Acacia cyclops* (rooikrans). Herbaceous weeds were largely ignored. Recent monitoring and the development of an extensive herbaceous weed and grass species list for the reserve have however shown that some herbaceous species already pose a risk to biodiversity in the area, while others have the potential to become a risk.

Within Helderberg Nature Reserve, a number of species indigenous to the CFR have been identified that would never have occurred naturally in the reserve. This is generally the result of previous planting in old recreational areas in an attempt to beautify the environment. Horticultural strains of indigenous species also present a risk to naturally occurring specimens. Some species are known to hybridise with locally indigenous species in the area, and pose a potential threat to the genetic integrity of such populations.

In order to protect indigenous vegetation from invasive species, the following is required:

- The prioritisation of areas for alien removal, focusing on biodiversity restoration
- The implementation of removal programmes for priority species and areas
- The development and implementation of an invasive and alien plant management plan as well as a management plan for alien biota

Invasive and alien faunal species are also eradicated in the reserve. Formal plans outlining the monitoring of the removal of identified species are however required.

5.3.6.6 Species introduction

There is potential to re-introduce locally extinct species for which suitable habitat and eco-niches are available at Helderberg. Several fauna species that had previously occurred in the Helderberg are down to very small numbers or are no longer present. Prior to the re-introduction of any species, a full proposal is required by the City's Faunal Management Committee. Investigation into the availability of suitable habitat for the species with reference to the public utilisation of areas is required, as is a full investigation into the historical

occurrence and status of the species. The effect of re-introducing species to the area must also be researched. The re-introduction of potentially dangerous or problematic species may also require a public participation process. An investigation of suitable sources is also needed.

All proposed re-introductions need to be recommended and approved before implementation by both the faunal and floral committees as well as provincial authorities. The implementation of any re-introduction programme must be specified in a plan of action, and must be documented accurately.

5.3.6.7 Strategic research

Research subjects beneficial to the management of Helderberg Nature Reserve need to be identified. These subjects could then be prioritised and pursued.

Currently, research is being undertaken, supported by reserve management. However, many of the projects are conducted by outside student researchers and organisations, and are not informed by the reserve's needs. Still, the use of Helderberg as a destination for research activities should be encouraged. Research activities should however not negatively affect the biodiversity or other aspects of the reserve.

An effort needs to be made to obtain copies of data resulting from research projects conducted within the reserve's boundaries.

5.4 Sensitivity analysis of Helderberg Nature Reserve

The reserve is a considerable asset to the City of Cape Town, and significantly contributes to national targets for threatened vegetation types as listed in the National Spatial Biodiversity Assessment (Driver *et al.* 2005) as well as provides a service and facilities to local residents and schools.

The development of the sensitivity and zoning plan is one of the steps towards compiling a CDF for the reserve. CDFs are tools to reconcile the various land use needs, and to delineate visitor user zones and the positioning and nature of new infrastructure, access points, roads and facilities. The CDF process has grown in response to the requirements of the National Environmental Management: Biodiversity Act (NEM:BA) of 2004, and seeks to comply with the spatial planning requirements of the Act. The CDF will ensure that best practice and sustainable development principles are integrated with spatial planning in protected areas.

The sensitivity-value analysis is the landscape analysis portion of the broader CDF. It is a multi-criteria decision support tool for spatial planning, which is designed to present the best available information in a format that enables defensible and transparent decision making. The sensitivity-value analysis process is based on the principle that the acceptability of a development (or placement of a structure) at a site is based on that site's value (arising from the site's biodiversity, heritage, aesthetic or other values) and its sensitivity or vulnerability to a variety of disturbances (Holness, 2005).

The sensitivity-value analysis, the CDF and the associated zoning plan should form part of an adaptive management system. They will grow and change over time as the understanding of the landscapes and ecosystems improves. However, they do not replace the need for detailed site and precinct planning and EIA compliance at site level.

The small size of Helderberg Nature Reserve did not require an extensive analysis, and the subsequent zoning process was fairly straightforward. The method used for both the sensitivity-value analysis and the zoning process was adapted from Holness & Skowno (2008) and SRK Consulting (2008¹; 2008²).

All geographic information work was carried out in ESRI's ArcMap Version 9.3.1 GIS, using the ArcInfo licence level, with Spatial Analyst and 3D Analyst extensions (see appendix 12 for full report).

5.5 Zoning plan of Helderberg Nature Reserve

5.5.1 Zoning informants

This section briefly outlines the values underlying the identification of broad tourism use zones. It is important to remember that the landscape/biodiversity analysis is just one of the informants in the zoning process. Although the biodiversity analysis is intrinsically a relatively objective scientific process, other informants to the zoning process are not.

Although every attempt is made to place high sensitivity-value sites into more protected zones where possible, the zoning process is in essence a compromise between environment and development. In particular, the identified high-value sites are often key biodiversity assets that need to be made available to the ecotourism market in an appropriate manner. Direct links are made between the biodiversity layers and the spatial management of the reserve when special management areas are identified (where applicable). Even within

broad high-tourist use zones, certain areas are likely to be subject to very tight conservation controls (potentially including complete exclusion of human impacts from an area).

Underlying decision-making rules used in the zoning process include the following:

- The zoning process is aimed at striking a *balance* between environmental protection and the development required to meet the broader economic and social objectives of the reserve.
- The zoning process takes into account existing development footprints and tourism access routes.
- This is based on the underlying principle that, all else being equal, an existing transformed site is preferable to a greenfields site from a biodiversity perspective.
- Infrastructure costs are dramatically increased when developments take place away from existing infrastructure.
- Existing tourism nodes and access routes are a reality of the economic landscape, and it would not be possible to shut down existing tourism sites compromising the development objectives of the reserve.
- Where existing development nodes, tourist sites and access routes occur in areas with high sensitivity-value, the broad use zoning aims to keep the development footprint as small as is realistically possible, preferably within the existing transformed site.
- Where possible, sites with high biodiversity sensitivity-value are put into stronger protection zones.
- Peripheral development is favoured and should, where possible, be located outside the conservation area.
- In particular, two key points need to be emphasised:
 - The designation of a broad use zone does not imply that all sites within that zone would be suitable for all the development types anticipated. Detailed site-level planning is still required, and many sites may prove to be unsuitable at a site/precinct/EIA planning level.
 - Special management areas/overlays need to be formalised and linked to the management plans.

5.5.2 Zoning definitions and descriptions

The zoning definitions and descriptions were workshopped with reserve and area managers. Four categories were decided on, namely primary conservation zones, conservation zones, low-intensity leisure zones and high-intensity leisure zones (see figure 3 for the Helderberg

zoning map). Appendix 13 outlines the proposed zoning definitions and descriptions. The process is still linked to the zoning used for the CapeNature reserves (Holness & Skowno 2008), as there should be general alignment of the broader use zones to enable comparison and integration if provincial documents so require.

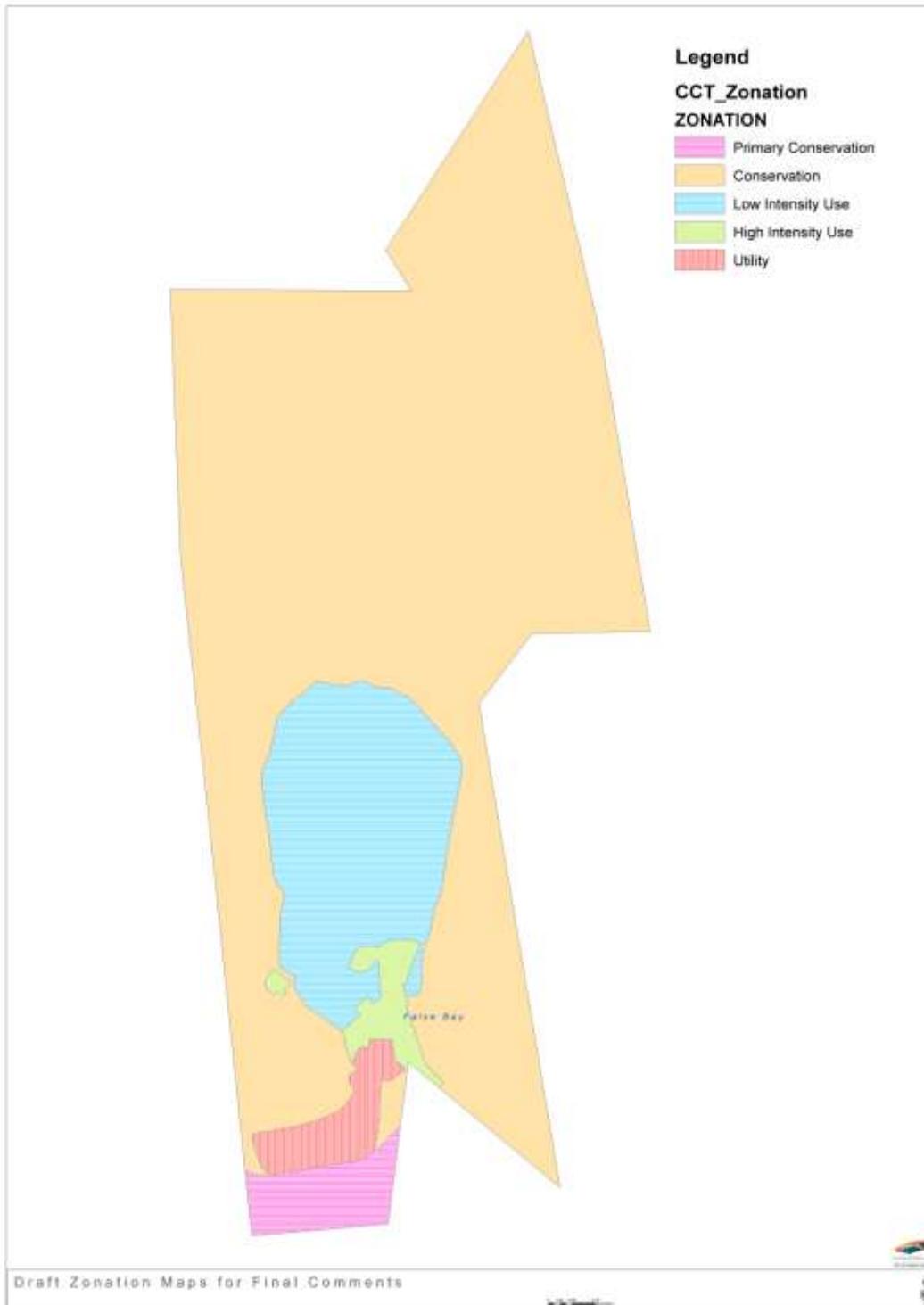


Figure 3: Helderberg Zonation Map

6. DEVELOPMENT PLAN

The development plan is still to be completed as part of the detailed precinct planning for the high-intensity use zone. This plan will indicate suitable development nodes, and will be guided by the infrastructure and zoning management plans.

7. COSTING PLAN

Table 6: Broad category breakdown for Management Interventions for the Helderberg Nature Reserve for the period 2011 – 2016

Management action	Funding source	Approximate costs 2011–2012	Approximate costs 2012–2013	Approximate costs 2013–2014	Approximate costs 2014–2015	Approximate costs 2015–2016
1. Invasive alien plant programme						
• Clearing of NBal's 1 & 2	Grant funding	R25 000,00	R26 250,00	R27 562,00	R28 940,00	R30 387,00
2. Fire management						
• Maintenance of fire belts	Operating	R35 000,00	R36 750,00	R38 587,00	R40 516,00	R42 542,00
• Planned ecological burn		-	R15 000,00	-	-	R20 000,00
3. Road and trail maintenance						
	Grant funding	R90 000,00	-	-	-	-
• Road repairs	Operating	R4 750,00	R5 000,00	R5 250,00	R5 512,00	R5 788,00
• Footpath maintenance	Operating	R5 000,00	R5 250,00	R5 512,00	R5 788,00	R6 077,00
• Parking area maintenance	Operating	-	R10 000,00	-	R15 000,00	-
4. Fencing						
• Repairs and maintenance	Operating	-	R15 000,00	-	-	R17 000,00
• New fence reserve development	Capital expenditure	-	R60 000,00	-	-	-
5. Infrastructure development						
• Helderberg office complex	Capital reserve fund	R2 500 000,00	-	-	-	-
6. Human resources						
• Direct human resource costs	Operating	R1 950 000,00	R2 106 000,00	R2 274 480,00	R2 456 438,00	R2 652 953,00
7. General expenses						
• General operating costs	Operating	R200 000,00	R210 000,00	R220 500,00	R231 525,00	R243 101,00
8. Special projects						
• Friends of Helderberg Environmental Education	Operating	R333 366,00	R350 034,00	R367 536,00	R385 912,00	R405 208,00
• Signage and interpretation	Capital expenditure	-	R50 000,00	-	-	-
Note:						
Human resource costs are escalated at 8% per annum.						
Operating expenditure is escalated at 5% per annum.						

PART 3

MONITORING & AUDITING

8. MONITORING & AUDITING

8.1 Annual audit procedure

8.1.1 METT-SA – Management Effectiveness Tracking Tool South Africa

The METT-SA is a rapid, site-level assessment tool adapted from the World Bank and Worldwide Fund for Nature (WWF) system (second edition, 2007). The system is based on the idea that good protected-area management follows a process comprising six distinct stages or elements:

It begins with understanding the **context** of existing values and threats (where are we now?), then progress through **planning** (where do we want to be?), followed by allocation of resources (**inputs**) (what do we need?). As a result of management actions (**processes**) (how do we go about it?), it eventually produces products and services (**outputs**) (what were the results?), which result in impacts or **outcomes** (what did we achieve?).

This version has been compiled so that it can be applied to the full range of protected areas managed by all C.A.P.E partners. It also applies to protected areas in other regions, and, with minor adaptations, could be applied outside of South Africa as well. It may also be used for marine protected areas (MPAs) and islands, but, in the long run, it may become necessary to amend the system to be more specific to these areas. In addition, a system for off-reserve conservation areas, such as conservancies or stewardships, may need to be developed.

When applying METT-SA, it is important for the following to be kept in mind:

- The METT-SA is intended to report on the reserve's progress. Thus, the score is the baseline against which future assessments are made to see if there has been an improvement.
- It is site-specific and must therefore not be used to compare scores between different protected areas.
- It is a useful tool to give indications of management trends. In this version, the six elements of the management process, as defined in the original version, are scored as subsets of the total. This gives an indication of where management should strive for improvement.
- It is not intended to replace more detailed assessments as part of adaptive management systems.
- The METT-SA has limitations in the quantitative measurement of outcomes, and these should be measured by more objective and quantitative systems.
- This version adjusts the total score where questions are irrelevant.

- Often, low scores on some questions could be a reflection on the organisation as a whole, and do not necessarily point to issues over which the protected-area manager has control. **The performance of managers should therefore under no circumstances be measured against the METT-SA results.**

Tracking the trends of management effectiveness is a long-term process, and instant improvements are unlikely. Generally, the METT-SA is applied at three-year intervals, but an annual application is acceptable if it is understood that changes may only be slight. The METT-SA for Helderberg Nature Reserve was undertaken in 2007, and the results are presented in appendix 14. The METT-SA will be repeated in approximately September 2011.

8.1.2 Protected-area review (PAR)

The PAR is an internal review conducted annually to assist managers in reviewing their sites, and to allow for adaptive management actions where required (and within managers' control).

8.2 Management plan review

This IRMP should be reviewed every five years, and adjusted where necessary. To achieve this, the following questions among others should be addressed:

- Did this management plan make a meaningful contribution to the management of Helderberg Nature Reserve?
- Were individual management 'prescripts' realistic and achievable? Were they written unambiguously, or was there room for misunderstanding?
- Were budgets for each management activity realistic? Were the allocated budgets too much or too little?
- Were enough, adequately qualified staff members allocated to each management activity?

There will be some overlap between the review and the audit, and they should therefore be done on the same day, by the same team.

8.3 Biodiversity monitoring

The South African biodiversity database has been developed in order to assist managers in storing data in a central, secure location. This database is a useful indicator within the reserves in order to determine the status of floral, faunal as well as tracking infrastructure developments. The system can be interrogated by managers, and species lists can be obtained per site, if required.

All data collected, such as bird counts, night counts and plant monitoring, are added to the database and kept up to date.

Table 7: Research and Monitoring programs underway

Action	Responsible party	Means of verification	Frequency
<p><u>Vegetation monitoring</u></p> <p>Invasive-species vegetation</p> <p>Aspects to be monitored include the effectiveness of the operation, the effectiveness of the follow-up, methods used, compliance with the alien-clearing schedule, environmental damage such as herbicide spillage, and vigilance of the presence of new potentially invasive species on site (early detection and rapid response)</p>	<p>Reserve staff</p> <p>Area manager, students and interns</p>	<p>Weekly inspections</p> <p>Final inspections</p> <p>Field verification sheets</p>	<p>Weekly</p> <p>Once-off – completion of contract</p> <p>Annually – to determine management unit clearing plan</p>
<p>Fire mapping</p> <p>All veld fires must be accurately mapped and recorded to build up a useful record that will assist with veld interpretation. These records will take the guesswork out of the effects of fire when it occurs on the property. A simple map indicating the extent of the burn and the date of the fire is the minimum requirement.</p>	<p>Reserve staff</p> <p>Area manager, students and interns</p>	<p>Veld age map, fire map</p>	<p>Post-fire</p>
<p>Post-fire recruitment</p>	<p>Reserve staff</p> <p>Area manager, students and interns</p>	<p>Stratified sampling plots</p>	<p>Post-fire</p> <p>Six months</p> <p>12 months</p> <p>Annually for three years</p>
<p>Abundance, density and structure</p>	<p>Reserve staff</p> <p>Area manager, students and interns</p>	<p>Fixed-point photography</p> <p>Presence, abundance and density</p>	<p>Annually</p>
<p>Threatened species</p>	<p>Reserve staff</p> <p>Area manager, students and interns</p>	<p>Field observation sheet</p>	<p>Seasonally</p>

<u>Faunal monitoring</u>			
Bontebok behaviour	Dr A Wasilewski Marborg University, Germany	Field observation	Bi-annually
limbovane ant project	Prof S Chown Stellenbosch University	Fixed transects Field observation sheets	Bi-annually
Nocturnal species counts	Reserve staff Area manager, students and interns	Modified vehicle line transect	Monthly
Bird diversity	Reserve staff Area manager, students and interns	Field observations	Weekly
Bird distribution	Somerset West Bird Club	Bird ringing	Monthly
Small fauna (mammals, reptiles and amphibians)	Reserve staff Area manager, students, interns and field staff	Stratified random Sherman trap array	Annually
Leopard distribution	Reserve staff Area manager, students, interns and field staff	Camera trapping	Monthly
<u>Water monitoring</u>	Reserve staff	Field collection equipment	Daily
Rainfall	Area manager, students, interns		

PART 4

REFERENCES

9. REFERENCES

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NOW THEREFORE the Appearer declared that the LESSOR hereby leases the Property to the LESSEE on the following terms and conditions:

1. Notwithstanding the date of signature hereof the lease shall be for a period of 99 years commencing on 1 JULY 1994.
2. The rental shall be the sum of R1,00 (ONE RAND) per annum. The full amount of R99,00 (NINETY NINE RAND) for the entire lease period, shall be payable in advance on the day of signature hereof.
3. The LESSEE shall not have the right to assign this lease or to sub-let the whole or portion of the Property.
4. The said Property hereby let shall be used by the LESSEE as a nature reserve, for the enhancement and protection of the natural vegetation and wildlife of the Property, for the promotion of nature conservation, for the free use and enjoyment by the landowners and landusers on Erinvale Country Estate as a Nature Reserve and subject to all restrictions relating thereto by the public in general. The Property shall be administered in terms of the provisions of the By-Law relating to the Helderberg Nature Reserve promulgated under Provincial Notice 391 of 1979 dated 4 May 1979, as amended and as a local nature reserve in terms of Section 7 of the Nature and Environmental Conservation Ordinance No 19 of 1974.
5. The LESSOR shall be represented on the Helderberg Nature Reserve Advisory Board.
6. The LESSEE shall compile a management plan for the Property in consultation with the LESSOR.
7. The LESSOR shall erect a 1,8 m veldspan type fence along the common boundary between the proposed Erinvale Country Estate and Golf Club and the Helderberg Nature Reserve as well as between the Erinvale Country Estate and Golf Club and the Property to be leased and the LESSEE shall make provision for the erection of an electric fence along the latter boundary.

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- 8. The LESSEE shall not without the prior written consent of the LESSOR erect or cause or permit to be erected any buildings and/or structures on the Property.
- 9. The LESSEE shall be responsible for the maintenance, security, enforcement of conditions of use by the general public, admission control and patrolling of the Property and for the reimbursement of same.
- 10. The LESSEE shall be liable for payment of all service charges levied against the Property including rates, taxes, water and electricity charges.
- 11. 11.1 The LESSEE shall at its cost provide and maintain fire-breaks between the LESSOR'S development, Erinvale Country Estate and Golf Club and the Property hereby let.
 11.2 All necessary fire-lighting equipment, shall be provided and maintained by the LESSEE at its cost, in good working order and condition at all times.
- 12. In the event of the LESSEE failing to comply with the provisions of this agreement, the LESSOR shall have the right, notwithstanding the provisions of Clause 1 above, to terminate this lease by written notice to that effect addressed to the LESSEE, provided that the LESSOR shall notify the LESSEE in writing of the breach complained of and allow a reasonable period to remedy the breach.
- 13. Should the LESSOR terminate the lease, the LESSOR shall pay to the LESSEE, after quiet possession of the Property has been given to the LESSOR, compensation for improvements made on the Property by the LESSEE, provided that if portion only of the Property is resumed and it is of such an extent that the remainder is not in the opinion of the LESSEE of sufficient size for the purpose for which the Property is leased, the LESSEE shall have the option of cancelling the lease and claiming compensation in respect of improvements made on the remaining Property. Compensation in terms of this clause shall be payable only for improvements made by the LESSEE out of its own funds and not for improvements made out of funds provided by the LESSOR, and only for improvements actually existing at the time the

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lease is cancelled or amended.

- 14. No compensation shall be payable unless the LESSEE has deposited with the LESSOR within one month of the completion of such improvements a certified statement showing the actual capital cost thereof. The LESSOR shall be entitled, if it wishes, to inspect the LESSEE'S books of account in order to verify the said statement. Compensation in terms of this clause shall be calculated according to the following formula :

$$\frac{C X}{Y}$$

where C equals the capital cost of the improvements, X equals the number of calendar months between the date of resumption of possession by the LESSOR in terms of this section and the expiration of the term referred to in Clause 1 hereof, and Y equals the number of calendar months between the date of completion of the improvements and the expiration of the term referred to in Clause 1 hereof. An evaluation of the capital improvements shall be made by an independent assessor at the termination or expiration of the lease.

- 15. The LESSEE shall not be entitled to the privilege conferred by any laws which are now or may hereafter come into force, for regulating the prospecting and mining for precious stones, minerals or base metals. It is a condition of lease that all rights to all minerals, mineral products, mineral oils, coal, base or precious metals or precious stones in or under the Property are reserved to and in favour of the LESSOR.
- 16. The LESSEE hereby selects domicilium citandi et executandi at the Municipal Offices, 20 Victoria Street, Somerset West to which all notices may be posted or delivered in respect of any action or proceeding arising from this Agreement or the cancellation thereof. The LESSOR hereby selects domicilium citandi et executandi at Lourensford Farms, Lourensford Road, Somerset West or at such other place as the LESSOR may stipulate in writing to the LESSEE.
- 17. The LESSEE shall be responsible for payment of :

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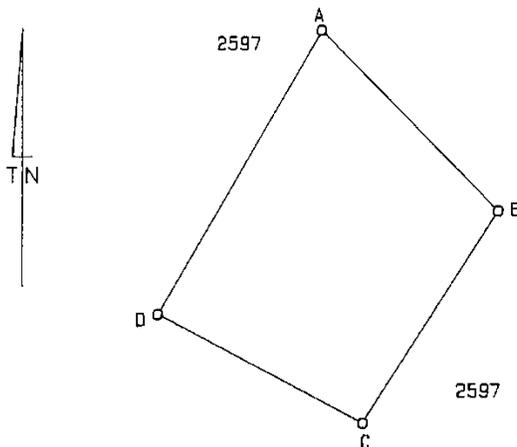
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SIDES Metres	ANGLES OF DIRECTION	CO-ORDINATES System Lo19'			S.G. No. 5909-94
		Y	X		
	Constant:	+	0,00	+3 700 000,00	
A B	19,55	315 33 30	A + 11 658,38	+ 70 277,86	Approved <i>[Signature]</i> Surveyor-General 1994-09-19
B C	19,52	32 24 10	B + 11 644,69	+ 70 291,82	
C D	17,99	117 48 20	C + 11 655,15	+ 70 308,30	
D A	25,44	209 54 10	D + 11 671,06	+ 70 299,91	
		16888	⊕ + 12 206,88	+ 70 436,70	
		17888	⊕ + 12 180,50	+ 70 670,94	

Description of Beacons.

A, B, C, D 12mm round iron peg



Scale 1: 400

The figure A B C D represents 414 square metres of land, being a Leasehold Area on Erf 2597 Somerset West situate in the Municipality of Somerset West Administrative District of Stellenbosch, Province of Cape of Good Hope. Surveyed in June 1994 by me,

G.K. Munns

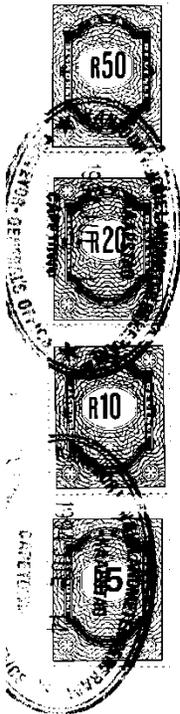
Professional Land Surveyor

PLS 0429

This diagram is annexed to No. dated i.f.o.	The original diagram is No. 373/1893 relating to Quitrent Deed No. Stel. Q. 19-7 dated 20.10.1893	File No. S/2308/54
		S.R. No. B 1957/94
		Comp. AHNE-3423 (M2265)
		AHNE-3423 (M2265)
		AHNE-3251 (M3186)

Registrar of Deeds

LEASEHOLD DCM.



SOMERSET WEST MUNICIPALITY

This diagram is necessary in order that the lease of a portion of erf 2597 Somerset West belonging to Somerset West Municipality may be registered and that this leasehold diagram is exempt from the provisions of Ordinance 15 of 1985 in terms of section 23(1) of the said Ordinance.


TOWN CLERK

6.7.94
DATE

EXEMPT FROM PROVISIONS
OF CHAPTER III
OF ORD. 15/1985

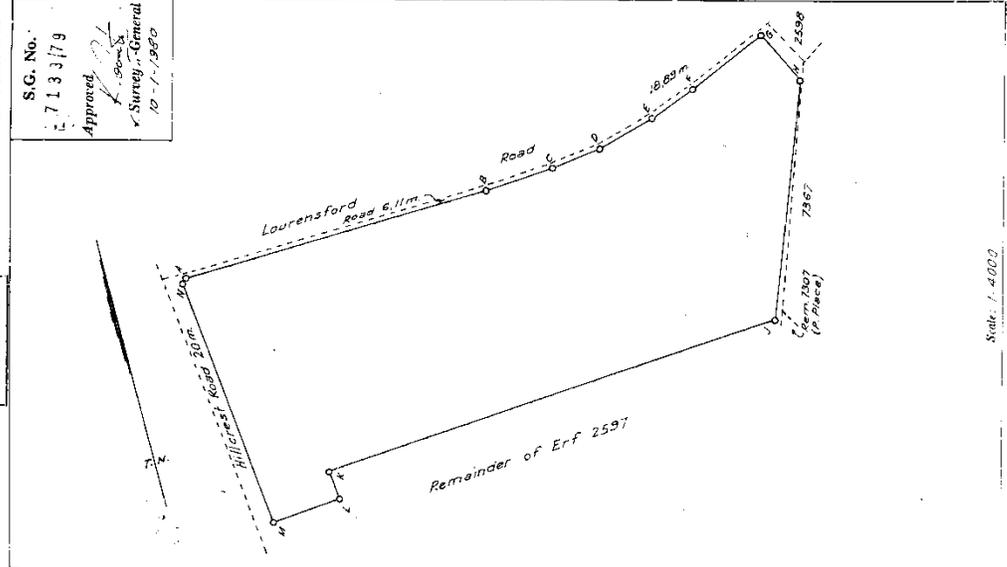
APPROVED IN TERMS OF SECT. 25
OF ORD. 15/1985
REF. C.2423
DATE 1994 / 09 / 05

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S.G. No. 7133/79

Approved
Surveyor General
10-1-1980



Scale 1:4000

SIDES	ANGLES OF Direction	COORDINATES System L'19°		
		N	E	Z
AB	350.89	268.57	50.00	2.07.59
BC	77.94	266.40	20.00	2.095.24
CD	57.66	262.41	20.00	2.090.72
DE	67.47	254.42	0.00	2.083.38
EF	56.34	249.45	0.00	2.065.57
FG	96.84	247.42	10.00	2.045.07
GH	65.68	334.59	40.00	2.009.33
HJ	270.01	21.00	10.00	2.058.85
JK	526.26	86.37	10.00	2.320.92
KL	33.12	354.24	0.00	2.357.94
LM	78.86	84.44	0.00	2.384.90
MN	286.87	174.71	20.00	2.392.14
NA	6.79	221.39	20.00	2.106.66
		59.888		2.072.92
		41.888		2.088.38

Beacons
All iron standards projecting 200 mm.

The pieces A, B, C, D, E, F, G, H, J, K, L, M, N represent 77,3865 hectares of land, being a Lease Area over Remainder of Erf 2597, Somerset West, situated in the Municipality of Somerset West, District of Stellenbosch.

Approved on 10 October 1979 by me

Printing Office of Good Hope

Land Surveyor

File No. S/2398/54
S.R. No. E, 211179
Comp. AM 28C/1922 (285)
AM 44/1992
AM 28C/1911 (524)

The original diagram is No. 303/1933, entered in the Transfer Book No. 516/Q 197

Registrar of Deeds

Appendix 3: Gazette information for original Reserve proclamation

APPENDIX 5

2nd September, 1960]

The Province of the Cape of Good Hope Official Gazette

457

MUNICIPALITEIT SOMERSET-WES: LAND-EN-ZEE-
ZICHT NATUURTUIN: OMSKRYWING VAN GRENSE

MUNICIPALITY OF SOMERSET WEST: LAND-EN-ZEE-
ZICHT NATURE RESERVE: DESCRIPTION OF BOUND-
ARIES

WENNIG geskied hierby kragtens artikel 3 ter van die
Land-reserve Ordinance op Natuurtuine, no. 18 van 1939, dat die
grense van die Land-en-Zeezicht Natuurtuin, 'n gebied van
ongeveer 604.8 akker, as volg omskryf word:—

NOTICE is hereby given in terms of section 3 ter of the
Nature Reserves Ordinance, No. 18 of 1939, that the
boundaries of the Land-en-Zeezicht Nature Reserve, an area
of approximately 604.8 acres, are defined as follows:—

Vanaf die aansluiting van die suidelike grens van die
Land-en-Zeezicht en die westelike grens van die plaas
Land-en-Zeezicht (Erf 2597) in 'n noordelike, oostelike en
suidelike rigting langs die grense van die plaas Land-en-
Zeezicht tot die grootste gedeelte van Erf 2597 in te
weersaatsig met die noordelike grens van Somerset-Wes Dorps-
uitbreiding 6 (TP 959 LD) vandaar langs die noordelike
grens van Somerset-Wes, Dorpsuitbreiding 6 in 'n weste-
like rigting tot die noordelike baken van Erf 2609; van-
daar in 'n suidelike rigting langs die westelike grense van
Erf 2609 en Erf 2608 tot die suidwestelike baken van Erf
2608; vandaar in 'n westelike rigting tot die aansluiting van
die suidelike grens van die Plaas Land-en-Zeezicht en die
westelike grens van die plaas Land-en-Zeezicht (Erf 2597).
—D. S. Sales, Stadsklerk. 3268

From the intersection of the Southern boundary of the
road Land-en-Zeezicht and the Western boundary of the
Farm Land-en-Zeezicht (Erf 2597), in a Northerly, Easterly
and Southerly direction along the boundaries of the farm
Land-en-Zeezicht (so as to include the major portion of
Erf 2597) to the intersection of the Eastern boundary of
Erf 2597 with the Northern boundary of Somerset West
Township Extension 6, (TP 959 LD); thence along this
Northern boundary of Somerset West Township Extension
6 in a Westerly direction to the Northern-most beacon of
Erf 2609; thence in a Southerly direction along the Western
boundaries of Erf 2609 and Erf 2608 to the South-western
beacon of Erf 2608; thence in a Westerly direction to the
intersection of the Southern boundary of the Road Land-
en-Zeezicht and the Western boundary of the Farm Land-
en-Zeezicht (Erf 2597).
—D. S. Sales, Town Clerk. 3268

Appendix 4: Oak Café Lease

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4: a/cwa/istoxk.net

GEREGISTREER REGISTERED
<i>[Signature]</i>
REGISTRATEUR/REGISTRAR
29.12.94

<i>[Signature]</i>
9/1

SEELREG DUTY	<i>[Signature]</i>
FOOI FEE	R. 75,00

K 1306 94

Protocol No 136

NOTARIAL AGREEMENT OF LEASE

KNOW ALL MEN WHOM IT MAY CONCERN

That on this 8th day of December 1994, before me, JAN HENDRIK HOFMEYR, a Notary Public duly sworn and admitted, residing and practising at Somerset West, personally came and appeared

SONJA UYS

duly authorised thereto under and by virtue of a Power of Attorney granted by GERT JACOBUS HUMAN, in his capacity as Town Clerk of the Municipality of Somerset West) (hereinafter called the Lessor) executed at Somerset West on the 16th day of November 1994 and a Power of Attorney granted by JANET MARY FORRESTER, Identity Number 510319 0069 08 5, unmarried

(hereinafter called the Lessee)

executed at Somerset West on the 8th day of NOVEMBER 1994 which Special Powers of Attorney have this day been exhibited to me, the Notary, and remain filed of record in my Protocol with the Minute hereof.

