INTEGRATED RESERVE MANAGEMENT PLAN

EDITH STEPHENS NATURE RESERVE

June 2011

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AUTHORIZATION PAGE

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

Reserve Planning Team:

Branch Manager, Regional Manager, Area Manager, Biophysical Specialist, Biodiversity Coordinator, Sustainable Resource Specialist and Monitoring and Evaluation Coordinator

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Luzann Isaacs – Area Manager

Biodiversity Management Branch

Environmental Resource Management Department

City of Cape Town

Name and Title	**Signature and Date**
Mr Jacob Hugo Executive Director: Economic, Environment and Spatial Planning Directorate	

Approved by:

Name and Title	**Signature and Date**
Mr Anton Bredell Minister of Local Government, Environmental Affairs and Development Planning	

DOCUMENTED

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INTEGRATED RESERVE MANAGEMENT PLAN

Compiled by

Luzann Isaacs

Biodiversity Management Branch

Environmental Resource Management Department

City of Cape Town

Edith Stephens Nature Reserve

June 2011

ISBN NUMBER

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List of abbreviations used

APO	annual plan of operations
C.A.P.E	Cape Action for People and the Environment
CDF	Conservation Development Framework
CFR	Cape Floristic Region
EIA	environmental impact assessment
IDP	Integrated Development Plan
IMEP	Integrated Metropolitan Environmental Policy
IRMP	Integrated Reserve Management Plan
LBSAP	Local Biodiversity Strategic Action Plan
METT-SA	Management Effectiveness Tracking Tool South Africa
MOU	memorandum of understanding
NGO	non-governmental organisation
PAR	protected-area review
RPC	Reserve Planning Committee
SWOT	strengths, weaknesses, opportunities and threats

PART 1

DESCRIPTION

1. INTRODUCTION

Edith Stephens, an eccentric and far-sighted botanist, donated 3,5 ha of land to Kirstenbosch National Botanical Garden to protect a rare plant species called the *Isoetes capensis*(Cape Quillwort), a relic plant found nowhere else in the world. In 2000, the City of Cape Town added the surrounding conservation-worthy land to extend the wetland park, and named the park after Ms Stephens. The vegetation at Edith Stephens Nature Reserve is a transition from Cape Dune Strandveld to Cape Flats Sand Fynbos, both of which are highly threatened. The site supports seven Red Data plant species, and some 95 bird species have been recorded. An important heronry is located here, and five water-bird species breed on the islands in the detention pond.

The large seasonal wetland provides an important habitat for breeding waterfowl, such as *Anas smithii* (Cape Shoveller), *Anas undulata* (Yellow-billed Duck) and *Gallinago nigripennis* (African Snipe). There are five amphibians, including the easternmost population of the endangered *Amietophrynus pantherinus* (Western Leopard Toad) that start their mass breeding in the first weeks of August. Twelve reptiles and 10 mammals can be found here, including the *Aonyx capensis* (Cape Clawless Otter) that still move along the Big Lotus 'river'.

Edith Stephens Nature Reserve works in partnership with many organisations in the surrounding communities, and is home to the Working for Wetlands project as well as the Primary Science Programme (see appendix 2 for lease agreement), a teacher development initiative.

The strategic management planning process that results in the development of an Integrated Reserve Management Plan (IRMP) for Edith Stephens Nature Reserve began with the definition of the vision followed by the purpose for the reserve. This purpose is then supported by desired states for the reserve. The reserve objectives contribute to realising 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.

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.

1.1 Purpose of management plan

The aim of the IRMP is to ensure that Edith Stephens 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 time 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 planning process for Edith Stephens Nature Reserve takes place against the backdrop of (i) the City of Cape Town's Integrated Development Plan (IDP) (Anon 2010[1]); (ii) the City of Cape Town's Integrated Metropolitan Environmental Policy (IMEP) (Anon 2003[1]); (iii) the biodiversity strategy (Anon 2003[2]) and Local Biodiversity Strategic Action Plan (LBSAP) (Anon 2009[1]), 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 Edith Stephens Nature Reserve is supported by a State of Biodiversity report (Anon 2010[2]), operational guidelines, and a monitoring and evaluation framework to ensure ongoing implementation and review of protected-area management activities (figure 1).

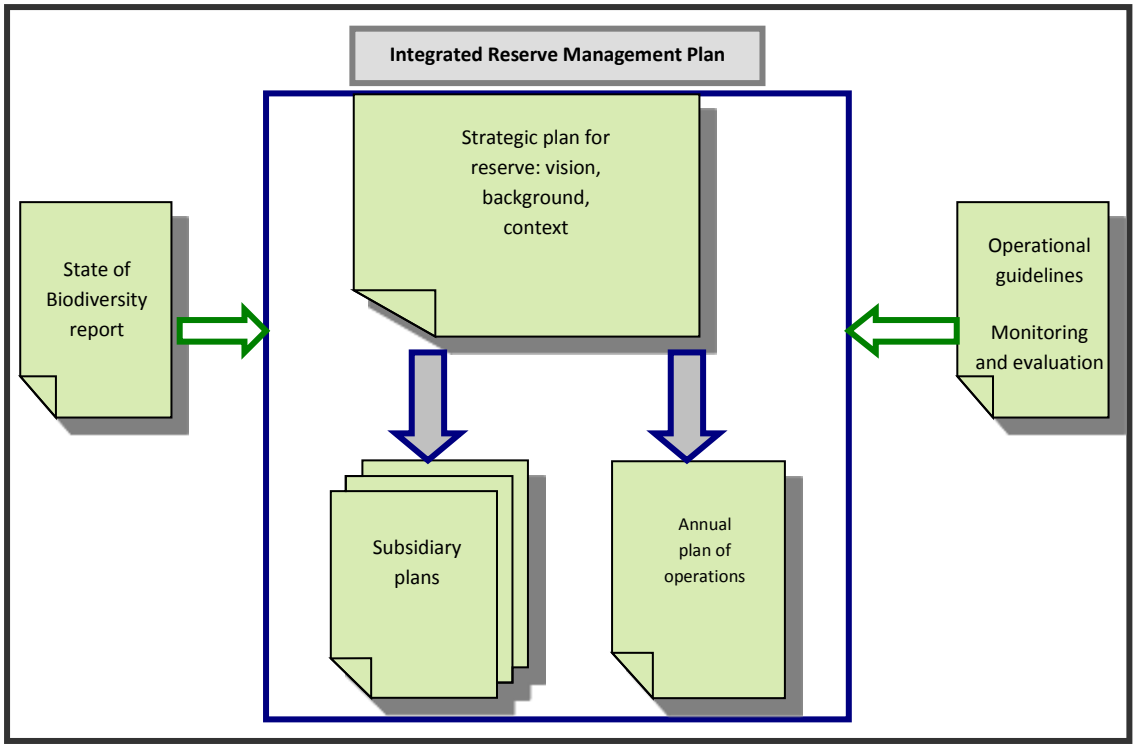


Figure 1: Elements of the IRMP

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

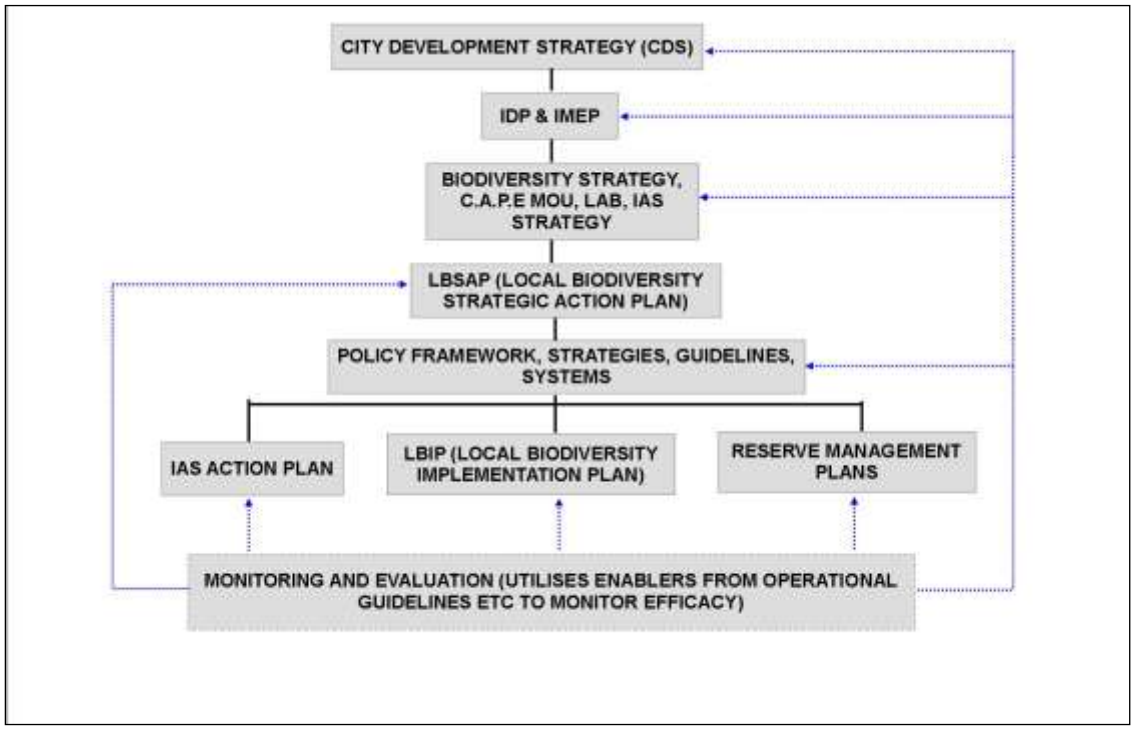


Figure 2: Legal and planning framework for the IRMP

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.

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. Iterative 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 provide input at an early stage. The ideas and outputs from the workshops have been incorporated into the IRMP wherever practically possible.

1.2 Location and extent

The reserve is 27, 3286 ha in extent. The centre of the reserve is approximately 13 km south-east of Cape Town city centre, with GPS coordinates 34^{O} 00' 11.00" S, 18 ^{O} 33' 04" E (see map 1). The reserve was named Edith Stephens Wetland Park at its establishment in the early 1990s (now called Edith Stephens Nature Reserve). It lies south of Lansdowne Road (M9), north of Vanguard Drive (M7), and east of Duinefontein/Weltevreden Road (M10) (see map 2).

2. DESCRIPTION OF LANDHOLDINGS AND OWNERSHIP

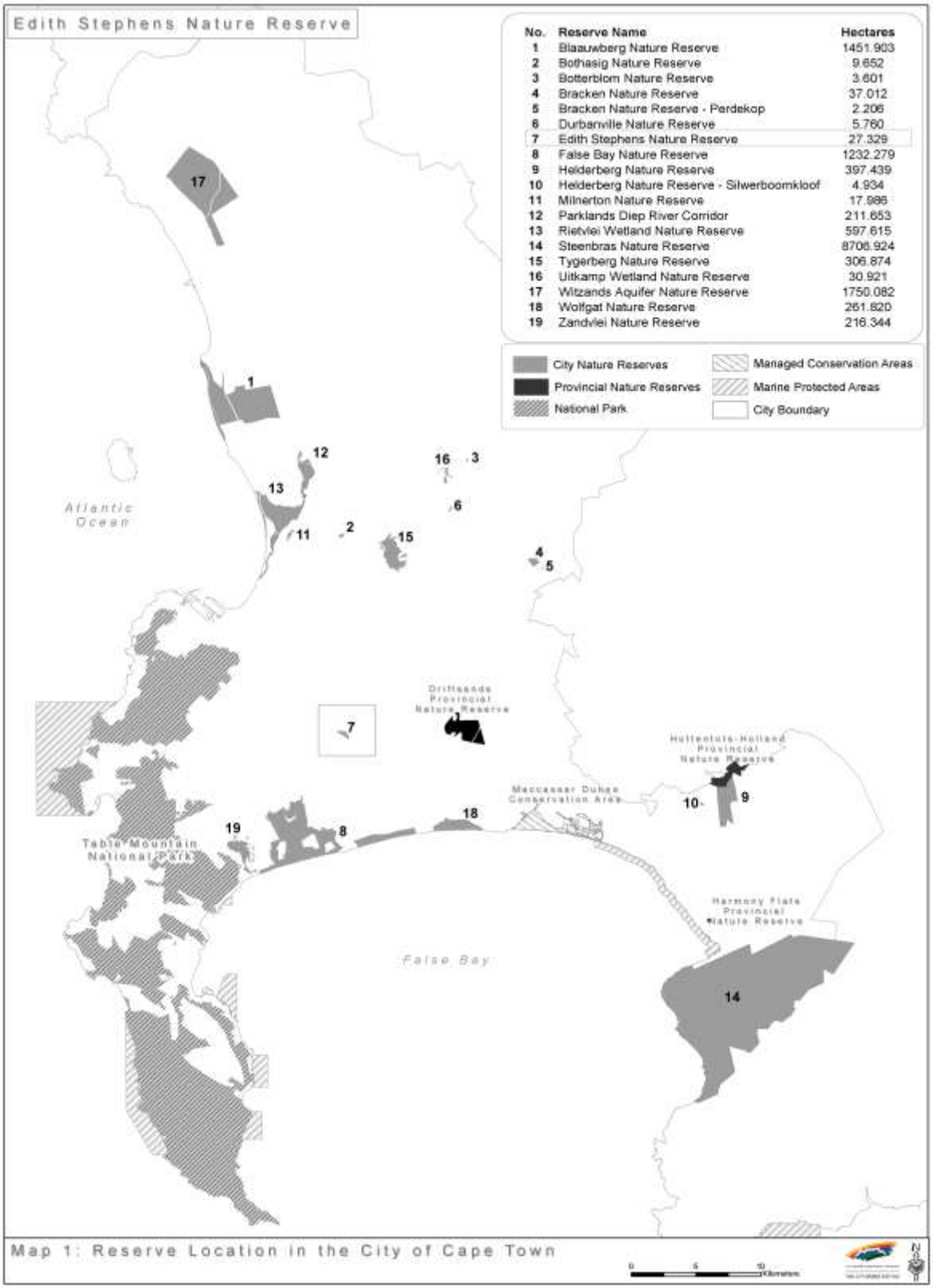
2.1 Property details and title deed information

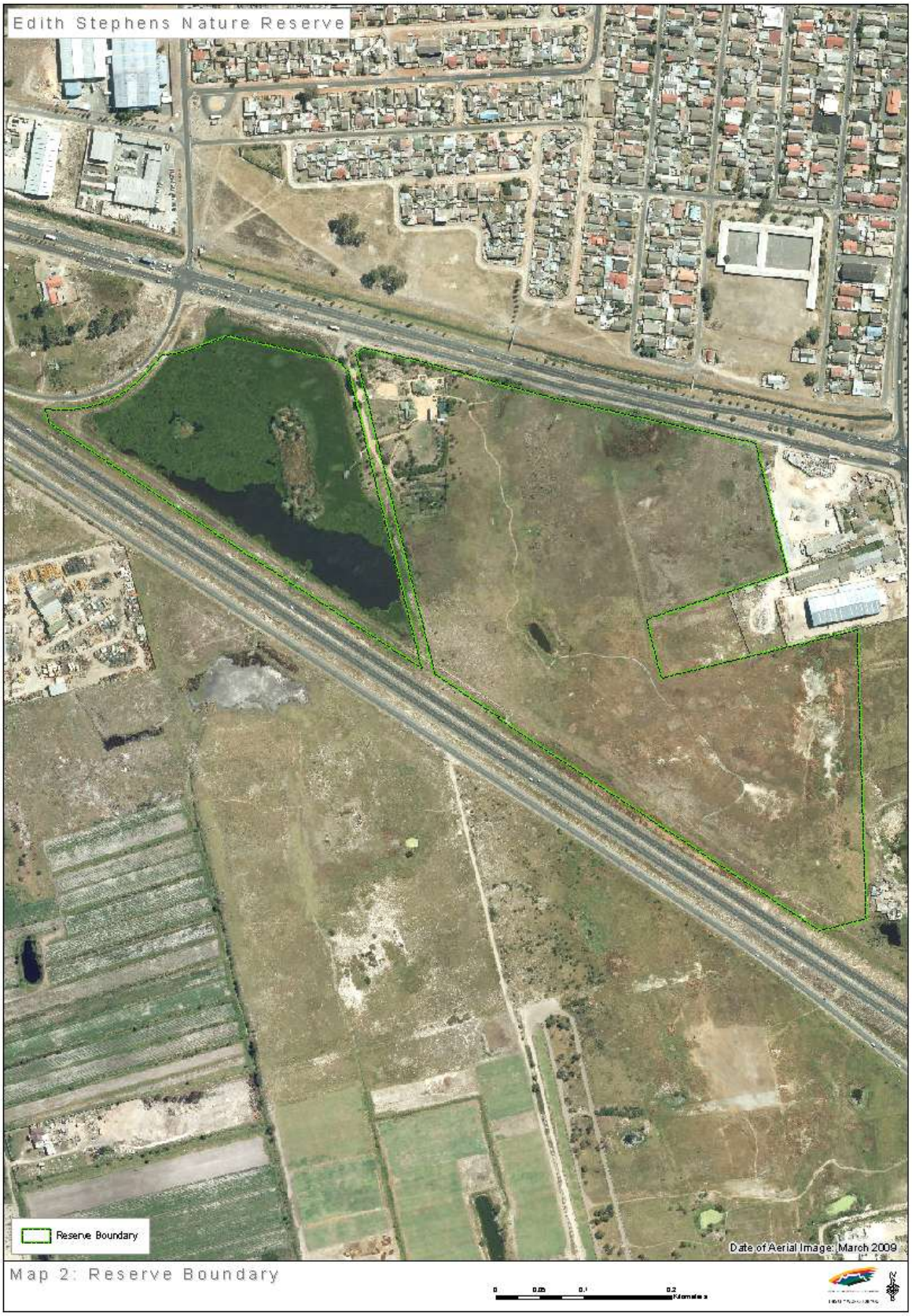
- Allotment area Sweet Home Farm 609, erf number 13, Philippi, situated in the City of Cape Town Municipality, Western Cape (see map 3 and appendix 1), in extent 4,9863 ha; held by title deed number T60318/2000
- Allotment area Sweet Home Farm 609, erf number 81, Philippi, situated in the City of Cape Town Municipality, Western Cape (see map 3 and appendix 1), in extent 5,2334 ha; held by title deed number T62782/1989

- Allotment area Sweet Home Farm 609, erf number 82, Philippi, situated in the City of Cape Town Municipality, Western Cape (see map 3 and appendix 1), in extent 2,3971 ha; held by title deed number T23743/1989
- Allotment area Sweet Home Farm 609, erf number 83, Philippi, situated in the City of Cape Town Municipality, Western Cape (see map 3 and appendix 1), in extent 4,2683 ha; held by title deed number T75094/1988
- Allotment area Sweet Home Farm 609, erf number 84, Philippi, situated in the City of Cape Town Municipality, Western Cape, owned by the City of Cape Town (see map 3 and appendix 1), in extent 4,8753 ha; held by title deed number T37411/1989
- Allotment area Sweet Home Farm 609, erf number 85, Philippi, situated in the City of Cape Town Municipality, Western Cape, owned by the City of Cape Town (see map 3 and appendix 1), in extent 2,263 ha; held by title deed number T23743/1989

The following ervenare not part of this proclamation, but is managed as an integral part of the nature reserve:

- Allotment area Sweet Home Farm 609, erf number 28, Philippi, situated in the City of Cape Town Municipality, Western Cape, owned by the South African National Biodiversity Institute (see map 3 and appendix 1), in extent 3,3052 ha; held by title deed number T9609/1957


Edith Stephens Nature Reserve
No. Reserve Name Hectares
1 Blaauwberg Nature Reserve 1451.903
2 Bothasig Nature Reserve 9.652
3 Botterblom Nature Reserve 3.601
4 Bracken Nature Reserve 37.012
5 Bracken Nature Reserve - Perdekop 2.206
6 Durbanville Nature Reserve 5.760
7 Edith Stephens Nature Reserve 27.329
8 False Bay Nature Reserve 1232.279
9 Helderberg Nature Reserve 397.439
10 Helderberg Nature Reserve - Silwerboomkloof 4.934
11 Milnerton Nature Reserve 17.986
12 Parklands Diep River Corridor 211.653
13 Rietvlei Wetland Nature Reserve 597.615
14 Steenbras Nature Reserve 8706.924
15 Tygerberg Nature Reserve 306.874
16 Uitkamp Wetland Nature Reserve 30.921
17 Witzands Aquifer Nature Reserve 1750.082
18 Wolfgat Nature Reserve 261.820
19 Zandvlei Nature Reserve 216.344
City Nature Reserves
Provincial Nature Reserves
National Park
Managed Conservation Areas
Marine Protected Areas
City Boundary
Atlantic Ocean
Driftsands Provincial Nature Reserve
Hottentots-Holland Provincial Nature Reserve
Macassar Dunes Conservation Area
Table Mountain National Park
Harmony Flats Provincial Nature Reserve
False Bay
Map 1: Reserve Location in the City of Cape Town



Map 2: Reserve Boundary


Edith Stephens Nature Reserve
LANSDOWNE ROAD
VANGUARD DRIVE
DURBANVILLE ROAD
CA609-84
CA609-85
CA609-13
CA609-83
CA609-38
CA609-82
CA609-81
Nature Reserve
Roads
Property
Map 3: Reserve Erven
0
0.125
0.25
0.5
Kilometers

2.2 Landscape perspective

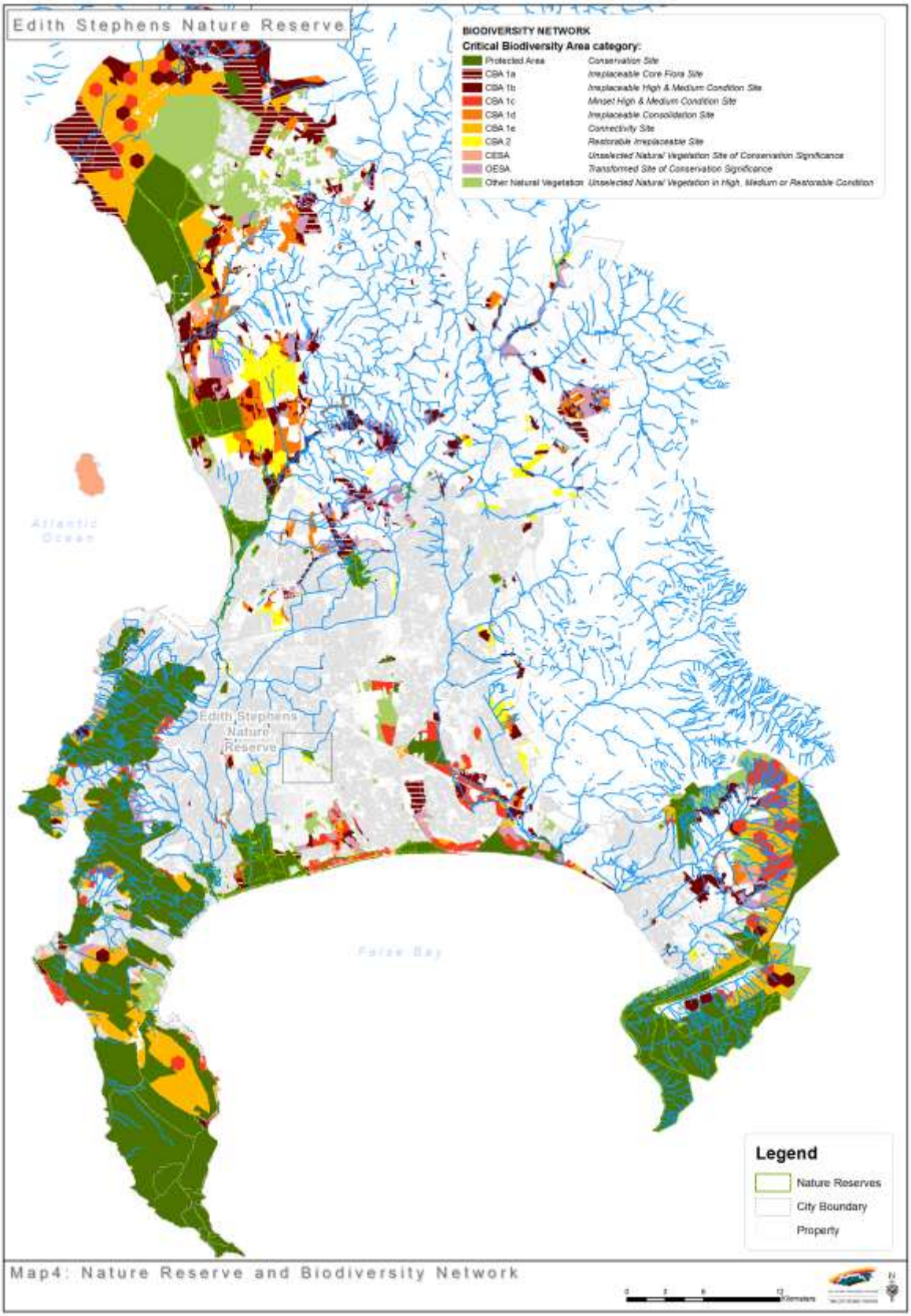
The reserve falls within the Cape Floristic Region (CFR). The CFR is the smallest yet richest of world's six floral kingdoms, and the only one to be found entirely within one country. This rich biodiversity is under serious threat for a variety of reasons, including conversion of natural habitat to permanent 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, which identified the key threats and root causes of biodiversity losses that need to be addressed in order to conserve the floral kingdom. This resulted in a spatial plan identifying areas that need to be conserved, and a series of broad programme activities that need to take place 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).

Edith Stephens Nature Reserve forms an important platform and integral link in the City's biodiversity network (Anon 2009[2]). This network ensures that parcels of land worthy of conservation are included in a protective network, connected to other parcels of conservation worthy land (as shown in map 4).


Edith Stephens Nature Reserve
BIODIVERSITY NETWORK
Critical Biodiversity Area category:
Protected Area
Conservation Site
CBA 1a
Irreplaceable Core Flora Site
CBA 1b
Irreplaceable High & Medium Condition Site
CBA 1c
Mineet High & Medium Condition Site
CBA 1d
Irreplaceable Consolidation Site
CBA 1e
Connectivity Site
CBA 2
Restorable Irreplaceable Site
CESA
Unselected Natural Vegetation Site of Conservation Significance
OESA
Transformed Site of Conservation Significance
Other Natural Vegetation
Unselected Natural Vegetation in High, Medium or Restorable Condition
Atlantic Ocean
Edith Stephens Nature Reserve
False Bay
Legend
Nature Reserves
City Boundary
Property
Map4: Nature Reserve and Biodiversity Network

2.3 Physical environment

2.3.1 Climate

The Mediterranean climate experienced at Edith Stephens Nature Reserve is characterised by warm, dry, windy summers and cool, wet winters. The site has an average elevation of 20 m above sea level, and is mostly flat. The prevailing summer winds are south-easterly, with north-western winds dominating in winter. Rainfall varies between 600 and 1 000 mm per annum, with 10% of the rainfall occurring in the summer months (see figure 3).