[Signatures]

And the Appearer declared, q.q. on behalf of the Lessor, to let to the Lessee, and q.q. on behalf of the Lessee, to hire from the Lessor the premises which has been duly surveyed as shown on the Leasehold Diagram S.G. No 5909/94 annexed hereto and demarcated thereon by the letters ABCD, in extent 414 square metres as a leasehold area on Remainder of Erf 2597 Somerset West situate in the Municipality of Somerset West, Division Stellenbosch, which property is held by the Lessor by virtue of Deed of Transfer No T12588/1947 (hereinafter referred to as the premises), subject to the following terms and conditions:

1. REPLACEMENT OF UNDERHAND AGREEMENT

This agreement replaces the underhand agreement dated 17th February 1994 whereby the property was let by the Lessor to the Lessee but all obligations in terms thereof existing at the time of execution of this agreement will remain binding upon the parties until they have been fulfilled.

2. PREMISES LET

The Lessor hereby lets to the Lessee who hereby hires the premises.

3. USE OF PREMISES

- (a) the Premises are let for the sole purpose of conducting therein the business of a refreshment kiosk and the Lessee shall not allow the Premises to be used for any other purpose without the prior written consent of the Lessor.
- (b) The Lessee shall not use, or permit to be used the Premises hereby leased for any illegal or improper purpose.
- (c) The Lessee shall at all times conform to all laws and statutory regulations and ordinances affecting the conduct of the said business and shall not commit or allow to be committed on the Premises anything in contravention of any law or regulation (municipal or otherwise) which may be in force or come into force at some future date and he shall at his own cost comply with all requirements of the Lessor's health and/or other regulations in force from time to time relating to the use of the Premises for the purpose of which they are let. The Lessee shall at his own expense obtain all licences and approvals necessary for the use of the Premises for the purpose for which they are let.
- (d) The Lessee shall not do or permit to be done any act or thing which shall or may endanger or injure the Premises or any part thereof or prejudice the fire insurance thereof or increase the rate of premium thereof.



4. PERIOD OF LEASE

This lease shall endure for a period of twenty (20) years as from the date of registration of the notarial lease. Notwithstanding any clause to the contrary in this agreement, the lease may be terminated by either party upon twelve (12) months written notice to that effect.

5. RENTAL

The rental payable by the Lessee to the Lessor in respect of the premises shall be as follows:

- (a) for the first 10 years an annual rental of R100,00 per annum escalated at 12 % shall be paid;
- (b) after the 10 year period a mutually accepted monthly market related rental shall be paid;
- (c) in the event of the agreement not being reached in respect of (b) above a mutually acceptable sworn appraiser shall be appointed to determine the rental the cost thereof to be shared equally between the parties.

6. ELECTRICITY, REFUSE REMOVAL, WATER AND OTHER SERVICE CHARGES

The Lessee shall be responsible for payment on due date of electricity, refuse removal and water charges levied in respect of the Premises. Any defect in or leakage of or accident to the water or electricity services shall be immediately reported by the Lessee to the Lessor in writing. The Lessor shall not be responsible for any loss or damage resulting through the cessation or interruption of, or defect in, the electricity, sewerage, water, telephone or other services, but the Lessee shall, in the event of any interruption, immediately on cessation of a service notify the Lessor and the controllers of the service in question should the controller not be the Lessor, of such cessation or interruption. Save that in special circumstances or emergency the Lessee may utilise lighting other than electricity in the premises, the Lessee shall at no time do, suffer, or permit to be done anything which may contravene any Municipal or other supply authority's by-laws or regulations relating to refuse removal and the supply of water and electricity to the premises, or the provisions of the Lessor's fire insurance cover in respect of the Premises. The Lessor shall have the right to suspend any of the aforesaid services at any reasonable time for the purpose of inspection, cleaning, repair or replacement.

7. MAINTENANCE OF PREMISES

- (a) The Lessee hereby acknowledges to have received possession of the leased Premises and fittings therein and undertakes on the termination of this lease,

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for whatever reason, to re-deliver the same to the Lessor in the same good order and repair as received, fair wear and tear alone excepted.

- (b) The Lessor shall be responsible for the maintenance and structural repair of the outside of the Premises while the Lessee shall be responsible to keep and maintain at all times the inside of the Premises in good repair, order and condition, all windows, doors, locks, hotwater cylinders, light fixtures and fittings being regarded as the inside of the Premises. Any damage which may be caused to the interior or exterior of the Premises by the Lessee or persons under his control or in or about the Premises in connection with the business being conducted therein shall be repaired by the Lessee forthwith upon being requested so to do by the Lessor. The Lessee undertakes to keep and maintain all water pipes and drains in or from the Premises free from obstruction and/or blockage. The Lessee undertakes to keep the Premises in a clean and tidy condition and to take such steps as may be deemed necessary by the Lessor to collect all bottles, containers and litter left by patrons of his business in the Reserve.

8. LIABILITY FOR INJURY

The Lessor shall not be liable for any injury to the Lessee, his employees, servants, visitors or patrons or any damages to any of his or their property resulting from any defects in the structure of the Premises or any part thereof, or from insufficient lighting or ventilation of any part thereof, or through any defects in any of the movables therein or plant or appliances installed or used in the Premises or resulting from leakage from, or breakage of, any water pipes or connection, or from any faulty electrical wiring connection, fitting or appliance, or from any other cause whatever, including any damage resulting from fire, flooding, lightning, Act of God, war riots and other civil commotions, nor shall any injury which the Lessee may sustain as aforesaid entitle the Lessee to terminate this lease prior to its expiration. The limitation of the Lessor's liability as aforesaid, shall apply whether such damage is sustained inside or outside the Premises. The Lessee shall not be entitled for any of the reasons aforementioned or for any reason whatsoever to withhold any monies payable by him under this Agreement or to claim any refund in respect of monies paid.

9. INSURANCE

The Lessor shall be responsible to arrange for sufficient insurance cover in respect of the Premises hereby leased as the cost of the Lessee who acknowledges that he shall arrange for sufficient insurance cover in respect of any property used or placed on the Premises by the Lessee.

10. DAMAGE TO THE PREMISES BY FIRE OR OTHER CAUSES

- (a) In the event of the partial destruction of the Premises by fire, flooding, storms, Act of God or the State's enemies, or by riot or insurrection, the Lessor shall take steps so soon as may be reasonably possible for the repair

thereof and the Lessee shall be entitled to an abatement of rental during the period that the Premises are under repair - the amount of such abatement to be mutually agreed upon, or failing agreement to be settled by arbitration.

- (b) In the event of the Premises being totally destroyed by fire, flooding, storms, Act of God or the States enemies, or by riot or insurrection, or so damaged as to render them unsuitable for the purpose for which they are let, then the Lessor shall have the right in its sole discretion either to re-build or repair the premises and keep the lease in force, or to cancel the lease by written notice addressed to the Lessee. In the event of the lease being kept in force the Lessee shall be entitled to a total remission of rent in respect of the period in which he is deprived of the beneficial occupation of the Premises. The Lessee shall not have any claim upon the Lessor for damages in consequence of any such deprivation or cancellation. If the Lessor shall fail to notify the Lessee within one (1) month from the date of the destruction or damage to the Premises, that it intends to rebuild or repair the Premises and keep the lease in force, then the Lessee shall be entitled to assume that the lease is cancelled and at an end. If the Lessor within the said period of one (1) month notifies the Lessee that it (The Lessor) intends to re-build or repair the Premises and keep the lease in force, then the repairs or rebuilding should be completed as soon as may be reasonably possible.
- (c) In the event of any dispute arising as to whether the Premises are totally or partially destroyed, or the period for which, or as to the extent to which the Lessee is deprived of the beneficial occupation of the Premises hereby let, or as to the amount of rent to be remitted in terms of sub-clause (a) hereof, or in the event of any dispute of whatsoever nature rising out of the partial or total destruction of the Premises, such dispute or disputes shall from time to time as they arise, be referred for decision to Arbitrators, one to be appointed by the Lessor and the other by the Lessee. In the event of the two Arbitrators not being able to agree, then the matter in dispute shall be immediately referred by them to an independent umpire to be selected by them previously, the decision of the umpire to be final and binding. Any Statutes or Regulations relating to arbitration shall apply in all respects.

11. PROHIBITION AGAINST MUSICAL ENTERTAINMENT

The Lessee shall not provide or permit to be provided any musical or other entertainment in or from the Premises without the prior written permission of the Lessor being obtained. The Lessee shall at all times conduct his business on the Premises in an efficient and orderly manner and shall not permit any disorderly, rowdy or intoxicated person on the Premises.

12. INDEMNITY FOR CLAIMS AGAINST THE LESSOR

The Lessee hereby indemnifies the Lessor against all claims or actions for costs, losses or damages of whatever nature, including all legal costs as between party and party and attorney and client which may be incurred by the Lessor in disputing any

such claim or action, which may be made against the Lessor arising directly or indirectly and in whatsoever manner out of the lease of the Premises by the Lessor to the Lessee or out of any act of commission or omission on the part of the Lessee, his employees, servants sub-lessees (if any), suppliers, contractors or patrons in or about the Premises.

13. DEFAULT

In the event of the non-payment of the rent or any portion thereof on due date as hereinbefore provided, or in the event of the Lessee committing any other breach whatsoever of any other term or condition of this lease, or should the Lessee become insolvent or execute any statutory assignment, or if the Lessee absconds, deserts or vacates the premises without giving proper notice, the Lessor shall have the right forthwith to declare this lease cancelled and at an end without any notice thereof being required, and it shall further have the right immediately to re-enter upon and take possession of the premises hereby let, or eject the Lessee or any other person or persons therefrom, and any such cancellation, re-entry or ejection shall in no way prejudice any claim which the Lessor may then or thereafter have against the Lessee, for any rent due, or for damages for breach of any of the terms and conditions hereof, and the Lessor shall in no way be liable to compensate the Lessee for any damages he may suffer by reason of any such cancellation, re-entry or ejection.

14. COMPENSATION

Notwithstanding anything in this agreement contained, the Lessor may resume possession of the whole or any portion of the Premises at any time on giving twelve months' notice in writing to that effect, should it be required for any local authority or government purposes and may cancel or amend the lease accordingly. In either case the Lessor may pay to the Lessee, after quiet possession of the Land has been given to the Lessor, compensation for improvements made on the Premises by the Lessee, provided that if portion only of the Premises be resumed and it is of such an extent that the remainder is not in the opinion of the Lessee of sufficient size for the purpose for which the Premises is leased, the Lessee shall have the option of cancelling the lease and claiming compensation in respect of improvements made on the remaining land. Compensation in terms of this clause shall be payable only for improvements made by the Lessee out of own funds and not for improvements made out of funds provided by the Lessor, and only for improvements actually existing at the time the lease is cancelled or amended. The Lessor reserves the right in her absolute discretion to decide for what improvements compensation shall be paid in terms of this clause.

No compensation shall in any event be payable unless the Lessee has deposited with the Lessor within one month of the completion of such improvements a certified statement showing the actual capital costs thereof. The Lessor shall be entitled, if it wishes, to inspect the Lessee's books of account in order to verify the said statement. Compensation in terms of this clause, if paid, shall be calculated according to the following formula:

$$\frac{CX}{Y}$$

where C equals the capital cost of the improvements, X equals the number of calendar months between the date of resumption of possession by the Lessor in terms of this section and the expiration of the term referred to in Clause 3 hereof, and Y equals the number of calendar months between the date of completion of the improvements and the expiration of the terms referred to in Clause 3 hereof. An evaluation of the capital improvements shall be made by an independent assessor at the termination or expiration of the lease with the Club.

15. DOMICILIUM CITANDI ET EXECUTANDI

Any notice which the Lessor may require to give to the Lessee shall be deemed to be duly given if sent by pre-paid registered letter addressed to the Lessee at the premises or left by the Lessor at such address. The Lessee chooses "domicilium citandi et executandi" at the premises in respect of all legal proceedings which the Lessor may institute against the Lessee in connection with this agreement or any matter arising therefrom. The Lessee hereby consents to the jurisdiction of the Magistrate's Court of Somerset West in respect of any legal proceedings arising out of this lease.

16. ACCESS TO PREMISES

The Lessor, its Councillors, workmen or agents shall at all reasonable times be at liberty to enter into the Premises for purposes of inspection, as also to do or carry on any work that may be required to be done in or to the Premises as it may deem necessary for the safety, repair, renovation or improvement of the Premises. The Lessee shall upon the request of the Lessor permit prospective future tenants to view the leased Premises at all reasonable times during the last three months of tenancy.

17. SUB-LETTING OR ASSIGNMENT

The Lessee shall not have right to cede or assign this lease or to sub-let the whole or any portion of the Premises hereby let without the written consent of the Lessor which consent shall not be unreasonably withheld.

18. FULL TERMS OF AGREEMENT

This agreement contains all the terms and conditions of the agreement entered into by the Lessee and the Lessor and the Lessee acknowledges and agrees that any representation, warranties, undertakings or promises whatsoever which may have been made by the Lessor or the Lessor's agents or employees other than those contained herein shall not be binding or enforceable against the Lessor, and the terms of this agreement cannot be varied otherwise than in writing and signed by both parties.

19. REMOVAL OF GOODS

The Lessee shall not remove or cause to be removed any movables brought by him on the Premises during the currency of this lease save in the ordinary course of business or with the written consent of the Lessor first being obtained.

20. APPLICATION OF MUNICIPAL ORDINANCE NO 20 OF 1974

This agreement shall be subject to the provisions of the Municipal Ordinance No 20 of 1974.

21. COSTS OF LEASE

All costs relating to the notarial lease shall be borne by the Lessee.

22. TRANSFER OF LEASE

The transfer of the lease shall be subject to approval of the Lessor.

In witness whereof the Appearers have hereunto set their hands at Somerset West on the day month and year first aforewritten in the presence of the subscribing witnesses and of me, the Notary.

AS WITNESSES:

1. amathee

2. Rense

Ship

Before me

[Signature]
NOTARY PUBLIC

Appendix 5: Plant Species List Helderberg

Family	Scientific Name	Common Name	Red Data Status
RUTACEAE	<i>Adenandra marginata</i>	China Flower	Least Concern
AIZOACEAE	<i>Adenogramma glomerata</i>		Least Concern
AIZOACEAE	<i>Adenogramma sylvatica</i>		Least Concern
RUTACEAE	<i>Agathosma bifida</i>		Least Concern
RUTACEAE	<i>Agathosma cerefolium</i>		Least Concern
RUTACEAE	<i>Agathosma crenulata</i>	Commercial Buchu	Declining
RUTACEAE	<i>Agathosma serphylaceae</i>		Least Concern
AMARYLLIDACEAE	<i>Amaryllis belladonna</i>	March Lily / Belladonna Lily	Least Concern
FABACEAE	<i>Amphithalea cuneifolia</i>		Least Concern
PRIMULACEAE	<i>Anagallis arvensis</i>		Least Concern
ASTERACEAE	<i>Anaxeton asperum</i>	None	Least Concern
COLCHICACEAE	<i>Androcymbium capense</i>	Cup-and-saucer	Least Concern
RANUNCULACEAE	<i>Anemone tenuifolia</i>	Wild Anemone / Syblom	Least Concern
MALVACEAE	<i>Anisodontea scabrosa</i>		Least Concern
RUBIACEAE	<i>Anthospermum aethiopicum</i>		Least Concern
RUBIACEAE	<i>Anthospermum spathulatum</i>		Least Concern
APIACEAE	<i>Arctopus echinatus</i>	Platdoring	Least Concern
APIACEAE	<i>Arctopus monocanthus</i>		Least Concern
ASTERACEAE	<i>Arctotis semipapposa</i>		Least Concern
FABACEAE	<i>Argyrolobium tuberosum</i>		Least Concern
IRIDACEAE	<i>Aristea africana</i>	None	Least Concern
IRIDACEAE	<i>Aristea bakeri</i>	None	Least Concern
IRIDACEAE	<i>Aristea capitata</i>	Blousuurkanol, Blue sceptre	Least Concern
IRIDACEAE	<i>Aristea latifolia</i>	None	Rare
IRIDACEAE	<i>Aristea spiralis</i>	None	Least Concern
FABACEAE	<i>Aspalathus angustifolia</i>		Least Concern
FABACEAE	<i>Aspalathus araneosa</i>		Vulnerable
FABACEAE	<i>Aspalathus arida</i>		Least Concern
FABACEAE	<i>Aspalathus astroites</i>		Least Concern

FABACEAE	<i>Aspalathus biflora</i>		Least Concern
FABACEAE	<i>Aspalathus bracteata</i>		Least Concern
FABACEAE	<i>Aspalathus cephalotes</i>		Least Concern
FABACEAE	<i>Aspalathus ciliaris</i>		Least Concern
FABACEAE	<i>Aspalathus cordata</i>	None	Least Concern
FABACEAE	<i>Aspalathus crenata</i>		Least Concern
FABACEAE	<i>Aspalathus cymbiformis</i>		Least Concern
FABACEAE	<i>Aspalathus divaricata</i>		Least Concern
FABACEAE	<i>Aspalathus elliptica</i>		Least Concern
FABACEAE	<i>Aspalathus ericifolia</i>		Least Concern
FABACEAE	<i>Aspalathus globosa</i>		Least Concern
FABACEAE	<i>Aspalathus hispida</i>		Least Concern
FABACEAE	<i>Aspalathus laricifolia</i>		Least Concern
FABACEAE	<i>Aspalathus linguiloba</i>		Least Concern
FABACEAE	<i>Aspalathus neglecta</i>		Least Concern
FABACEAE	<i>Aspalathus perfoliata</i>		Least Concern
FABACEAE	<i>Aspalathus willdenowiana</i>		Least Concern
ASPARAGACEAE	<i>Asparagus africanus</i>		Least Concern
ASPARAGACEAE	<i>Asparagus declinatus</i>		Least Concern
ASPARAGACEAE	<i>Asparagus kraussianus</i>		Least Concern
ASPARAGACEAE	<i>Asparagus rubicundus</i>	Wild Asparagus	Least Concern
ASPARAGACEAE	<i>Asparagus scandens</i>	Climbing asparagus	Least Concern
ASCLEPIADACEAE	<i>Aspidoglossom gracile</i>		Least Concern
ASCLEPIADACEAE	<i>Aspidoglossom heterophyllum</i>		Least Concern
ASTERACEAE	<i>Athanasia crithmifolia</i>		Least Concern
ASTERACEAE	<i>Athanasia juncea</i>		Least Concern
ASTERACEAE	<i>Athanasia trifurcata</i>		Least Concern
ASTERACEAE	<i>Athrixia heterophylla</i>		Least Concern
PROTEACEAE	<i>Aulax pallasia</i>		Near Threatened
PROTEACEAE	<i>Aulax umbellata</i>		Near Threatened
IRIDACEAE	<i>Babiana stricta</i>		Near Threatened
IRIDACEAE	<i>Babiana villosula</i>		Endangered
COLCHICACEAE	<i>Baeometra uniflora</i>		Least Concern
ASTERACEAE	<i>Berkheya armata</i>		Least Concern

ASTERACEAE	<i>Berkheya herbacea</i>		Least Concern
BRUNIACEAE	<i>Berzelia lanuginosa</i>		Least Concern
IRIDACEAE	<i>Blaeria barbiger</i>		Least Concern
IRIDACEAE	<i>Bobartia gladiata</i>		Least Concern
IRIDACEAE	<i>Bobartia indica</i>		Least Concern
FABACEAE	<i>Bolusafra bituminosa</i>		Least Concern
PROTEACEAE	<i>Brabejum stellatifolium</i>	Willd Almond	Least Concern
POACEAE	<i>Briza maxima</i>		Least Concern
BRUNIACEAE	<i>Brunia albiflora</i>	Cofee Bush	Least Concern
BRUNIACEAE	<i>Brunia noduliflora</i>	Stompie / Fonteinbossie / Volstruisies	Least Concern
ASPHODELACEAE	<i>Bulbine favosa</i>		Least Concern
ASPHODELACEAE	<i>Bulbine praemorsa</i>		Least Concern
ASPHODELACEAE	<i>Bulbinella triquetra</i>		Least Concern
ANTHERICACEAE	<i>Caesia contorta</i>		Least Concern
RESTIONACEAE	<i>Cannomois virgata</i>		Least Concern
CELASTRACEAE	<i>Cassine peragua</i>		Least Concern
CELASTRACEAE	<i>Cassine parviflora</i>		Least Concern
CELASTRACEAE	<i>Cassine schinoides</i>		Least Concern
LAURACEAE	<i>Cassytha ciliolata</i>		Least Concern
ARALIACEAE	<i>Centella glabrata</i>		Least Concern
ARALIACEAE	<i>Centella villosa</i>		Least Concern
ORCHIDACEAE	<i>Ceratandra atrata</i>		Least Concern
DIPSACACEAE	<i>Cephalaria rigida</i>		Least Concern
SCROPHULARIACEAE	<i>Chaenostoma uncinatum</i>		Least Concern
IRIDACEAE	<i>Chasmanthe aethiopica</i>		Least Concern
IRIDACEAE	<i>Chasmanthe floribunda</i>		Least Concern
GENTIANACEAE	<i>Chironia baccifera</i>		Least Concern
GENTIANACEAE	<i>Chironia linoides</i>		Least Concern
GENTIANACEAE	<i>Chironia tetragona</i>		Least Concern
ANTHERICACEAE	<i>Chlorophytum rigidum</i>		Least Concern
ASTERACEAE	<i>Chrysanthemoides monilifera</i>	Boneseed Bush / Bietou Boetabessie	Least Concern
ASTERACEAE	<i>Chrysocoma coma-aurea</i>		Least Concern
ROSACEAE	<i>Cliffortia cuneata</i>	None	Least Concern
ROSACEAE	<i>Cliffortia odorata</i>		Least Concern

ROSACEAE	<i>Cliffortia phillipsii</i>		Vulnerable
ROSACEAE	<i>Cliffortia polygonifolia</i>		Least Concern
ROSACEAE	<i>Cliffortia ruscifolia</i>	Climber's Friend / Steekbos	Rare
ROSACEAE	<i>Cliffortia strobilifera</i>		Least Concern
EUPHORBIACEAE	<i>Clutia alaternoides</i>		Least Concern
EUPHORBIACEAE	<i>Clutia laxa</i>		Least Concern
EUPHORBIACEAE	<i>Clutia polifolia</i>		Least Concern
EUPHORBIACEAE	<i>Clutia polygonoides</i>		Least Concern
EUPHORBIACEAE	<i>Clutia pubescens</i>		Least Concern
CONVOLVULACEAE	<i>Convolvulus farinosus</i>		Least Concern
ASTERACEAE	<i>Corycium orobanchoides</i>		Least Concern
ASTERACEAE	<i>Cotula turbinata</i>		Least Concern
ASTERACEAE	<i>Cotula ceniifolia</i>		Least Concern
CRASSULACEAE	<i>Crassula capensis</i>		Least Concern
CRASSULACEAE	<i>Crassula coccinea</i>		Least Concern
CRASSULACEAE	<i>Crassula fascicularis</i>		Least Concern
CRASSULACEAE	<i>Crassula flava</i>		Least Concern
CRASSULACEAE	<i>Crassula obtusa</i>		Least Concern
CRASSULACEAE	<i>Crassula pellucida</i>		Least Concern
CRASSULACEAE	<i>Crassula pruinosa</i>		Least Concern
CRASSULACEAE	<i>Crassula pubescens</i>		Least Concern
CRASSULACEAE	<i>Crassula saxifraga</i>		Least Concern
ASTERACEAE	<i>Cullumia ciliaris</i>		Least Concern
ASTERACEAE	<i>Cullumia setosa</i>		Least Concern
CUNONIACEAE	<i>Cunonia capensis</i>		Least Concern
TECOPHILAEACEAE	<i>Cyanella hyacinthoides</i>		Least Concern
TECOPHILAEACEAE	<i>Cyanella lutea</i>		Least Concern
TPTERIDOPHYTA	<i>Cyathea capensis</i>		Declining
FABACEAE	<i>Cyclopia falcata</i>		Least Concern
FABACEAE	<i>Cyclopia maculata</i>		Near Threatened
CYPERACEAE	<i>Cyperus sphaerospermus</i>		Least Concern
CYPERACEAE	<i>Cyperus thunbergii</i>		Least Concern
CAMPANULACEAE	<i>Cyphia bulbosa</i>	Bergbaroe	Least Concern
CAMPANULACEAE	<i>Cyphia digitata</i>	None	Least Concern

CAMPANULACEAE	<i>Cyphia phyteuma</i>		Least Concern
CAMPANULACEAE	<i>Cyphia violubilis</i>		Least Concern
AMARYLLIDACEAE	<i>Cyrtanthus angustifolius</i>		Least Concern
FUMARIACEAE	<i>Cysticapnos cracca</i>		Least Concern
THYMELAEACEAE	<i>Dais cotinifolia</i>		Least Concern
ASTERACEAE	<i>Dicerthamnus rhinocerotis</i>	Renosterbos	Least Concern
ASTERACEAE	<i>Dimorphotheca nudicaulis~</i>		Least Concern
ASTERACEAE	<i>Dimorphotheca pluvialis</i>		Least Concern
RUTACEAE	<i>Diosma hirsuta</i>		Least Concern
FABACEAE	<i>Diospyros glabra</i>		Least Concern
FABACEAE	<i>Dipogon lignosus</i>		Least Concern
ORCHIDACEAE	<i>Disa bracteata</i>		Least Concern
ORCHIDACEAE	<i>Disa graminifolia</i>		Least Concern
ASTERACEAE	<i>Disparago ericoides</i>		Least Concern
ORCHIDACEAE	<i>Disperis capensis</i>	Moederkappie	Least Concern
HYACINTHACEAE	<i>Drimia convallarioides</i>		Least Concern
MESEMBRYANTHEMACEAE	<i>Drosanthemum calycinum</i>		Near Threatened
DROSERACEAE	<i>Drosera cistiflora</i>	Sundew	Least Concern
DROSERACEAE	<i>Drosera hilaris</i>	Sprawling Sundew	Least Concern
DROSERACEAE	<i>Drosera pauciflora</i>	Little Sundew	Least Concern
DROSERACEAE	<i>Drosera trinerva</i>		Least Concern
BORAGINACEAE	<i>Echiostachys incanus</i>		Vulnerable
RESTIONACEAE	<i>Elegia capensis</i>	Horsetail restio	Least Concern
RESTIONACEAE	<i>Elegia juncea</i>		Least Concern
HYPOXIDACEAE	<i>Empodium plicatum</i>		Least Concern
POACEAE	<i>Eragrostis curvula</i>		Least Concern
AIZOACEAE	<i>Erepsia anceps</i>		Least Concern
AIZOACEAE	<i>Erepsia heteropetala</i>		Least Concern
ERICACEAE	<i>Erica articularis</i>		Least Concern
ERICACEAE	<i>Erica baccans</i>		Least Concern
ERICACEAE	<i>Erica bauera</i>		Critically Endangered
ERICACEAE	<i>Erica bicolor</i>		Least Concern
ERICACEAE	<i>Erica calycina</i>		Least Concern
ERICACEAE	<i>Erica cerithoides</i>		Least Concern

ERICACEAE	<i>Erica coccinea</i>		Least Concern
ERICACEAE	<i>Erica diaphana</i>		Least Concern
ERICACEAE	<i>Erica hirtiflora</i>		Least Concern
ERICACEAE	<i>Erica imbricata</i>	Salt and Pepper Heath	Least Concern
ERICACEAE	<i>Erica lutea</i>		Least Concern
ERICACEAE	<i>Erica mammosa</i>		Least Concern
ERICACEAE	<i>Erica mauritanica</i>		Least Concern
ERICACEAE	<i>Erica nudiflora</i>		Least Concern
ERICACEAE	<i>Erica paniculata</i>		Least Concern
ERICACEAE	<i>Erica parviflora</i>		Least Concern
ERICACEAE	<i>Erica penicilliformis</i>		Least Concern
ERICACEAE	<i>Erica pinea</i>		Least Concern
ERICACEAE	<i>Erica plukenetti</i>	Hangertjie	Least Concern
ERICACEAE	<i>Erica savilea</i>		Least Concern
ERICACEAE	<i>Erica sessiliflora</i>	Groenheide	Least Concern
ERICACEAE	<i>Erica setosa</i>		Least Concern
ERICACEAE	<i>Erica speciosa</i>		Least Concern
ERICACEAE	<i>Erica strigosa</i>		Least Concern
ERICACEAE	<i>Erica taxifolia</i>		Least Concern
ERICACEAE	<i>Erica transparens</i>		Least Concern
ERICACEAE	<i>Erica triflora</i>		Least Concern
ERIOSPERMACEAE	<i>Eriocephalus punctulatus</i>		Least Concern
EUPHORBIACEAE	<i>Euphorbia erythrina</i>		Least Concern
EUPHORBIACEAE	<i>Euphorbia genistoides</i>		Least Concern
ASTERACEAE	<i>Euryops abrotanifolius</i>	Geel Magriet	Least Concern
ASTERACEAE	<i>Euryops rupestris</i>		Least Concern
ASTERACEAE	<i>Felicia amoena</i>		Least Concern
ASTERACEAE	<i>Felicia cymbalariae</i>		Least Concern
ASTERACEAE	<i>Felicia filifolia</i>		Least Concern
ASTERACEAE	<i>Felicia tenella</i>		Least Concern
POACEAE	<i>Festuca scabra</i>		Least Concern
CYPERACEAE	<i>Ficinia indica</i>		Least Concern
CYPERACEAE	<i>Ficinia nigrescens</i>		Least Concern
SCROPHULARIACEAE	<i>Freylinia lanceolata</i>		Least Concern