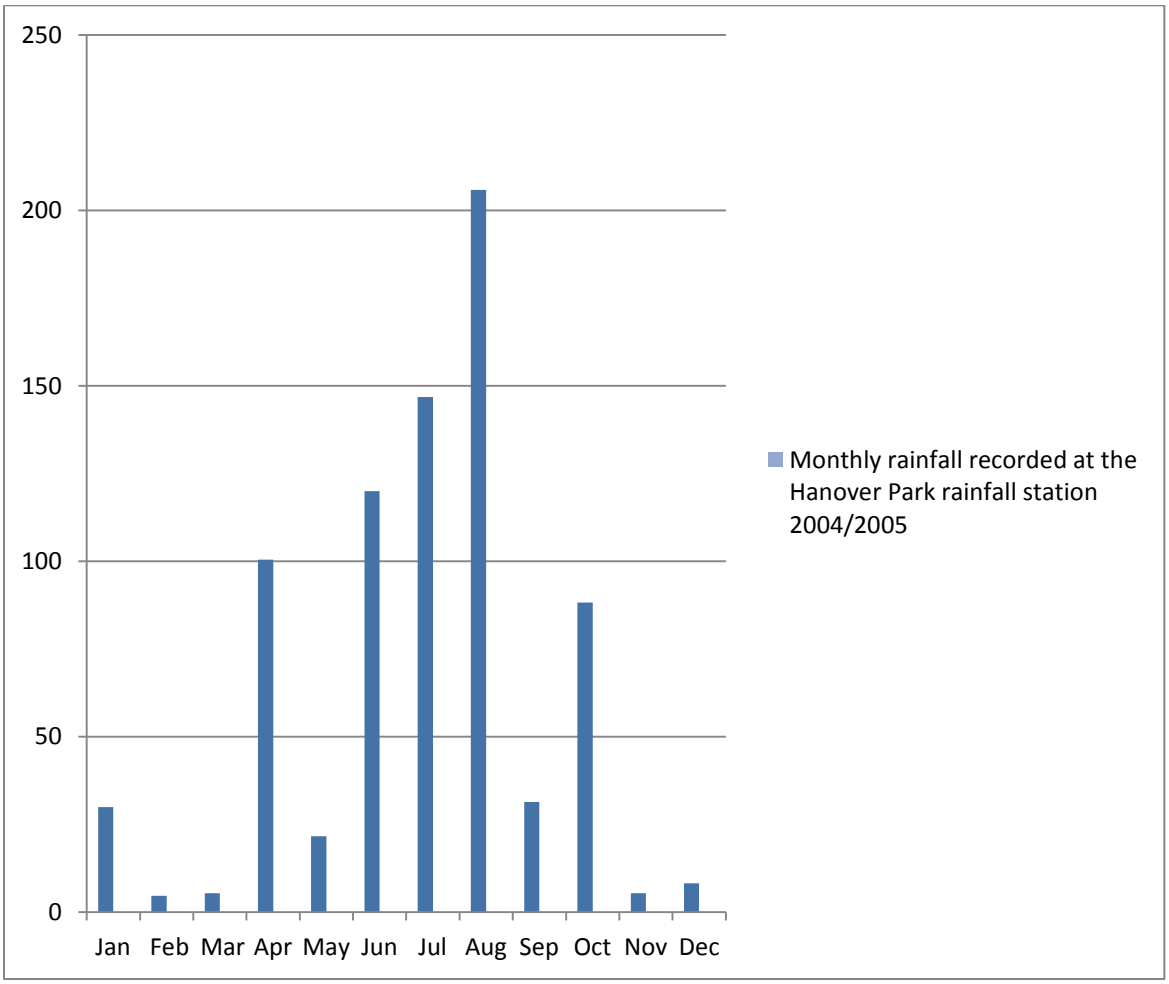


Figure 3: Rainfall for 2004/5 at the Hanover Park rainfall station (Haskins 2005)

2.3.2 Geology, geomorphology, soils and land types

The site is situated on the western portion of the Cape Flats sands. Soils are sandy, with negligible clay content and an effective depth of approximately half a metre. The soils can be classified as belonging to the Fernwood, Cartref or Vilafontes form. All of the forms display little or no structure within their horizons, and all three display leached subsoil horizons.

The site lays right at the boundary of sands belonging to the Springfontein formation (slightly acidic) and the younger Witzand formation (slightly alkaline); there is no outcropping rock. According to a survey done in 2002 (Helme 2002), there was a high conductivity (salinity) level in water samples taken from the site, which suggests that there may be some artificial pollution sources affecting the soil and water salinities in the area. A possible source of pollution is the neighbouring industrial land use, such as brick-making, a chicken factory and informal builder's rubble recycling.

2.3.3 Hydrology and aquatic systems

2.3.3.1 Catchments

The reserve is located in the Zeekoevlei catchment adjacent to the Lotus canal. The detention pond is linked to the Lotus canal, and attenuates flood conditions that arise in the canal, which runs parallel to Lansdowne Road to the north of the reserve. In addition, it receives stormwater intermittently from the Philippi area (see map 5.

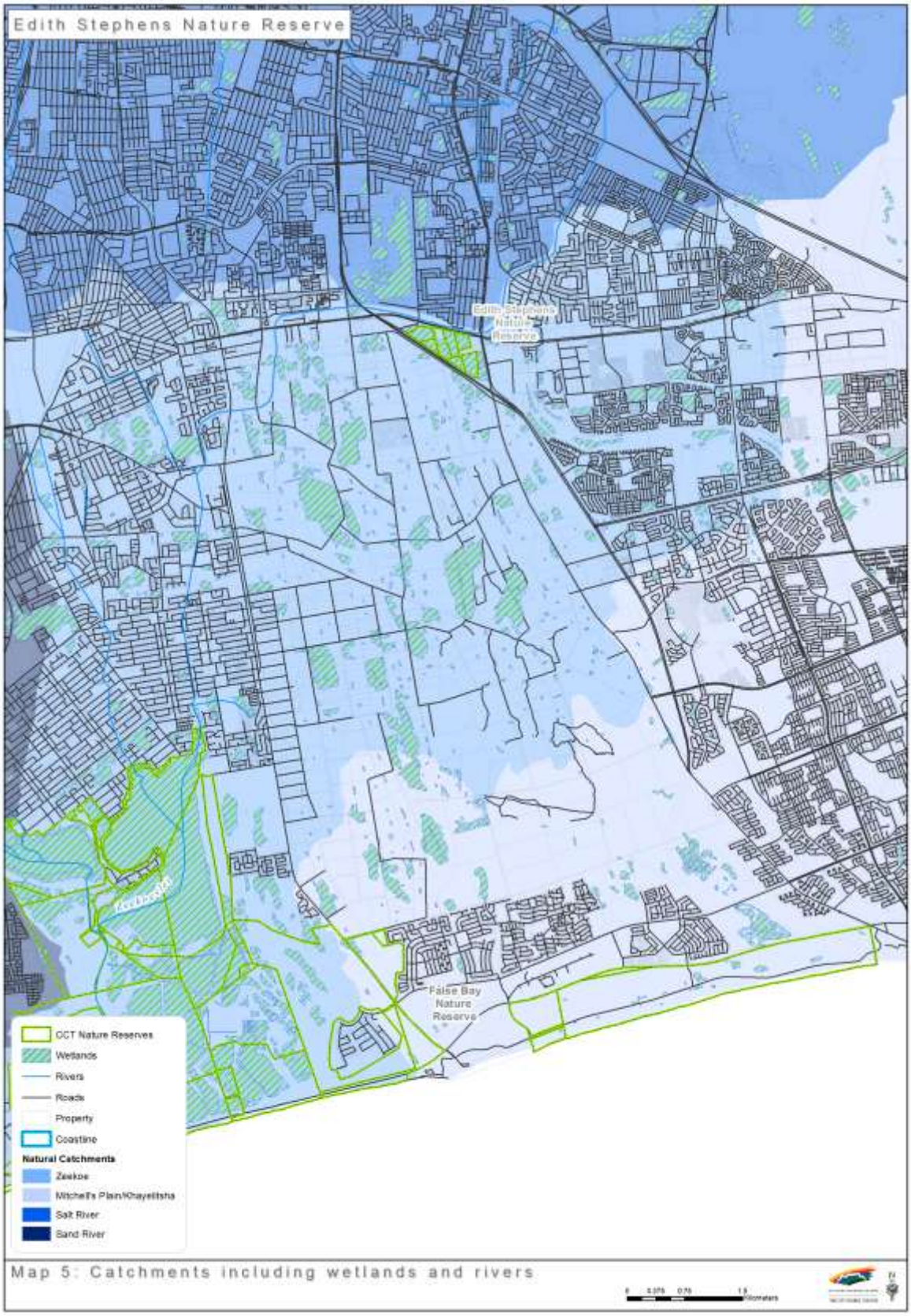
The ground-water levels in the summer of 2001 from well point 1 and 2 were respectively 1,55 m and 1,42 m below the ground surface, indicating the presence of the wetland. An extensive seasonal wetland exists within Edith Stephens Nature Reserve. The wetland extends over erf 609/81/82 and 83, some of which may hold water for the entire year, as pools are substantially deeper than those found elsewhere on the site. In particular, a large excavation pit on erf 609/83 contains water throughout the year, as shown in appendix 13.

During the winter months from May to September, the wetland is characterised by extensive deep water-body ecosystems, while, in the summer months, the water bodies are proportionately smaller and fewer, completely changing the ecosystem. The water bodies along the south-eastern boundary of the reserve (erf 609/81) are usually dry during the summer months from October to April. The water level trend in the wetland is dependent on rainfall and ground-water levels.

2.3.3.2 Rivers

Edith Stephens Nature Reserve is linked to the Big Lotus 'river' by a larger offline detention pond on the south-western boundary and a small inlet from the Little Lotus 'river'. In their

original state, both rivers were a string of seasonal wetlands, which, in the winter months, received runoff from as far away as the area where the Ottery Hypermarket is now located (Brown, C. and Magoba, R. 2009). The Big Lotus ‘river’ was constructed to receive runoff from the growing industrial and housing development that was taking place on the Cape Flats, such as the airport, Manenberg, Nyanga, Gugulethu and the agriculture area known as VaderlandscheRietvlei (Brown, C. and Magoba, R. 2009). In 1987, the pond at the reserve was built to prevent flooding to the surrounding areas. The Little Lotus ‘river’ originally was a canal, dug during World War II to drain the then Youngsfield aerodrome and military base (Brown, C. and Magoba, R. 2009).



Map 5: Catchments including wetlands and rivers

2.4 Biological environment

2.4.1 Vegetation

Vegetation in Edith Stephens Nature Reserve is Cape Flats Dune Strandveld characterised by tall, evergreen, hard-leaved shrubland, with grasses (as a result of a history of disturbance) and annual herbs. It is a nationally Endangered vegetation type, endemic to Cape Town. At present, 56% is transformed, with a national conservation target set at 24%; some 6% is conserved (see summary of City of Cape Town vegetation in appendix 8). A botanical study that was conducted in 2002 (Helme 2002) indicated a remnant of Cape Flats sand fynbos on the site, characterised by species such as *Lampranthus reptans*, *Ischyrolepis sabulosa*, *Gladiolus quandrangulus*, *Lachenalia arbuthnotiae* and *Lachenalia reflexa (see appendix 9)*.

Most of these species are still present on site. The Cape Flats Dune Strandveld grows on alkaline sands, and the Cape Flats Sand Fynbos on nutrient-poor acidic sands, indicating that the nature reserve lies on an ecotone. The Cape Lowland Freshwater vegetation is found on the site, and is characterised by temporally flooded restio-lands, sedge-lands and rush-beds. It is an azonal vegetation type with a 'critically endangered' conservation target of 24%. At present, an estimated 14% is conserved in the Cape Peninsula and Agulhas National Park as well as other City of Cape Town nature reserves (see figure 4).

Four main plant communities can be found on the site, one being an artificial habitat created by soil disturbance, and the others differing mainly in soil chemistry and soil moisture status. The higher water table together with the soil pH on this site are probably the critical determinants of botanical community structure. Very slight changes in soil moisture (degree of saturation, period of inundation) are the most important factors determining the make-up of the botanical communities on site, and these differences are, in turn, most often the result of very small differences in topography and elevation (0,1 m may make a substantial difference). These topographical features can be seen in appendix 14, with higher parts obviously being better drained. Historical maps can be seen in appendix 13.

Figure 4: Vegetation map of Edith Stephens Nature Reserve

2.4.1.1 Cape Lowland Freshwater (seasonally inundated pond)

This is the dominant plant community on this site, and the increasing rarity of the habitat was the reason for the creation of the original reserve. There are extensive wetlands on erf 609/81 on the south-eastern boundary, some of which may hold water for most of the year, as the pools are substantially deeper than those found elsewhere on the site. The water in the pools is likely to have been slightly acidic in the past, but it has been discovered that groundwater salinities over much of the site are now very high. This may cause changes in the plant species composition. An indication of the salinity of the habitat is the predominance of *Sarcocornia capensis* (seekraal) at the bottom of the dry pools in summer. The succulent species are capable of tolerating very saline soil and water, which are inundated for much of winter and spring. Further evidence of the high salinity is the predominance of *Diplachnefusca* (swamp grass), a widespread indigenous species, in many of the wetter areas on the site. This species always grows in or near water, sometimes even in very brackish water. *Sporobolus virginicus* (brakgras) is also a very common grass on the fringes of the wetter areas, and is well known as a species tolerant of very high salinities, even growing along the coast, near the high-water mark.

The most common species found in these seasonally inundated ponds is the sedge *Bolboschoenus maritimus*. This species is also capable of tolerating raised salinities. One of the most characteristic species of the open water bodies is *Aponogeton angustifolius*, of which the leaves and flowers float on the water surface. *Crassula natans* typically occurs partly submerged at the edge of these pools.

Three of the rare species are found only in areas that are seasonally flooded (the ponds). The remarkable grape-like alga *Hydrodictyon africanum* is dependent on standing water for at least two or three months a year, and is a totally aquatic-free floating species. The fern *Isoetes capensis* and the daisy *Cotula vulgaris* (more widespread on site) are both species of wet areas, usually growing in a few centimetres of water, right at the edge of seasonal pools.