CYPERACEAE	<i>Fuirena hirsuta</i>		Least Concern
RUBIACEAE	<i>Galium capense</i>		Least Concern
ASTERACEAE	<i>Gazania ciliaris</i>		Least Concern
IRIDACEAE	<i>Geissorhiza aspera</i>		Least Concern
IRIDACEAE	<i>Geissorhiza imbricata</i>		Least Concern
IRIDACEAE	<i>Geissorhiza inflexa</i>		Least Concern
IRIDACEAE	<i>Geissorhiza juncea</i>		Least Concern
IRIDACEAE	<i>Geissorhiza ovata</i>		Least Concern
IRIDACEAE	<i>Geissorhiza setacea</i>		Endangered
GERANIACEAE	<i>Geranium canescens</i>		Least Concern
GERANIACEAE	<i>Geranium incanum</i>		Least Concern
ASTERACEAE	<i>Gerbera crocea</i>		Least Concern
ASTERACEAE	<i>Gerbera piloselloides</i>		Least Concern
ASTERACEAE	<i>Gerbera tomentosa</i>	Tontelblaarbossie	Least Concern
IRIDACEAE	<i>Gladiolus blommesteinii</i>	None	Least Concern
IRIDACEAE	<i>Gladiolus brevifolius</i>	Pypie	Least Concern
IRIDACEAE	<i>Gladiolus carneus</i>		Least Concern
IRIDACEAE	<i>Gladiolus debilis</i>	Painted Lady	Least Concern
IRIDACEAE	<i>Gladiolus gracilis</i>		Least Concern
IRIDACEAE	<i>Gladiolus liliaceus</i>	Large Brown Afrikander	Least Concern
IRIDACEAE	<i>Gladiolus maculatus</i>	Brown Afrikander	Least Concern
IRIDACEAE	<i>Gladiolus nerineoides</i>	None	Rare
IRIDACEAE	<i>Gladiolus permeabilis</i>		Least Concern
IRIDACEAE	<i>Gladiolus recurvus</i>		Vulnerable
IRIDACEAE	<i>Gladiolus tristis</i>	Vlei Aandblom / Trompetters / Marsh Afrikanders	Least Concern
IRIDACEAE	<i>Gladiolus virgatus</i>		Least Concern
IRIDACEAE	<i>Gladiolus watsonius</i>		Near Threatened
APOCYNACEAE	<i>Gomphocarpus cancellatus</i>	Wild cotton	Least Concern
HALORAGACEAE	<i>Gunnera perpensa</i>		Declining
AMARYLLIDACEAE	<i>Haemanthus sanguineus</i>		Least Concern
SCROPHULARIACEAE	<i>Halleria lucida</i>		Least Concern
ASTERACEAE	<i>Haplocarpa lanata</i>		Least Concern
OROBANCHACEAE	<i>Harveya capensis</i>	Ink Flower	Least Concern
SCROPHULARIACEAE	<i>Hebenstretia paarlensis</i>		Least Concern

ASTERACEAE	<i>Helichrysum cymosum</i>		Least Concern
ASTERACEAE	<i>Helichrysum felinum</i>		Least Concern
ASTERACEAE	<i>Helichrysum foetidum</i>		Least Concern
ASTERACEAE	<i>Helichrysum grandiflorum</i>		Least Concern
ASTERACEAE	<i>Helichrysum indicum</i>		Least Concern
ASTERACEAE	<i>Helichrysum nudifolium</i>		Least Concern
ASTERACEAE	<i>Helichrysum odoratissimum</i>		Least Concern
ASTERACEAE	<i>Helichrysum pandurifolium</i>		Least Concern
ASTERACEAE	<i>Helichrysum rotundifolium</i>		Least Concern
ASTERACEAE	<i>Helichrysum spiralepis</i>		Least Concern
ASTERACEAE	<i>Helichrysum teretifolium</i>		Least Concern
BRASSICACEAE	<i>Heliophila concatenata</i>		Least Concern
BRASSICACEAE	<i>Heliophila meyeri</i>		Least Concern
BRASSICACEAE	<i>Heliophila scoparia</i>		Least Concern
MALVACEAE	<i>Hermannia diversistipula</i>		Least Concern
MALVACEAE	<i>Hermannia flammea</i>		Least Concern
MALVACEAE	<i>Hermannia hyssopifolia</i>		Least Concern
APIACEAE	<i>Hermas ciliata</i>		Least Concern
IRIDACEAE	<i>Hesperantha acuta</i>		Least Concern
IRIDACEAE	<i>Hesperantha falcata</i>		Least Concern
IRIDACEAE	<i>Hesperantha pilosa</i>		Least Concern
IRIDACEAE	<i>Hesperantha radiata</i>		Least Concern
IRIDACEAE	<i>Hesperantha spicata</i>		Vulnerable
ASTERACEAE	<i>Heterolepis aliena</i>		Least Concern
MALVACEAE	<i>Hibiscus aethiopicus</i>		Least Concern
ASTERACEAE	<i>Hippia frutescens</i>		Least Concern
TECOPHILAEACEAE	<i>Holothrix villosa</i>		Least Concern
ASTERACEAE	<i>Hymenolepis parviflora</i>		Least Concern
AQUIFOLIACEAE	<i>Ilex mitis</i>	Cape Holly	Least Concern
FABACEAE	<i>Indigofera candolleana</i>		Least Concern
FABACEAE	<i>Indigofera confusa</i>		Least Concern
FABACEAE	<i>Indigofera cytisoides</i>	None	Least Concern
FABACEAE	<i>Indigofera digitata</i>	Sprawling Pea	Least Concern
FABACEAE	<i>Indigofera filliformis</i>		Least Concern

FABACEAE	<i>Indigofera incana</i>		Least Concern
FABACEAE	<i>Indigofera mauritanica</i>		Least Concern
FABACEAE	<i>Indigofera psoraloides</i>		Vulnerable
RESTIONACEAE	<i>Ischyrolepis capensis</i>		Least Concern
RESTIONACEAE	<i>Ischyrolepis sieberi</i>		Least Concern
RESTIONACEAE	<i>Ischyrolepis triflora</i>		Least Concern
APIACEAE	<i>Itasina filifolia</i>		Least Concern
IRIDACEAE	<i>Ixia dubia</i>	Kalossies	Declining
IRIDACEAE	<i>Ixia flexuosa</i>		Least Concern
IRIDACEAE	<i>Ixia polystacha</i>		Least Concern
IRIDACEAE	<i>Ixia scillaris</i>		Least Concern
IRIDACEAE	<i>Ixia versicolor</i>		Critically Endangered
JUNCACEAE	<i>Juncus capensis</i>		Least Concern
KIGGELARIACEAE	<i>Kiggelaria africana</i>	Wild Peach	Least Concern
RANUNCULACEAE	<i>Knowltonia anemonoides</i>		Least Concern
RANUNCULACEAE	<i>Knowltonia capensis</i>		Least Concern
RANUNCULACEAE	<i>Knowltonia vesicatoria</i>		Least Concern
HYACINTHACEAE	<i>Lachenalia orchioides</i>		Least Concern
HYACINTHACEAE	<i>Lachenalia rosea</i>		Least Concern
HAEMODORACEAE	<i>Lanaria lanata</i>		Least Concern
IRIDACEAE	<i>Lapeirousia corymbosa</i>	Koringblommetjie	Declining
LAMIACEAE	<i>Leonotis leonurus</i>		Least Concern
FABACEAE	<i>Lessertia capensis</i>		Least Concern
PROTEACEAE	<i>Leucadendron rubrum</i>		Least Concern
PROTEACEAE	<i>Leucadendron salignum</i>		Least Concern
PROTEACEAE	<i>Leucadendron sessile</i>		Near Threatened
PROTEACEAE	<i>Leucadendron spissifolium</i>		Least Concern
PROTEACEAE	<i>Leucospermum gueinzii</i>	Kloof Mountain Pincushion	Endangered
PROTEACEAE	<i>Leucospermum tottum var. tottum</i>		Least Concern
APIACEAE	<i>Lichtensteinia lacera</i>	Kalmoes	Least Concern
LINACEAE	<i>Linum africanum</i>		Least Concern
LINACEAE	<i>Linum thunbergii</i>		Least Concern
LOBELIACEAE	<i>Lobelia comosa</i>		Least Concern
LOBELIACEAE	<i>Lobelia coronopifolia</i>		Least Concern

LOBELIACEAE	<i>Lobelia erinus</i>		Least Concern
LOBELIACEAE	<i>Lobelia pinifolia</i>		Least Concern
BORAGINACEAE	<i>Lobostemon glaucophyllus</i>		Least Concern
FABACEAE	<i>Lotononis prostrata</i>		Near Threatened
FABACEAE	<i>Lotus discolor</i>		Least Concern
ASTERACEAE	<i>Mairia crenata</i>		Least Concern
CELASTRACEAE	<i>Maytenus acuminata</i>		Least Concern
CELASTRACEAE	<i>Maytenus oleoides</i>		Least Concern
ASTERACEAE	<i>Metalasia densa</i>		Least Concern
ASTERACEAE	<i>Metalasia inversa</i>		Least Concern
ASTERACEAE	<i>Metalasia muricata</i>	Blombos / Witsteekbossie	Least Concern
IRIDACEAE	<i>Micranthus alopecuroides</i>		Least Concern
IRIDACEAE	<i>Micranthus tubulosus</i>		Least Concern
APOCYNACEAE	<i>Microloma tenuifolium</i>		Least Concern
LOBELIACEAE	<i>Monopsis debilis</i>		Least Concern
LOBELIACEAE	<i>Monopsis lutea</i>		Least Concern
LOBELIACEAE	<i>Monopsis simplex</i>		Least Concern
GERANIACEAE	<i>Monsonia speciosa</i>		Endangered
MONTINIACEAE	<i>Montinia caryophyllaceae</i>		Least Concern
IRIDACEAE	<i>Moraea angusta</i>		Least Concern
IRIDACEAE	<i>Moraea anomala</i>		Least Concern
IRIDACEAE	<i>Moraea bituminosa</i>		Least Concern
IRIDACEAE	<i>Moraea gawleri</i>		Least Concern
IRIDACEAE	<i>Moraea lugubris</i>		Least Concern
IRIDACEAE	<i>Moraea papilionaceae</i>		Least Concern
IRIDACEAE	<i>Moraea ramosissima</i>		Least Concern
IRIDACEAE	<i>Moraea tricuspidata</i>		Least Concern
IRIDACEAE	<i>Moraea unguiculata</i>		Least Concern
IRIDACEAE	<i>Moraea vegeta</i>		Least Concern
IRIDACEAE	<i>Moraea villosa</i>		Vulnerable
POLYGALACEAE	<i>Muraltia demissa</i>		Least Concern
POLYGALACEAE	<i>Muraltia heisteria</i>		Least Concern
MYRSINACEAE	<i>Myrsine africana</i>		Least Concern
BRUNIACEAE	<i>Nebelia paleaceae</i>	Bergstompie	Least Concern

SCROPHULARIACEAE	<i>Nemesia acuminata</i>		Least Concern
SCROPHULARIACEAE	<i>Nemesia versicolor</i>		Least Concern
AMARYLLIDACEAE	<i>Nerine sarniensis</i>	Guernsey lily	Least Concern
RUBIACEAE	<i>Nenax acerosa</i>		Least Concern
ASTERACEAE	<i>Oedera capensis</i>		Least Concern
SCROPHULARIACEAE	<i>Oftia africana</i>		Least Concern
OLEACEAE	<i>Olea europeae</i>		Least Concern
OLEACEAE	<i>Olea capensis capensis</i>	Ysterhout	Least Concern
HYACINTHACEAE	<i>Ornithogalum thyrsoides</i>	Chincherinchee	Least Concern
ASTERACEAE	<i>Osmitopsis afra</i>		Least Concern
ASTERACEAE	<i>Osmitopsis asteriscoides</i>		Least Concern
ASTERACEAE	<i>Osmitopsis nana</i>		Rare
ASTERACEAE	<i>Osteospermum ciliatum</i>		Least Concern
ASTERACEAE	<i>Osteospermum spinosum</i>		Least Concern
SANTALACEAE	<i>Osyris compressa</i>	None	Least Concern
FABACEAE	<i>Otholobium fruticans</i>		Least Concern
FABACEAE	<i>Otholobium hirtum</i>		Least Concern
FABACEAE	<i>Otholobium obliquum</i>		Least Concern
FABACEAE	<i>Otholobium spicatum</i>		Least Concern
ASTERACEAE	<i>Othonna digitata</i>		Least Concern
ASTERACEAE	<i>Othonna heterophylla</i>		Least Concern
ASTERACEAE	<i>Othonna quinquedentata</i>		Least Concern
OXALIDACEAE	<i>Oxalis bifida</i>		Least Concern
OXALIDACEAE	<i>Oxalis commutata</i>		Least Concern
OXALIDACEAE	<i>Oxalis compressa</i>		Least Concern
OXALIDACEAE	<i>Oxalis glabra</i>		Least Concern
OXALIDACEAE	<i>Oxalis incarnata</i>		Least Concern
OXALIDACEAE	<i>Oxalis lanata</i>		Least Concern
OXALIDACEAE	<i>Oxalis livida</i>		Least Concern
OXALIDACEAE	<i>Oxalis nidulans</i>		Least Concern
OXALIDACEAE	<i>Oxalis obtusa</i>		Least Concern
OXALIDACEAE	<i>Oxalis pes-capre</i>		Least Concern
OXALIDACEAE	<i>Oxalis purpurea</i>		Least Concern
OXALIDACEAE	<i>Oxalis tenuifolia</i>		Least Concern

HYPOXIDACEAE	<i>Pauridia minuta</i>		Near Threatened
GERANIACEAE	<i>Pelargonium capitatum</i>	Kusmalva	Least Concern
GERANIACEAE	<i>Pelargonium chamaedryfolium</i>		Least Concern
GERANIACEAE	<i>Pelargonium elongatum</i>		Least Concern
GERANIACEAE	<i>Pelargonium incarnatum</i>	Crane's Bill / Horlosies / Vrouebossie	Least Concern
GERANIACEAE	<i>Pelargonium longicaule</i>		Least Concern
GERANIACEAE	<i>Pelargonium patulum</i>		Least Concern
GERANIACEAE	<i>Pelargonium rapaceum</i>		Least Concern
GERANIACEAE	<i>Pelargonium suburbanum</i>		Vulnerable
GERANIACEAE	<i>Pelargonium tabulare</i>		Least Concern
GERANIACEAE	<i>Pelargonium triste</i>	Night-Scented Pelargonium	Least Concern
ADIANTACEAE	<i>Pellaea pteroides</i>		Least Concern
PENAECEAE	<i>Penaea mucronata</i>		Least Concern
POACEAE	<i>Pennisetum thunbergii</i>		Least Concern
POACEAE	<i>Pentameris macrocalycina</i>		Least Concern
POACEAE	<i>Pentaschistis curviflora</i>		Least Concern
POACEAE	<i>Pentaschistis patula</i>		Least Concern
APIACEAE	<i>Peucedanum ferulaceum</i>		Least Concern
APIACEAE	<i>Peucedanum strictum</i>		Least Concern
RHAMNACEAE	<i>Phylica ericoides</i>		Least Concern
RHAMNACEAE	<i>Phylica imberis</i>		Least Concern
RHAMNACEAE	<i>Phylica pubescens</i>	Featherhead	Least Concern
SCROPHULARIACEAE	<i>Phyllopodium cordatum</i>		Least Concern
CUNONIACEAE	<i>Platylophus trifolius</i>		Least Concern
FABACEAE	<i>Podylaria biflora</i>		Least Concern
FABACEAE	<i>Podylaria calyptrata</i>		Least Concern
FABACEAE	<i>Podylaria montana</i>		Least Concern
ASTERACEAE	<i>Polyarrhena relfexa</i>		Least Concern
PODOCARPACEAE	<i>Podocarpus latifolius</i>	Real yellowwood	Least Concern
POLYGALACEAE	<i>Polygala bracteolata</i>		Least Concern
POLYGALACEAE	<i>Polygala parkeri</i>		Least Concern
POLYGONACEAE	<i>Polygonum plebeim</i>		Least Concern
ASTERACEAE	<i>Printzia polifolia</i>		Least Concern
CAMPANULACEAE	<i>Prismatocarpus brevilobus</i>		Least Concern

CAMPANULACEAE	<i>Prismatocarpus diffusus</i>		Least Concern
PROTEACEAE	<i>Protea acaulis</i>	Aardroos	Least Concern
PROTEACEAE	<i>Protea angustata</i>		Endangered
PROTEACEAE	<i>Protea aurea</i>		Least Concern
PROTEACEAE	<i>Protea burchellii</i>		Vulnerable
PROTEACEAE	<i>Protea compacta</i>	Bot River Protea	Near Threatened
PROTEACEAE	<i>Protea coronata</i>	Green Sugarbush	Near Threatened
PROTEACEAE	<i>Protea cynaroides</i>	King Protea	Least Concern
PROTEACEAE	<i>Protea eximia</i>		Least Concern
PROTEACEAE	<i>Protea grandiceps</i>		Near Threatened
PROTEACEAE	<i>Protea lacticolor</i>		Endangered
PROTEACEAE	<i>Protea lanceolata</i>		Least Concern
PROTEACEAE	<i>Protea laurifolia</i>		Least Concern
PROTEACEAE	<i>Protea lepidocarpodendron</i>		Near Threatened
PROTEACEAE	<i>Protea lorea</i>	Thong-leaf Sugarbush	Near Threatened
PROTEACEAE	<i>Protea magnifica</i>		Least Concern
PROTEACEAE	<i>Protea mundii</i>	Forest Sugarbush	Least Concern
PROTEACEAE	<i>Protea nana</i>		Least Concern
PROTEACEAE	<i>Protea neriifolia</i>	Narrow-leaf Sugarbush	Least Concern
PROTEACEAE	<i>Protea nitida</i>	Waboom	Least Concern
PROTEACEAE	<i>Protea obtusifolia</i>		Near Threatened
PROTEACEAE	<i>Protea pudens</i>		Endangered
PROTEACEAE	<i>Protea repens</i>	Sugarbush	Least Concern
PROTEACEAE	<i>Protea scabra</i>	Sandpaper-leaf Sugarbush	Near Threatened
PROTEACEAE	<i>Protea scolymocephala</i>	Thistle-leaf Sugarbush	Vulnerable
PROTEACEAE	<i>Protea susannae</i>		Near Threatened
FABACEAE	<i>Psoralea alata</i>		Least Concern
FABACEAE	<i>Psoralea aphylla</i>		Least Concern
FABACEAE	<i>Psoralea imbricata</i>		Least Concern
FABACEAE	<i>Psoralea monophylla</i>		Least Concern
FABACEAE	<i>Psoralea pinnata</i>		Least Concern
CELASTRACEAE	<i>Pterocelastrus tricuspidatus</i>		Least Concern
ORCHIDACEAE	<i>Pterygodium alatum</i>		Least Concern
ORCHIDACEAE	<i>Pterygodium catholicum</i>		Least Concern

ORCHIDACEAE	<i>Pterygodium platypetalum</i>		Least Concern
FABACEAE	<i>Rafnia angulata</i>		Least Concern
FABACEAE	<i>Rafnia triflora</i>		Least Concern
RESTIONACEAE	<i>Restio tetragonus</i>		Least Concern
RESTIONACEAE	<i>Restio triticeus</i>		Least Concern
ANACARDIACEAE	<i>Rhus angustifolia</i>	Willowy Korentebos	Least Concern
ANACARDIACEAE	<i>Rhus rosmarinifolia</i>	Rosemary / Taaibos	Least Concern
ANACARDIACEAE	<i>Rhus tomentosa</i>		Least Concern
FABACEAE	<i>Rhynchosia totta</i>		Least Concern
CAMPANULACEAE	<i>Roella ciliata</i>		Least Concern
CAMPANULACEAE	<i>Roella incurva</i>	None	Least Concern
IRIDACEAE	<i>Romulea cruciata</i>		Least Concern
IRIDACEAE	<i>Romulea gracillima</i>		Least Concern
IRIDACEAE	<i>Romulea hirsuta</i>		Least Concern
IRIDACEAE	<i>Romulea rosea</i>		Least Concern
LAMIACEAE	<i>Salix mucronata</i>		Least Concern
LAMIACEAE	<i>Salvia africana-lutea</i>		Least Concern
LAMIACEAE	<i>Salvia chamelaeagnea</i>		Least Concern
ORCHIDACEAE	<i>Satyrium bicallosum</i>		Least Concern
ORCHIDACEAE	<i>Satyrium bicorne</i>		Least Concern
ORCHIDACEAE	<i>Satyrium coriifolium</i>		Least Concern
DIPSACACEAE	<i>Scabiosa columbaria</i>		Least Concern
PTERIDOPHYTA	<i>Schizaea pectinata</i>		Least Concern
CYPERACEAE	<i>Schoenoxiphium lanceum</i>		Least Concern
GENTIANACEAE	<i>Sebaea aurea</i>		Least Concern
GENTIANACEAE	<i>Sebaea exacoides</i>		Least Concern
GENTIANACEAE	<i>Sebaea micrantha</i>		Least Concern
SCROPHULARIACEAE	<i>Selago corymbosa</i>		Least Concern
SCROPHULARIACEAE	<i>Selago fruticulosa</i>		Least Concern
SCROPHULARIACEAE	<i>Selago scabrida</i>		Least Concern
ASTERACEAE	<i>Senecio burchellii</i>		Least Concern
ASTERACEAE	<i>Senecio erubescens</i>		Least Concern
ASTERACEAE	<i>Senecio grandiflorus</i>		Least Concern
ASTERACEAE	<i>Senecio lineatus</i>		Least Concern

ASTERACEAE	<i>Senecio paniculatus</i>		Least Concern
ASTERACEAE	<i>Senecio pinifolius</i>		Least Concern
ASTERACEAE	<i>Senecio pterophorus</i>		Least Concern
ASTERACEAE	<i>Senecio pubigerus</i>		Least Concern
ASTERACEAE	<i>Senecio purpureus</i>		Least Concern
ASTERACEAE	<i>Senecio rosmarinifolius</i>		Least Concern
ASTERACEAE	<i>Senecio subcanescens</i>		Least Concern
PROTEACEAE	<i>Serruria decipiens</i>		Vulnerable
PROTEACEAE	<i>Serruria kraussii</i>	Snowball Spiderhead	Vulnerable
CARYOPHYLLACEAE	<i>Silene bellidioides</i>		Least Concern
CARYOPHYLLACEAE	<i>Silene undulata</i>		Least Concern
IRIDACEAE	<i>Sparaxis grandiflora</i>		Endangered
HYPOXIDACEAE	<i>Spiloxene alba</i>		Vulnerable
HYPOXIDACEAE	<i>Spiloxene capensis</i>	Peacock Flower	Least Concern
HYPOXIDACEAE	<i>Spiloxene flaccida</i>		Least Concern
HYPOXIDACEAE	<i>Spiloxene schlechteri</i>		Least Concern
LAMIACEAE	<i>Stachys aethiopica</i>	Katbossie	Least Concern
ASTERACEAE	<i>Stoebe capitata</i>		Least Concern
ASTERACEAE	<i>Stoebe plumosa</i>	Slangbos	Least Concern
THYMELAEACEAE	<i>Struthiola myrsinites</i>		Least Concern
ASTERACEAE	<i>Syncarpha canescens</i>	Vlaktetee	Least Concern
ASTERACEAE	<i>Syncarpha gnaphaloides</i>		Least Concern
SCROPHULARIACEAE	<i>Teedia lucida</i>		Least Concern
FABACEAE	<i>Tephrosia capensis</i>		Least Concern
POACEAE	<i>Tetaria bolusii</i>		Least Concern
POACEAE	<i>Tetaria bromoides</i>		Least Concern
POACEAE	<i>Tetaria fasciata</i>		Least Concern
POACEAE	<i>Tetaria ustulata</i>		Least Concern
RESTIONACEAE	<i>Thamnochortus fruticosus</i>		Least Concern
IRIDACEAE	<i>Thereianthus bracteolatus</i>		Least Concern
IRIDACEAE	<i>Thereianthus spicatus</i>		Least Concern
SANTALACEAE	<i>Thesium capitatum</i>		Least Concern
SANTALACEAE	<i>Thesium carinatum</i>		Least Concern
SANTALACEAE	<i>Thesium frisea</i>		Data Deficient

SANTALACEAE	<i>Thesium funale</i>		Least Concern
SANTALACEAE	<i>Thesium nudicaule</i>		Least Concern
SANTALACEAE	<i>Thesium paniculatum</i>		Least Concern
SANTALACEAE	<i>Thesium strictum</i>		Least Concern
APIACEAE	<i>Torilis arvensis</i>	Common hedge parsley	Least Concern
ASPHODELACEAE	<i>Trachyandra filiformis</i>		Least Concern
ASPHODELACEAE	<i>Trachyandra hirsuta</i>		Least Concern
ASPHODELACEAE	<i>Trachyandra muricata</i>		Least Concern
ASPHODELACEAE	<i>Trachyandra oligotricha</i>		Least Concern
ASPHODELACEAE	<i>Trachyandra tabularis</i>		Least Concern
JUNCAGINACEAE	<i>Triglochin bulbosa</i>		Least Concern
IRIDACEAE	<i>Tritoniopsis antholyza</i>		Least Concern
IRIDACEAE	<i>Tritoniopsis burchellii</i>		Least Concern
IRIDACEAE	<i>Tritoniopsis pulchella</i>		Least Concern
IRIDACEAE	<i>Tritoniopsis ramosa</i>		Least Concern
IRIDACEAE	<i>Tritoniopsis triticea</i>		Least Concern
ALLIACEAE	<i>Tulbaghia alliaceae</i>		Least Concern
ASTERACEAE	<i>Ursinia paleacea</i>	Geelmagriet	Least Concern
ASTERACEAE	<i>Ursinia pinnata</i>		Least Concern
FABACEAE	<i>Virgilia oroboides oroboides</i>	Keurboom	Least Concern
HAEMODORACEAE	<i>Wachendorfia brachyandra</i>		Vulnerable
HAEMODORACEAE	<i>Wachendorfia paniculata</i>	Rooikanol / Spinnepokblom	Least Concern
HAEMODORACEAE	<i>Wachendorfia thyrsoflora</i>	None	Least Concern
CAMPANULACEAE	<i>Wahlenbergia capensis</i>	None	Least Concern
CAMPANULACEAE	<i>Wahlenbergia cernua</i>		Least Concern
CAMPANULACEAE	<i>Wahlenbergia exilis</i>		Least Concern
CAMPANULACEAE	<i>Wahlenbergia obovata</i>		Least Concern
IRIDACEAE	<i>Watsonia amabilis</i>		Critically Rare
IRIDACEAE	<i>Watsonia angusta</i>	None	Least Concern
IRIDACEAE	<i>Watsonia borbonica</i>	Suurkanol	Least Concern
IRIDACEAE	<i>Watsonia marginata</i>	None	Least Concern
IRIDACEAE	<i>Watsonia schlechterii</i>	None	Least Concern
IRIDACEAE	<i>Watsonia spectabilis</i>		Least Concern
IRIDACEAE	<i>Watsonia zeyheri</i>	None	Least Concern

COLCHICACEAE	<i>Wurmbea inusta</i>		Vulnerable
COLCHICACEAE	<i>Wurmbea recurva</i>		Least Concern
SCROPHULARIACEAE	<i>Zaluzianskya capensis</i>		Least Concern
SCROPHULARIACEAE	<i>Zaluzianskya divaricata</i>		Least Concern
SCROPHULARIACEAE	<i>Zaluzianskya villosa</i>		Least Concern
ARACEAE	<i>Zantedeschia aethiopica</i>	Arum Lilly	Least Concern
ZYGOPHYLLACEAE	<i>Zygophyllum flexuosum</i>		Least Concern
ZYGOPHYLLACEAE	<i>Zygophyllum fulvum</i>		Least Concern

Plant Species List Silberboomkloof

Family	Scientific Name	Common Name	Red Data Status
RUTACEAE	<i>Adenandra sp.1</i>		
AGAPANTHACEAE	<i>Agapanthus africanus</i>	Bloulelie	
RUTACEAE	<i>Agathosma crenulata</i>	Commercial Buchu	Declining
AMARYLLIDACEAE	<i>Amaryllis belladonna</i>	March Lily/ Belladonna Lily	Least Concern
PRIMULACEAE	<i>Anagallis arvensis~</i>		Least Concern
RUBIACEAE	<i>Anthospermum aethiopicum</i>		Least Concern
MALVACEAE	<i>Antizoma sp.1</i>		
APIACEAE	<i>Arctopus echinatus</i>	Platdoring	Least Concern
IRIDACEAE	<i>Aristea capitata</i>		
APOCYNACEAE	<i>Asclepias sp.1</i>		
FABACEAE	<i>Aspalathus sp.1</i>		
ASPARAGACEAE	<i>Asparagus sp.1</i>		
ASTERACEAE	<i>Athanasia trifurcata</i>		Least Concern
ASTERACEAE	<i>Berkheya herbacea</i>		Least Concern
IRIDACEAE	<i>Bobartia sp.1</i>		Least Concern
POACEAE	<i>Brachiaria sp.1</i>		
LAURACEAE	<i>Cassytha ciliolata</i>		Least Concern
GENTIANACEAE	<i>Chironia baccifera</i>	Christman Berry	Least Concern
ASTERACEAE	<i>Chrysanthemoides monilifera</i>	Bitoubos	Least Concern
ASTERACEAE	<i>Conyza canadensis</i>		
POACEAE	<i>Cortaderia sp.1</i>		
CRASSULACEAE	<i>Crassula capensis~</i>		Least Concern
ASTERACEAE	<i>Cullumia sp.1</i>		
TECOPHILAEACEAE	<i>Cyanella hyacinthoides</i>		Least Concern
CYPERACEAE	<i>Cyperus sp.1</i>		
ASTERACEAE	<i>Dicerothermus rhinocerotis</i>	Renosterbos	Least Concern
ASTERACEAE	<i>Dimorphotheca cuneata</i>		
RUTACEAE	<i>Diosma hirsuta</i>		
FABACEAE	<i>Diospyros glabra</i>		Least Concern

	<i>Dittrichia graveolens</i>		
FABACEAE	<i>Dolichos junodii</i>		
POACEAE	<i>Ehrharta sp.1</i>		
AIZOACEAE	<i>Erepsia sp.1</i>		Least Concern
ERICACEAE	<i>Erica sp.1</i>		
CYPERACEAE	<i>Ficinia sp.1</i>		
ASTERACEAE	<i>Helichrysum sp.1</i>		
MALVACEAE	<i>Hermannia rudis</i>		
APIACEAE	<i>Hermas sp.1</i>		
MALVACEAE	<i>Hibiscus aethiopicus~</i>		Least Concern
	<i>Hypochaeris radicata</i>		
KIGGELARIACEAE	<i>Kiggelaria africana</i>	Wil Peach	Least Concern
	<i>Lactuca serriola</i>		
PROTEACEAE	<i>Leucadendron argenteum</i>	Silver Tree	Endangered
PROTEACEAE	<i>Leucadendron sp.1</i>		
	<i>Ligustrum sp.1</i>		
LOBELIACEAE	<i>Lobelia erinus</i>		Least Concern
BORAGINACEAE	<i>Lobostemon sp.1</i>		
CELASTRACEAE	<i>Maytenus oleoides</i>		Least Concern
ASTERACEAE	<i>Metalasia muricata</i>	Blombos/ Witsteekbossie	least Concern
IRIDACEAE	<i>Micranthus alopecuroides</i>		Least Concern
ANENIACEAE	<i>Mohria caffrorum</i>		
MONTINIACEAE	<i>Montinia caryophyllacea</i>		Least Concern
IRIDACEAE	<i>Moraea tricuspida</i>		Least Concern
IRIDACEAE	<i>Moraea virgata karooica</i>		
POLYGALACEAE	<i>Muraltia sp.1</i>		
MYRSINACEAE	<i>Myrsine africana</i>		Least Concern
	<i>Oenothera sp.1</i>		
SCROPHULARIACEAE	<i>Oftia africana</i>		Least Concern
OLEACEAE	<i>Olea europaea africana</i>		
HYACINTHACEAE	<i>Ornithogalum thyrsoides</i>	Chincherinchee	Least Concern
SANTALACEAE	<i>Osyris compressa</i>	None	Least Concern
OXALIDACEAE	<i>Oxalis sp.1</i>		
OXALIDACEAE	<i>Oxalis tenuifolia</i>		Least Concern

GERANIACEAE	<i>Pelargonium sp.1</i>		
GERANIACEAE	<i>Pelargonium triste</i>	Night-Scented Pelargonium	
POACEAE	<i>Pentaschistis sp.1</i>		
RHAMNACEAE	<i>Phyllica sp.1</i>		
	<i>Picris echioides</i>		
PENAECEAE	<i>Plantago lanceolata</i>	Ribwort plantain	
FABACEAE	<i>Podalyria biflora</i>		
PROTEACEAE	<i>Protea coronata</i>	Green Sugarbush	Near Threatened
FABACEAE	<i>Psoralea asarina</i>		
DEMMSTAEDTIACEAE	<i>Pteridium aquilinum~</i>	Bracken fern	Least Concern
RESTIONACEAE	<i>Restio sp.1</i>		
ANACARDIACEAE	<i>Rhus angustifolia</i>	Willow Korentebos	Least Concern
ANACARDIACEAE	<i>Rhus tomentosa</i>		
ROSACEAE	<i>Rubus sp.1</i>		
LAMIACEAE	<i>Salvia africana-caerulea</i>		
DIPSACACEAE	<i>Scabiosa columbaria</i>		Least Concern
GENTIANACEAE	<i>Sebaea aurea</i>		Least Concern
SCROPHULARIACEAE	<i>Selago sp.1</i>		
ASTERACEAE	<i>Senecio pubigerus</i>		Least Concern
POACEAE	<i>Stenotaphrum secundatum</i>	Buffalo Grass	
POACEAE	<i>Tetraria thermalis</i>		
SANTALACEAE	<i>Thesium sp.1</i>		

Appendix 6 Mammal Species List Helderberg

Family	Scientific Name	Common Name	Red Data Status
SORICIDAE	<i>Corcidura cyanea</i>	Reddish-Grey Musk Shrew	Data Deficient
SORICIDAE	<i>Myosorex varius</i>	Forest Shrew	Data Deficient
SORICIDAE	<i>Crocidura flavescens</i>	Greater Red Musk Shrew	Least Concern
CHRYSOCHLORIDAE	<i>Amblysomus hottentotus</i>	Hottentot Golden Mole	Least Concern
CHRYSOCHLORIDAE	<i>Chrysochloris asiatica</i>	Cape Golden Mole	Least Concern
LEPORIDAE	<i>Lepus saxatilis</i>	Scrub Hare	Least Concern
LEPORIDAE	<i>Lepus capensis</i>	Cape Hare	Least Concern
LEPORIDAE	<i>Pronolagus rupestris</i>	Smith's Red Rock Rabbit	Least Concern
BATHERYGIDAE	<i>Cryptomys hottentotus</i>	Common Molerat	Least Concern
BATHERYGIDAE	<i>Georychus capensis</i>	Cape Dune Molerat	Least Concern
HYSTRICIDAE	<i>Hystrix africaeaustralis</i>	Cape Porcupine	Least Concern
MURIDAE	<i>Mus minutoides</i>	Pygmy Mouse	Least Concern
MURIDAE	<i>Acomys subspinosus</i>	Cape Spiny Mouse	Least Concern
MURIDAE	<i>Aethomys namaquensis</i>	Namaqua Rock Mouse	Least Concern
MURIDAE	<i>Myomyscus verreauxii</i>	Verreaux's Mouse	Least Concern
MURIDAE	<i>Otomys irroratus</i>	Southern African Vlei Rat	Least Concern
MURIDAE	<i>Otomys saundersiae</i>	Saunders's Vlei Rat	Least Concern
MURIDAE	<i>Dendromus mlanotis</i>	Grey Climbing Mouse	Least Concern
MURIDAE	<i>Dendromus mesomelas</i>	Brants's Climbing Mouse	Least Concern
MURIDAE	<i>Rhabdomys pumilio</i>	Striped Field Mouse	Least Concern
MURIDAE	<i>Tatera afra</i>	Cape Gerbil	Least Concern
CANIDAE	<i>Vulpes chama</i>	Cape Fox	Least Concern
CANIDAE	<i>Canis mesomelas</i>	Black Backed Jackal	Least Concern
CANIDAE	<i>Poecilogale albinucha</i>	African Weasel	Data Deficient
FELIDAE	<i>Caracal caracal</i>	Caracal	Least Concern
FELIDAE	<i>Panthera pardus</i>	Leopard	Near Threatened
MUSTELIDAE	<i>Aonyx capensis</i>	Cape Clawless Otter	Least Concern
MUSTELIDAE	<i>Melivora capensis</i>	Honey Badger	Near Threatened
MUSTELIDAE	<i>Ictonyx striatus</i>	Striped Polecat	Least Concern

VIVERRIDAE	<i>Galerella pulverulenta</i>	Small Grey Mongoose	Least Concern
VIVERRIDAE	<i>Herpestes ichneumon</i>	Large Grey Mongoose	Least Concern
VIVERRIDAE	<i>Atilax paludinosus</i>	Water Mongoose	Least Concern
VIVERRIDAE	<i>Genetta genetta</i>	Small Spotted Genet	Least Concern
BOVIDAE	<i>Sulvicapra grimmia</i>	Common Duiker	Least Concern
BOVIDAE	<i>Raphicerus melanotis</i>	Cape Grysbok	Least Concern
BOVIDAE	<i>Raphicerus campestris</i>	Steenbok	Least Concern
BOVIDAE	<i>Damaliscus pygargus pygargus</i>	Bontebok	Vulnerable
BOVIDAE	<i>Pelea capreolus</i>	Grey Rhebuck	Least Concern
BOVIDAE	<i>Oreotragus oreotragus</i>	Klipspringer	Least Concern
CERCOPITHECIDAE	<i>Papio ursinus</i>	Chacma Baboon	Least Concern
PROCAVIIDAE	<i>Procavia capensis</i>	Rock dassie	Least Concern

Mammal Species List Silberboomkloof

Family	Scientific Name	Common Name	Red Data Status
SORICIDAE	<i>Crocidura flavescens</i>	Greater Red Musk Shrew	Least Concern
CHRYSOCHLORIDAE	<i>Amblysomus hottentotus</i>	Hottentot Golden Mole	Least Concern
CHRYSOCHLORIDAE	<i>Chrysochloris asiatica</i>	Cape Golden Mole	Least Concern
LEPORIDAE	<i>Lepus saxatilis</i>	Scrub Hare	Least Concern
LEPORIDAE	<i>Pronolagus rupestris</i>	Smith's Red Rock Rabbit	Least Concern
BATHERYGIDAE	<i>Cryptomys hottentotus</i>	Common Molerat	Least Concern
BATHERYGIDAE	<i>Georchus capensis</i>	Cape Dune Molerat	Least Concern
HYSTRICIDAE	<i>Hystrix africaeaustralis</i>	Cape Porcupine	Least Concern
MURIDAE	<i>Mus minutoides</i>	Pygmy Mouse	Least Concern
MURIDAE	<i>Acomys subspinosus</i>	Cape Spiny Mouse	Least Concern
MURIDAE	<i>Aethomys namaquensis</i>	Namaqua Rock Mouse	Least Concern
MURIDAE	<i>Myomyscus verreauxii</i>	Verreaux's Mouse	Least Concern
MURIDAE	<i>Otomys irroratus</i>	Southern African Vlei Rat	Least Concern
MURIDAE	<i>Otomys saundersiae</i>	Saunders's Vlei Rat	Least Concern

MURIDAE	<i>Dendromus mlanotis</i>	Grey Climbing Mouse	Least Concern
MURIDAE	<i>Dendromus mesomelas</i>	Brants's Climbing Mouse	Least Concern
MURIDAE	<i>Rhabdomys pumilio</i>	Striped Field Mouse	Least Concern
FELIDAE	<i>Caracal caracal</i>	Caracal	Least Concern
MUSTELIDAE	<i>Ictonyx striatus</i>	Striped Polecat	Least Concern
VIVERRIDAE	<i>Galerella pulverulenta</i>	Small Grey Mongoose	Least Concern
VIVERRIDAE	<i>Herpestes ichneumon</i>	Large Grey Mongoose	Least Concern
VIVERRIDAE	<i>Atilax paludinosus</i>	Water Mongoose	Least Concern
VIVERRIDAE	<i>Genetta genetta</i>	Small Spotted Genet	Least Concern
BOVIDAE	<i>Raphicerus melanotis</i>	Cape Grysbok	Least Concern

Appendix 7 Bird Species List Helderberg

Scientific Name	Common Name	Roberts Bird Number	Red Data Status
<i>Tricholaema leucomelas</i>	Acacia Pied Barbet	465	RA
<i>Anas sparsa</i>	African Black Duck	105	UA
<i>Apus barbatus</i>	African Black Swift	412	C
<i>Anhinga rufa</i>	African Darter	60	V
<i>Muscicapa adusta</i>	African Dusky Flycatcher	690	US
<i>Haliaeetus vocifer</i>	African Fish-Eagle	148	RA
<i>Accipiter tachiro</i>	African Goshawk	160	UA
<i>Polyboroides typus</i>	African Harrier-Hawk	169	UA
<i>Upupa africana</i>	African Hoopoe	451	RA
<i>Columba arquatrix</i>	African Olive-Pigeon	350	RA
<i>Anthus cinnamomeus</i>	African Pipit	716	V
<i>Rallus caerulescens</i>	African Rail	210	C
<i>Acrocephalus baeticatus</i>	African Reed Warbler	631	C
<i>Threskiornis aethiopicus</i>	African Sacred Ibis	91	CA
<i>Gallinago nigripennis</i>	African Snipe	286	RA
<i>Strix woodfordii</i>	African Wood-Owl	394	RA
<i>Tachymarpis melba</i>	Alpine Swift	418	CS
<i>Porzana pusilla</i>	Baillon's Crake	215	C
<i>Hirundo rustica</i>	Barn Swallow	518	CS
<i>Apalis thoracica</i>	Bar-throated Apalis	645	RA
<i>Amauromis flavirostris</i>	Black Crake	213	C
<i>Cuculus clamosus</i>	Black Cuckoo	378	C
<i>Campephaga flava</i>	Black Cuckooshrike	538	U
<i>Circus maurus</i>	Black Harrier	168	V
<i>Milvus migrans migrans</i>	Black Kite	126	CW
<i>Psalidoprocne holomelaena</i>	Black Sawwing	536	V
<i>Accipiter melanoleucus</i>	Black Sparrowhawk	158	U
<i>Nectarina amethystina</i>	Black Sunbird	792	C
<i>Nycticorax nycticorax</i>	Black-crowned Night Heron	76	CA

<i>Ardea melanocephala</i>	Black-Headed Heron	63	CA
<i>Elanus caeruleus</i>	Black-shouldered Kite	127	UA
<i>Vanellus armatus</i>	Blacksmith Lapwing	258	C
<i>Anthropoides paradiseus</i>	Blue crane	208	V
<i>Telophorus zeylonus</i>	Bokmakierie	746	CA
<i>Aquila pennatus</i>	Booted Eagle	136	V
<i>Crithagra sulphuratus</i>	Brimstone Canary	877	CA
<i>Prodotiscus regulus</i>	Brown-backed Honeybird	478	U
<i>Riparia paludicola</i>	Brown-throated Martin	533	C
<i>Sarothrura elegans</i>	Buff-spotted Flufftail	218	C
<i>Centropus burchellii</i>	Burchell's Coucal	356	RA
<i>Batis capensis</i>	Cape Batis	700	V
<i>Pycnonotus capensis</i>	Cape Bulbul	566	CA
<i>Emberiza capensis</i>	Cape Bunting	885	CA
<i>Serinus canicollis</i>	Cape Canary	872	CA
<i>Mirafra apiata</i>	Cape Clapper Lark	495	UA
<i>Corvus capensis</i>	Cape Crow	547	V
<i>Bubo capensis</i>	Cape Eagle-Owl	400	U
<i>Sphenoeacus afer</i>	Cape Grassbird	661	CA
<i>Macronyx capensis</i>	Cape Longclaw	727	UA
<i>Cossypha caffra</i>	Cape Robin-Chat	601	CA
<i>Chaetops frenatus</i>	Cape Rock-jumper	611	C
<i>Monticola rupestris</i>	Cape Rock-Thrush	581	UA
<i>Anas smithii</i>	Cape Shoveler	112	C
<i>Crithagra totta</i>	Cape Siskin	874	CA
<i>Passer melanurus</i>	Cape Sparrow	803	RA
<i>Pternistis capensis</i>	Cape Spurfowl	195	CA
<i>Promerops cafer</i>	Cape Sugarbird	773	CA
<i>Anas capensis</i>	Cape Teal	106	RA
<i>Streptopelia capicola</i>	Cape Turtle-Dove	354	CA
<i>Motacilla capensis</i>	Cape Wagtail	713	CA
<i>Ploceus capensis</i>	Cape Weaver	813	UA
<i>Zosterops virens</i>	Cape White-eye	796	CA
<i>Dendropicus fuscescens</i>	Cardinal Woodpecker	486	C

<i>Bubulcus ibis</i>	Cattle Egret	71	RA
<i>Cisticola textrix</i>	Cloud Cisticola	666	CA
<i>Lanius collaris</i>	Common Fiscal	732	UA
<i>Delichon urbicum</i>	Common House-Martin	530	V
<i>Gallinula chloropus</i>	Common Moorhen	226	RA
<i>Coturnix coturnix</i>	Common Quail	200	RS
<i>Sturnus vulgaris</i>	Common Starling	757	CA
<i>Apus apus</i>	Common Swift	411	C
<i>Estrilda astrild</i>	Common Waxbill	846	CA
<i>Vanellus coronatus</i>	Crowned Lapwing	255	C
<i>Chrysococcyx caprius</i>	Diderik Cuckoo	386	C
<i>Alopochen aegyptiaca</i>	Egyptian Goose	102	CA
<i>Euplectes capensis</i>	Yellowrumped Widow	827	C
<i>Oriolus oriolus</i>	Eurasian Golden Oriole	543	CV
<i>Falco subbuteo</i>	Eurasian Hobby	173	U
<i>Cercomela familiaris</i>	Familiar Chat	589	CA
<i>Caprimulgus pectoralis</i>	Fiery-necked Nightjar	405	C
<i>Sigelus silens</i>	Fiscal Flycatcher	698	UA
<i>Buteo trizonatus</i>	Forest Buzzard	150	V
<i>Dicrurus adsimilis</i>	Forktailed Drongo	541	V
<i>Megaceryle maximus</i>	Giant Kingfisher	429	UA
<i>Indicator indicator</i>	Greater Honeyguide	474	U
<i>Hirundo cucullata</i>	Greater Striped Swallow	526	US
<i>Ardea cinerea</i>	Grey Heron	62	CA
<i>Cisticola subruficapilla</i>	Grey-backed Cisticola	669	CA
<i>Scleroptila africanus</i>	Grey-Wing Francolin	190	CA
<i>Geocolaptes olivaceus</i>	Ground Woodpecker	480	UA
<i>Bostrychia hagedash</i>	Hadeda Ibis	94	UA
<i>Alcedo semitorquata</i>	Half-collared Kingfisher	430	U
<i>Scopus umbretta</i>	Hamerkop	81	UA
<i>Numida meleagris</i>	Helmetted Guineafowl	203	CA
<i>Passer domesticus</i>	House Sparrow	801	UA
<i>Turnix hottentotus</i>	Hottentot Buttonquail	206	EN
<i>Buteo rufofuscus</i>	Jackal Buzzard	152	UA

<i>Prinia maculosa maculosa</i>	Karoo Prinia	686	CA
<i>Cercotrichas coryphoeus</i>	Karoo Scrub-Robin	614	RA
<i>Chrysococcyx klaas</i>	Klaas's Cuckoo	385	U
<i>Bradypterus sylvaticus</i>	Knysna Warbler	640	R
<i>Falco biarmicus</i>	Lanner Falcon	172	V
<i>Galerida magnirostris</i>	Large-billed Lark	512	C
<i>Streptopelia senegalensis</i>	Laughing Dove	355	UA
<i>Indicator minor</i>	Lesser Honeyguide	476	RA
<i>Acrocephalus gracilirostris</i>	Lesser Swamp-Warbler	635	RA
<i>Cisticola tinniens</i>	Levaillant's Cisticola	677	CA
<i>Ixobrychus minutus</i>	Little Bittern	78	CS
<i>Egretta garzetta</i>	Little Egret	67	CA
<i>Tachybaptus ruficollis</i>	Little Grebe	8	RA
<i>Bradypterus baboecala</i>	Little Rush-Warbler	638	C
<i>Sylvietta rufescens</i>	Long-billed Crombec	651	RA
<i>Anthus similis</i>	Long-billed Pipit	717	RA
<i>Alcedo cristata</i>	Malachite Kingfisher	431	RA
<i>Nectarinia famosa</i>	Malachite Sunbird	775	CA
<i>Oena capensis</i>	Namaqua Dove	356	RS
<i>Cisticola fulvicapilla</i>	Neddicky	681	UA
<i>Turdus olivaceus</i>	Olive Thrush	577	UA
<i>Dendropicos griseocephalus</i>	Olive Woodpecker	488	C
<i>Anthobaphes violacea</i>	Orange-breasted Sunbird	777	CA
<i>Terpsiphone viridis</i>	Paradise Flycatcher	710	US
<i>Hirundo dimidiata</i>	Pearl-breasted Swallow	523	C
<i>Falco peregrinus</i>	Peregrine Falcon	171	UA
<i>Corvus albus</i>	Pied Crow	548	RA
<i>Ceryle rudis</i>	Pied Kingfisher	428	UA
<i>Spreco bicolor</i>	Pied Starling	759	C
<i>Vidua macroura</i>	Pin-tailed Whydah	860	RA
<i>Anthus leucophrys</i>	Plain-backed Pipit	718	CA
<i>Crithagra leucopterus</i>	Protea Seedeater	880	U
<i>Ardea purpurea</i>	Purple Heron	65	UA
<i>Anas erythrorhyncha</i>	Red-billed Teal	108	RA

<i>Calandrella cinerea</i>	Red-capped Lark	507	C
<i>Cuculus solitarius</i>	Red-chested Cuckoo	377	RS
<i>Sarothrura rufa</i>	Red-chested Flufftail	217	C
<i>Streptopelia semitorquata</i>	Red-eyed Dove	352	UA
<i>Urocolius indicus</i>	Red-Faced Mousebird	426	RA
<i>Fulica cristata</i>	Red-knobbed Coot	228	RA
<i>Onychognathus morio</i>	Red-winged Starling	769	CA
<i>Phalacrocorax africanus</i>	Reed Cormorant	58	CA
<i>Falco rupicolus</i>	Rock Kestrel	181	UA
<i>Hirundo fuligula</i>	Rock Martin	529	CA
<i>Accipiter rufiventris</i>	Rufous-chested Sparrowhawk	155	UA
<i>Riparia riparia</i>	Sand Martin	532	CS
<i>Monticola explorator</i>	Sentinel Rock-Thrush	582	RA
<i>Tadorna cana</i>	South African Shelduck	103	V
<i>Laniarius ferrugineus</i>	Southern Boubou	736	CA
<i>Cinnyris chalybeus</i>	Southern Double-collared Sunbird	783	CA
<i>Ploceus velatus</i>	Southern Masked-Weaver	814	V
<i>Netta erythroptalma</i>	Southern Pochard	113	V
<i>Euplectes orix</i>	Southern Red Bishop	824	RA
<i>Colius striatus</i>	Speckled Mousebird	424	CA
<i>Columba guinea</i>	Speckled Pigeon	349	CA
<i>Bubo africanus</i>	Spotted Eagle-Owl	401	UA
<i>Burhinus capensis</i>	Spotted Thick-knee	297	UA
<i>Plectropterus gambensis</i>	Spur-wing Goose	116	UA
<i>Buteo vulpinus</i>	Steppe Buzzard	149	CS
<i>Saxicola torquata</i>	Stonechat	596	C
<i>Sarothrura affinis</i>	Striped Flufftail	221	V
<i>Coccyzygia melanotis</i>	Sweet Waxbill	850	C
<i>Charadrius tricollaris</i>	Three-banded Plover	249	UA
<i>Aquila verreauxii</i>	Verreaux's Eagle	131	UA
<i>Cryptillas victorini</i>	Victorin's Warbler	641	C
<i>Burhinus vermiculatus</i>	Water Thick-knee	298	C
<i>Colius colius</i>	White-backed Mousebird	425	RA
<i>Phalacrocorax lucidus</i>	White-breasted Cormorant	55	CA

<i>Corvus albicollis</i>	White-necked Raven	550	UA
<i>Apus caffer</i>	White-rumped Swift	415	CS
<i>Hirundo albigularis</i>	White-throated Swallow	520	V
<i>Phylloscopus trochilus</i>	Willow Warbler	643	C
<i>Euplectes capensis</i>	Yellow Bishop	827	CA
<i>Crithagra flaviventris</i>	Yellow Canary	878	UA
<i>Anas undulata</i>	Yellow-billed Duck	104	UA
<i>Egretta intermedia</i>	Yellow-billed Egret	68	V
<i>Milvus migrans parasitus</i>	Yellow-billed Kite	126	V
<i>Cisticola juncidis</i>	Zitting Cisticola	664	RA

Appendix 8 Reptile Species List Helderberg

Scientific Name	Common Name	Red Data Status
<i>Acontias meleagris</i>	Cape Legless Skink	Least Concern
<i>Afrogecko porphyreus</i>	Marbled Leaf-toed Gecko	Least Concern
<i>Agama atra</i>	Southern Rock Agama	Least Concern
<i>Bitis arietans arietans</i>	Puff Adder	Least Concern
<i>Bitis atropos</i>	Berg Adder	Least Concern
<i>Bradypodion pumilum</i>	Cape Dwarf Chameleon	Least Concern
<i>Chamaesaura anguina</i>	Cape Grass Lizard	Least Concern
<i>Chersina angulata</i>	Angulate Tortoise	Least Concern
<i>Cordylus cordylus</i>	Cape Girdled Lizard	Least Concern
<i>Crotaphopeltis hotamboeia</i>	Herald Snake	Least Concern
<i>Dasypeltis scabra</i>	Common Eggeater	Least Concern
<i>Dispholidus typus</i>	Boomslang	Least Concern
<i>Duberria lutrix</i>	Common Slug Eater	Least Concern
<i>Geochelone pardalis</i>	Leopard Tortoise	Least Concern
<i>Hemachatus haemachatus</i>	Rinkhals	Least Concern
<i>Homopus areolatus</i>	Parrot-beaked Tortoise	Least Concern
<i>Homoroselaps lacteus</i>	Spotted Harlequin Snake	Least Concern
<i>Lamprophis aurora</i>	Aurora House Snake	Least Concern
<i>Lamprophis guttatus</i>	Spotted House Snake	Least Concern
<i>Lamprophis inornatus</i>	Olive House Snake	Least Concern
<i>Lycodonomorphus rufulus</i>	Common Brown Water Snake	Least Concern
<i>Mabuya capensis</i>	Cape Skink	Least Concern
<i>Mabuya homalocephala</i>	Red Sided Skink	Least Concern
<i>Naja nivea</i>	Cape Cobra	Least Concern
<i>Pachydactylus geitje</i>	Ocellated Thick-toed Gecko	Least Concern
<i>Pelomedusa subrufa</i>	Marsh Terrapin	Least Concern
<i>Psammophylax rhombeatus</i>	Rhombic Skaapsteker	Least Concern
<i>Pseudaspis cana</i>	Mole Snake	Least Concern
<i>Pseudocordylus microlepidotus</i>	Cape Crag Lizard	Least Concern

<i>Tetradactylus seps</i>	Short-legged Seps	Least Concern
<i>Tetradactylus tetradactylus</i>	Common Long-tailed Seps	Least Concern

Reptile Species List Silverboomkloof

Scientific Name	Common Name	Red Data Status
<i>Bitis arietans arietans</i>	Puff Adder	Least Concern
<i>Chersina angulata</i>	Angulate Tortoise	Least Concern
<i>Duberria lutrix</i>	Common Slug Eater	Least Concern
<i>Geochelone pardalis</i>	Leopard Tortoise	Least Concern
<i>Lamprophis inornatus</i>	Olive House Snake	Least Concern
<i>Mabuya capensis</i>	Cape Skink	Least Concern
<i>Mabuya homalocephala</i>	Red Sided Skink	Least Concern
<i>Naja nivea</i>	Cape Cobra	Least Concern
<i>Dispholidus typus</i>	Boomslang	Least Concern
<i>Agama atra</i>	Southern Rock Agama	Least Concern

Appendix 9 Amphibian Species List Helderberg

Scientific Name	Common Name	Red Data Status
<i>Amietia fuscigula</i>	Cape River Frog	Least Concern
<i>Amietophrynus rangeri</i>	Raucous Toad	Least Concern
<i>Arthroleptella landdrosia</i>	Landroskop Moss Frog	Near Threatened
<i>Arthroleptella villiersi</i>	De Villier's Moss Frog	Least Concern
<i>Breviceps montanus</i>	Cape Mountain Rain Frog	Least Concern
<i>Capensibufo rosei</i>	Cape Mountain Toad	Least Concern
<i>Hyperolius marmoratus</i>	Painted Reed Frog	Least Concern
<i>Strongylopus grayii</i>	Clicking Stream Frog	Least Concern
<i>Tomopterna delalandii</i>	Cape Sand Frog	Least Concern
<i>Xenopus laevis</i>	Common Platanna	Least Concern

Appendix 10 Fish Species List Helderberg

Scientific Name	Common Name
<i>Gambusia affinis</i>	Mosquito fish
<i>Micropterus salmoides</i>	Large mouth bass
<i>Galaxius zebratus</i>	Cape galaxius
<i>Tilapia sparrmanii</i>	Banded Tilapia
<i>Cyprinus carpio</i>	Carp

Appendix 11: Safety and Security Audit

CITY OF CAPE TOWN

BIODIVERSITY MANAGEMENT BRANCH

Executive Brief

Comprehensive Security Audit of the Biodiversity Management Branch of the City of Cape Town

MARCH 2010



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Introduction

The City of Cape Town' Biodiversity Management Branch, in wishing to ensure the safety of visitors and staff, requested assistance on conducting a security audit of all (25) its managed (and envisaged) Nature Reserves.

The need was based on the following assumptions:

- That the areas are poorly managed
- Security Agencies are inefficient in their operations
- The lack of tools to measure management effectiveness
- Safety and security of visitors as well as that of personnel are threatened.

Plan-It, in collaboration with Thorn-Ex and Titan Security, agreed to undertake the project. Owing to the budgetary constraints, it was agreed that the audit would encompass 12 priority Reserves, as selected by the Biodiversity Management Branch.

The following outcomes were proposed and accepted:

- A desktop exercise to evaluate existing information and identify gaps
- A physical Audit of the listed facilities
- Consultation with public user groups
- Recommendations in respect of security technology and infrastructure
- A comprehensive report on all findings
- A basic entry level conservation security training session for staff

The project was to be completed by the end of April 2010.

Approach

The focus was to be on the safety and security of staff working in the different reserves, of visitors to these reserves and of the biodiversity within the reserves.

The audit was to involve the reserve managers, site managers and any other staff the Biodiversity Management Branch deemed necessary to provide information for the audit.

The Project commenced with the Branch being approached to supply maps of each reserve with as much information as possible on all types of infrastructure, bio-physiographic information etc e.g. boundaries of reserves and kind of fence along these, access points, roads, tracks, paths, power lines, telephone lines, buildings, cell phone towers, masts, aerials, bridges, streams, rivers, contours, vegetation, adjacent land use, habitation or settlements in close proximity.

Questionnaires were then drawn up and sent to all the Reserve Managers as well as separate questionnaires which were sent to the various public interest groups, via the Reserve Managers.

Upon receipt of the above the project team drafted a preliminary working document to guide and focus the audit.

The audit commenced on the 15th of February 2010 with a workshop with the various Managers and a presentation of the findings from the questionnaires to the Biodiversity Branch.

The audits commenced on the 16th of February 2010 with a visit to each Reserve..

During each audit the manager and staff were interviewed and a physical inspection of infrastructure was conducted. The audits focused on existing security systems, security infrastructure, activities, incidents, job descriptions, training and manpower

In addition to the audits workshops were scheduled, via the Reserve Manager with relevant external safety and security institutions and public interest groups. The workshops were then held with various District and Reserve-specific public interest groups.

On conclusion of the audit phase, the security technology specialist visited the Reserves to inspect the systems and infrastructure in place at each reserve. Based on and with reference to the initial draft Audit Report, the specialist undertook an assessment of technology short-comings in order to arrive at feasible recommendations for practicable improvements.

The completed report was then circulated to all the Reserve Managers as a Draft Report for comment, prior to the Final Comprehensive Report incorporating such comment being presented to the Branch.

The Project was then concluded with a basic entry level security training session for nominated staff covering aspects such as:

- Information gathering and reporting
- Patrol structuring, planing and safety
- Preparedness and response
- Handling of transgressors (armed or un-armed)
- Incident handling
- Charge office procedures
- Evidence and Statements
- Record keeping and dossier development

Executive Summary

A safety and security audit was carried out on twelve Reserves under the jurisdiction of the Biodiversity Branch of the Directorate Environmental Resource Management.

The Audit was aimed at doing a rapid and verifiable analysis of the current security situation, security services, infrastructure, staffing, and social contexts. The information allowed for a “threat” level to be determined for each reserve.

Information acquired through a questionnaire survey with the Reserve Mangers, and information provided by the Branch was used as a baseline to guide and provide focus for the individual Reserve audits.

The Audits very quickly revealed that the location of the various reserves with their own unique social contexts primarily dictated the level of threat of each Reserve.

Some Reserves perceived as being “dangerous” were found to be “safe” with very low key incidents actually occurring. Although social ills do tend to spill over into Reserves the occurrence thereof is very localised and relate to prostitution, substance abuse, theft and illegal plant harvesting for the muti trade.

General security observations revealed that any metal infrastructure or equipment and solar panels are at greatest risk and are stolen on a regular basis. Trespassing, vagrants traversing the reserves and the harvesting of plants for the commercial flower industry and commercially driven herbal medicine /"muthi" industry are linked to an associated threat to staff and visitors. However incidents of visitors and staff being accosted by vagrants are rare.

Security activities were generally viewed as an add-on function when incidents are reported, with some Reserve Managers and Field staff trying to fit security patrols and activities into their management work schedule. The Visitor Controller Officers, on the other hand are essentially Access Control Officers who may be called on to perform some Law Enforcement function if their training enables them to do so. However staff does carry out combined operations with Law Enforcement bodies like Marine and Coastal Management, SAPS or City Law Enforcement when activities in the vicinity of the reserves warrant this in the interests of conservation.

One of the most evident security shortcomings found was that Reserves were "abandoned", for all practical purposes, after hours, on weekends and on public holidays.

The investigation also found that very few Reserves actively patrol the Reserve and fences on a regular basis.

The Findings of each audit, including the responses received from the public interest groups were used to determine the threat level of each Reserve. The threat levels are based on a combination of factors which may affect security to the reserve, its staff and visitors as well as these threats in relation to other reserves.

The threat levels low, medium, and high reflects the safety threat to visitors, staff, and infrastructure. Further to which the threat level provides an indication in respect of intervention priority (staffing, infrastructure, equipment).

The results were as follow:

Reserve	Threat Level	Threat	Primary Cause
Witzands ACA	Medium	Illegal Access / Trespassing	Lack of fencing
Blaauwberg CA	Medium	Illegal Access / Trespassing	Lack of coverage
Rietvlei WR	Low	Illegal Access / Trespassing	Lack of coverage
Durbanville NR	Low	Theft	Lack of presence
Bracken NR	Low	Trespassing	Lack of coverage
Tygerberg NR	High	Trespassing / poaching	Lack coverage
Zandvlei NR	Low	Illegal Access / Trespassing	State of infrastructure
Falls Bay EP	High	Violent crime	Lack of fencing /coverage
Edith Stephens WP	Low	Theft	Lack of fencing
Wolfgat & Macassar NR	Severe	Violent crime	Location & Social
Kogelberg NR	Medium	Illegal Access / Trespassing	Extent / coverage
Helderberg NR	Low	Illegal Access / Trespassing	Lack coverage

Understaffing and poor or non-existent boundaries were found to be the primary cause of compromised Reserve security. The provision of “feet on the ground” or a management presence is therefore viewed as the first step towards improving the current situation.

The Investigation did conclude that technology solution options entailed fairly low key equipment such as Day-Night or Peak Inversion monitoring cameras, basic building alarm systems, external building detection beams, lighting, etc.

Infrastructure requirements were predominantly in respect of fencing.

Fencing is not always the preferred solution for safeguarding and demarcating an urban Reserve. However, it is suggested that failure to demarcate the boundaries of a Reserve compromises the authority’s ability to manage a designated area and severely limits the authority’s ability to prosecute transgressors. Simple in-expensive measures such as signage and markers will greatly aid in addressing these matters.

The relative “newness” of the Branch was found create various generic management challenges which negatively affect the efficiency and effective of Reserve management.