2.4.1.2 Cape Flats Sand Fynbos

This community is a subtype of the highly threatened (all remnants are 100% irreplaceable according to C.A.P.E) Cape Flats Sand Fynbos vegetation type. The marine sands have been well leached and are slightly acidic, and the shallow water table means that most of the area is seasonally damp to wet. Given the large scale destruction of this habitat type within the region, it is not surprising that many of these species are now threatened and listed in the Red Data List of threatened species.

Five of the eight recorded threatened species (*Lampranthusreptans, Ischyrolepis sabulosa, Gladiolus quadrangulus, Lachenalia arbuthnotiae* and *Lachenalia reflexa*) occur largely within this community, and it is thus one of the key habitats on the site. It should be noted that in spring of 2002, the number of flowering specimens of *Gladiolus quadrangulus* was very healthy, with well over 300 plants noted, most of these within the main fenced-off reserve. Since then, monitoring has been extended to the rest of the areas, as the numbers of plants averaged 100 in the period 2006–2010, indicating a decline in the population, which is of serious concern.

Aside from the rare species noted, typical species include *Cotula turbinata, Cynodon dactylon* (kweek)*, Crassula decumbens, Felicia tenella, Geissorhizajuncea, Heliophila pusilla* and *Micranthus junceus*. In 2002, a study conducted by Holmes showed that the community is lacking many typical shrubby species, probably as a result of too frequent fires. However, since 2006, with permanent staff carrying out rehabilitation and fire management tasks, these shrubs have been increasing.

The seasonally damp sands tend not to be invaded by the highly invasive annual alien grasses *Bromus diandrus* (ripgut brome), *Avena barbata* and *Avena fatua* (wild oat). Instead, the common alien grasses *Briza minor* (small quaking grass) and *Lolium* spp. (rye grass), as well as *Lotus subbiflorus*, invade these areas.

According to Holmes (2002), most of the reserve is neutral to alkaline, and would have supported Cape Flats Dune Fynbos, with fynbos confined to neutral sands. The conservation value of this community is very high in local and regional terms.

2.4.1.3 Cape Flats Dune Strandveld (Thicket on well-drained soils)

This plant community is restricted to areas of increased elevation, where the better drainage allows woody species, such as *Searsia laevigata* (dune taaibos/koerentebos), *Searsia glauca* (blue kunibush, of which only one plant remains on site), *Brunsvigia orientalis* (kandelaarblom/gifbol), *Trachyandra ciliata* (wildeblomkool), *Chasmanthe aethiopica* (piempiempie), *Hellmuthia membranacea* and *Asparagus lignosus*, to persist. A couple of seedlings of *Chrysanthemoides monilifera* (bietou) – a fast-growing, typical thicket species that is dispersed by birds – were found in these areas. The history of too frequent fires has resulted in very few species surviving in this habitat, and it is likely that a number of species recorded on the original lists have now become locally extinct, such as *Jordaani elladubia* (a creeping vygie on drier sands), *Aspalathus hispida* (wit ertjiebos) and *Aspalathus niger* (blouertjiebos). This community is best represented in the eastern portion of Isoetes Vlei, on

sands that are possibly slightly alkaline to neutral. With the presence of staff on the site, there has been a decrease in the effects and frequency of fires, and, as a result, many of the abovementioned species have been re-established with the assistance of a rehabilitation plan. A detailed list of all plant species can be found in appendix 3.

The local conservation significance of these drier areas is slightly lower than that of the seasonally wet areas, as they support only two of the 'site specials', namely *Lampranthus reptans* and *Ischyrolepis sabulosa*, which grow in sprawling mats at the edge of this habitat. Both these species are more typically found in seasonally wet, acidic sand habitats. The regional conservation value of the habitat is also very high.

2.4.2 Mammals

Species of small mammal that have been recorded at Edith Stephens Nature Reserve to date are small predators of the *Viverridae* family, namely *Galerella pulverulenta* (Small Grey Mongoose) and *Atilax paludinosus* (Water Mongoose). *Aonyx capens* (Cape Clawless Otter) is still present in the Big Lotus 'river' system, and visits the seasonal wetland pans. Subterranean mole fauna include the *Chrysochloris asiatica* (Cape Golden Mole*)* and the rodent *Bathyergus suillus* (Cape Dune Mole rat). These subterranean species play important ecological roles in the turnover of nutrients in the soil column, and the dispersal of bulbous species. A variety of rodent species are found in Edith Stephens Nature Reserve, with species depending on coastal thicket or seasonal wetland habitat (Miller & Barett 2002). These smaller mammal species play a significant role in supporting a variety of bird, mammal and reptile predators. See appendix 4 for a complete species list.

2.4.3 Birds

A variety of bird communities at Edith Stephens Nature Reserve are associated with various habitats.

Seasonal wetlands on erven 609/81 and 82 are of the greatest importance for the interesting and sensitive bird species of this habitat. However, erven 609/28 and 83, including the various seasonal pools and artificial dams, are of little ornithological interest, attracting only species otherwise widespread within the region. A number of species common elsewhere in the region visit the area to feed, and open areas of standing water attract small groups of waterfowl (Louw 2002). However, this habitat does support some species not found elsewhere in the reserve, such as African Snipe and Yellow Bishop, and the bulk of the populations of Vanellus *armatus* (Blacksmith plover), *Cisticola juncidis* (Fan-tailed cisticola) and *Macronyx capensis* (Orange-throated Long-claw). A number of these species

undoubtedly breed here, nesting on or close to the ground, where they are vulnerable to disturbance or trampling.

The deepwater pools, a series of open water bodies on erf 609/81 within the seasonal wetland, supports a different bird community. The presence of *Fulica cristata* (Red-knobbed Coot) and *Gallinula chloropus* (Moorhen) indicates the presence of permanent standing water. This is the only area within Edith Stephens Nature Reserve that is frequented by *Plegadis falcinellus* (Glossy Ibis). The pools also support a surprising number of waterfowl. Counts of *Anas undulate* (Yellow-billed Duck), Anas*erythro rhyncha* (Red-billed Teal), *Anas smithii* (Cape Shoveller) and *Netta erythrophthalma* (Southern Pochard) are comparable with, and in some cases even exceed, data from other, much larger wetlands on the Cape Flats and the broader Western Cape (Taylor *et al*. 1999). Groups of this size are probably seasonal, but are nonetheless remarkable for such a small area. See appendix 5 for a complete species list.

2.4.4 Reptiles

Reptile habitats in the reserve can be categorised as seasonal wetland, permanent wetland (detention pond/artificial dams), general wetland, sandy habitat and general terrestrial habitat (De Villiers 2002). See detailed list in appendix 6.

2.4.5 Amphibians

The *Amietophrynus pantherinus* (Western Leopard Toad) population is of conservation significance. During 2009 and 2010, 50 toads were counted on average in the monitoring programme (De Villiers 2002). See appendix 7 for complete list.

2.4.6 Invertebrates

Baseline data must still be collected.

2.4.7 Fish

Cyperinus carpio(Carp) was recorded to have been sighted. However, further baseline data must still be collected.

2.5 Socio-political context

2.5.1 History

Edith Stephens Nature Reserve is situated on the Cape Flats, neighboured by Manenberg to the north, Philippi informal settlement (named Sweet Home) to the east, and the Philippi horticultural area to the south. The reserve is named after a botanist who bought and

donated 3,5 ha to the eastern side of the area, on erf number CA 609-28, to Kirstenbosch National Botanical Garden. It was proclaimed as a heritage site in the 1950s for the conservation of the *Isoetes capensis* (Cape Quillwort), a rare fern that used to occur in seasonal water-filled depressions on the Cape Flats. In 1997, the local municipality identified the surrounds as a key natural open space in the spatial plan called the Wetton-Lansdowne-Philippi corridor. This followed on an extensive public participation process. In 1999, R750 000 was set aside by the then Cape Town Municipality to purchase the land around the 3,5 ha, and R700 000 was used for construction and site restoration.

2.5.2 Socio-economic context

Edith Stephens Nature Reserve falls within the City of Cape Town's planning district G, which is collectively called the Cape Flats. All information under this section was taken from a technical report done by the City of Cape Town (Anon 2009[3]). Many environmental projects in an urban context are initiated in response to the socio-economic context surrounding a nature reserve. These socio-economic factors need to be understood by the management authority of urban nature reserves to ensure the conservation of species in the long term (Anon 2003[3]).

The district represents some of the most marginalised areas in the city, and is characterised by low-income dormitory-type residential areas with very limited economic activity. It is the district most in need of regeneration, economic development and the provision of services, adequate housing and effective transport systems. This creates challenges, as, often, natural areas are not considered a priority compared to the issues listed above. The relevance of such areas is not understood; this, however, does not diminish the fact that they are important.

The district includes areas like Grassy Park, Hanover Park, Gugulethu, Crossroads, Nyanga, Manenberg and Philippi. The latter six communities are closest and therefore have the biggest influence on the reserve.

The infrastructure and awareness programmes of the reserve should take into consideration their target audience as well as the circumstances of the people closest to the nature reserve. District G: Klipfontein/False Bay has one of the largest populations of all the districts, as well as a very high population density.

District G: Klipfontein/False Bay is the second-worst off of all districts in terms of levels of living, with the worst-off area being Nyanga (one of the neighbouring communities of Edith Stephens Nature Reserve), which could influence law enforcement interventions aimed at promoting positive partnerships.

2.5.2.1 Economic attributes

The district is characterised by a low standard of living, a very high unemployment rate and a concerning lack of economic activity. The district has the second-highest level of unemployment of all districts, at 19,9%. This is particularly significant considering that 42% of the city's population reside within districts G and F. Even though this statistic is negative, it also creates an opportunity for the reserve management authorities to ensure that many of their social interventions contribute to a higher standard of living for the community.

Though there are many resource challenges linked to the communities surrounding Edith Stephens Nature Reserve, all three tiers of government have initiated and implemented a variety of poverty alleviation and economic development initiatives in the community.

Edith Stephens Nature Reserve has on many occasions partnered or been requested to partake in Social Development and other departments' initiatives. This approach has always fostered sound relationships with the neighbouring community, and should be continued. The management of the reserve has not yet funded major strategic projects, and this should be considered in future.

2.6 Protected-area expansion

Even though Edith Stephens Nature Reserve is mostly fragmented, it has many strategic links. Possibilities include the integration of the road reserve and private property. The detention pond on erven CA 609-84 and CA609-85 is linked to a southern retention pond on erf CA 609-86. The reserve has the potential to become a showcase for strategic projects that demonstrate integration between the social and the natural environment because of its distance in relation to other nature reserves, and its social context.

3. PURPOSE, VISION/MISSION, SIGNIFICANCE/VALUE

3.1 Purpose of the protected area

Edith Stephens Nature Reserve is located in the Cape Floristic Region, 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.

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

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

- Developing a high-quality visitor destination, with responsible conservation, people and prosperity practices
- Conserving critically endangered wetland ecosystems, vegetation and habitat types linked to wetlands
- Promoting sound environmental education principles
- Conducting projects/activities that promote integration of the natural and social environment

3.2 Vision and mission

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 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 Kingdom, 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 that 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, 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.

3.2.1 Vision

Edith Stephens Nature Reserve vision

To manage, protect and rehabilitate the natural assets of Edith Stephens Nature Reserve by partnering with the neighbouring community to ensure continuous management, and ensuring the existence and enhancement of the rich biodiversity value of the reserve 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 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

Edith Stephens 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 the Edith Stephens Nature Reserve
- To ensure that all management objectives are pursued in a manner that encourages positive and responsible interactions between the communities and its biodiversity
- To prioritise tasks/actions in the day-to-day operations that promote integration of the natural and social environment, producing quality work
- To implement high-quality environmental education projects, programmes, facilities and resources that communicate environmental issues that affect biodiversity in an urban context
- To build a platform of opportunity for the economic and environmental benefit of the surrounding community

3.3 Significance of property (biodiversity, heritage and social)

- A large area of the property contains Cape Flats Dune Strandveld, listed as endangered by the South African National Vegetation Conservation Assessment, 2004.

- Soils suggest the presence of Cape Flats sand fynbos in the areas that need rehabilitation.
- Parts of the property consist of seasonal wetlands, which were once extensive on the Cape Flats, but have mostly been developed.
- The reserve offers habitat for birds and other fauna related to these kinds of wetlands.
- The reserve also provides environmental education and capacity-building initiatives to an average of 20 NGOs per annum in the surrounding community, ensuring that the area contributes not only to an improved natural environment, but also improved livelihoods for these communities. Also advanced emphasis on environmental education by housing Primary Science Programme PSP that develops teachers in science and other related fields through workshops. Section 6.1 of the lease agreement oblige PSP to utilise the facilities specifically for environmental education (see appendix 2)

PART 2

MANAGEMENT POLICY FRAMEWORK

4. ADMINISTRATIVE AND LEGAL FRAMEWORK FOR THE MANAGEMENT AUTHORITY

4.1 Legal framework

The following is a list of legislation applicable to the management of Edith Stephens Nature Reserve. Repealed legislation has been included as greyed-out text for information purposes only.

Table 1: Details of relevant legal documents influencing this management plan

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.	• 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	The objectives of the Act are to provide for: • 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: • 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.	• 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.	• 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: • protected natural environments; • littering; • special nature reserves;	• Environment Conservation Amendment Act 98 of 1991 • Environment Conservation Amendment Act 79 of 1992 • Environment Conservation Second Amendment Act 115 of 1992	

	• waste management; • limited-development areas; • regulations on noise, vibration and shock; and • EIAs.	• 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 Act, Act 28 of 2002	Provides for equitable access to, and sustainable development 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.	• 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	• 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	• 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 Act (Act	• Publication date 4 February 2003	

	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.	• 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.	• 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	• 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.	• 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.	• 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	• Promulgated 28 September 2007, PG 6469; LA 44559	
City of Cape Town Bylaw relating to signage		•	

4.2 Administrative framework

Edith Stephens 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 southern region, and falls under the oversight of the regional manager, with the daily management being the responsibility of an area manager, who is assisted by two operational staff members. The operational management of Edith Stephens Nature Reserve is supported by various other City of Cape Town departments, including, but not limited to, Law Enforcement; Roads and Stormwater; Water and Sanitation; City Parks; Human Resources, and Finance.

The following two tables show the current staffing complement.

Table 2: Current staff structure

Designation	Number of staff	Workweek	Supervisor
Area manager	1	40 hours, Monday–Friday	Regional manager
Field ranger	2	40 hours, Monday–Friday	Area manager
Environmental education officer	1	40 hours, Monday–Friday	Area manager
Experiential training student	1 (dependent on funding)	40 hours, Monday–Friday	Area manager

5. PROTECTED-AREA POLICY FRAMEWORK & GUIDING MANAGEMENT PRINCIPLES

5.1 Management objectives

Table 3: Defined management objectives for Edith Stephens Nature Reserve

High-level objective	*Objective*	*Sub-objective*	*Initiative*	*Low-level plan*
CONSERVATION OF REPRESENTATIVE, FUNCTIONAL ECOSYSTEMS 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	**Representative ecosystems** To incorporate a spectrum of viable aquatic and terrestrial ecosystems characteristic of Edith Stephens Nature Reserve, and to re-introduce missing elements where possible	**Consolidation and expansion of land areas** Consolidation of protected areas, focusing on underrepresented ecosystems, functional linkages and processes	(1) Identify underrepresented habitats/ecosystems (2) Consolidate reserve boundaries (3) Incorporate viable vegetation groups (4) Establish corridors linking Edith Stephens Nature Reserve with other catchments and terrestrial ecosystems (5) Acquire land for more of a buffer function	Reserve expansion plan (existing)
		Re-introduction of biota Re-establishment, where possible, of locally extinct or depleted biodiversity components and populations in accordance with International Union for Conservation of Nature (IUCN) principles and guidelines as well as other norms and standards of the City of Cape Town	(1) Re-establish indigenous herbivore complement within constraints of reserve size and urban setting	Faunal management plan (to be developed)
		Fire management Apply appropriate fire regime in fynbos areas (frequency, season, intensity, size)	(1) Implement a fire management plan in accordance with objectives of conserving biodiversity and threatened biota (2) Monitor impact of fire management regime	Fire management plan (to be developed)
		Threatened biota Maintain viable populations of threatened species in order to meet obligations in terms of international agreements and	(1) Maintain viable populations of rare/threatened plant and animal species (identify, locate and monitor	Threatened-biota plan (to be developed and included in the biodiversity monitoring plan)

		conventions	populations of priority species)	
		Monitoring plan Implement and maintain an approved monitoring plan for the reserve	(1) Implement and maintain a biological monitoring programme for the reserve	Monitoring plan (existing)
	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	**Vegetation** Re-establish physical, chemical and biological processes in degraded vegetation areas	(1) Rehabilitate all degraded sites	Vegetation rehabilitation plan (existing)
		Alien plants and other alien biota Control and, where possible, eliminate alien biota to facilitate re-establishment of natural biodiversity patterns and process in invaded areas	(1) Establish the distribution and density of invasive species (2) Prioritise areas for alien removal, focusing on biodiversity restoration (3) Implement removal programs for priority species and areas (4) Conduct sensitive alien-plant control that encourages natural biodiversity patterns	Invasive alien plant management plan Alien biota management plan (to be developed)
MITIGATE INTERNAL and EXTERNAL PRESSURES To reduce threats and pressures and limit environmental impacts resulting from non-biodiversity management aspects and operations on	**Reconciling biodiversity with other reserve objectives** To ensure that non-biodiversity management aspects of reserve operations (revenue generation, including visitor, resource use, developments,	**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	(1) Reserve zoning (2) Develop and implement Conservation Development Framework (CDF) (3) Develop in accordance with EIA process (NEMA) and corporate policies (4) Establish visitor carrying capacities (5) Implement green standards and environmental best practice based on corporate policy	CDF (partially existing)

surrounding land and resource use	management activities, etc.) are informed and constrained by biodiversity conservation objectives, and that the impacts of these activities on biodiversity are minimised	**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	(1) Quantify current extractive resource activities (2) Define opportunities and constraints in line with corporate guidelines (3) Regulate resource use according to adaptive management processes (4) Ensure extractive resource use is in accordance with national/provincial laws, policies and guidelines	Sustainable resource use management plan (to be developed)
	Reconciling biodiversity with external threats To reduce external threats and pressures, and limit impacts of surrounding land and resource use on biodiversity conservation within the reserve	**External developments** Minimise the impacts associated with inappropriate developments outside the reserve	(1) Engage regional land management authorities, including IDPs and spatial development frameworks at local and regional level (2) Align with bioregional planning, including explicitly identified areas for the maintenance of important biodiversity patterns and processes with appropriate land use guidelines (3) Provide input into planning and decision-making processes for external development that may compromise reserve and biodiversity network objectives (4) Negotiate to ensure that external developments are not visually obtrusive or out of character with the park	(Cooperative governance and communication plan) (to be developed at a strategic level, and not as an operational plan for Edith Stephens Nature Reserve, although this has an influence on the long-term management of the site)
		External activities Negotiate to ensure that external resource and land use does not detrimentally affect ecological processes within the reserve	(1) Negotiate to mitigate or improve the management of external, potentially detrimental impacts (2) Encourage eco-friendly resource use and land management practices on adjacent properties (3) Mitigate the impacts of oil and other pollution events through appropriate contingency planning	Environmental emergency contingency plan (Cooperative governance and communication plan) (to be developed)

		Hydrological and water chemistry changes 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	(1) Lobby for appropriate catchment categorisation (currently general authorization) (2) Encourage enforcement of legislation applicable to the management and protection of aquatic resources (3) Facilitate regular assessments of River Health. (4) Address the issue of sewage and other point-source pollution of aquatic systems	Cooperative governance and communication plan (to be developed)
		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
	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	(To be developed)

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 prescriptions (3) Facilitate appropriate interpretation of cultural heritage associated with the reserve	Cultural heritage management plan (to be developed)

5.1.1 Socio-economic objectives

Table 4: Socio-economic objectives for Edith Stephens Nature Reserve

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 and 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	Local socio-economic development plan (to be developed)

	Increase environmental awareness and encourage participation in quality conservation initiatives	Inspire visitors and communities to consider 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)	
		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	Education development plan (to be developed)
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 advisory forum (2) Develop effective communication mechanisms and responsibilities for representatives	Stakeholder relationship plan (to be developed)
	Effective cooperative governance	Minimise degrading impact and consequences of inappropriate development in and around the reserve	(1) Establish and maintain good working relationship 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, partnerships and government through written agreements/terms of reference and MOUs	
Develop a high-standard, responsible visitor destination for local and international		Ensure that all sustainable visitor products are accessible to surrounding communities	(1) Design customer satisfaction survey (2) Analyse current product use, and identify opportunities	Visitor plan (to be developed)
		Ensure that community partners are given equal opportunity, linked to possible sustainable opportunities on the site		

visitors	Develop, manage and enhance a range of sustainable visitor products		(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 (to be developed)
	Conserve and manage cultural heritage assets		(1) Develop a database of all tangible and intangible cultural assets, including inventory, maps and relevant documentation (2) Facilitate appropriate interpretation of cultural heritage associated with the reserve, taking into account the reserve's socio-economic context	Cultural heritage management plan (to be developed)
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	Marketing plan (to be developed)
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	Communication programme (to be developed)
Advance strategic human resource management	Ensure good human resource management	N/A	(1) Implement and support learnerships and volunteer programmes (2) Ensure that all staff have access to training initiatives as per the Workplace	Staff capacity-building programme/ institutional development and staff capacity-building programme (to be developed)

			Skills Plan (3) Ensure that all corporate human resource policies are adhered to	
Financial management	Ensure that sound financial management practices are applied to and underpin the reserve	N/A	Manage cost spending appropriately	Financial sustainability programme (to be developed)
Achieve good corporate governance/ management	Effective management of risk profile	N/A	Conduct legal review	Risk management programme (to be developed)

5.2 SWOT analysis

Strengths

- Staff buy-in and positive attitude of neighbouring landowners
- Strong community involvement
- Existing good radio and telephonic communication systems
- Management commitment to compiling and implementing management plans and biodiversity action plans
- Legislative support – municipal bylaws, Nature Conservation Ordinance and NEMA
- Constitutional support
- Existing corporate support services
- Main reserve entrance and exit controlled by visitor access booms and gates
- Defensible boundaries
- Access to specialist services and databases
- Staff determination and will to succeed
- Regular implementation and monitoring of biological monitoring systems
- Established environmental education programme

Weaknesses

- Insufficient appropriately trained staff to ensure that all biodiversity objectives are met, e.g. basic field ranger, 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 enforce environmental legislation adequately
- Public's ignorance of applicable environmental legislation
- Insufficient human resources available for law enforcement due to distance from area head office

Opportunities

- Contrast of area to surrounding landscape

- To create buy-in among key stakeholders and role players
- Community constituency building
- Increased sense of community ownership
- Job creation, and career succession and planning
- Accessing funds for Expanded Public Works/Sustainable Livelihoods programmes to assist in job creation and reserve infrastructure maintenance and development
- To engage communities bordering the reserve proactively and to recognise their needs
- Continuous liaison with and support of Friends groups
- To link up with surrounding landowners, sharing knowledge and resources in order to manage the biodiversity network effectively
- Promote the reserve as a destination for outdoor eco-activities

Threats

- Unemployment 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 ill-considered land use practices
- Change in local government political structures
- Policies and practices that counter the mainstreaming of biodiversity

5.3 Protected-area management policy framework and guiding principles

5.3.1 Community participation

Edith Stephens Nature Reserve will strive to nurture productive and mutually beneficial partnerships firstly with its surrounding communities, and secondly with the broader Cape Town community, which will 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, poverty relief projects as well as other developmental initiatives. By participating in skills development, learnership programmes and volunteer initiatives, local skills can be developed. Through the support of community-based social development initiatives, the reserve can also enhance socio-economic benefits to local communities.

Through the integration of an education and conservation plan, Edith Stephens Nature Reserve will contribute to raising environmental awareness and will encourage participation in conservation initiatives.

The main aims of the reserve education plan will be:

- to inspire visitors and communities to consider the environment as an interrelated and interdependent system, of which they are an integral part;
- to educate learners, educators and community focus groups to take environmental action, assisted by resource and information materials;
- to develop and implement environmental education programmes suited to the needs of various focus groups;
- to develop and implement an interpretation plan that complements the education plan; and
- to ensure that education contributes to, and integrates with, conservation operations.

In order to develop and maintain good reserve/community/stakeholder relations, all relevant stakeholders need to be identified. An effective communication system also needs to be developed in order to liaise with interested and affected parties. Where necessary, task teams and working groups may be established in order to assist the reserve with key issues.

5.3.2 Safety and security

A safety and security audit, aimed at completing a rapid and verifiable analysis of the current security situation, security services, infrastructure, staffing and social context, has been carried out in Edith Stephens Nature Reserve.

According to the audit, Edith Stephens Nature Reserve has a low security risk, with its strength lying in the partnership with community/government-based law enforcement (Phelan & Thornhill 2010). The community policing forums show a keen interest in the safety and security of the site, and this partnership should be further strengthened. A defensible boundary needs to be established with a combination of fencing and other infrastructure and landscaping interventions. For more information, please see appendix 11, which contains the details of the safety and security audit conducted in City of Cape Town nature reserves.

5.3.3 Culture-historical, archaeological and paleontological management

The reserve will identify and manage culture-historical sites, guided by the City of Cape Town's District Environment and Heritage Branch.

5.3.4 Tourism development and management

Edith Stephens Nature Reserve has been included in various tourism initiatives, such as the Cape Care Route. It also belongs to Cape Town Tourism, but opportunities linked to these partnerships must still be explored. This area can be strengthened with a better partnership firstly with the City of Cape Town's Tourism Department (internally), and secondly with the broader tourism industry (externally).

5.3.5 Infrastructure

Edith Stephens Nature Reserve has various existing structures and buildings, which are primarily used for education and plant propagation. Other usage includes the hosting of private functions (birthdays) and community development initiatives (workshops and annual general meetings). However, because of the infrastructure limitations, usage is limited. Plans were developed for present and future infrastructure development on the site. Most plans were subjected to some public participation, and partners have been made aware of the plans (see appendix 12).

5.3.6 Biodiversity conservation management

5.3.6.1 Community-based natural resource management

Community-based natural resource management as a practice has not been encouraged at the nature reserve, due to the lack of information on the extent and type of species that could be harvested, and the potential threats of harvesting activities. Research on this should be encouraged, as this could open up economic opportunities, which, in turn, could build strong partnerships with the surrounding communities (see under "Socio-political context", part 1).

5.3.6.2 Fire management

Edith Stephens Nature Reserve's recorded history of frequent fires dates back to 1978 (Bruce *et al*. 1978). Since 2006, only fires on the periphery of the reserve have been recorded. In the drier areas of the reserve, the intervals between fires should be between eight and ten years. The seasonally wet ecosystems in the reserve should burn at 10–15-year intervals.

Fire management implementation in Edith Stephens Nature Reserve involves the following:

- 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
- Use of fire data and geographic information systems for recording and mapping
- Application of post-fire monitoring programmes
- Application of fire data to determine prescribed burning needs
- Development and implementation of a fire protection and response plan, including affected stakeholders, such as additional City of Cape Town departments and private landowners neighbouring the nature reserve

5.3.6.3 Catchment management

The reserve management will establish partnerships with the City of Cape Town's Roads and Stormwater Department and catchment management authorities to ensure environmentally conscious management practices for the Big and Little Lotus catchments. These partnerships should address issues of water quality and the management of indigenous and invasive aquatic species, and could translate into agreements.

5.3.6.4 Invasive-species management

The management of invasive alien species is a priority within the reserve. Through the control and, where possible, elimination of alien biota, natural biodiversity and processes will be re-established in invaded areas.