The aforesaid institutional matters included:

- Lack in consistency of staff designations
- Lack of consistency in functional content (job descriptions)
- Lack of career pathing and skills development program
- Lack of measurable performance standards
- Lack of training and capacity building
- Lack of uniform operational procedures and protocols
- Un-clear performance objectives of Advisory Boards
- Jurisdictional uncertainties in respect of cooperation with other environmental law enforcement agencies
- Lack of memorandums of Understanding with Utility Service Branches active in Reserves

The apparent absence of a clear and definitive Branch Policy on Reserve Safety and Security was viewed as a contributing shortcoming. Further to which, no consistency was found in respect of operational procedures or protocols. Some stations had a Management Plan whilst others were still going to develop such plans. Some stations had developed their own safety procedures.

In respect of Procedures and Protocols it is suggested that the Biodiversity branch consider the developing the following procedures and protocols;

- Incident response (poaching, trespassing, theft, fire, attack, medical emergency, land invasion, pollution, un-wanted pets)
- Reserve patrols
- Fence and gate security
- Visitor control

It is suggested that the above procedures and protocols be developed in conjunction with an auditable reserve management system which is linked to the personnel and finance performance requirements. It is also recommended that the Branch conduct an Institutional “Governance Audit” to guide the above protocols, relationships with other

government institutions and law enforcement bodies as well as the Branch's legal obligations.

Consultation with public interest groups and reserve managers highlighted the benefits of "friend" groups. Some stations financial ability and conservation maintenance activities were greatly enhanced by such "friends" groups. Further to which, the social role that urban reserves play as "safe areas" for people to walk their pets, have picnics or conduct social functions was highlighted at several public meetings. It was also mentioned that in some areas where "gang turf" issues were dominant the reserves were viewed as "neutral" territories.

Advisory Boards are a requirement in terms of reserves proclaimed under the Protected Areas Act although no clarity could be defined with respect to the extent, role and responsibilities of the various Reserves Advisory Boards. Some Reserves indicated that they played an active role whilst others were not aware of their existence. The development of clear responsibilities and objectives for each Board is viewed as imperative to contributing to the achievement of the Reserve objectives whilst providing a formal link to neighbouring communities and local government.

Most Reserves have other City Utility Departments executing functions within the Reserve, share boundaries with them, or manage large tracts of land under their jurisdiction. None of the Reserves were aware of any Memorandums of Understanding which clarify joint management matters. This was viewed as institutional shortcoming requiring attention at higher level.

A variety of Security Service providers render various levels of security to Reserves. These services vary from private security firms providing uniformed guards to provide a static or gate control service to services where such guards are used as Bushrangers. It was the investigation's conclusion that each District or Reserve negotiates their own contract conditions with such service providers, a situation which does not contribute to clear and measurable security service provisioning.

The City Law Enforcement Services and structures were generally viewed as not being able to respond to conservation related incidents. Only a few Reserves reported adequate responses to call-outs or incidents with most Reserves saying they rely on the local SAPS for assistance.

Reserves which have installed alarm systems linked to the City Law Enforcement Control Rooms, reported that in the event of alarm activation the Reserve manager is phoned to investigate. No direct service benefit could be found in respect City Law Enforcement.

What was most evident during the investigation was the risk posed by staff acting outside their areas of jurisdiction. These transgressions are not through ill intent and staff is not necessarily aware that they are exceeding their authority. Urgent attention should be paid to the authority necessary for the role staff plays in enforcing provincial conservation laws, fisheries laws, and National laws. This should be done in cognisance of the criminal Procedures Act. It is further suggested that cooperation agreements and execution delegations be formalised with other environmental and conservation agencies.

Due to several reserves having a coastal boundary and the ever present activities of highly organised and dangerous Abalone poaching gangs the involvement of staff in curbing these activities need to clearly defined and coordinated. It is suggested that this should be the preserve of a highly trained and well equipped District based Law Enforcement Component conducting their duties in collaboration with other authorities and with the necessary jurisdiction.

It is the opinion of this investigation team that the establishment of a District based Law Enforcement Component will greatly contribute in addressing some of the security shortcomings highlighted. In addition, such a component will also alleviate some of the external enforcement requirements placed on Reserve staff thus allowing them to focus on reserve management and security.

Conclusion and generic recommendations

The audit results correlated closely with the location and management capacity of each Reserve. High concentrations of un-employed people living in dense informal settlements adjacent to reserves do pose a greater risk to the Reserves. Staff was found to be more exposed to violent crimes in such circumstances than those located in rural or medium to high income areas.

Although social ills do tend to spill over into Reserves the occurrence thereof is very localised and relates to prostitution, substance abuse, theft and illegal plant harvesting for the muti trade.

The Findings of each audit, including the responses received from the public interest groups were used to determine the threat level of each Reserve.

The threat levels low, medium, and high reflects the safety threat to visitors, staff, and infrastructure. Further to which the threat level provides an indication in respect intervention priority (staffing, infrastructure, equipment).

The results were as follow:

Reserve	Threat Level	Threat	Primary Cause
Witzands ACA	Medium	Illegal Access / Trespassing	Lack of fencing
Blaauwberg CA	Medium	Illegal Access / Trespassing	Lack of coverage
Rietvlei WR	Low	Illegal Access / Trespassing	Lack of coverage
Durbanville NR	Low	Theft	Lack of presence
Bracken NR	Low	Trespassing	Lack of coverage
Tygerberg NR	High	Trespassing / poaching	Lack coverage
Zandvlei NR	Low	Illegal Access / Trespassing	State of infrastructure
Falls Bay EP	High	Violent crime	Lack of fencing /coverage
Edith Stephens WP	Low	Theft	Lack of fencing
Wolfgat & Macassar NR	Severe	Violent crime	Location & Social
Kogelberg NR	Medium	Illegal Access / Trespassing	Extent
Helderberg NR	Low	Illegal Access / Trespassing	Lack coverage

Understaffing and poor or non-existent boundaries were found to be the primary cause of compromised Reserve security. The provision of “feet on the ground” or a management presence is therefore viewed as the first step towards improving the current situation.

The Investigation did conclude that technology solutions entail fairly low key equipment such as Day-Night or Peak Inversion monitoring cameras, basic building alarm systems, external building detection beams, lighting, etc.

Infrastructure requirements were predominantly in respect of fencing.

Fencing is not always the preferred solution for safeguarding and demarcating an urban Reserve. However, it is suggested that failure to demarcate the boundaries of a Reserve compromises the authority's ability to manage a designated area and severely limits the authority's ability to prosecute transgressors. Simple in-expensive measures such as signage and markers will greatly aid in addressing these matters.

In areas where fencing is vandalised on a regular basis the use of electric fencing (long distances, or Diamond Razor Mesh (short distances) is recommended. However it is recommended that spring-steel barb wire be used in all other instances.

The relative "newness" of the Branch was found to create various generic management challenges which negatively affect the efficiency and effective of Reserve management.

The apparent absence of a clear and definitive Branch Policy on Reserve Safety and Security was viewed as a contributing shortcoming.

A great inconsistency was found in staff designations, with some staff fulfilling similar conservation functions being called Conservation Officers whilst other were called Site Managers or Assistant Managers. The same problem was evident within the junior staff ranks. On some stations "labourers" conducted similar duties to those of Bushrangers.

The appointment and use of Contract staff was found to be a management challenge to most Reserves. Contract staff are generally employed by an external service provider whilst The Branch is responsible for the day to day management of said staff including the provision of uniforms and training. The opinion is held that the cost of these services could very well be such that the Branch could employ these contract staff directly to a greater benefit.

Several instances were found of junior staff being employed for several years as "Small Plant operators" or "Foreman" and having developed a keen interest and expertise in various conservation matters. The provision of career pathing opportunities to staff will not only contribute to the goals of the Branch but also provide an incentive to junior staff.

No evidence was found of a clear skills development program for officers and the impression was created that each officer arranges and sees to his or her own training. This was especially evident with some officers having been trained as Peace officers and appointed whilst others had been trained but not appointed and some still needed to be trained. Some Officers were also expressing the need to be appointed as Fisheries Officers whilst other believed they should be trained and appointed as Environmental Inspectors.

Most reserves had Conservation Students and Interns fulfilling a variety of roles and responsibilities, in some instances un-paid. The rotation of Students and interns was thought to be a good means of exposing them to various experiences and opportunities.

The investigation also found that most staff lacked basic equipment such as binoculars, handcuffs, batons or mace thereby limiting their ability to execute their duties.

The apparent lack of a dress code was viewed as a factor which contributed to the public's sense of security or respect when coming into contact with officers. The wearing of T-shirts, overalls, or golf shirts should not be promoted whilst on duty in the public eye.

No consistency was found in respect of operational procedures or protocols. Some stations had a Management Plan whilst others were still going to develop such plans. Some stations had developed their own safety procedures.

One of the most evident security shortcomings found was that Reserves were "abandoned", for all practical purposes, after hours, on weekends and on public holidays. It is understood that staff work standard working hours. However, the provision of accommodation, which most Reserves have, to either Site managers or Bushrangers are seen as a simple cost effective measure. Where there are operational staff resident on the Reserves (mostly students) it acts as a definite deterrent to illegal activities. Staff stationed on Reserves can then work on a "conservation standard" shift schedule of 20 days on 5 days off.

The investigation also found that very few Reserves actively patrol the Reserve and fences on a regular basis. Although staff shortage is a contributing factor, careful planning and allocation of available resources will ensure that Reserves are patrolled on

a regular basis. It is further suggested that the sharing of resources between Reserves will allow for more frequent patrols.

With regard to Procedures and Protocols it is suggested that the Biodiversity branch consider developing the following;

- Incident response (poaching, trespassing, theft, fire, attack, medical emergency, land invasion, pollution, un-wanted pets)
- Reserve patrols
- Fence and gate security
- Visitor control

It is suggested that the above procedures and protocols be developed in conjunction with an auditable Reserve management system which includes a personnel and finance performance aspect.

Consultation with public interest groups and reserve managers highlighted the benefits of “friend” groups. Some stations’ financial ability and conservation maintenance activities were greatly enhanced by such “friends” groups. It is accepted that not all Reserves have the opportunity to have well capacitated “friends”. However, the neighbouring community’s sense of ownership was found to be a primary contributor to a Reserves state of security.

Further to which the social role that urban reserves play as “safe areas” for people to walk their pets, have picnics or conduct social functions was highlighted at several public meetings. It was also mentioned that in some areas where “gang turf” issues was dominant the reserves were viewed as “neutral” territories.

Advisory Boards are a requirement in terms of reserves proclaimed under the Protected Areas Act. The aim of which is to allow participation by interested parties and to ensure their continual engagement. With regard to reserves not yet proclaimed under the Protected Areas Act but which have Advisory Boards their role is much the same with the possible addition of raising and allocation of funds. This investigation could not clearly define the extent, role and responsibilities of the various Reserves Advisory Boards. Some Reserves indicated that they played an active role whilst others were not aware of their existence. The development of a clear responsibilities and objectives for each Board is viewed as imperative to contributing to the achievement of the Reserve

objectives whilst providing a formal link to neighbouring communities and local government.

The removal of Spare tyres from Reserve vehicles by the Transport Sections should be halted as it poses a significant risk to staff operating in remote areas or providing law enforcement services.

Most Reserves have other City Utility Departments executing functions within the Reserve, share boundaries with them, or manage large tracts of land under their jurisdiction. None of the Reserves were aware of any Memorandums of Understanding which clarify joint management matters. This was viewed as institutional shortcoming requiring attention at higher level.

A variety of Security Service providers render various levels of security to Reserves. These services vary from private security firms providing uniformed guards to providing a static or gate control service to services where such guards are used as Bushrangers. It was the investigations conclusion that each District or Reserve negotiates their own contract conditions with such service providers, a situation which does not contribute to clear and measurable security service provisioning.

The City Law Enforcement Services and structures were generally viewed as not being able to respond to conservation related incidents. Only a few Reserves reported adequate responses to call-outs or incidents with moth Reserves saying they rely on the local SAPS for assistance.

Reserves which have installed alarm systems linked to the City Law Enforcement Control Rooms, reported that in the event of an alarm activation, the Reserve manager is phoned to investigate. No direct service benefit could be found in respect of City Law Enforcement.

What was most evident during the investigation was the risk posed by staff acting outside their areas of jurisdiction. These transgressions are not through ill intent and staff are not necessarily aware that they are exceeding their authority. Urgent attention should be paid to necessary authority and the role staff play in enforcing provincial conservation laws, fisheries laws, and National laws. This should be done in cognisance of the criminal Procedures Act. It is further suggested that cooperation agreements and

execution delegations be formalised with other environmental and conservation agencies.

Due to several reserves having a coastal boundary and the ever present activities of highly organised and dangerous Abalone poaching gangs, the involvement of staff in curbing these activities need to be clearly defined and coordinated. It is the opinion of this team that this should be the preserve of a highly trained and well equipped District based Law Enforcement Component conducting their duties in collaboration with other authorities and with the necessary jurisdiction.

It is the opinion of this investigation team that the establishment of a District based Law Enforcement Component will greatly contribute in addressing some of the security shortcomings highlighted. In addition, such a component will also alleviate some of the external enforcement requirements placed on Reserve staff thus allowing them to focus on reserve management and security. The current practice of Law enforcement staff working a daily night shift is questioned as no evidence could be found on its effectiveness. It is suggested that through information gathering, coordination with other authorities and planning, such nightly activities could take place on a sporadic basis with much greater successes.

The investigation team was also of opinion that the management requirements of the various Reserves need to be included in the Municipal Spatial Development Framework so as to ensure that the Reserve - Neighbourhood interface receive adequate attention.

Summary of recommendations

INSTITUTIONAL		
Aspect	Issue	Recommendation
Governance	<ol style="list-style-type: none"> 1. Relationship with other National & Provincial Conservation/Environmental institutions 2. Relationship with other City Institutions 3. Obligations in respect of By-laws, Municipal Systems Act (2000) and the Municipal Finance Management Act (2003) 4. Working agreements with other Utility Services 	<ol style="list-style-type: none"> 1. Conduct Institutional Governance Audit 2. Draft MOU's
Policy & Procedures	<ol style="list-style-type: none"> 1. Management Policies, Goals, Objectives 2. Operational Procedures & Protocols 	<ol style="list-style-type: none"> 1. Develop management Policies Goals & Objectives 2. Develop Procedures and Protocols
Management	<ol style="list-style-type: none"> 1. Consistency in personnel designations 2. Consistency in personnel functional content 3. Career pathing 4. Skills development 5. Reserve Management Standards 	<ol style="list-style-type: none"> 1. Develop consistent Job Descriptions 2. Develop Skills Development and career pathing Protocol 3. Develop Auditable Reserve Management System linked to Personnel & Financial Performance Management System

Reserve	Additional Staffing	Security and Equipment	Infrastructure
NORTH			
Witzands	<ol style="list-style-type: none"> 3x Bushrangers Small labor team Staff must be trained in 4 wheel driving Officers appointed as Peace Officers 	<ol style="list-style-type: none"> Establish a MOU with Bulk Water Replace damaged fences Monitor Wood cutter activities Permits must contain more information Reserve map required Curb illegal access Regular perimeter patrols. 	<ol style="list-style-type: none"> 4x4 vehicle in good condition Office Trellidor and burglar bars Demarcation of boundaries Erect signage Electric fence along north and north-eastern boundary Basic staff equipment
Blaauwberg	<ol style="list-style-type: none"> 6x Bushrangers (2 x3-member teams) 2 x Permanent Visitor Controller Off's Officers appointed as Peace Officers Station District Law Enforcement Component 	<ol style="list-style-type: none"> Staff be appointed as Peace Officers Law Enforcement Component duties expanded to cover "hot spots" in district. Daily night shifts limited to conduct patrols across district and do ad hoc night time 	<ol style="list-style-type: none"> Link present alarm system to security service provider. Mount Day-Night camera to cover main resort area. Active Monitor to monitor activities during peak periods. Erect signage Basic staff equipment
Rietvlei	<ol style="list-style-type: none"> 2 x Bushrangers Officers appointed as Peace Officers 	<ol style="list-style-type: none"> Regular perimeter patrols Co-ordinate with MCM 	<ol style="list-style-type: none"> Fence along R27 road. Alarm systems at new facilities Peak Inversion camera with recording facility for main gate Fence open residential property boundaries Patrol boat Basic staff equipment
CENTRAL			
Bracken	<ol style="list-style-type: none"> 1x EE Officer/Community Officer. 1x Labourer 	<ol style="list-style-type: none"> Visible patrols Liaison with Everite Hostel. 	<ol style="list-style-type: none"> Ablutions at gate Day-night camera for main access area. Removal of derelict buildings Guard monitoring Clear alien vegetation along fences Basic staff equipment

Durbanville	<ol style="list-style-type: none"> 2x Visitor Controller Officers Officers appointed as Peace Officers 	<ol style="list-style-type: none"> Boundary fence cleared of vegetation Erect signage iro handling of unwanted pets 	<ol style="list-style-type: none"> Steel gate at offices to be kept locked, and fitted with buzzer and solenoid access control Video monitor for door Service counter inside front door Alarm system to include response Long-range mobile panic buttons Lighting at offices and main gate Peak Inversion camera for main gate Guard Monitoring system Basic staff equipment
Tygerberg	<ol style="list-style-type: none"> Employ current 3 Contract Bushrangers 2x Bushrangers 1x Site Manager 1x Foreman 5x Labourers 1x Additional EE Officer/Community Liaison 2x Visitor Controller Officers Officers appointed as Peace Officers Station District Law Enforcement Component 	<ol style="list-style-type: none"> Attend Community Police Forum and Crime Watch meetings. Bushrangers obtain drivers licenses Staff presence over week-ends and after hours All gate remotes currently issued be recovered immediately and re-issued under a new access signal code Keys handed out should be retrieved and locks changed. Kanonberg be afforded controlled access in the event of a fire. 	<ol style="list-style-type: none"> Replace existing camera at main entrance gate with a Peak Inversion camera with recording facility Present cameras be replaced with Day-Night cameras. Plattekloof and Quarry area be re-fenced with electric fence Perimeter road should be constructed where feasible Flatrap razer coils installed on top of all fences and along bottom of select fences Accommodation for Bushranger teams Installation of trigger operated floodlight in darker area of parking Additional mountain bike Basic staff equipment
SOUTH			
Zandvlei	<ol style="list-style-type: none"> 3x Visitor Controller Officers 3x Bushrangers 4x Labourers Officers appointed as Peace Officers 	<ol style="list-style-type: none"> Cease involvement in public amenity facilities on eastern side Formal gate control required during open hours Formalise relationship with Mountain Men Security Services Evening security at offices by private security service provider Introduce ad hoc evening patrols Formalise co-operation with Marine and Coastal Management regarding control at the estuary. 	<ol style="list-style-type: none"> Northern access well designated and controlled access point Signage at the entrance, parking areas & along the water Re-fence office area with Diamond Razor Mesh Provide appropriate security lighting Replaced northern and western fence with Diamond Razor Mesh fence New offices need to be completed & fitted with monitored alarm system and BX Outdoor Beams Guard Monitoring system Motorized boat Basic staff equipment
False Bay	<ol style="list-style-type: none"> 9x Bushrangers 4x Static Guards Officers appointed as Peace Officers Station District Law Enforcement Component 	<ol style="list-style-type: none"> Regular patrols supported Bushrangers and Visitor Control officers should be circulated & deployed to cover peak periods of public use within the Park. Change permanent night shift to a planned basis during periods of specific risk or in response to specific incidents Co-ordinate night activities with 	<ol style="list-style-type: none"> Establish two or three Bushranger bases Re-fence southern and eastern boundary electric fence Motorised patrol 2x Quad Install Guard Patrol Monitoring system Fence Rondevlei offices and EE Centre with Diamond

		<p>5. other law enforcement bodies Visitor Controller Officers patrol Zeekoevlei picnic area during peak periods.</p>	<p>7. Razor Mesh Install additional trigger Install flood lights at all facilities 8. Day-Night camera to Rondevlei Viewing Tower for office and entrance area 9. Upgrade all existing cameras to Day-Night cameras with recording 10. Additional cameras for Zeekoevlei entrance gate and new office complex 11. Buildings should be alarmed with a siren and linked to a security service provider 12. Buildings which do not have security staff at night should be fitted with BX80 13. Erect signage 14. Basic staff equipment</p>
Edith Stephens	<p>1. Replace "small plant operator" with a fence maintenance post.</p>	<p>1. The reserve fence needs to be patrolled daily or at least twice a week 2. Walk-in access should be controlled and documented at the gate 3. Office gate should remain locked</p>	<p>1. Northern and southern fences must be replaced with Razor Diamond Mesh be considered or electric fence using spring steel wire 2. Management track should be created along the fence 3. Basic staff equipment</p>
EAST			
Wolfgat & Macassar	<p>1. 8 x Bushrangers. 2. 3x District Law Enforcement Officers 3. 2 x Community Liaison Officers 5. Officers appointed as Peace Officers 6. Station District Law Enforcement Component</p>	<p>1. Weltevreden office security system should include a response system 2. City employed private security with mobile support to patrol coastal road esp. parking areas 3. Investigate sand mining permits</p>	<p>1. Demarcate reserve using cement poles 2. Erect signage 3. Move Macassar Gate 4. Basic staff equipment</p>
Kogelberg	<p>1. 1x Visitor Controller Officer 2. 3x Bushrangers 3. Officers appointed as Peace Officers</p>	<p>1. Improve communication services</p>	<p>1. Construct Bushranger camp 2. Erect signage 3. Fence Erf 19 and north-west boundary using electric fence 4. Install alarm at all buildings 5. Install trigger lighting 6. Install depot fence at rear 7. Install Reed Switches for solar panels 8. Peak Inversion Camera for entrance gate to depot 9. Basic staff equipment</p>
Helderberg	<p>1. 6 existing Labourers trained to level of Bushrangers 2. Officers appointed as Peace Officers</p>	<p>1. Develop system for evening monies 2. Regular perimeter patrols</p>	<p>1. Erect signage 2. Electric fence be retained 3. Peak Inversion camera at main gate 4. Day -Night camera to cover parking area 5. Basic staff equipment</p>

Costing

The equipment costing listed below are based on actual quotes provided.

Fencing:

Diamond Razor mesh fencing installed per 100m 440,00/meter	R	
1,8m, 12 strand electric fencing installed at 100m (Au Alloy wire)	R	55,00/meter
12 Joule Nemtek energizer with built in fence monitor excl	R	3400,00

Alarm Equipment:

To supply and install an 8-zone alarm Paradox alarm system complete with battery back-up, keypad, 15 watt siren, four internal infra red passives, two fixed panic buttons and two reed switches. Alarm system can be zone doubled to a 16 zone system.

	R	3600,00
excl.		

To supply and install one outdoor BX80 beam excl.	R	1500,00
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GSM 4 channel radio, programmed to four cellular phone numbers and linked to fence energizers, Alarm systems, Solar panels and standalone panic systems R 1800,00 excl

Long Range remote panic – one long range remote	R	250,00 excl.
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Long Range receiver – installed excl.	R	1100,00
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Cameras:

To supply and install one gate camera – Peak inversion camera, auto-iris lens, 40m co-axial cable, power supply, 4-channel embedded digital recorder (250 G) hard drive and one 17 inch monitor. Price includes camera housing and installation

R 11 900,00 excl.

To supply and install one day/night camera – Day/Night camera, auto-iris lens, 40m co-axial cable, power supply, 4-channel embedded digital recorder (250 G) hard drive and

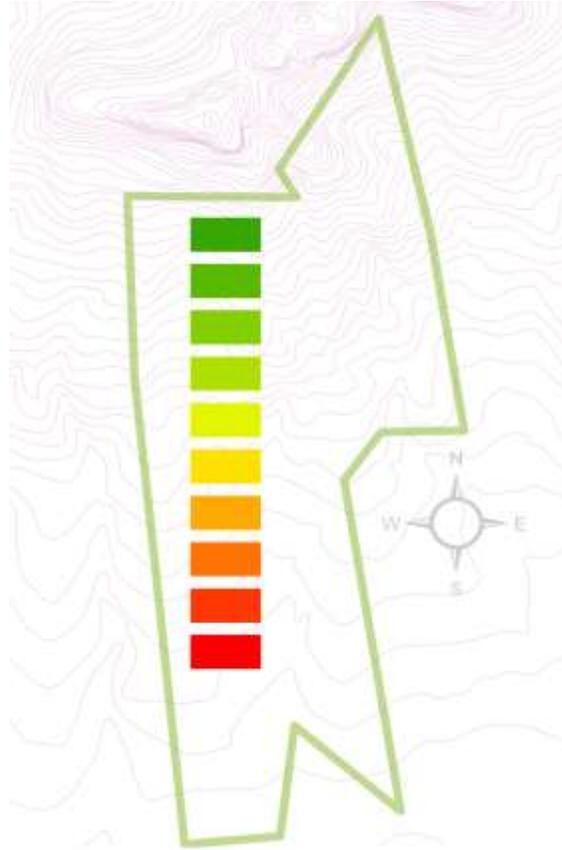
one 17 inch colour monitor. Price includes housing and installation
R 12 900,00 excl.

Appendix 12: Sensitivity Value Analysis

SENSITIVITY- VALUE ANALYSIS AND ZONATION

PROCESS:

HELDERBERG NATURE RESERVE



Prepared for the Biodiversity Branch and Environmental Management Systems Branch

SEPTEMBER 2010

Arne Purves

Natural Resource Specialist

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1. Introduction

The Helderberg Nature Reserve is situated in Somerset West on the slopes of the Helderberg Mountain overlooking False Bay. The reserve was established in September 1960 as the Land en Zeezicht Nature Reserve, primarily to protect the water catchment for the Somerset West area. The reserve is known locally as the Helderberg Nature Reserve and is managed by the City of Cape Town's Biodiversity Branch. In 1995, two portions of land (Farm Erinvale No 722 & Remainder of Erf 3059) to the east of the reserve were leased to the City and included in the reserve management area. The reserve forms part of the City's Biodiversity Network and is listed as a protected area.

The natural vegetation in the reserve is representative of Mesic Mountain Fynbos on the upper reaches, and Renosterveld on the lower reaches. The represented vegetation types are Kogelberg Mountain fynbos, Cape Winelands Shale Fynbos and Swartland Shale Renosterveld (Rebello et al, 2006). These vegetation types are all listed as threatened ecosystems under National Environmental Management: Biodiversity Act (Act 10 of 2004), DEAT (in press).

The reserve has a host of easily accessible visitor facilities and also has an environmental education centre with dedicated EE programs. The reserve also has a very active Friends Group and advisory board.

The reserve is a significant asset to the City and makes significant contributions to national vegetation targets of threatened vegetation types as listed in the National Spatial Biodiversity Assessment (Driver *et al*, 2005), as well as providing a service and facilities to local residents and schools.

1.1 Scope of Report

The development of the Sensitivity and Zonation plan is one of the steps required in compiling a Conservation Development Framework (CDF) for the reserve. CDFs are tools to reconcile the various land-use needs and to delineate visitor user zones and the positioning and nature of new infrastructure, access points, roads and facilities.

The CDF process has grown in response to the requirements of the NEMBA (2004) and is a strategy to comply with the spatial planning requirements of these acts. The CDFs will ensure that best practice and sustainable development principles are integrated into spatial planning within protected areas.

The Sensitivity-Value analysis is the landscape analysis portion of the broader Conservation Development Framework. It is a multi-criteria decision-support tool for spatial planning that is designed to integrate the best available information into a format that allows for defensible and transparent decisions to be made. The Sensitivity-Value process is based on the principle that the acceptability of a development (or placement of a structure) at a site is based on the site's value (either from biodiversity, heritage, aesthetic or a combination of values) and its sensitivity or vulnerability to a variety of types of disturbance (Holness *et al*, 2005).

- The Sensitivity-Value analysis, the CDF and the associated zonation plan should form part of an adaptive management system. They will grow and change over time as the understanding of the landscapes and ecosystems improve; and
- It does not replace the need for detailed site and precinct planning and EIA compliance at site level.

2. Background and Brief

The Sensitivity-Value analysis was undertaken by the EMS Branch's natural resource specialist. The small size of the City's nature reserve also did not require an extensive analysis, with the subsequent zonation process being fairly straight forward. The methodology used for both the Sensitivity-Value analysis and the zonation process was adapted from Holness (2008) and SRK Consulting (2008).

All geographical information work was carried out in ESRI's ArcMap version 9.3.1 GIS (Geographical Information System) using the ArcInfo license level with Spatial Analyst and 3D Analyst extensions.

The brief for the project was to develop a methodology to compile a Sensitivity-Value analysis and zonation plan for the City's nature reserves and to use the Helderberg Nature Reserve as a test case.

3. Sensitivity-Value Analysis

Sensitivity-Value Analysis and Zoning Process methodology

Stage 1: Data synthesis and compilation

Compilation of required data for the analysis

- Spatially define the planning domain or study area.
- Evaluate available and required datasets for the Sensitivity-Value model.
- Spatial data is collected or created for each element of the Sensitivity-Value model.

Stage 2: Layer interpretation

Layer interpretation is an important component of the Sensitivity-Value process that requires a combination of spatial data interpretation and expert knowledge.

- Using the assembled data, areas are assigned a score on a common scale for each element of the model; and
- The scores achieved for each element of the model are represented as separate input layers on a GIS.

Stage 3: Sensitivity-Value Analysis

The Sensitivity-Value analysis stage involves an iterative exploration of the input layers.

- The scores achieved for each element of the model are weighted and aggregated to obtain an overall Sensitivity-Value ranking.
- Different weightings and aggregation procedures and combinations of input layers can be explored; and
- The robustness of the Sensitivity-Value analysis is examined.

The resultant Sensitivity-Value output maps should provide an initial understanding of the spatial distribution of the important and sensitive biodiversity, landscape and heritage features.

Stage 4: Development of a draft zonation plan

The outputs of the Sensitivity-Value process are used as the foundation for the development of a draft zonation plan. The Sensitivity-Value outputs and draft zonation plan are work shopped with relevant stakeholders.

Stage 5: Refinement of the draft zonation and the identification of special management overlays

Special management areas/overlays are identified using the information derived from the Sensitivity-Value analysis. Recommendations are made regarding the management of the land-use zones and special management areas.

The draft is then presented for comment to the City and stakeholder groups to obtain broad public input into the plan prior to finalisation,

Stage 6: Final Zonation and Conservation Development Framework.

The comments and input from the public participation process are integrated into the final zonation plan. The plan is passed through Council for approval and adoption.

3.1 Input Layers

The study area for the CDF was defined as the current management boundary of the Helderberg Nature Reserve. The northern boundary of the reserve abuts the Hottentots Holland Nature Reserve, managed by CapeNature. This area is covered by the Sensitivity-Value analysis carried out by Holness (2008). This report aims to ensure compatibility with the above report.

3.1.1 Biodiversity

3.1.1a Habitat Value

The habitat unit as defined by a particular vegetation community is used as the broad proxy for biodiversity. The vegetation communities are good surrogates for habitat value as it uses readily available information that clearly delineates the distribution of distinct subsets of biodiversity across the landscape.

The South African National Vegetation Map (Rebello *et al*, 2006) was used to broadly define the habitat units. The NSBA (Driver *et al*, 2005) values were used to inform current ecosystem status and level of protection of vegetation types within the study area.

The following factors were also incorporated in the habitat value calculation

- A refined vegetation community map was compiled during a ground truthing exercise. The broader national vegetation units were still used to delineate the habitat units for the reserve, but it should be noted that the national vegetation types and vegetation unit boundaries have been corrected to a finer scale for the reserve.
- The value assigned to a habitat unit should reflect the contribution that vegetation type makes to the local, provincial and national conservation estate.
- This value should reflect the rarity of the habitat, the level of transformation that occurred within the habitat type, species richness and diversity, habitat heterogeneity, and contribution to local conservation targets as identified in the City's Biodiversity Network (Benn, 2008).
- The habitat value also takes into account a gap analysis (how much is in reserves), whereby habitat types that exists largely outside of protected areas receive a higher value.

Broad habitat value is a poor indication of the value of a particular site if a reserve has a history of significant transformation or degradation. Where a reserve includes transformed and/or degraded areas these need to inform the adjustment of the broad habitat value to reflect:

- The level and type of transformation that has occurred at a particular site.
- The rehabilitation/restoration potential of a site. Areas that are likely to revert, with a minimum of management intervention, to a natural or near natural state should be allocated a higher value than areas where extensive management intervention is required.
- Degraded or developed areas were considered to have lower habitat values. The habitat values were adjusted downwards according to the level and type of degradation or habitat loss that has occurred.