Invasive 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* species and *Acacia cyclops* (Rooikrans). Herbaceous

weeds were largely ignored. However, recent monitoring and the development of an extensive herbaceous weed and grass species list for the reserve have shown that some herbaceous species already pose a risk to biodiversity in the area, while others may soon become one. Some examples of herbaceous species are *Pennisetumclandestinum, Viciabenghalensis*and *Viciasativa.*

From 2005 to 2010, Edith Stephens Nature Reserve also had to manage the Water Hyacinth (*Eichhorniacrassipes*) on the stormwater pond, as there was a decline of species diversity of water fowl in the area. In December 2010, the initial clearing of the water hyacinth was completed and, since then, bird diversity in the monitoring programmes has increased.

A number of indigenous South African species (mostly plants) that are not local to the area have been identified in the reserve. The occurrence of such species is generally as a result of attempts to beautify old recreational areas. Horticultural strains of indigenous species also present a risk to naturally occurring specimens. Some species are known to hybridise with species in the area, and pose a potential threat to the genetic diversity of such populations, such as a horticultural hybrid of *Cliffortia* species.

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

- 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 management plan

Invasive and alien faunal species are also eradicated in the reserve. Formal plans outlining the monitoring of the removal of identified species, such as *Corvussplendens* (Indian House Crow), are however required.

5.3.6.5 Species introductions

Species that are historically indigenous to Edith Stephens Nature Reserve, and for which suitable habitat and eco-niches are available, could be re-introduced to the area. Several fauna species that previously occurred in the reserve are no longer present or are down to small numbers.

Prior to the re-introduction of any species, a full proposal is required. The availability of suitable habitat for the species with reference to public utilisation of areas needs to be investigated. A full investigation into the historical occurrence and status of the species is

also required, as is research on the effect of re-introducing species to the area. Re-introduction of potentially dangerous or problematic species may also require a public participation process. An investigation of suitable sources is also necessary.

All proposed re-introductions need to be recommended and approved by the fauna and flora management committees as well as provincial authorities before implementation. The implementation of any re-introduction programmes must be specified and documented in a plan of action.

5.3.6.6 Strategic research

Research subjects that are beneficial to the management of Edith Stephens Nature Reserve need to be identified. These subjects may then be prioritised and further pursued.

Currently, research is being conducted in the reserve, with management's support. However, many of the projects are conducted by outside student researchers and organisations, and are not informed by the reserve's needs.

Also, an effort needs to be made to obtain copies of data and results from projects conducted within the reserve's boundaries.

5.4 Sensitivity analysis of Edith Stephens Nature Reserve

The reserve is a considerable asset to the City, and significantly contributes to national vegetation targets of 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 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 National Environmental Management: Biodiversity Act (2004), and seeks to comply with its spatial planning requirements. A 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 will never replace the need for detailed site and precinct planning as well as EIA compliance at site level.

The small size of the nature reserve did not require an extensive analysis, resulting in a fairly straightforward subsequent zoning process. The methodology used for both the sensitivity-value analysis and the zoning process was adapted from Holness and Skowno (2008) and SRK Consulting (2008[1]; 2008[2]).The zoning of Edith Stephens Nature Reserve can be found in appendix 10.

5.5 Zoning plan of Edith Stephens Nature Reserve

5.5.1 Zoning informants

Underlying decision-making rules used in the zoning process

- 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 greenfield 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 that compromise 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.
- Two key points need to be emphasised:
    a. 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 level of planning.
    b. 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 zone, conservation zone, low-intensity leisure zone and high-intensity leisure zone. Please see appendix 10 for the Edith Stephens Nature Reserve zoning map, while appendix 10 outlines the proposed zoning and zone 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.

6. DEVELOPMENT PLAN

In August 2000, a master plan was developed for infrastructure development in Edith Stephens Nature Reserve. The plan mainly focused on the boardwalks and other infrastructure in the conservation area. It was then further detailed in July 2006, also to include the development of the high-intensity use/leisure zone. Both plans went through extensive consultation with the then area manager, Dalton Gibbs; community stakeholders; lessees as well as projects based on the site. The plans create a basis for future development on the site, as the underlying principles that the consultants used for the development of both plans were:

- conservation;
- environmental education; and
- recreation.

These still are the underlying principles of the current City of Cape Town department tasked with reserve management.

Figure 5 is a conceptual drawing of the development plan for Edith Stephens Nature Reserve, done in 2006 by a landscape architecture company. In the 2006 plan, the consultant also included a detailed costing plan, which could be used to estimate the funds needed to construct this infrastructure.

Figure 5: Future proposed Infrastructure development concept plan for the high intensity zone

7. COSTING PLAN

Edith Stephens Nature Reserve has a dedicated budget in the Environmental Resource Management Department of the City of Cape Town, with the financial year running from July to June, which is revised annually. A more detailed costing estimate is provided in table 6.

Table 5: Costing framework for Edith Stephens Nature Reserve

	Funding source	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**2015/16**
Invasive plant management	Grant	R10 000,00	R12 000,00	R14 000,00	R16 000,00	R18 000,00
Fire management	Operating	R6 000,00	R8 000,00	R10 000,00	R12 000,00	R14 000,00
Road and trail maintenance	Operating	R120 000,00	R140 000,00	R180 000,00	R200 000,00	R300 000,00
Human resources	Operating	R2 000 000,00	R2 160 000,00	R2 330 180,00	R2 519 424,00	R2 720 977,92
Infrastructure development (design phase)	Capital expenditure/ grant		R500 000,00			
Phase 1: Upgrade of existing buildings	Capital expenditure/ grant			R2 000 000,00		
Phase 2: New pathways and other infrastructure in conservation area	Capital expenditure/ grant				R2 000 000,00	
Phase 3: New hall, toilets, offices and kitchen	Capital expenditure/ grant					R7 000 000,00
Fencing	Operating and capital	R50 000,00	R70 000,00	R90 000,00	R100 000,00	R130 000,00
General expenses	Operating	R300 000,00	R320 000,00	R340 000,00	R360 000,00	R380 000,00
Environmental education	Operating	R60 000,00	R62 000,00	R64 000,00	R66 000,00	R68 000,00
Special projects	Grant/capital expenditure	R200 000,00	R200 000,00	R200 000,00	R200 000,00	R200 000,00

PART 3

8. MONITORING & AUDITING

8.1 Annaul 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 byallocation 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 Edith Stephens Nature Reserve was undertaken in 2007, and the results are presented in appendix 15. 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 to take place where required (and within managers' control).

8.2 Management plan review

This management plan should be reviewed every five years, and adjusted where necessary. To achieve this, the following questions (and others as needed) should be asked:

- Did this management plan make a meaningful contribution to the management of Edith Stephens Nature Reserve?
- Were individual management 'prescriptions' 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 sufficient, appropriately qualified staff members allocated to each management activity?

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

8.3 Biodiversity monitoring

Table 7: Research and monitoring programmes under way

Action	Responsible Party	Means of Verification	Frequency
<u>Vegetation Monitoring</u>			
IAS Vegetation 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)	Reserve staff Reserve Manager, Students and Interns	Weekly Inspections Final Inspections Field Verification Sheets	Weekly Once off – completion of contract Annually - to determine Management Unit Clearing Plan
Fire mapping 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.	Reserve staff Reserve Manager, Students and Interns	Veld age map, fire map	Post fire
Post Fire Recruitment	Reserve staff Reserve Manager, Students and Interns	Stratified Sampling plots	Post fire 6 months 12 months Annually for 3 years

Vegetation Rehabilitation monitoring	Reserve staff Reserve Manager, Students and Interns	Fixed point photography	Annually
Threatened Species	Reserve staff Reserve Manager, Students and Interns	Presence, abundance, density Field Observation Sheet	Annually
<u>Faunal Monitoring</u> Small mammal and reptile monitoring	Reserve staff Reserve Manager, Students, Interns and Field Staff	Pitfall traps and Sherman traps	Annually
Bird Diversity	Reserve staff Reserve Manager, Students and Interns	Bird counts	Weekly
Law enforcement patrols: Illegal activity and threats/potential threats to the reserve	Reserve staff Reserve Manager, Students and Interns	Observations	Weekly
<u>Water Monitoring</u> Water level	Reserve staff Reserve Manager, Students, Interns	Field collection equipment	Quarterly

PART 4

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9. REFERENCES

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PART 5

10. APPENDICES

A. LEGAL AGREEMENTS

Appendix 1: Surveyor-General diagrams of Edith Stephens Nature Reserve

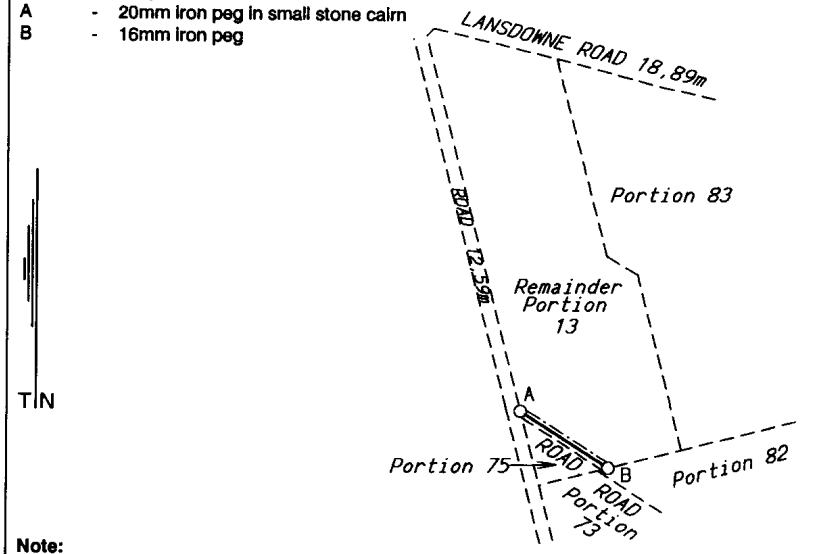
david hellig & abrahamse (ref L3937) SERVITUDE DGM.

OFFICE COPY

SIDES Metres		ANGLES OF DIRECTION		CO-ORDINATES Y System Lo19° X		S.G. No.
AB	98,28	Constants 303 18 20	A	0,00	+ 3700 000,00	10387/1995
			B	+ 41 278,71	+ 63 909,51	Approved
				+ 41 196,57	+ 63 963,48	Surveyor-General
		160 Mactank	◬	+ 23 141,72	+ 71 142,46	1996-05-08
		37 Devils Peak	◬	+ 51 662,73	+ 58 471,22	

Beacon Description

A - 20mm iron peg in small stone cairn
B - 16mm iron peg



Note:
Where limited by the property boundary the servitude extends to the boundary

Scale 1:5000

The line A B

represents the north eastern and south western boundary of an 8,00 metre and 4,00 metre wide pipeline servitude respectively, as shown over

REMAINDER PORTION 13 OF THE FARM SWEET HOME NO. 609

Situate in the Transitional Metropolitan Substructure of the Cape Rural Council
in the Administrative District of the Cape Province of Western Cape

Surveyed in January 1992 to September 1994

by me, **S G Le Brun(PLS0337)**
Professional Land Surveyor

This diagram is annexed to	The original diagram is	File No. CAPE MF
No. dated I.f.o. Registrar of Deeds	No. 2387/1944 annexed to Transfer No. 1944. .13624	S.R. No. E 3288/1995 Comp. AHNC-2211 (M1710) AHNC-2213 (M1716)

david heilig & abrahamse (ref L3937)

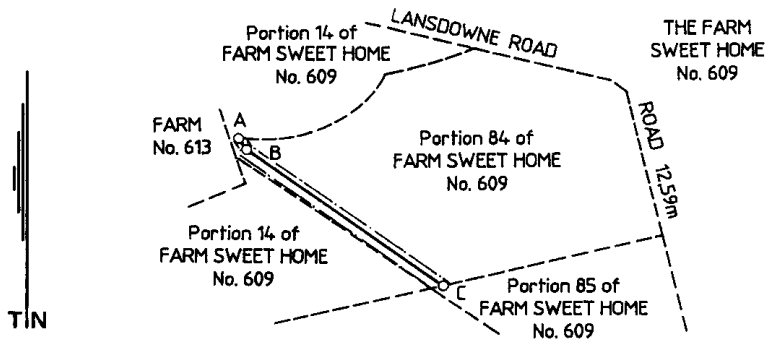
SERVITUDE DGM.

OFFICE COPY

SIDES Metres		ANGLES OF DIRECTION		CO-ORDINATES Y System Lo19° X		
		Constants			0,00	+ 3700 000,00
AB	9,24	344 33 40	A	+	41 714,48	+ 63 616,52
BC	211,09	303 39 50	B	+	41 712,02	+ 63 625,43
			C	+	41 536,32	+ 63 742,44
		160 Mactank	△	+	23 141,72	+ 71 142,46
		37 Devils Peak	△	+	51 662,73	+ 58 471,22

S.G. No.
10389/1995
Approved
for Surveyor-General
1996-05-08

Beacon Description
A,C - 20mm iron peg in small stone cairn
B - Concrete cone



Note:
Where the property boundary is closer than 8,00 metres from the line BC the servitude extends to the property boundary

Scale 1:5000

1) The line AB represents the north eastern and south western boundary of a 4,00 metre and 8,00 metre wide pipeline servitude respectively, as shown
2) The line BC represents the north eastern and south western boundary of a 8,00 metre and 6,00 metre wide pipeline servitude respectively, as shown over

PORTION 84 OF THE FARM SWEET HOME NO. 609

in the Transitional Metropolitan Substructure of the Cape Rural Council
Situate in the Administrative District of the Cape Province of Cape ~~of Good Hope~~ Western

Surveyed in January 1992 to September 1994

by me,

S G Le Brun(PLS0337)
Professional Land Surveyor

This diagram is annexed to	The original diagram is	File No. Cape ~~689~~ MF
No. dated I.f.o. Registrar of Deeds	No. 7148/1988 annexed to Transfer No. 1989. .37411	S.R. No. E3288/1995 Comp. AHNC-2211 (M1710) AHNC-2132 (M1677)

SERVITUDE DGM.

david hellig & abrahamse (ref L3937)

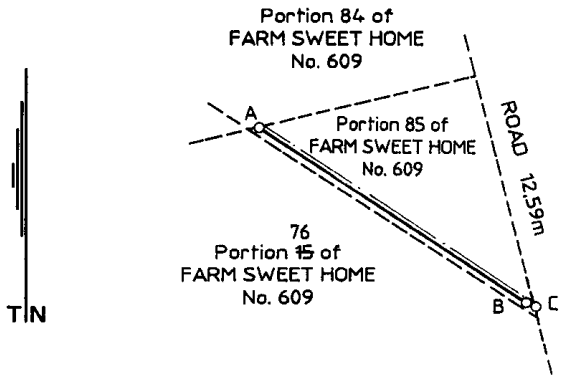
SERVITUDE DGM.

OFFICE COPY

SIDES Metres		ANGLES OF DIRECTION		CO-ORDINATES Y System Lo19° X		
		Constants		0,00	+	3700 000,00
AB	281,36	303 39 50	A	+ 41 536,32	+	63 742,44
BC	9,59	294 48 00	B	+ 41 302,14	+	63 898,40
			C	+ 41 293,44	+	63 902,42
		160 Mactank	◬	+ 23 141,72	+	71 142,46
		37 Devils Peak	◬	+ 51 662,73	+	58 471,22

S.G. No.
10388/1995
Approved
Surveyor-General
1996-05-08

Beacon Description
A - 20mm iron peg in small stone cairn
B - Concrete cone
C - 16mm iron peg



Note:
Where the property boundary is closer than 8,00 metres from the line ABC the servitude extends to the property boundary

Scale 1:5000

The line A B C

represents the north eastern and south western boundary of an 8,00 metre and ~~8~~,00 metre wide pipeline servitude respectively, as shown over

PORTION 85 OF THE FARM SWEET HOME NO. 609

in the Transitional Metropolitan Substructure of the Cape Rural Council Western
Situate in the Administrative District of the Cape Province of Cape ~~of Good Hope~~

Surveyed in January 1992 to September 1994

S G Le Brun(PLS0337)
Professional Land Surveyor

by me.

This diagram is annexed to	The original diagram is	File No. Cape ~~609~~ MF
No. dated i.f.o. Registrar of Deeds	No. 7149/1988 annexed to Transfer No. 1989. .23743	S.R. No. E3288/1995 Comp. AHNC-2211 (M1710)

SERVITUDE DGM.

stern & ekermans
professional land surveyors, cape town

OFFICE COPY

S&E REF. 2225/13

SIDES Metres		ANGLES OF DIRECTION		CO-ORDINATES Y	System Lo 19° X
		Constant		+ 0,00	+3 700 000,00
AB	100,95	285 25 50	A	+ 41 243,88	+ 63 576,33
BC	51,98	282 48 10	B	+ 41 146,57	+ 63 603,19
CD	314,55	346 09 30	C	+ 41 095,88	+ 63 614,71
DE	110,40	76 09 30	D	+ 41 020,63	+ 63 920,13
EF	170,73	166 08 20	E	+ 41 127,82	+ 63 946,54
FG	33,48	121 04 10	F	+ 41 168,72	+ 63 780,78
GA	192,85	166 03 10	G	+ 41 197,40	+ 63 763,50
		4 T 18	⊕	+ 41 287,90	+ 63 548,63
		5 T 18	⊕	+ 41 551,89	+ 63 476,39

S.G. No. 5275-88

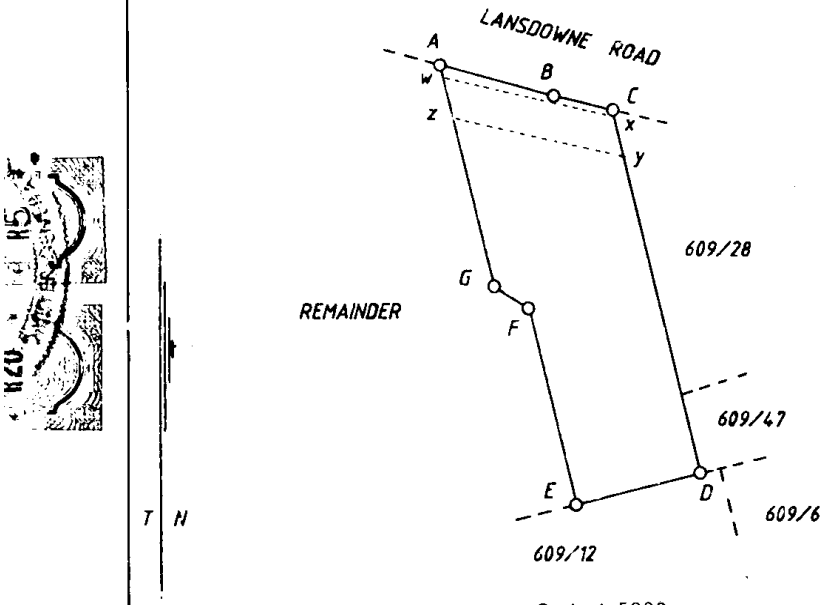
Approved
for Surveyor-General
1988-09-27

Description of Beacons

A B C D E F G 12mm iron peg

Note

The figure w x y z represents an Electric Power Transmission Servitude 31 metres wide vide Dgm. No. 7087/79 annexed to D/S K10/1981S



Scale 1:5000

The figure A B C D E F G

represents 4,2645 Hectares of land, being

Portion 83, a portion of portion 13, of the Farm Sweet Home No. 609 ~~Cape~~

situate ~~at Philippi~~

Administrative District of Cape Province of Cape of Good Hope.

Surveyed in May 1988
by ~~me~~ us

B.L. Gutsman
Land Surveyors

This diagram is annexed to	The original diagram is	File No. Cape 609
No.		S.R. No. E 1808/88
dated	No. 2387/1944 annexed to	Comp. AHNC-2211(M1710)
i.f.o.	Transfer/~~Grant~~	AHNC-2213(M1716)
	No. 1944-273-13624	

david hellig & abrahamse (ref L3937)

SERVITUDE DOM.

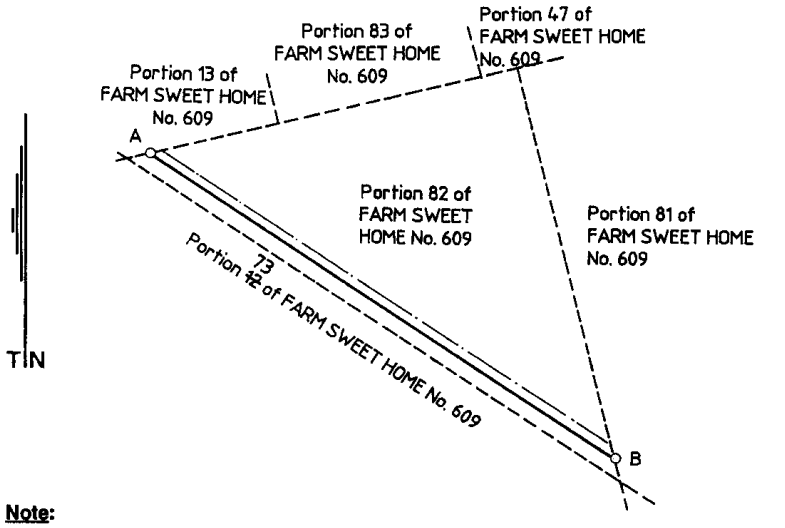
OFFICE COPY

SIDES Metres		ANGLES OF DIRECTION		CO-ORDINATES Y System Lo19° X		S.G. No.
		Constants		0,00	+ 3700 000,00	10386/1995
AB	295,00	303 18 20	A	+ 41 196,57	+ 63 963,48	Approved
			B	+ 40 950,03	+ 64 125,47	for Surveyor-General
						1996-05-08
		160 Mactank	◬	+ 23 141,72	+ 71 142,46	
		37 Devils Peak	◬	+ 51 662,73	+ 58 471,22	

Beacon Description

A - 16mm iron peg

B - 20mm iron peg in small stone cairn



Note:
Where the property boundary is closer than 8,00 metres from the line AB the servitude extends to the property boundary

Scale 1:3000

The line A B

represents the north eastern and south western boundary of an 8,00 metre and 4,50 metre wide pipeline servitude respectively, as shown over

PORTION 82 OF THE FARM SWEET HOME NO. 609

in the Transitional Metropolitan Substructure of the Cape Rural Council Western
Situate in the Administrative District of the Cape Province of Cape ~~of Good Hope~~

Surveyed in January 1992 to September 1994

by me.

S G Le Brun(PLS0337)
Professional Land Surveyor

This diagram is annexed to	The original diagram is	File No. Cape ~~699~~ MF
No. dated I.f.o. Registrar of Deeds	No. 7147/1988 annexed to Transfer No. 1989. .23743	S.R. No. E3288/1995 Comp. AHNC-2213 (M1716)

SERVITUDE DOM.

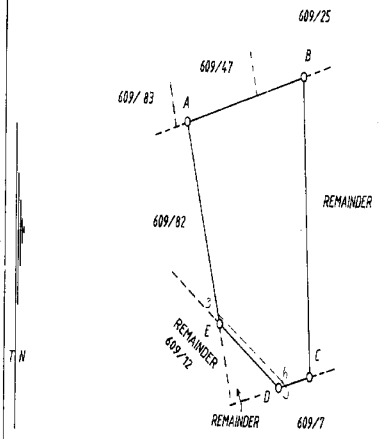
STERN & EKERMANS
Land Surveyors, Cape Town

OFFICE COPY

SIDES Metres		ANGLES OF DIRECTION		CO-ORDINATES Y System Lo 19°	X	S.G. No.
		Constant		+ 0,00	+3 700 000,00	7146-88
AB	209,91	256 11 40	A	+ 41 001,73	+ 63 915,49	
BC	328,43	358 13 30	B	+ 40 797,88	+ 63 865,40	Approved
CD	54,43	76 12 50	C	+ 40 787,71	+ 64 193,67	
DE	127,81	123 20 50	D	+ 40 840,57	+ 64 206,64	for Surveyor-General
EA	227,49	166 10 00	E	+ 40 947,34	+ 64 136,38	
		4 T 18	⊕	+ 41 287,90	+ 63 548,63	1989-02-13
		5 T 18	⊕	+ 41 551,89	+ 63 476,39	

Description of Beacons

A.B.C.D.E 12mm iron peg



Scale 1:5000

The figure A B C D E

represents 5,2335 Hectares of land, being

Portion 81, a portion of portion 6, of the Farm Sweet Home No. 609 ~~Cape~~ 114

situate ~~in at Philippi~~ in 144

Administrative District of Cape Province of Cape of Good Hope.

Surveyed in May 1988 - September 1988

by ~~me~~, us B.R. Goldman Land Surveyors

This diagram is annexed to	The original diagram is	File No. Cape 609
T 62782/89		S.R. No. 3 2493/88
No.	No. 2380/1944 annexed to	Comp. AHNC - 2211(M1710)
dated	Transfer ~~Grant~~	AHNC - 2212(M1711)
i.f.o.	No. 1944-254-12680	AHNC - 2213(M1716)
Registrar of Deeds		AHNC - 2214 (M1717)

C

S G E REF. 2225/13 FOR ENDORSEMENTS

SERVITUDES/LEASEHOLD AREAS

SURVEY RECORD	DIAGRAM NO.	DESCRIPTION	DATE	INITIALED
E2288/95	10386/95	The line g h j represents the north western and south western boundaries of the servitude		

WESTERN CAPE REGIONAL SERVICES COUNCIL

In terms of Section 23(1) of Ordinance No. 15 of 1985, this subdivision is exempt from the provisions of Chapter 3 of the said Ordinance.

SUBDIVISIONAL PROVISIONS OF ORDINANCE NO. 15/1985

29. 6. 1988.

for CHIEF EXECUTIVE OFFICER Date

SUBDIVISIONAL PROVISIONS OF ACT 70 OF 1970

2(a)

SERVITUDE DCM.

OFFICE COPY

SIDES Metres		ANGLES OF DIRECTION
AD	675,20	282·38·50
BC	187,31	282·38·50
BE	21,85	166·09·40
CF	21,28	166·09·40

CO-ORDINATES	Y System Lo 19°	X
Constant	0,00	+3 700 000,00
A	+41 556,00	+63.531,50
B	+41 090,65	+63 635,92
C	+40 907,89	+63 676,94
D	+40 897,18	+63 679,34
E	+41 095,88	+63 614,71
F	+40 912,98	+63 656,27
2T18	+40 772,39	+63 669,15
3T18	+40 989,56	+63 618,47

S.G. No.
7088/79

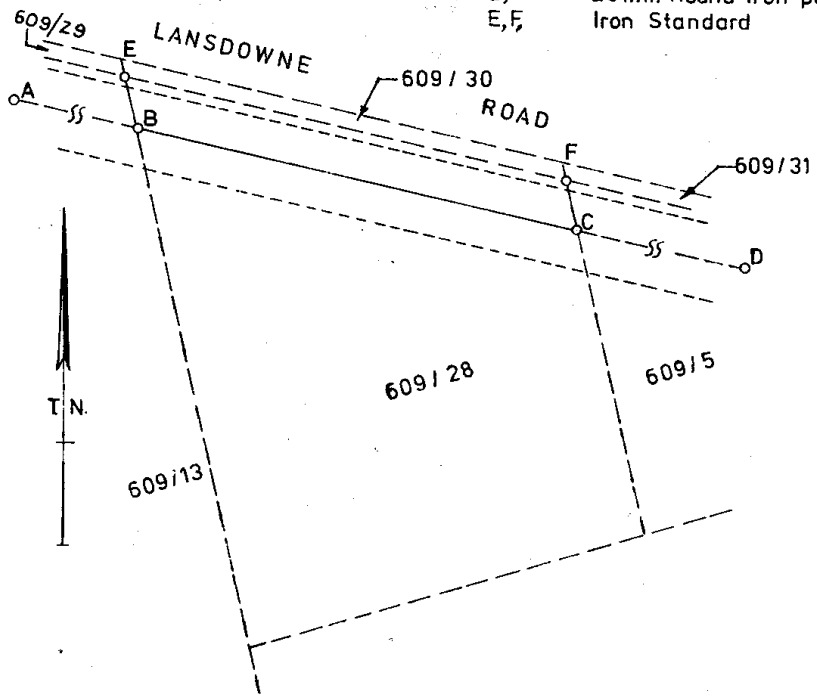
Approved

Surveyor-General

10 -1- 1980

Beacon Description

A,B,C, 12 mm. Round iron peg.
D, 25 mm Round iron peg.
E,F, Iron Standard



Scale 1: 2500

The ~~figure~~ line B,C represents the centre line of an Electric Power ~~represents~~ Transmission Servitude ~~Area~~ 31 metres wide over ~~of land, being~~ Portion 28 of the Farm Sweet Home No.609 ~~Cape~~ situate ~~in~~ at Philippi

Administrative District of the Cape. Province of Cape of Good Hope.