Data Inputs (GIS methods and sources)

Base habitat map:

The Helderberg Vegetation Community map was used to delineate habitat units according to their national vegetation type. This was compiled using recent aerial photography and a rapid in-field assessment of the vegetation communities. The broader vegetation types as listed in the South African Vegetation Map (Rebelo *et al*, 2006) were used as the smallest vegetation unit (see Figure 1) as there was little difference in the sensitivity values allocated to vegetation communities within these broader units.

The values used to adjust the base habitat scores are the listed in Table 2. This is necessary in order that critically endangered ecosystems are accurately reflected in the scoring in terms of protection status and, % transformation of the vegetation types.

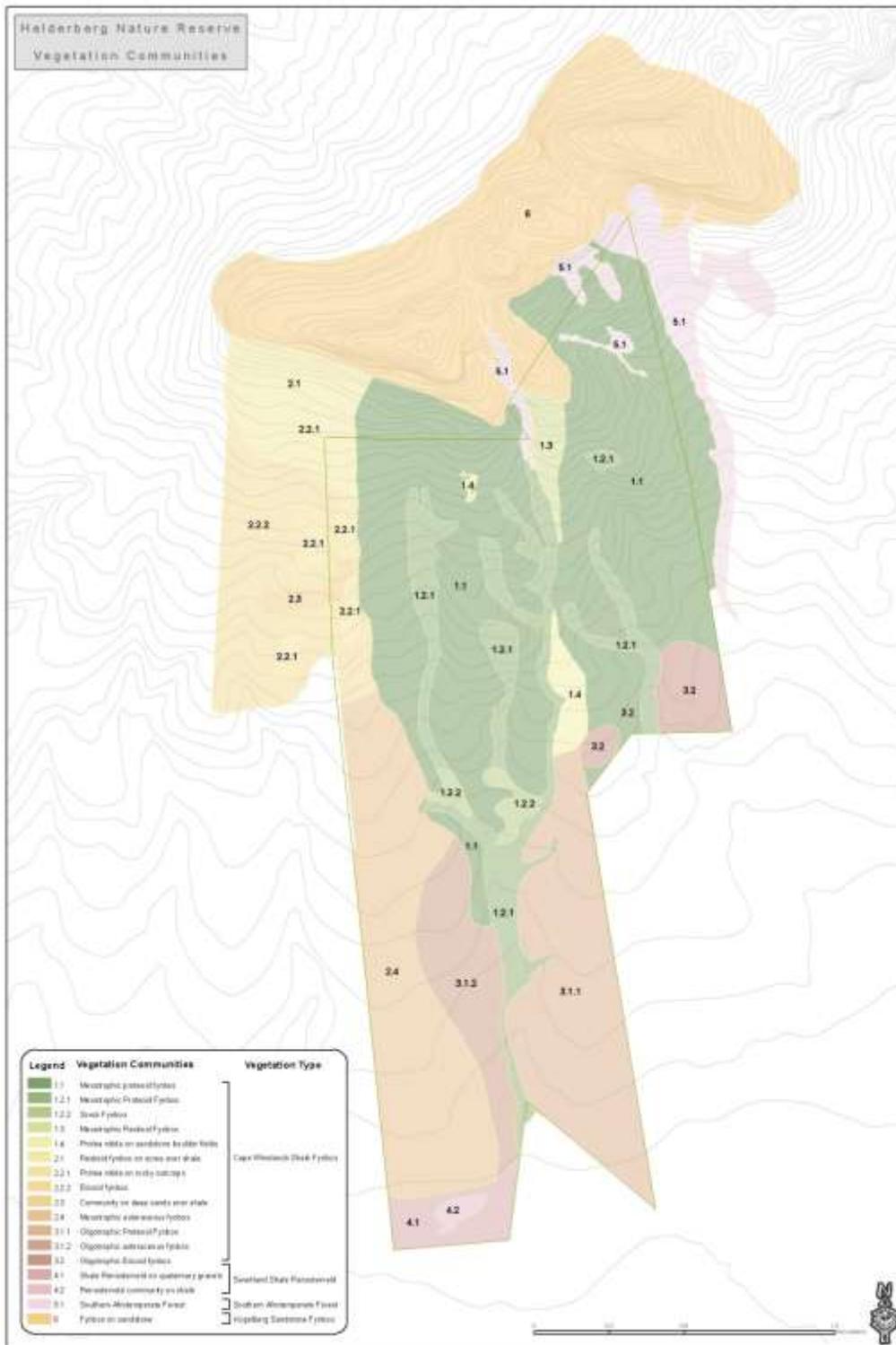


Figure 1: Helderberg Vegetation Communities and National Vegetation Types

3.1.1b: Transformation # Degradation Map:

Habitat transformation and degradation was mapped from recent aerial photography (2005, 2007 and 2008). Habitat modifiers are listed in Table 1 and Figure 2 shows their types and spatial extent.

Table 1: Habitat Modifiers

Type	Category	Description
Transformed	Facilities	Facilities for use by public within the reserve (Ablutions, displays, benches etc.)
	Housing and hard surfaces	Formal and informal housing, incl. old sites that still have hard surfaces etc.
	Quarries	Open excavation or burrow pits – can be current or historic
	Road & paths	The road (management and access roads), trail and boardwalk network
	Dams	Artificial water impoundments and Bulk water infrastructure
	Recreational Open Space	Primarily areas where lawns are maintained for public recreation. Often associated with non-indigenous tree planting for shade etc.
Degraded Heavy, moderate or Low	Firebreaks/fencing	Strips of cleared land maintained for fire management. Including the boundary fencing which usually incorporates a firebreak.
	Invasive Alien vegetation	These areas include sites that have an Invasive Alien Plant infestation density of more than 75%. Sites need to be assessed in terms of their restoration potential. This would also include plantation (Forestry) sites.
	Disturbed	Areas where the natural habitat is not in a near-natural state, but is also not irreversibly transformed. These areas still perform important habitat and ecosystem functions.

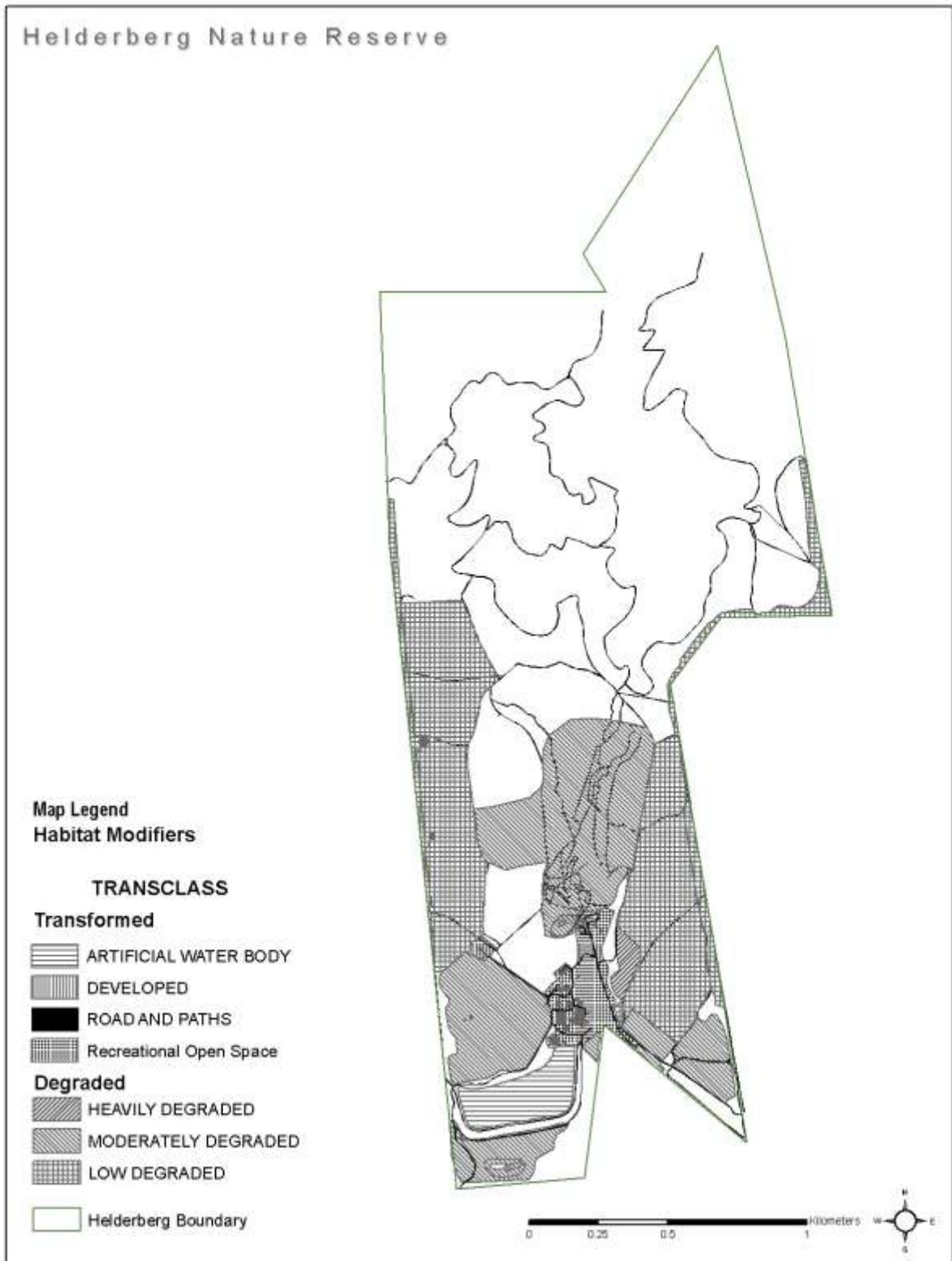


Figure 2: Habitat Modifiers

Scoring, Logic and rationale

The scoring method derived was as follows:

1. Base values were assigned to the study area according to the ecosystem status of the vegetation types (Table 2).
2. The Base values were adjusted on the basis of habitats that are likely to receive an adjusted conservation status under the “Criterion D” listing of threatened ecosystems in terms of NEMBA (2004). This reflects vegetation types with high numbers of rare and endangered plant species. This value replaced the NSBA Conservation Status where higher and was not used in addition to them (Table 2).
3. Base values were adjusted according to the protection status of the vegetation type (Gap Analysis) as determined in the fine scale conservation plan for the City (see Appendices, Table 9).
4. Base values were adjusted according to the % Transformation that has occurred within each vegetation type within the City. (See Appendices, Table 10).
5. The values of all degraded sites were reduced according to the type of habitat degradation (Table 3); and
6. The values of all transformed areas were reduced to zero
7. Once these values were determined, the values were converted to a 0-10 range using a linear conversion method in ArcGIS.

Table 2: Habitat Value summary for each vegetation type before local adjustment for transformation/degradation					
Vegetation Type	NSBA Conservation Status Score	Criterion D Score*	SANBI Conservation Status	% Transformed Score	Unmodified Score
Atlantis Sand Fynbos	6	10	5	3	18
Boland Granite Fynbos	8	6	3	3	14
Cape Estuarine Salt Marshes	4	0	-1	3	6
Cape Flats Dune Strandveld: False bay	8	8	3	10	21
Cape Flats Dune Strandveld: West Coast	4	8	3	2	13
Cape Flats Sand Fynbos	10	10	4	10	24
Cape Lowland Freshwater Wetlands	4	0	-1	2	5
Cape Winelands Shale Fynbos	8	0	3	3	14
Elgin Shale Fynbos	10	0	4	6	20
Hangklip Sand Fynbos	6	6	-1	4	9
Kogelberg Sandstone Fynbos	4	10	2	0	12
Lourensford Alluvium Fynbos	10	10	3	10	23

North Peninsula Granite Fynbos	4	0	-1	2	5
Peninsula Sandstone Fynbos	4	8	-1	0	7
Peninsula Shale Fynbos	6	0	-1	4	9
Peninsula Shale Renosterveld	10	0	3	10	23
South Peninsula Granite Fynbos	8	0	2	6	16
Southern Afrotemperate Forest	4	0	-1	0	3
Swartland Alluvium Fynbos	10	0	5	10	25
Swartland Granite Renosterveld	10	10	4	10	24
Swartland Shale Renosterveld	10	10	4	10	24
Swartland Silcrete Renosterveld	10	0	-1	10	19
Western Shaleband Vegetation	4	0	3	0	7
<i>*This value only replaces NSBA Conservation Status Value when it's a higher value</i>					

Table 3: Habitat Value Summary table

Base Values	NSBA Conservation Status	Critically Endangered Endangered Endangered Vulnerable Least Threatened	10 8 6 4	
	Criterion D Status	Critically Endangered Endangered Endangered Vulnerable Least Threatened	10 8 6 4	Criterion D Status overrides NSBA where the value is higher
Broad adjustors	Vegetation remnants % Transformed	0-14% 15-29% 30-39% 40-49% 50-59% 60-69% 70-99%	0 2 3 4 5 6 10	This criterion highlights the critically endangered vegetation types within the City without considering protection status.
	Ecosystem protection Status (Gap Analysis)	Not Protected Hardly Protected Poorly Protected Moderately Protected Protected	5 4 3 2 -1	Currently not represented in formal reserves >5% of target in reserves 5->50% of target in reserves 50->100% of target in reserves 100% + of target conserved in

		Well Protected		formal protected areas
Local adjustors	Overriding values for transformed sites	Artificial water bodies Quarries/roads Developed Recreational Open Space (ROS)	0 0 0 0	Value reduced to 0 Value reduced to 0 Value reduced to 0 Value reduced to 0
	Adjusting values for degraded sites	Heavily degraded Moderately degraded Low degraded	-6 -2 -1	High density aliens – depleted seed bank with low restoration potential Previously ploughed old fields High density aliens – intact seed bank with high restoration potential Forestry (Pine, Gum) plantations High density non-locally indigenous species Area is recovering from historic disturbance, to a near natural state. Cleared fire belt areas Modified wetlands with NB habitat value

GIS Procedure:

Habitat Value Unmodified Score

1. Export vegetation data to separate shapefile
2. Delete all fields except the "SANBI_VEG" field
3. Dissolve on field "SANBI_VEG"
4. Add fields, NSBA Conservation Status Score (NSBA_SCR), Criterion D Score (Crit_D), SANBI Conservation Status (SANBI_Cons), % Transformed (PERC_TRANS), Unmodified Score (UNMod_SCR). Use Short Integer field type.
5. Populate the attribute table with the relevant scores
6. Calculate the Unmodified Habitat Value Score. Note: The Criterion D score will override the NSBA score if the latter is a higher value.

Habitat Transformation

1. All roads, trails and boardwalks are buffered by 1 meter.
2. All transformation types were digitised from aerial photography at a scale of 1:700. Artificial water bodies were extracted from the wetlands layer.
3. All transformation layers were unioned.
4. Values were assigned as per the table. Type in field "TRANSCLASS" and the score in the field "VALUE"

Habitat Value Modified Score

1. Union the above two layers
2. Clip the union layer to the study area
3. Delete all unnecessary fields.
4. Add field "MOD_SCR"
5. Calculate the value for "MOD_SCR". Remember to reduce the over-riding transformation values to 0
6. Covert to a 1-10 range using equal intervals and label 1-10. Ensure sampling uses all records (set to 25000).
7. Export to shapefile and label HabitatValue.shp
8. Create map for report and export

Outputs

See Figure 3

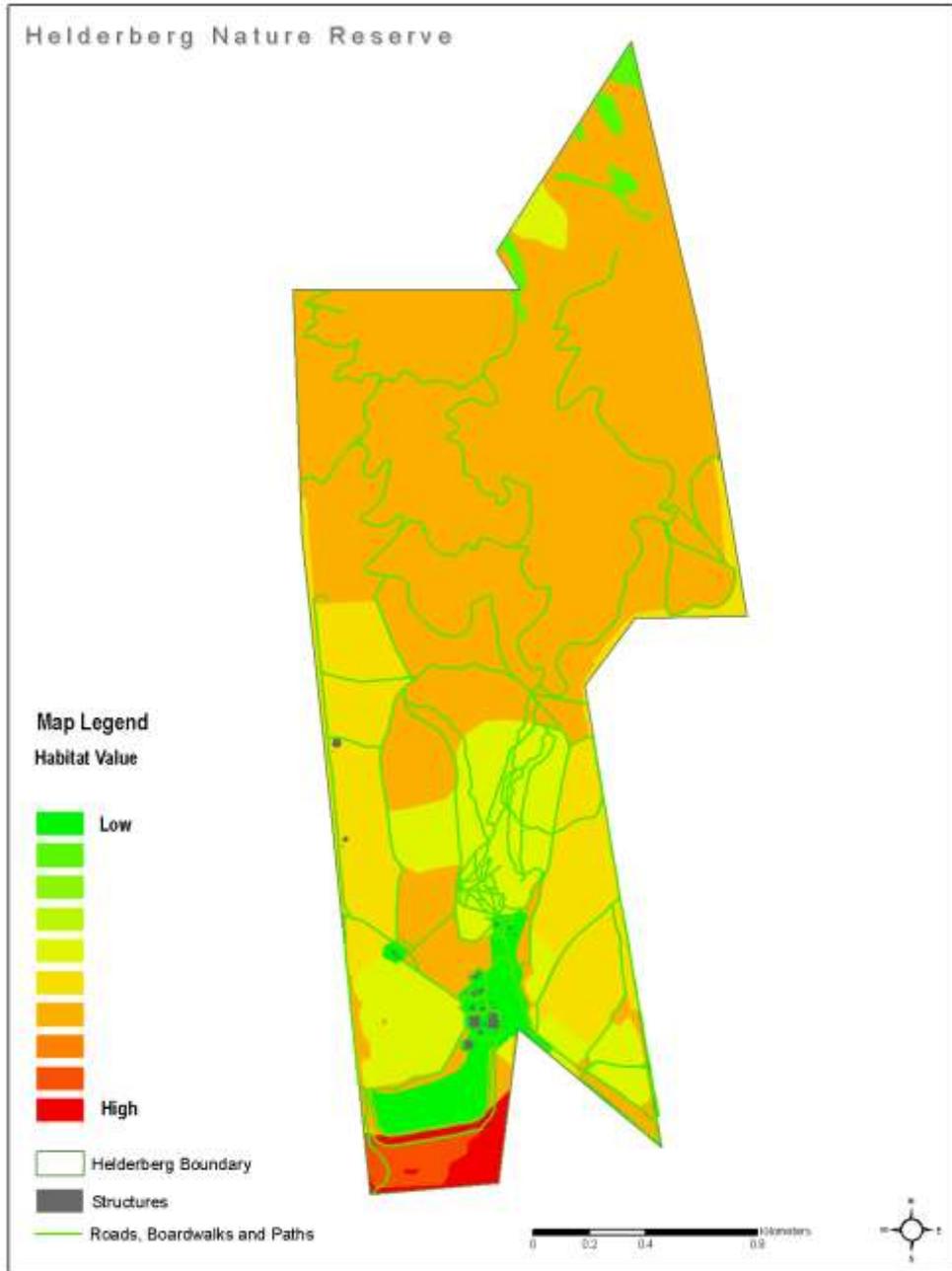


Figure 3: Habitat Value (Modified)

Interpretation in a local context

A critically endangered and endangered vegetation type occurs in the reserve. These are heavily transformed lowland vegetation types which include, Swartland Shale Renosterveld and Cape Winelands Shale Fynbos. Although the Kogelberg Sandstone Fynbos is listed as least threatened, it is listed as a critically endangered ecosystem in the Draft National List of Threatened Ecosystems, DEAT 2010(in press) due to the high prevalence of rare and endangered species occurring in this vegetation type. These vegetation types are all poorly represented in nature reserves in the City (Although the Kogelberg Sandstone Fynbos is well protected outside of the City in the Kogelberg Provincial Nature Reserve).

Showstoppers/fatal flaws and special management area informants

Development of Greenfield sites within any critically endangered or endangered vegetation type or ecosystem should be approached with extreme caution, as by definition one cannot afford further biodiversity loss in these areas within the City.

Degraded areas that have residual seed banks should receive the highest restoration priority. These areas have been mapped as special management areas (see Figure 10).

3.1.1c Special Habitat Value¹

The value of some areas of a reserve to the biodiversity estate may not be fully reflected by the habitat proxy (vegetation units). It is critical that these areas are identified and included. However, care must be taken not to allow flawed data, selective data availability, perceptions and species/taxa bias to skew the biodiversity value of one site over another.

Key aspects that should be taken into account in this layer:

- Habitats important for supporting populations of special species.
 - Care must be taken to ensure that this input fairly reflects the distribution of special species across the reserve.
 - Where detailed and comprehensive data are available this can be based on actual distributions, but in all likelihood this will be based on expert assessment of likely habitat requirements for identified species.

¹ Not used in the Helderberg Sensitivity-Value Analysis

- ❑ Areas containing significant biodiversity assets such as Leopard, Black eagles, Leopard toads etc. that are not specifically linked to entire habitats.
- ❑ Other habitats that have significant biodiversity value that have been omitted from the broad conservation value layer as a result of scale issues.

Data Inputs (GIS methods and sources)

Although species data is available from the Protea Atlas project and CapeNature, these values would not have a significant influence on the habitat value so a separate analysis was not deemed necessary. The data also only covered the northern section of the reserve.

In the case of the Helderberg Nature Reserve the habitat proxy is considered adequate to cover the faunal habitat requirements within the reserve.

3.1.2 Topographic Sensitivity

This layer is used to identify areas with steep slopes or with sensitive geological or geomorphologic features. Significant impacts (such as accelerated soil erosion or landslides) may occur during construction in, or with improper management.

Sensitivity to erosion was not considered in this report. The steepness and habitat values provide a good enough proxy for sensitivity to erosion.

Data Inputs (GIS methods and sources)

This layer is derived from a triangular irregular network (TIN) created in ArcView 9.3.1 using the 3D Analyst extension and ArcInfo licence level. The 2m Contour layer for the City was used to calculate the base heights for the TIN. Slope angles were calculated using the 3D Analyst extension.

Scoring, logic and rationale

Slope angles were split into categories that relate to potential impacts and the limits of construction without significant cut and fill.

Procedure:

- ❑ Buffer study area by 500m
- ❑ Clip the 2m contour layer with the buffered boundary layer
- ❑ Calculate Slope angles
- ❑ Reclassify according to Table 4 using 3D Analyst - reclassify
- ❑ Convert raster layer to vector shapefile and clip to the reserve boundary
- ❑ Create new field "VALUE"
- ❑ Assign values according to attribute field "GRIDCODE" to shapefile field "VALUE"
- ❑ Create and export map
- ❑ Final Topographic Sensitivity layer: Helderberg_topo_sensitivity.shp

Table 4: Topographic sensitivity

Source	Category	Value	Note
Slope angles calculated from 2m contour layer	45° - <90°	10	Very high potential for erosion and slope instability
	30° - <45°	9	Strong potential for erosion and slope instability
	15° - <30°	8	High risk of erosion following disturbance
	10° - <15°	6	Moderate risk of erosion following disturbance
	5° - <10°	2	Low sensitivity
	0° - <5°	0	No special topographical sensitivity

Outputs

See Figure 4

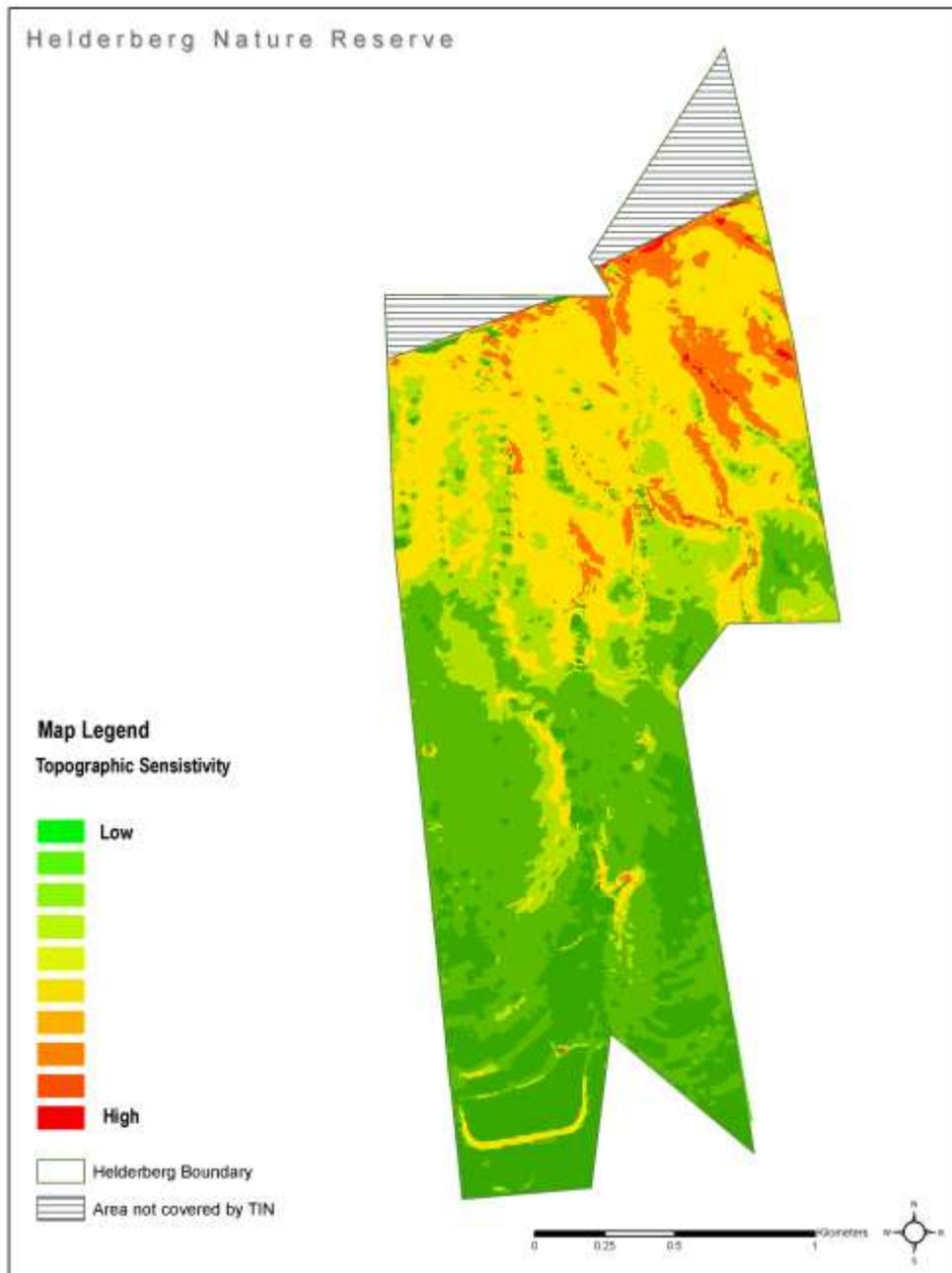


Figure 4: Topographic Sensitivity

Showstoppers/fatal flaws and Special Management Area Informants

Structures or development on steep slopes should be avoided. Existing roads on steep slopes are a management priority for drainage management.

3.1.3 Hydrological Sensitivity

The hydrological sensitivity layer has two purposes: to identify areas important for maintaining hydrological processes and to identify areas where infrastructure could be damaged by flooding.

Data inputs (GIS methods and sources)

The footprint within which the hydrological sensitivity is determined is defined by buffering river and wetlands by pre-determined distances.

River data was extracted from the City's rivers layer.

Wetlands data was extracted from the City's wetland layer.

Scoring, logic and rationale

These layers were reclassified as artificial or natural wetlands. Both the rivers and wetlands were buffered and scored as detailed in Table 5.

Procedure

- ❑ Clip the rivers and wetlands layer to the buffered boundary layer
- ❑ Create separate shapefiles for Natural/Semi-natural wetlands and Artificial/Modified wetlands
- ❑ Buffer natural and semi-natural wetlands by 50m (ensure use dissolve all)
- ❑ Buffer natural and semi-natural wetlands by 100m (ensure use dissolve all)
- ❑ Union the three wetlands shapefiles, create a new field "BUFFER", populate with the buffer distance value
- ❑ On the output shapefile create a field "WETNAT_VAL" and populate according to the value in Table 4.
- ❑ Delete all unnecessary fields.

- ❑ Repeat these steps for the artificial/modified wetlands and rivers, using the values and buffer distances specified in Table 4.
- ❑ Merge the new wetlands and rivers shapefiles and dissolve adjacent features with the same value.
- ❑ Clip the shapefile to the reserve boundary
- ❑ Create and export map
- ❑ Final Hydrological sensitivity layer: Helderberg_hydro_sensitivity.shp

Table 5: Hydrological sensitivity

Source	Category	Value	Note
City Wetlands layer	Natural wetlands, seeps and pans - Actual area plus 50m	10	Actual wetland area - potential for direct disturbance
	Wetlands, seeps and pans - 100m buffer	8	High sensitivity to disruption of hydrological and sediment transfer processes
	Artificial water bodies - actual area plus 20m	5	Buffer to accommodate spatial extent of potential water level fluctuations.
	Artificial water bodies - 50m buffer	4	As above, lower sensitivity as further away.
City Rivers layer	Perennial rivers - Actual area plus 80m	10	Includes areas with potential flood risk.
	Perennial rivers - 150m buffer	6	Areas where disruptions could impact on hydrological processes.

Outputs

See Figure 5

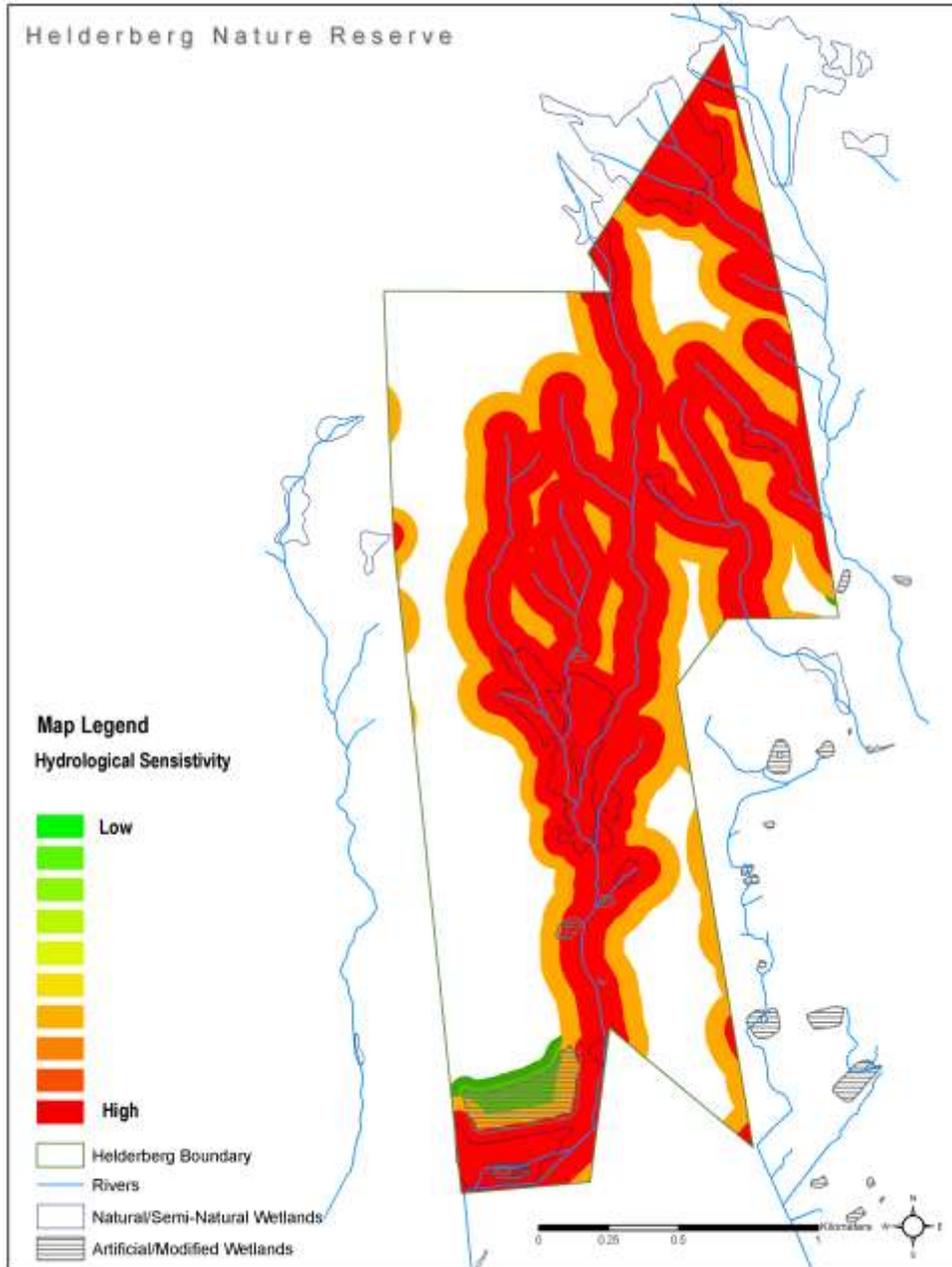


Figure 5: Hydrological Sensitivity

Interpretation in local context

The buffers applied in the analysis are generous and should be refined at a local, site level if required.

3.1.4 Visual Sensitivity

This layer examines the value of the study area from a visually aesthetic perspective. Visually intrusive development should not occur in areas with a high visual aesthetic value.

The visual sensitivity layer examines how visually intrusive a development will be in a landscape.

Data inputs (GIS methods and sources)

A viewshed analysis was run on the TIN created for the study area, using ArcMap 9.3.1 and the 3D Analyst extension.

Scoring, logic and rationale

The visual analysis examined how visually intrusive a development or structure would be at a particular point. Three separate variables were calculated (see Table 6).

- Slope steepness was calculated based on the TIN for the study area. Slope angles were divided into 10 equal width categories (the range was 0°-40°). These were scored in the range 1-10.
- An analysis of the visibility of each site from every other site in the reserve was undertaken. A 100m grid of points within the reserve was used to define 714 viewpoints with a Z value of 1.5m (the grid was created using the “Special Raster Tools” in Hawth’s Tools extension for ArcMap 9.3). The viewshed examines (on a proportional basis) which sites are most visible. Similar to slope steepness, these values were divided into 10 equal width categories and scored on a 0-10 basis.
- A viewshed analysis from all roads, paths and trails was undertaken. The analysis parameters used were the same as above except for the viewpoints used.
- These 3 values were added together and reclassified into the range 0-10 equal width categories to ensure compatibility with other layers.

Table 6: Visual Sensitivity Procedure

Source	Category	Value	Note
1. Slope Steepness			
<ul style="list-style-type: none"> ❑ Slopes modeled in ArcGIS using Spatial Analyst ❑ Slopes reclassified 	<p>10 equal width categories</p> <p>Scored 1 to 10</p>	0-10	<p>Slope angles calculated TIN created from 2m Contours</p> <p>Values converted into ten integer based classes, with the maximum value equivalent to slopes of over 45°</p>
2. Grid visibility			
<ul style="list-style-type: none"> ❑ 100m grid of reserve area used as viewpoints ❑ Reclassified 	<p>10 equal width categories</p>	0-10	<p>Analysis based on the TIN</p> <p>Values converted into ten integer based classes, with the maximum value equivalent to visibility from 2.5% of park viewpoints.</p>
3. Tourist viewpoint and public road visibility			
<ul style="list-style-type: none"> ❑ All tourist roads, paths and trails used as viewpoints ❑ Reclassified 	<p>10 equal width categories</p>	0-10	<p>Analysis based on the TIN</p> <p>Values converted into ten integer based classes, with the maximum value equivalent to visibility from 5% of park viewpoints.</p>

Procedure:

Visual Sensitivity

- ❑ Create a 100m point grid covering the buffered reserve boundary layer. Hawth's tools have an easy tool for this.
- ❑ Create a point shapefile using the roads and paths shapefile. Using the "feature vertices to points" tool.
- ❑ Run the viewshed analysis using the two shapefiles above as the view points. Use a Z factor of 1.5m.
- ❑ Reclassify into 10 equal width categories and export the raster to feature class.
- ❑ Clip to the reserve boundary
- ❑ Intersect the 3 shapefiles and delete all unnecessary fields. Add field "VISUAL_VAL" .Add up the 3 "VALUE" fields using the field calculator and populate the "VISUAL_VAL" field
- ❑ Reclassify into 10 equal class categories
- ❑ Create and export map
- ❑ Final Visual Sensitivity layer: Helderberg_visual_sensitivity.shp

Outputs

See Figure 6

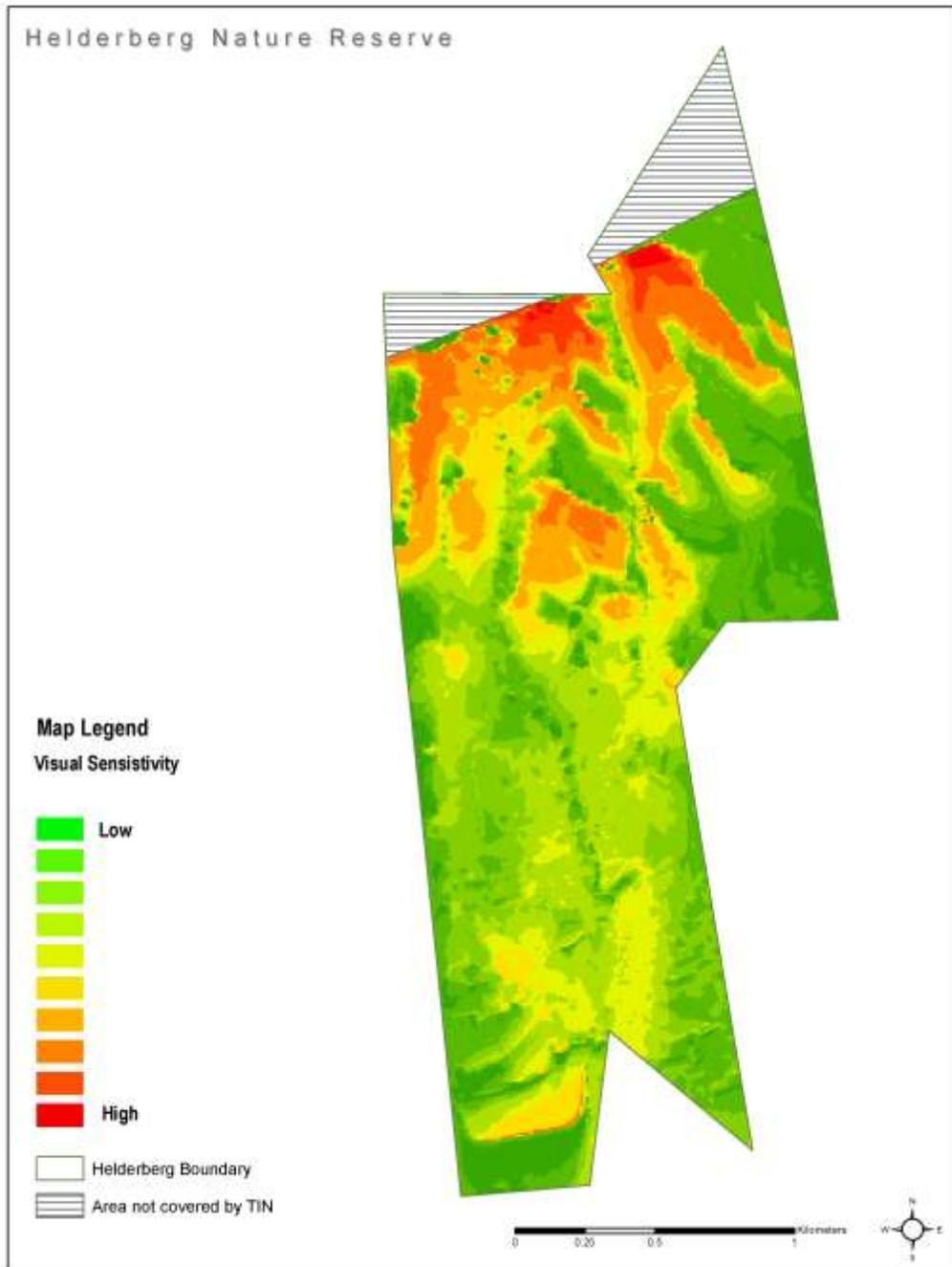


Figure 6: Visual Sensitivity

Interpretation in local context

Visually intrusive structures or development should be avoided.

Showstoppers/Fatal flaws and Special Management Area Informants

The viewshed analysis determines the visibility of areas from predefined observation points. However, the visibility of a development is only one of the components that determine its visual impact. Other factors, such as the development's design, construction and layout also contribute to the overall impact on the aesthetic character of its environment. Special consideration should be given to developments that are proposed in highly visible areas.

3.1.5 Heritage Sensitivity

This layer summarises the value or significance of a heritage site. The significance of a site will to a large extent determine the level of protection and management measures required for a site, and hence should be taken into account when undertaking spatial planning.

Although the Helderberg Nature Reserve does not have any specific sensitive heritage points, the entire area was originally set aside as a heritage resource to protect the water supply for the Somerset West Area. A detailed heritage sensitivity value analysis was not carried out.

4. Sensitivity-Value Analysis process (including weightings) and summary layers

The sensitivity-value analysis process has two key parts:

- The preparation of the input layers in a consistent and easy to analyze format (as outlined in the previous sections)
- The preparation of a summary layer which allows all the input layers to be easily accessed, interrogated, combined in a range of weightings (if necessary), and then used as a decision support tool in a workshop situation.

Data inputs (GIS methods and sources)

The GIS process is geared to keeping the dataset flexible enough for use in a workshop situation. All input and summary data need to be available within a single vector shapefile. The GIS method is as follows:

- ❑ Clip all input summary datasets to the spatial footprint of the smallest layer. This should correspond to the extent of the study area boundary. It is critical that all the clipped layers have the spatial extent, even though not all the area within the layer may be included within a polygon. Areas outside the polygons receive a 0 value in the union process so it is critical that these represent true 0 values and not gaps in the dataset.
- ❑ Union all datasets. This produces a composite vector shapefile containing all the data from the underlying summary layers.
- ❑ Delete all unnecessary attribute fields from the union shapefile.
- ❑ Summary information is calculated for each of the fragmented polygons using simple field calculations. A new attribute field is added for each summary weighting. Values are calculated using the field calculator. Complex calculations can be saved as expressions.
- ❑ Details of the summary calculations are given in Table 7.
- ❑ Export final sensitivity layer as Helderberg_sensitivity.shp

Table 7: Sensitivity-Value Weightings*

Linear summary	LINEAR	Habitat Value + Special Habitat Value + Topographic Sensitivity + Hydrological Sensitivity + Visual sensitivity + Heritage Value	Equal weighted summary of all layers
Biodiversity Value	BIODIV_VAL	Habitat Value + Special Habitat Value	Equal weighted summary of biodiversity value layers
Biodiversity sensitivity value	BIODIVSEN	2x(Habitat Value) + 2x(Special Habitat Value) + Hydrological Sensitivity + Visual sensitivity	Equal weighted summary of biodiversity value and sensitivity layers
Biodiversity Value driven summary	BIOVALHEAV	4x(Habitat Value) + 4x(Special Habitat Value) + Hydrological Sensitivity + Visual sensitivity + Heritage sensitivity	Layer which emphasizes the biodiversity value of a site, and hence is strongly influenced by the distribution of rare and threatened habitats and species, as well as by patterns of transformation across the landscape.
Balanced summary	BALANCED	2x(Habitat Value) + 2x(Special Habitat Value) + Topographic Sensitivity + Hydrological Sensitivity + Visual sensitivity + Heritage Sensitivity	This is the favoured layer which emphasizes biodiversity value and aesthetic considerations, and de-emphasizes biodiversity sensitivities
Maximum	MAX_VAL	Habitat Value + Special Habitat Value + Topographic Sensitivity + Hydrological Sensitivity + Visual sensitivity + Heritage Sensitivity	Select on all input layer fields to get max value for a polygon (not cumulative)

*Not all layers may be required as in the table

Outputs

See Figure 7

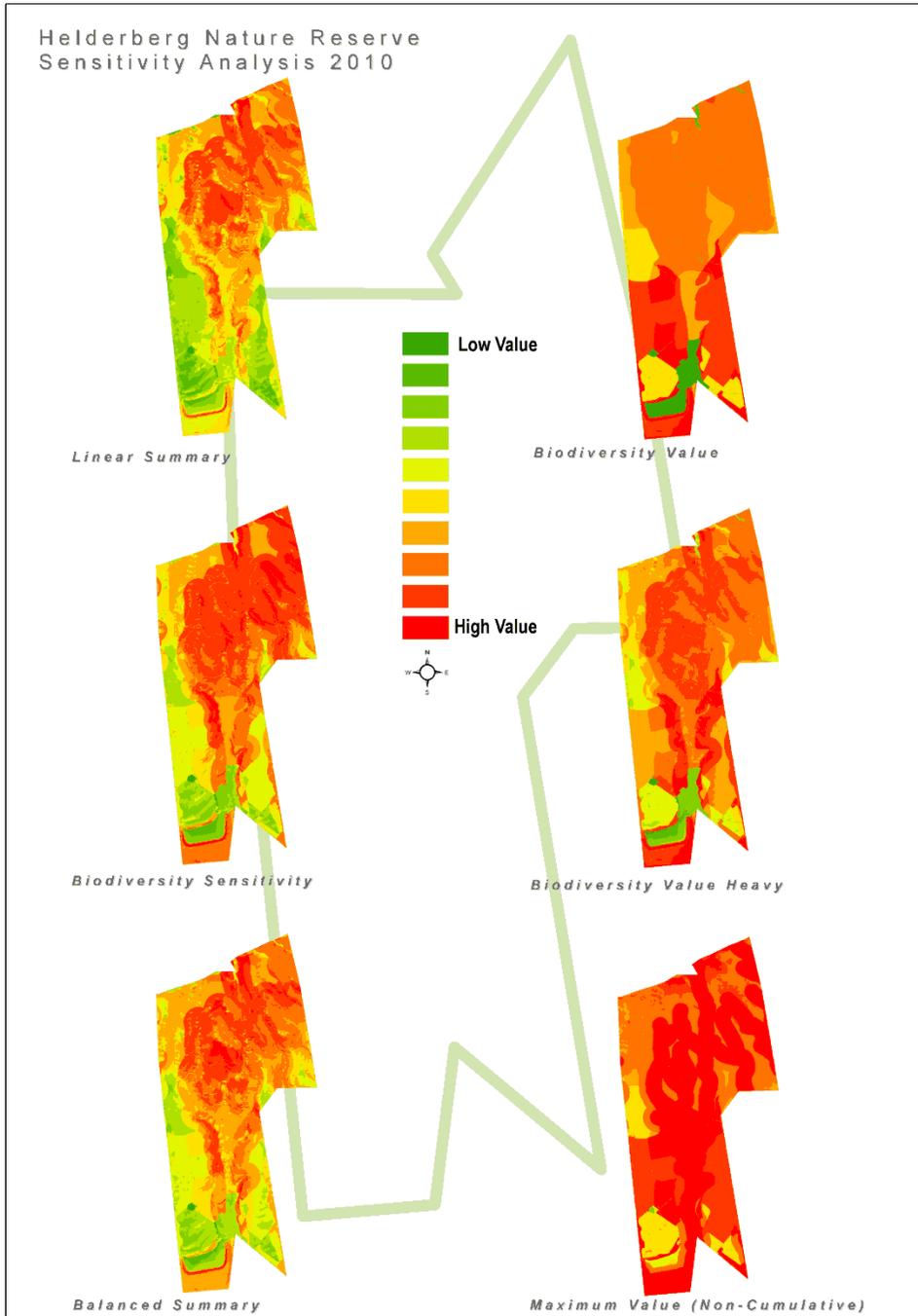


Figure 7: Examples from the outputs from the sensitivity–value analysis process using different weightings (See Table 6)

Interpretation in local context

The combined range of weightings presented in Table 6 and Figure 7 indicate no significant difference in outcome of the summary layers, except for the Maximum value which tends to highlight entire landscapes except in extremely low sensitivity environments. This is a typical scenario of areas with levels of biodiversity sensitivity and large topographic variability (Holness, 2008).

There is a significant gap in the Habitat Value between the highest (22) and second highest (14) values. This is due to the Swartland Shale Renosterveld in the southern section of the reserve. It should be noted that this area has received a significant level of disturbance and has an overflow channel bisecting it.

The Balanced Summary weighting (see Figure 8) was used as the sensitivity analysis input for the zonation process.

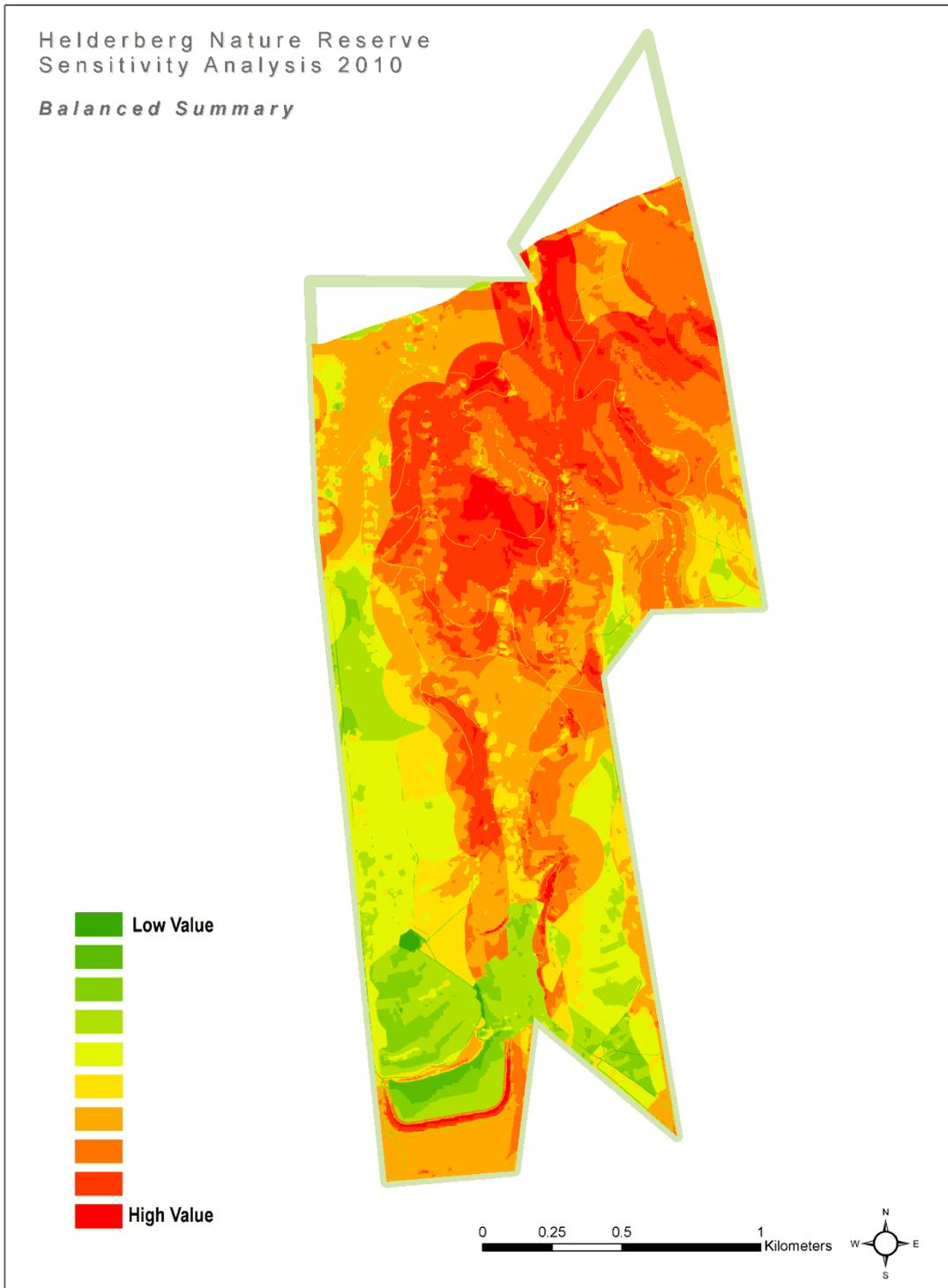


Figure 8: Sensitivity Analysis: Balanced Summary

5. Zoning Process

5.1 Zoning Informants

This section briefly outlines the values underlying the identification of broad tourism use zones. It is important to remember that the landscape/biodiversity analysis is just one of the informants in the zonation process. Although the biodiversity analysis is intrinsically a relatively objective scientific process, other informants to the zoning process are not. Although every attempt is made to place high sensitivity-value sites into more protected zones where possible, the zoning process is in its essence a compromise between environment and development. In particular, often the identified high value sites are the key biodiversity assets that need to be made available in an appropriate manner to the ecotourism market. Direct links between the biodiversity layers and the spatial management of the reserve are made during the identification of special management areas (Where applicable). Even within broad high tourist use zones, there are likely to be areas subject to very tight conservation controls (potentially including complete exclusion of human impacts from an area).

Underlying decision making rules used in the zonation process:

- The zonation process is aimed a striking a *balance* between environmental protection and the development required to meet the broader economic and social objectives of the reserve.
- The zoning process takes into account existing development footprints and tourism access routes.
 - This is based on the underlying principle that all else being equal, an existing transformed site is preferable to a greenfields site from a biodiversity perspective.
 - Infrastructure costs are dramatically increased when developments take place away from existing infrastructure.
 - Existing tourism nodes and access routes are a reality of the economic landscape, and it is would not be possible to shut down existing tourism sites compromising the development objectives of the reserve.
- Where existing development nodes, tourist sites and access routes occur in areas with high sensitivity-value, then the broad use zoning aims to keep the

development footprint as small as is realistically possible, preferably within the existing transformed site.

- Where possible, sites with high biodiversity sensitivity-value are put into stronger protection zones.
- Peripheral development is favoured and where possible should be located outside of the conservation area.

Two key points need to be emphasized:

- The designation of a broad use zone does not imply that all sites within that zone would be suitable for all the development types anticipated within that use zone. Detailed site level planning is still required, and many sites may prove to be unsuitable at a site/precinct/EIA level of planning.
- Special Management Areas/Overlays need to be formalized and the links made to the management plans.

(Adapted from Holness, 2008)

5.2 Zoning Definitions and Descriptions

The zonation definitions and descriptions were workshopped with reserve and area managers. Four categories were decided on, namely; Primary Conservation zone, Conservation zone, Low Intensity leisure zone and High Intensity leisure zone. Table 11 outlines the proposed zonation and zone descriptions. The link is still made to the Zonation used for the CapeNature Reserves (Holness, 2008) as there should be general alignment of the broader use zones for ease of comparison and integration if required in Provincial documents.

5.3 Draft Zoning Outputs

A zonation workshop was held at the Helderberg Nature Reserve on the 1st June 2010. The zonation for the Helderberg Nature Reserve was drawn up using the balanced sensitivity analysis as an input in applying the Zonation categories as defined in Table 11. Figure 9 shows the draft zonation for the Helderberg Nature Reserve.

Table 8 shows the breakdown per zonation category and the % of the total per category.

Table 8: Breakdown (in HAs and % of Area) of the 5 Zonation Categories in the reserve

Zonation category	Area Has	% of Area
Primary Conservation	11.05	2.78
Conservation	312.16	78.54
Low Intensity Use	57.31	14.42
High Intensity Use	7.45	1.87
Utility	9.47	2.38

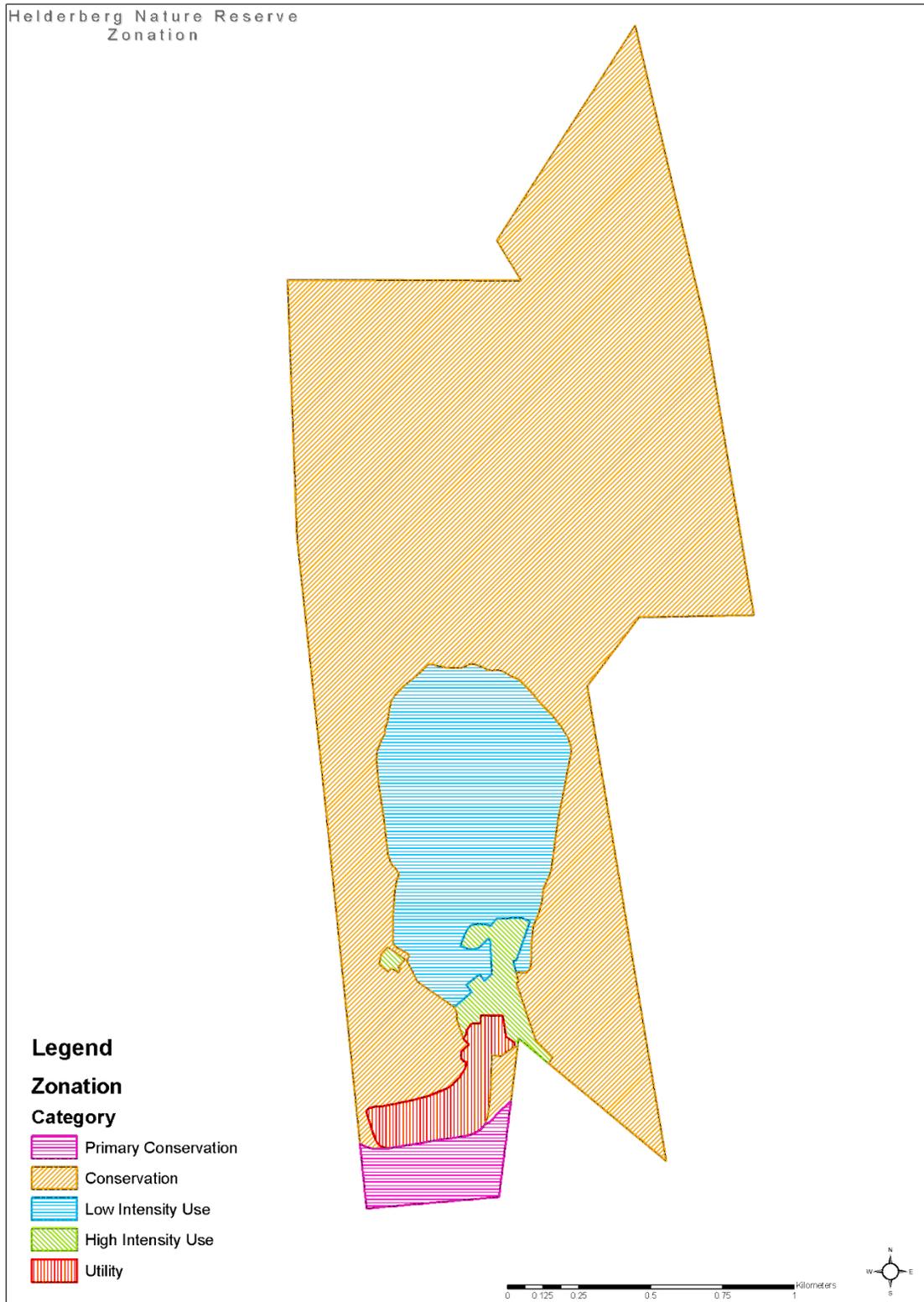


Figure 9: Draft Zonation for the Helderberg Nature Reserve

5.4 Special Management Overlays

Overlay zones are applied to different areas of the reserve requiring special management intervention. Overlay management zones are applied to areas of national, regional or reserve based importance for example: RAMSAR SITE or IBA (important Bird Areas), NB cultural sites or Natural resource consumptive use areas (Medicinal Plants).

The potential special management overlays are:

1. Heritage
2. Special Conservation
 - a. This special management overlay defines areas around known locations of critically endangered species or species requiring specific management interventions.
3. Rehabilitation
 - a. Areas identified for restoration and rehabilitation

5.4.1 Special Management Overlay for Restoration and Rehabilitation Sites

i) The areas in the reserve that are currently under pine plantations are considered extremely valuable and restorable. The pine planting causes minimal disturbance to the seed bank, and as can be seen from the recovering areas that were previously under pine plantation, the restoration potential of these areas is excellent. The residual seed bank is intact in these areas and they should be prioritised for restoration once the pines area clear felled. It is for this reason that they are allocated a “moderately degraded” score.

The vegetation type is Cape Winelands Shale fynbos and recovery of these areas will contribute a further 21Ha to achieving the national target of 800Ha. See Figure 11.

ii) The area of the reserve zoned Low Intensity leisure has had many non-locally indigenous protea species planted in it. The management objectives for the reserve should dictate the removal of these plants over a defined period of time.

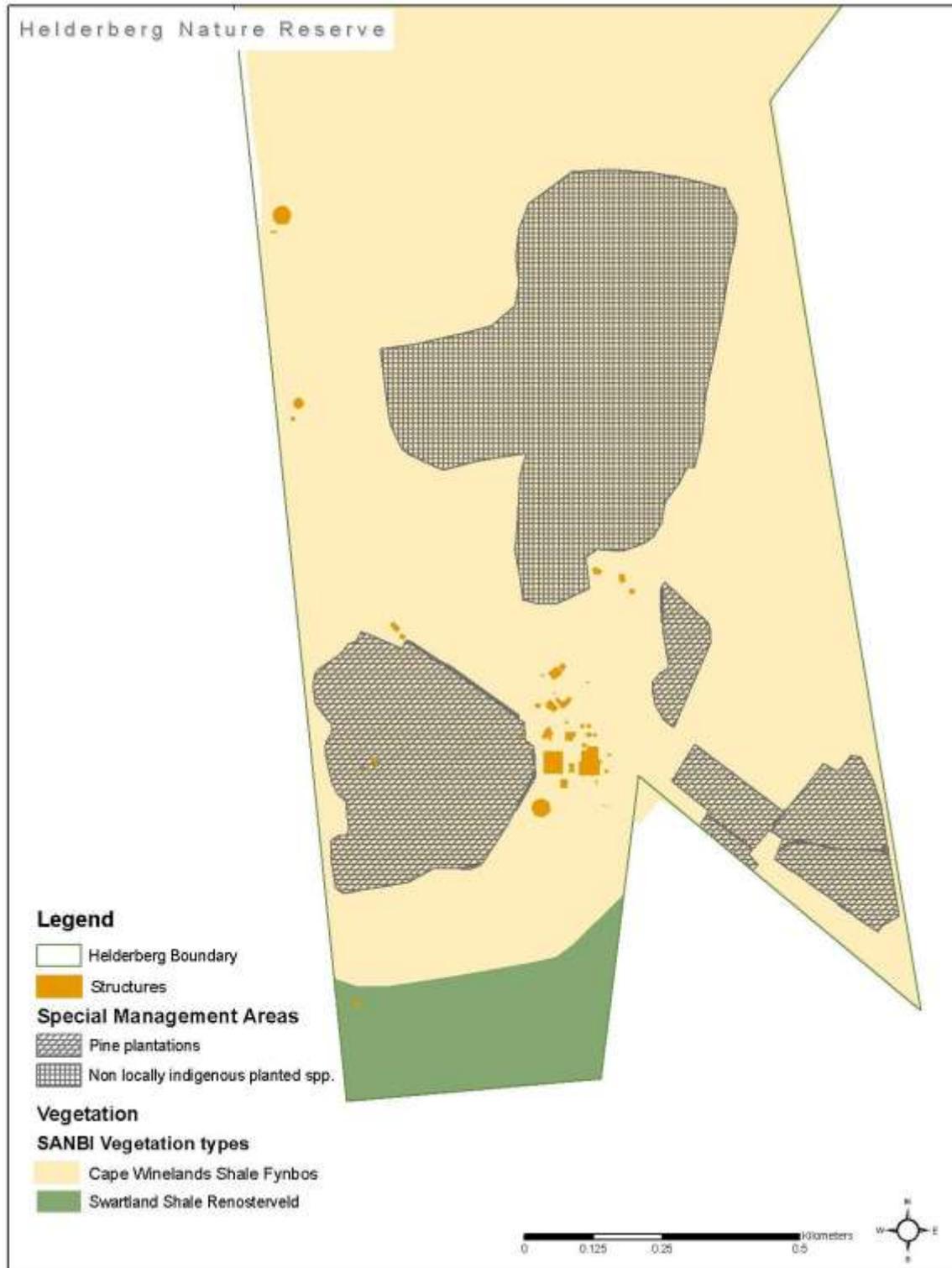


Figure 10: Special Management Overlay zones

6. Conclusions and Recommendations

Helderberg Nature Reserve has an existing development footprint of 9HAs in extent. This area has been zoned as the high intensity leisure zone. It is recommended that any envisaged construction of offices and tourism facilities takes place within this defined area. This may require a site scale planning process to design the optimal layout of facilities within this area. It is recommended that a landscape architect compiles a detailed site plan for this area.

The special management overlay zones should be incorporated into the reserve management plan.

7. References

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Appendices

Table 9: Base values: Ecosystem Status of National vegetation types occurring in the City

Vegetation Type	NSBA Conservation Status	NSBA Conservation Status - Score	Criterion D Status	Criterion D score	SANBI Conservation Status (% target Conserved in City)	Conservation Status Score
Atlantis Sand Fynbos	Vulnerable	6	Critically endangered	10	Not Protected	5
Boland Granite Fynbos	Endangered	8	Vulnerable	6	Poorly Protected	3
Cape Estuarine Salt Marshes	Least threatened	4			Well Protected	-1
Cape Flats Dune Strandveld: False bay	Endangered	8	Endangered	8	Poorly Protected	3
Cape Flats Dune Strandveld: West Coast	Least threatened	4	Endangered	8	Poorly Protected	3
Cape Flats Sand Fynbos	Critically endangered	10	Critically endangered	10	Hardly Protected	4
Cape Lowland Freshwater Wetlands	Least threatened	4			Well Protected	-1
Cape Winelands Shale Fynbos	Endangered	8			Poorly Protected	3
Elgin Shale Fynbos	Critically endangered	10			Hardly Protected	4
Hangklip Sand Fynbos	Vulnerable	6	Vulnerable	6	Well Protected	-1
Kogelberg Sandstone Fynbos	Least threatened	4	Critically endangered	10	Moderately Protected	2
Lourensford Alluvium Fynbos	Critically endangered	10	Critically endangered	10	Poorly Protected	3
North Peninsula Granite Fynbos	Least threatened	4			Well Protected	-1
Peninsula Sandstone Fynbos	Least threatened	4	Endangered	8	Well Protected	-1
Peninsula Shale Fynbos	Vulnerable	6			Well Protected	-1
Peninsula Shale Renosterveld	Critically endangered	10			Poorly Protected	3
South Peninsula Granite Fynbos	Endangered	8			Moderately Protected	2
Southern Afrotemperate Forest	Least threatened	4			Well Protected	-1

Swartland Alluvium Fynbos	Critically endangered	10			Not Protected	5
Swartland Granite Renosterveld	Critically endangered	10	Critically endangered	10	Hardly Protected	4
Swartland Shale Renosterveld	Critically endangered	10	Critically endangered	10	Hardly Protected	4
Swartland Silcrete Renosterveld	Critically endangered	10			Not Protected	-1
Western Shaleband Vegetation	Least threatened	4			Poorly Protected	3

Table 10: National vegetation types for the City of Cape Town showing historic extent, remaining extent, targets and targets achieved inside and outside Protected Areas

National Vegetation Type	Historic extent (ha)	Current extent (ha)	Selected in Bionet (ha)	Target %	Target (ha)	Extent in proclaimed Protected Areas	Target met in selected Bionet	% Target conserved	% Target met in proclaimed Protected Areas	% Selected in Bionet from current extent	% Remaining from historic extent	15% of historic extent	% that is not selected in Bionet	Conservation Status	SANBI Conservation Status
Atlantis Sand Fynbos	25234.63	15711.95	12695.95	30	7570.39	0.00	Yes	168	0	81	62	3785.19	19	VU	Not Protected
Boland Granite Fynbos	9575.31	6064.19	4807.17	30	2872.59	354.52	Yes	167	12	79	63	1436.30	21	EN	Poorly Protected
Cape Estuarine Salt Marshes	39.86	25.79	25.64	24	9.57	25.64	Yes	268	268	99	65	5.98	1	LT	Well Protected
Cape Flats Dune Strandveld: False Bay	27260.11	8467.86	7272.84	24	6542.43	1855.58	Yes	111	28	86	31	4089.02	14	EN	Poorly Protected
Cape Flats Dune Strandveld: West Coast	12700.27	10603.88	6892.82	24	3048.07	964.79	Yes	226	32	65	83	1905.04	35	LT	Poorly Protected
Cape Flats Sand Fynbos	54410.34	8466.70	8464.75	30	16323.10	464.07	No	52	3	100	16	8161.55	0	CE	Hardly Protected
Cape Lowland Freshwater Wetlands	1463.98	1095.47	1068.83	24	351.36	786.66	Yes	304	224	98	75	219.60	2	LT	Well Protected
Cape Winelands Shale Fynbos	2666.97	1706.19	1388.97	30	800.09	217.89	Yes	174	27	81	64	400.05	19	EN	Poorly Protected
Elgin Shale Fynbos	841.18	321.14	282.77	30	252.35	4.58	Yes	112	2	88	38	126.18	12	CE	Hardly Protected
Hangklip Sand Fynbos	3301.60	1910.25	1489.88	30	990.48	1363.63	Yes	150	138	78	58	495.24	22	VU	Well Protected
Kogelberg Sandstone Fynbos	9499.63	9260.73	8814.04	30	2849.89	1944.47	Yes	309	68	95	97	1424.94	VU	LT	Moderately Protected
Lourensford Alluvium Fynbos	4819.25	409.97	409.97	30	1445.77	190.30	No	28	13	100	9	722.89	0	CE	Poorly Protected
North Peninsula Granite Fynbos	1997.35	1439.12	1343.54	30	599.21	986.44	Yes	224	165	93	72	299.60	7	LT	Well Protected
Peninsula Sandstone Fynbos	21896.12	21348.95	20761.60	30	6568.83	17306.57	Yes	316	263	97	98	3284.42	3	LT	Well Protected

Peninsula Shale Fynbos	1262.79	690.37	688.96	30	378.84	686.97	Yes	182	181	100	55	189.42	0	VU	Well Protected
Peninsula Shale Renosterveld	2374.81	316.89	316.89	26	617.45	261.67	No	51	42	100	13	356.22	0	CE	Poorly Protected
South Peninsula Granite Fynbos	7148.66	2481.74	2290.70	30	2144.60	1770.19	Yes	107	83	92	35	1072.30	8	EN	Moderately Protected
Southern Afrotropical Forest	347.52	346.79	346.79	34	118.16	276.80	Yes	294	234	100	100	52.13	0	LT	Well Protected
Swartland Alluvium Fynbos	1742.41	75.91	75.91	30	522.72	0.00	No	15	0	100	4	261.36	0	CE	Not Protected
Swartland Granite Renosterveld	8059.16	1951.89	1951.89	26	2095.38	35.64	No	93	2	100	24	1208.87	0	CE	Hardly Protected
Swartland Shale Renosterveld	46712.40	4019.33	4018.76	26	12145.22	408.13	No	33	3	100	9	7006.86	0	CE	Hardly Protected
Swartland Silcrete Renosterveld	1066.65	188.43	188.43	26	277.33	0.00	No	68	0	100	18	160.00	0	CE	Not Protected
Western Shaleband Vegetation	328.59	328.57	328.57	30	98.58	31.11	Yes	333	32	100	100	49.29	0	LT	Poorly Protected
	244749.59	97232.12	85925.67		68622.40	29935.65						36712.44			

Appendix 13: City of Cape Town Nature Reserves and Conservation Areas: Land Use Zoning - Desired State* & Experiential Qualities

Experience	Zone	Desired State*	Conservation objectives	Secondary objective	Experiential Qualities	Activities	Interaction between users	Frequency of use	Group size	Sophistication and type of facilities	Primary user movement within the zone	Roads & footpaths	Equivalent Provincial zone
Close To Nature Activities tend to be at landscape level	Primary conservation	Natural or near-natural areas (or areas that can be rehabilitated to this state) that are managed primarily for biodiversity conservation. The experience is one of relative solitude and wildness. The nature of the experience is dependant on the quality of the natural environment. The main accent of management is biodiversity conservation and "Pack it in Pack it out" principles are applied to all activities including management. There may be some signs of infrastructure mainly of a heritage nature. In the longer term, unused utility infrastructure (e.g. reservoirs) should be phased out and the site rehabilitated.	Natural areas should be kept intact in order to protect habitat required to meet biodiversity targets for various vegetation types and to provide undisturbed habitat for a range of species. Where possible degraded areas should be rehabilitated.	Managed to provide visitor experiences in a way that does not impact on the biodiversity objective. Where appropriate heritage values are managed as required	Relative sense of isolation	Controlled access** Research and monitoring. Accompanied small groups. The size and frequency of groups to be specified for each reserve.	None or very low	None -Very low	Small	No new facilities. Existing structures should be phased out where appropriate. Heritage assets are managed where appropriate	Pedestrian access in accompanied small groups Motorised for essential management only.	Absolutely essential management tracks and footpaths in accordance with the foot path and road management plan Ongoing restoration of old paths/roads to be prioritized and monitored.	Quiet
	Conservation	Natural or near-natural areas (or areas that can be rehabilitated to this state) that are managed for biodiversity conservation. This zone provides experiences of a relative sense of relaxation in an environment that is openly exposed to the sights and sounds of the city. Although it is a place of quietness and naturalness, there will be more interaction between users than in the Primary Conservation Zone. The quality of the experience is less dependant on the quality of the natural environment.	Natural areas should be kept intact in order to protect habitat required to meet biodiversity targets for various vegetation types and to provide undisturbed habitat for a range of species. Where possible degraded areas should be rehabilitated.	Managed to provide visitor experiences in a way that does not impact on the biodiversity objective.	Relaxation	Self guided hiking, non-motorised access***, bird watching, etc. In reserves where access to water bodies is allowed, this area is limited to non-motorized vessels only in accordance with the Vlei By-Laws.	Moderate	Moderate	Small	Low impact, eco-friendly facilities that facilitate ecologically sustainable activities and visitor experiences may be permitted under certain circumstances. These are strictly for achieving the social and development objectives of the reserve where appropriate and are subject to a stringent internal approval process and must be inline with an approved reserve management plan.	Pedestrian Non motorised Motorised access for management only.	Management tracks/roads and footpaths. Minimal footpath construction to prevent ecological damage. Boardwalks may be permitted where appropriate to protect sensitive areas. The footpath system should be designed so as to control access into the Primary Conservation zone. Off road wheelchair access may be provided where appropriate.	
Outdoor Natural Experience Activities tend to be at precinct level	Low Intensity leisure	Natural, near-natural or managed landscapes which are primarily managed to promote recreational and educational objectives. The main accent is on recreational activities which are more reliant on the quality of the facilities provided than in a Conservation Zone. By their nature these zones are placed in more transformed landscapes. Interaction and socialisation are an integral part of the experience.	Although some areas will be impacted by a range of activities and limited infrastructure, most areas should be kept largely intact and ecological processes should remain functioning. Where possible degraded areas should be rehabilitated.	Recreation and education Managed to provide a largely natural outdoor area to support the recreational and education objectives of the reserve.	Socialisation	Walking, non-motorised access, bird watching. In reserves where access to water bodies is allowed, motorized vessels are only allowed under strict control (e.g. no waterskiing, low speed limits and wake-free zones) in accordance with the Vlei By-Laws.	Frequent	Moderate -high	Small-moderate	Low-Medium impact, eco-friendly facilities that facilitate ecologically sustainable activities and visitor experiences. E.g. Benches, bird hides, informative signage, lookouts. Parking for access to this and other zones.	Pedestrian Non motorised Motorised access for management only	Appropriate foot paths with directional signage Boardwalks should facilitate access and protect sensitive areas. Normal wheelchair access where appropriate Parking with no facilities for access to this and other zones	Low intensity leisure

	High Intensity Use	High use landscapes, which are often largely transformed, which are managed largely to support visitor activities more dependent on facilities, education and administrative functions of reserves. High intensity visitor facilities with modern commercialised amenities with very concentrated, activities. The quality of the visitor experience is heavily dependant of the quality of the facilities which enable the visitor to experience the environment with a minimum of effort. Due to the high impacts these are concentrated at specific nodes. These nodes are generally situated at existing facilities including historic buildings and precincts. The main focus of management is to ensure a high quality visitor experience whilst ensuring that the activities have a minimal impact on the surrounding environment and that heritage resources are respected and celebrated.	The activities and infrastructure in these areas should be managed to minimize impacts on biodiversity and visitor experience in other zones. Where feasible, non-crucial infrastructure should over time be removed from the reserve and the sites rehabilitated.	Facilities are managed to facilitate and promote appropriate visitor activities and educational use of the reserve. Administration; provides appropriate management infrastructure to facilitate other objectives of the reserve.	Entertainment	Events, self guided walks, wheelchair accessible trails, parking, picnicking. In reserves where access to water bodies is allowed, this area is appropriate for high intensity uses such as power boating and waterskiing in accordance with the Vlei By-Laws.	Very frequent	Very high	Small - Large	Picnic areas, parking areas, restaurants, information centers, ablutions, environmental education facilities, nurseries etc. Provides parking from which pedestrian access is gained to other zones.	Motorised Access People movers & Pedestrian access	Access roads and associated parking. Footpaths constructed to a higher standard for the comfort of the user. Design standards to be set in the footpath and road management plan Wheelchair access encouraged in this zone.	High Intensity Leisure
Site Specific Level	Utility zone	Area used for utility functions such as bulk water provision, landfill sites within the protected /conservation areas etc.	The activities and infrastructure in these areas should be managed to minimize impacts on biodiversity and visitor experience in other zones. Where feasible, non-crucial infrastructure should over time be removed from the reserve and the sites rehabilitated.	Administration Conservation where appropriate	Utility	Determined at site	Determined at site	Determined at site	Determined at site	Determined at site	Determined at site level	Access roads and associated parking as required by the Utility Function	
<p>* Note. The "Desired State" is the long term objective of the zone and these desired conditions may not actually exist at the time of zoning. Achieving the "Desired State" will be informed by many factors and may only be reached after many years.</p> <p>** Accompanied access refers to controlled access. The level and type of control is determined at reserve level.</p> <p>*** Non-motorised access refers to mountain bikes, horses, paragliding etc. These activities are reserve specific and reference must be made to the reserve management plan for a list of acceptable activities per reserve.</p>													

REPORTING PROGRESS IN URBAN PROTECTED AREAS

*A Site-level rapid assessment tool
based on the World Bank & WWF's
"Management Effectiveness Tracking
Tool"*

Prepared for the

City of CapeTown

by

Howard Langley & Paul Britton

22 May 2007



REPORTING PROGRESS AT PROTECTED AREA SITES: DATA SHEET

Name of protected area	Helderberg Nature Reserve		
Location of protected area (country and if possible, map reference)	South Africa, Western Cape, Somerset West, Verster Avenue,		
Date of establishment (distinguish between agreed and gazetted)	<i>Agreed</i>	<i>Gazetted</i>	
Ownership details (i.e. owner, tenure rights etc.)	City of Cape Town		
Management Authority	City of Cape Town		
Protected area size (ha)	406		
Staff numbers	<i>Permanent</i> 12	<i>Temporary</i> 2 (1 Student, 1 Visitor Controller)	
Budget	0		
Designation (ICUN category), World Heritage, Ramsar etc	Local Authority Nature Reserve		
Reason for designation			
Brief detail of World Bank funded project or projects in PA	N/A		
Brief detail of WWF funded project or projects in PA	N/A		
Brief detail of other relevant projects in PA	Current upgrade to Gate house, building of new store facility and office complex is planned		

List two of the primary protected area objectives	
Objective 1	Protection of Mountain Fynbos Biodiversity
Objective 2	Protection of ecological processes
List the top two most important threat to the PA (and indicate reasons why they are selected)	
Threat 1	Unrealistic budget available to manage PA
Threat 2	Invasive vegetation
List top two critical management activities	
Activity 1	Management of people in the PA
Activity 2	Management of invasive vegetation
Date assessment carried out:	29-May-07
Name of assessor:	Owen Wittridge

1: Context : Where are we now?	Criteria	Value	Score	Comments	Next steps
1.1 Legal status Does the PA have legal status?	The PA is not formally proclaimed	0		<i>The PA is legally proclaimed</i>	Identify areas adjacent to the PA that are of conservation value and would benefit from inclusion into the PA
	The Local Authority has agreed that the PA should be formally proclaimed but the process has not yet begun	1			
	The PA is in the process of being proclaimed but the process is still incomplete	2			
	The PA has been legally proclaimed	3	3		
1.2. Protected Area regulations	There are no legal mechanisms for controlling inappropriate land use and activities in the PA	0		No specific regulations however general municipal by-laws can be used. No trained staff to enforce regulations.	Draw up regulations specific for PA
	Legal mechanisms for controlling inappropriate land use activities in the PA exist but are not being implemented.	1			
	Legal mechanisms for controlling inappropriate land use and activities in the PA exist but there are some problems in effectively implementing them	2	2		
	Legal mechanisms for controlling inappropriate land use and activities in the PA exist and are being effectively implemented	3			
1.3. Law enforcement PA has capacity/resources to enforce regulations & bylaws well enough?	PA has no effective capacity/resources to enforce regulations & bylaws	0		<i>Currently only the Reserve Manager is trained in law enforcement</i>	Appoint/train more staff to uphold laws.
	There are major deficiencies in capacity/resources to enforce regulations & bylaws (e.g. lack of skills, no patrol budget)	1	1		
	PA has acceptable capacity/resources to enforce regulations & bylaws but some deficiencies remain	2			
	PA has excellent capacity/resources to enforce regulations & bylaws	3			

1.4. Protected Area boundary demarcation Is the boundary known and demarcated?	The boundary of the PA is not known by the management authority or local residents/neighbouring land users	0		<i>The PA is fenced, except for the top area</i>	Identify a manner in which to highlight areas not fenced
	The boundary of the PA is known by the management authority but is not known by local residents/neighbouring land users	1			
	The boundary of the PA is known by both the management authority and local residents but is not appropriately demarcated	2	2		
	The boundary of the PA is known by the management authority and local residents and is appropriately demarcated	3			
1.5. Resource inventory Do you have enough information to manage the area?	There is little or no information available on critical habitats, species and cultural values of the PA	0		Information is scattered and needs to be consolidated. Local knowledge needs to be captured	Consolidation of information resources is necessary. Survey and monitoring needs to be determined and incorporated into a monitoring and evaluation programme. Develop better ways in which data can be received and recorded
	Information on critical habitats, species and cultural values of the PA is not sufficient to support planning and decision making	1			
	Information on critical habitats, species and cultural values of the PA is sufficient for key areas of planning/decision making but the necessary survey work is not being maintained	2	2		
	Information concerning critical habitats, species and cultural values of the PA is sufficient to support planning and decision making and is being maintained	3			
Subtotal: Context		15	10		

2: Planning: Where do we want to be?	Criteria	Value	Score	Comments	Next steps
2.1. Protected area design Does the protected area need enlarging, corridors etc to meet its objectives?	Inadequacies in design mean achieving the PA's major management objectives is impossible	0		<i>Large private properties border the PA.</i>	Engage in conversation with other land owners in an attempt to enlarge the PA - Kingskloof and Cape Nature "finger"
	Inadequacies in design mean that achievement of major objectives are constrained to some extent	1			
	Design is not significantly constraining achievement of major objectives, but could be improved	2	2		
	Reserve design features are particularly aiding achievement of major objectives of the PA	3			
2.2 Management plan Is there a management plan (compliant with Protected Areas Act) and is it being implemented?	There is no standard Management Plan for the PA	0		1990 Helderberg Management Plan	Adapt Management Plan to new template and get approval and public buy in
	A standard Management Plan is being prepared or has been prepared, but is not yet approved.	1			
	An approved Management Plan exists and is being implemented, but has not been updated/reviewed during the past five years.	2	2		
	An approved Management Plan exists, is being implemented and has been updated/reviewed during the past three years	3			
2.3. Conservation Development Framework (CDF) Is there a visitor use zoning system indicating position and nature of operation & visitor infrastructure?	There is no CDF for the PA	0	0		To be drawn up in conjunction with Management Plan
	A CDF is being prepared or has been prepared but is not being implemented	1			
	An approved CDF exists but it is only being partially implemented because of funding constraints or other problems	2			
	An approved CDF exists and is being implemented	3			
Additional points	The planning process allows adequate opportunity for key stakeholders to influence the management plan	1	1	All major issues are discussed at the Advisory Board meetings	Ensure the Advisory Board meets regularly
	There is an established schedule and process for periodic review and updating of the management plan	1			
	The results of monitoring, research and evaluation are routinely incorporated into planning	1			

Subtotal Score: Planning		12	5		
3: Inputs: What do we need?	Criteria	Value	Score	Comments	Next steps
3.1. Research Is there a programme of management-orientated research work?	Research needs have not been identified nor is any research work taking place in the PA	0		Sugarbird movement, Argentine ant research and the role of fire and aliens, bontebok research and how populations interact with each other	Identify attitional needs
	Research needs have been identified, but other than for ad hoc research, no management orientated research is being done.	1			
	There is considerable research work but only limited "management" orientated research is being done.	2	2		
	There is considerable research work being undertaken, which is relevant to management needs	3			
3.2. Human Resource capacity Does the PA have sufficient HR capacity to manage the protected area?	The PA has no HR capacity	0		law enforcement capacity is lacking	Appoint area based Law enforcement officers
	HR capacity is inadequate for critical management activities	1			
	HR capacity is sufficient, but there are deficiencies in necessary skills for critical management activities	2	2		
	HR capacity and expertise is adequate for management needs	3			
3.3. Current budget Is the current budget sufficient?	There is no dedicated budget for the PA	0		Area based however it is available and approved	Establish PA budget if possible
	The available budget is inadequate for basic management needs and presents a serious constraint to the capacity to manage	1			
	The available budget is acceptable, but could be further improved to fully achieve effective management	2	2		
	The available budget is sufficient and meets the full management needs of the PA	3			
Additional points	The budget is secure/guaranteed for the PA on an annual cycle	1	1		
	The budget is secure/guaranteed on a three year cycle	2			
	The PA is not reliant on external funding	2			

Subtotal	14	7
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4: Process : How do we go about it?	Criteria	Value	Score	Comments	Next steps
4.1. Annual Plan of Operation (APO) Is there an annual work plan/APO that is approved by the organisation?	No approved/standardised APO exists	0	0	An APO exists but is not approved	An approved plan is to be drawn up for the PA in conjunction with budget cycles, CDF and Management plans
	An approved APO exists but activities are not monitored against the plan's targets	1			
	An approved APO exists and actions are monitored against the plan's targets, but many activities are not completed	2			
	Actions are monitored against the approved APO's targets and most or all prescribed activities are completed	3			
4.2. Resource management Is the protected area adequately managed (e.g. for fire, invasive species, poaching)?	Requirements for active management of critical ecosystems, species and cultural values have not been assessed	0		Critical species have not been assessed.	PA needs to be assessed in terms of critical ecosystems species
	Requirements for active management of critical ecosystems, species and cultural values are known but are not being addressed	1			
	Requirements for active management of critical ecosystems, species and cultural values are only being partially addressed	2	2		
	Requirements for active management of critical ecosystems, species and cultural values are substantially or fully addressed.	3			
4.3. Staff training Is there enough training for staff?	Staff are untrained	0		Staff have received training in machine handling, boardwalk construction and fire fighting	A comprehensive skills audit needs to be carried out
	Staff training and skills are low relative to the needs of the PA	1			

	Staff training and skills are adequate, but could be further improved to fully achieve the objectives of management	2	2		
	Staff training and skills are in tune with the management needs of the PA, and with anticipated future needs	3			
4.4. Budget management	Budget management is poor and significantly undermines effectiveness	0		Inherited a poor budget with no direct control as budget is centralized at an area level.	Percentage allocation for PA to be implemented as of new financial year. See budget comments.
Is the budget managed to meet critical management needs?	Budget management is poor and constrains effectiveness	1			
	Budget management is adequate but could be improved	2	2		
	Budget management is excellent and aids effectiveness	3			
4.5. Operational equipment & infrastructure	There is little or no operational equipment & infrastructure	0		Current office space is limited	Identify needs and plan and budget accordingly
(as required for operational management purposes, but excluding tourism/visitor facilities)	There is some equipment & infrastructure but these are wholly inadequate	1			
	There is equipment and infrastructure, but still some major gaps that constrain management	2	2		
	There is adequate operational equipment and infrastructure	3			
4.6 Maintenance of equipment & infrastructure	There is no approved Maintenance Plan and no maintenance is taking place	0		Needs have been identified and are being addressed as budget becomes available.	To acquire necessary equipment and infrastructure.
Is equipment & infrastructure (including tourism/visitor facilities) adequately maintained?	There is no Maintenance Plan and maintenance is taking place to an unsatisfactory standard.	1			
	There is no Maintenance Plan, but maintenance is taking place to a satisfactory standard.	2	2		
	There is an approved Maintenance Plan that is being fully implemented to a high standard.	3			
4.7. Education and awareness programme	There is no education and awareness programme	0		Well run, fully booked EE programme in place, managed by the Friends in conjunction with City standards	Ensure annual review is implemented
Is there a planned education programme?	There is a limited and <i>ad hoc</i> education and awareness programme, but no overall planning for this	1			

	There is a planned education and awareness programme but there are still serious gaps	2			
	There is a planned & effective education & awareness programme fully linked to the objectives and needs of the PA	3	3		
4.8. Government & commercial neighbours	There is no contact between managers and neighbouring official or corporate land users	0		<i>Management meets regularly with IAP, Advisory Boards and local neighbours - Cape Nature, Lourensford, Vergelegen as well as other City departments</i>	
Is there co-operation with adjacent land users?	There is limited contact between managers and neighbouring official or corporate land users	1			
	There is regular contact between managers and neighbouring official or corporate land users, but only limited co-operation	2			
	There is regular contact between managers and neighbouring official or corporate land users, & substantial co-operative management	3	3		
4.9. Advisory committee/forum	There is no Advisory Committee/forum	0		<i>Meets regularly and assists with planning issues</i>	
An Advisory Committee of local representatives and specialists advises on PA management & development issues.	An Advisory Committee/forum is in the process of being established communities	1			
	An Advisory Committee/forum exists, but does not contribute significantly to the management/development of the PA.	2			
	A well represented Advisory Committee/forum contributes significantly to the proper management/development of the PA.	3	3		
4.10. Community partners	Community partners have no input into decisions relating to the management of the PA	0		<i>Not all communities are represented</i>	Identify community partners that should be represented on the Advisory Board
Do community partners have input to management decisions via the Advisory Committee?	Community partners have limited input into the PA's management decisions via local governance structures	1			
	Community partners contribute to some decisions relating to management via the PA's Advisory Committee	2	2		
	Community partners are fully representative on the PA's Advisory Committee and directly participate decisions making.	3			

4.11. Commercial tourism Do commercial tour operators contribute to protected area management?	There is little or no contact between managers and tourism operators using the PA	0	0		Identify possible tourism initiatives
	There is contact between managers and tourism operators but this is largely confined to administrative or regulatory matters	1			
	There is limited co-operation between managers and tourism operators to enhance visitor experiences and maintain conservation values	2			
	There is excellent co-operation between managers and tourism operators to enhance visitor experiences, protect values and resolve conflicts	3			
4.12. Monitoring & evaluation	There is no monitoring and evaluation in the PA	0		Limited such as rainfall stats, visitor stats	
	There is some <i>ad hoc</i> monitoring & evaluation, but no overall strategy and/ or no regular collection of results	1	1		
	There is an agreed and implemented monitoring & evaluation system but results are not systematically used for management	2			
	A good monitoring & evaluation system exists, is well implemented and used in adaptive management	3			
Additional points	There is open communication and trust between local stakeholders and PA managers	1			
	Programmes to enhance local community welfare, while conserving PA resources, are being implemented	1			
Subtotal		38	22		

5: Outputs/Outcomes: What were the results/achievements?					
	Criteria	Value	Score	Comments	Next steps
5.1. Visitor facilities Are visitor/tourism facilities good enough and sufficient to prevent damage to the PA?	There are no visitor facilities and services	0		<i>Maintenance programmes need to be adopted</i>	<i>Maintenance programmes need to be adopted</i>
	Visitor facilities and services are inappropriate for current levels of visitation or are under construction	1			
	Visitor facilities and services are adequate for current levels of visitation but could be improved	2	2		
	Visitor facilities and services are excellent for current levels of visitation	3			
Additional points	There are active programmes for restoration of degraded areas within the PA and/or in associated buffer zone	1			
5.2. Ecological & Cultural condition assessment Is the protected area being managed consistent to its objectives?	Important biodiversity, ecological and cultural values are being severely degraded in the PA	0		<i>Current management is appropriate</i>	Identify critical elements.
	Some biodiversity, ecological and cultural values are being severely degraded	1			
	Some biodiversity, ecological and cultural values are being partially degraded but the most important values have not been significantly impacted	2	2		
	Biodiversity, ecological and cultural values are predominantly intact	3			
5.3. Access assessment Are the available management mechanisms working to control access or use?	Protection systems (patrols, permits etc) are ineffective in controlling access or use of the PA in accordance with designated objectives	0		Systems have been discussed at a Corporate level. Some areas can be accessed by going around the fence below the cliff face. This does take place occasionally	Ensure an additional staff presence is employed in the area.
	Protection systems are only partially effective in controlling access or use of the PA in accordance with designated objectives	1			

	Protection systems are moderately effective in controlling access or use of the PA in accordance with designated objectives	2			
	Protection systems are largely or wholly effective in controlling access or use of the PA in accordance with designated objectives	3	3		
5.4. Economic benefit assessment					
Is the Protected Area providing economic benefits to local communities?	The existence of the PA has reduced the options for economic development of the local communities	0		<i>The Harmony Flats Working group clears invasive vegetation from the PA on an adhic basis. The restaurant employs local people. The PA itself makes use of staff from the area. Orchid legacy project has trained staff to grow and sell orchids</i>	To properly quantify the economic benefit of the area and identify other opportunities.
	The existence of the PA has neither damaged nor benefited the economy of the local economy	1			
	There is some flow of economic benefits to local communities from the existence of the PA but this is of minor significance to the regional economy	2	2		
	There is a significant or major flow of economic benefits to local communities from activities in and around the PA (e.g. employment of locals, locally operated commercial tours etc)	3			
5.5. Community benefit assessment (other than economic) e.g. recreation & education facilities, community hall, sport facilities etc.					
	The existence of the PA has not delivered any direct or indirect community benefits	0		Relaxation factor, many different aspects - hiking, picnics etc	
	The existence of the PA has delivered some minor short term community benefits	1			
	The PA delivers some quantifiable long term community benefits that make a difference to the lives of local communities	2			
	The PA delivers considerable quantifiable long term community benefits that make a real difference to the lives of local communities	3	3		
Subtotal Score: Outcomes		16	12		

1: CONTEXT	VALUE	SCORE
1.1. Legal status	3	3
1.2. Protected Area regulations	3	2
1.3. Law enforcement	3	1
1.4. Protected area demarcation	3	2
1.5. Resource Inventory	3	2
Subtotal	15	10
2: PLANNING		
2.1. Protected area design	3	2
2.2. Management plan	3	2
2.3. Conservation Development Framework	3	0
Additional Points	3	1
Subtotal	12	5
3: INPUTS		
3.1. Research	3	2
3.2. Staff numbers	3	2
3.3. Current budget	3	2
Additional Points	5	1
Subtotal	14	7
4: PROCESS		
4.1. Annual Plan of Operation	3	0
4.2. Resource management	3	2
4.3. Staff training	3	2
4.4. Budget management	3	2
4.5. Operational equipment & infrastructure	3	2
4.6. Maintenance of equipment & infrastructure	3	2
4.7. Education & awareness	3	3
4.8. Government & commercial neighbours	3	3
4.9. Advisory committee	3	3
4.10. Community partners	3	2
4.11. Commercial Tourism	3	0
4.12. Monitoring & Evaluation	3	1
Additional Points	2	0
Subtotal	38	22
5: OUTPUTS/OUTCOMES		
5.1. Visitor facilities	3	2
5.2. Condition assessment	3	2
5.3. Access assessment	3	3
5.4. Economic benefit assessment	3	2
5.5. Community benefit assessment	3	3
Additional Points	1	0
Subtotal	16	12
TOTAL SCORES	95	56