Surveyed in December 1976 - March 1977
by me

Land Surveyor

This diagram is annexed to No. D/S K 381/81S dated i.f.o. Registrar of Deeds	The original diagram is No. 4229/36 annexed to Transfer/~~Grant~~ No. 1957·193·9609	File No. ~~S/11788~~ CAPE 609 S.R. No. E. 2159/79 Comp. AH-2AA/V3/~~2023~~ (6633)

Sdv 7088/79

Appendix 2: Primary Science Programme lease agreement with City of Cape Town

AGREEMENT OF LEASE made and entered into between THE CITY OF CAPE TOWN *(hereinafter called the "Lessor")* of the one part and the Western Cape Primary Science Programme Trust (Registration Number: IT2806/99) *(hereinafter called the "Lessee")* of the other part.

WHEREAS the Lessee has applied to the Lessor for the lease of a garage and extension which is approximately 161m² in extent and a cottage which is approximately 64m² in extent, as shown on attached Plan a copy of which is annexed hereto *(hereinafter referred to as "the Land")*. The above properties are City-owned.

AND WHEREAS the Lessor has agreed to lease to the Lessee the said Land.

NOW THEREFORE THE PARTIES HERETO AGREE AS FOLLOWS:

1. COMMENCEMENT DATE AND PERIOD OF LEASE

   1.1 This lease shall endure for a period of 15 years with an option to be renewed at the end of the period for a further five years, reckoned from the 1st day of April 2003.

2. RENTAL

   2.1 The Lessee shall pay to the Lessor a rental of R3500.00 per month, which includes services charges, but excludes electricity, water and sewerage, such rental to be payable in advance at any cash receiving office of the City of Cape Town or such other place as the Lessor may nominate in writing from time to time. The rent is to be paid into account no. 2322/638/101 on or before the 7th day of each month for the duration of the lease.

   2.2 The rental shall NOT be subject to VAT.

3. RATES, TAXES AND OTHER CHARGES

   3.1 The Lessor shall pay rates and taxes due or which may become due on the Land, buildings and structures thereon if applicable.

   3.2 The Lessee shall pay the Lessor at the tariff rates applicable from time to time for all water and electricity used on the Land.

(AGR 110303.WB WPD)

4. DEVELOPMENT

The Lessee shall commence improvement of the buildings prior to the date of the signing of this agreement by the Lessor and shall proceed with such improvements to the satisfaction of the Lessor. Details of the building work layout and landscaping of the Land must be submitted to the Lessor for approval before any work is undertaken.

5. UTILITIES

5.1 In respect of the Land, the Lessee shall:-

5.1.1 be responsible, where applicable, for the costs of all electricity and other services required in respect of the buildings; and

5.2 The Lessee shall pay for the cost of all electricity, gas and water supplied to and consumed upon the Land during this Lease.

5.3 The Lessee shall pay to the Lessor the cost of all services relating to the Land, including, but not limited to, the cost of sewerage discharge and refuse removal.

4.4 The Lessor will take responsibility for the following security services :
Two nightwatchmen will be on duty per night
Two general workers will be on site daily providing a presence on site while they go about their tasks.
An alarm system will be installed on the land linked to Council's Rapid Deployment Unit which is an armed response unit.

6. CONDITION AND USE OF LAND

6.1 The Land shall be used only for environmental educational purposes in accordance with the Mission Statement of the PSP, which includes, inter alia, to improve the quality of teaching and learning of science and related subjects through the development and support of competent primary school teachers. The PSP recognises the need for the development of a socially and environmentally responsible scientific and technological culture that enhances life skills, vocational opportunities and public commitment to economic development in a healthy environment.

6.2 No activity different to an activity contemplated in sub-clause 6.1 shall be undertaken by the Lessee on the Land without the prior written consent of the Lessor, and the Lessee shall ensure that no such unauthorised activities are undertaken by any other person. The Lessor shall be entitled, when granting its consent to any proposed activities, to impose such reasonable conditions relating to such activities as it may deem fit, and the Lessee shall be bound to observe the same.

6.3 In its use of the Land, the Lessee shall:-

6.3.1 conform with all laws and statutory, municipal and other by-laws and regulations relating to lessees or occupiers of the Land including the requirements of the Director : Community Services.

6.3.2 not knowingly nor negligently cause nor allow to be caused any obstructional blockage or failure in any sewerage pipes, water pipes, drains and other supply equipment and installations serving the Land and shall at his own cost remove any obstruction or blockage in any pipe or drain serving the Land, and where necessary repair the pipe or drain concerned;

6.3.3 not act, nor permit any person to act in a manner, in relation to the Land, which may be a source of annoyance or nuisance to, or cause damage or disturbance to, the occupants of neighbouring properties.

6.4 This lease shall be subject to all servitudes and conditions, if any, binding on the

Lessor in respect of the Land hereby leased.

6.5 The Lessee shall not remove or cause or permit to be removed from the Land any soil, clay, gravel, sand or other matter upon or below the surface of the Land without the prior written consent of the Lessor.

6.6 No trees growing on the land may be removed or interfered with without the written consent of the Director : Municipal Services.

6.6.4 Any maintenance to the trees shall be undertaken under the direction of the Lessor's Director Parks and Forests or his nominated representative.

6.6.5 The responsibility for the arrangement of and the costs pertaining to any required tree work shall be borne by the Lessee.

6.7 The Lessee shall not erect or cause or permit to be erected any buildings and/or structures on the Land without the prior written consent of the Lessor nor shall the Lessee effect any improvement or additions of such buildings and/or structures nor make any substantial variations or alterations on the Land without the prior written consent of the Lessor.

6.8 The Lessee shall maintain such Land, buildings and structures thereon in good order and condition.

6.9 The Lessee shall be responsible at all times for the maintenance of good order and behaviour on the land.

(AGR 11003 WB WPD)

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7. MAINTENANCE

7.1 The Lessor may at all mutually convenient times through its officials enter upon the Land or any buildings or structures erected thereon and inspect the same, and may make an inventory of all defects or matters for repair found thereon or therein for which the Lessee is responsible as herein provided and within fourteen days of the receipt of a notice in writing from the Lessor calling upon it so to do, the Lessee shall make good any defects or matters requiring repair as aforesaid and if the Lessee shall fail to do so, the Lessor or its appointed representative may enter upon the Land, buildings and structures and remedy such defects or make and effect the repairs aforesaid and recover the cost from the Lessee.

8. ADVERTISEMENTS

8.1 The Lessee shall not, without the written consent of the Lessor, use or cause or permit to be used any fence, structure or the exterior of any building on the Land for the display of advertisements of any description whatsoever.

9. INSURANCE

9.1 The Lessee undertakes for the currency of this lease to insure and keep insured against damage or loss by fire or earthquake the buildings and structures to be erected upon the Land in terms of this lease for such sum or sums as may be necessary to cover their replacement and the Lessee shall cede such policies of insurance to the Lessor, and forward the annual renewal receipts to the Lessor's Executive Director, Corporate Finance, Civic Centre, Cape Town on or before due date each year.

10. FIRE PROTECTION

10.1 (a) The Lessee agrees to abide by the National Building Regulations promulgated under the National Building Regulations and Building Standards Act, 1977 as amended from time to time, relating to Fire Protection and in particular by Regulation T1 (General Requirement) and Regulation T2 (Offences), the contents and effect of which the Lessee

acknowledges to know and understand.

(b) The Lessee hereby indemnifies the Lessor against any claim of whatsoever nature, which may be made against the Lessor arising either directly or indirectly from non-compliance with the said Fire Protection Regulations.

10.2 The Lessee shall at all times obey the lawful instructions of an official of Council, allow inspections by an official of Council, and in general co-operate with the Fire Prevention Services of the Lessor or any other authority which may replace the said bodies or take over the responsibility of ensuring compliance with the Fire Regulations as amended from time to time.

10.3 The Lessee shall maintain and repair all fire prevention equipment on the Land and shall have same serviced on a regular basis as required by the Fire Prevention Services of the Lessor or any other authority which may replace the said bodies or take over the responsibility of ensuring compliance with the Fire Regulations as amended from time to time.

11. INDEMNITY

11.1 The Lessee hereby indemnifies the Lessor and undertakes to keep the Lessor indemnified against all liability howsoever caused or arising, all actions, suits, proceedings, claims, demands, costs and expenses whatsoever which may be taken or made against the Lessor or become payable by the Lessor at the suit of any person that may be the direct or indirect result of the Lease of the Land.

11.2 The parties agree that any claim arising out of this Agreement of Lease may be instituted in a magistrates court having jurisdiction in respect of the Land so leased notwithstanding the amount of such claim.

11.3 The Lessee hereby agrees to the Council being permitted to cede or assign the Council's rights under the Lease in the event of the Lessor deciding to dispose of the Freehold or Leasehold provided that such disposition shall be subject to the existing rights of the Lessee.

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12. SUBLETTING

12.1 The Lessee shall not sublet or part with the possession of any portion of the Land without the consent of the Lessor in writing.

13. LIQUOR LICENCE

13.1 Neither the Lessee nor any other person shall acquire or hold any licence for the sale of intoxicating liquor upon the Land without the prior written consent of the Lessor. The Lessee shall not do, permit, allow or suffer any person to do anything on the Land which would be an infringement of the law for the time being regulating the sale, supply or delivery of intoxicating liquor.

14. NOISE/DISTURBANCE/CONDUCT

14.1 The Lessee shall be responsible at all times for the maintenance of good order, behaviour and government on the Land and within any buildings and/or structures thereon.

14.1.1 The Land or buildings shall not be used for discotheque purposes, dances, parties or any other purpose which is likely to cause a nuisance and/or disturbance to the surrounding neighbourhood.

14.1.2 No amplification of sound and/or musical instruments shall be used on the Land.

14.1.2.1 Any public address made at any sports function or meeting shall be made by means of a megaphone only and shall not be supported by any mechanical and/or electrical device for additional sound amplification, unless such devices are restricted to a sound pressure level of 35 dBA at the boundary of the Land.

14.1.2.2 Notwithstanding the provisions of Clause 14.1.2.1, the Lessee shall not generate or allow to be generated

any disturbing noise or noise nuisance as defined in the Noise Control Regulations.

14.1.3 Sports related or social activities must be concluded by not later that 10:45 p.m.

15. FLOODLIGHTS

15.1 Floodlights must be extinguished by not later than 09:30 p.m.

16. ACCESS TO LAND BY LESSOR

16.1 The Lessor reserves the right of free access, at a time mutually agreed by the lessor and lessee, to the Land for the purpose of inspection, maintenance, renewal, cleansing, repairs and reconstruction of, or in connection with existing foul sewers, rising mains, stormwater drains, watermains, electric cables, or any works appurtenant thereto, or in regard to any such or other municipal services which the Lessor may in future lay in or across the Land, the Lessor reserving to itself the right to establish such services by mutual agreement. The Lessee shall not build over, alter, or in any manner disturb such services except with the express permission in writing of the Director : Municipal Services in respect of the services concerned, and upon due compliance with any specified precautionary measures. Should work involving maintenance, clearing, construction, reconstruction or repairs become necessary at any time the Lessor shall, in performing such work cause as little inconvenience as possible to the Lessee, and the Lessor shall re-instate as nearly as reasonably possible to its original condition the surface of any ground disturbed.

16.2 The Lessor shall not be liable for any damage of any nature whatsoever, which the Lessee may suffer from whatsoever cause or its employees acting within the scope of their duties arising either directly or indirectly out of this lease or the use of the Land.

17. LESSEE'S BREACH OF LEASE

17.1 Should:-

17.1.1 the Lessee fail to pay any rental instalment on due date, and thereafter fail to do so within a period of seven (7) days of having been requested to do so; or

17.1.2 breach any other provision of this Lease and fail to remedy such breach within a month of the giving to him by the Lessor of notice requiring such breach to be remedied;

the Lessor shall then, subject to the provisions of sub-clause 19.3, be entitled to cancel this Lease on notice to the Lessee to such effect, such cancellation to be without prejudice to any other claim which the Lessor may have against the Lessee arising out of such breach and/or cancellation.

17.2 Should an attorney be engaged, by reason of default on the part of the Lessee, to collect any amount owing to the Lessor in terms of this Lease, then the Lessee shall be responsible for the payment of all charges incurred with such attorney, as between attorney and client including collection commission where applicable.

17.3 Should the Lessor cancel this Lease and the Lessee dispute the Lessor's right to do so, and remain in occupation of the Land pending the determination of the dispute, then:-

17.3.1 the Lessee shall continue to make all payments in terms of this Lease on the due date thereof; and

possession of portion only of the Land be resumed and the remainder of the land is of such an extent that it is of insufficient size for the purpose for which the Land is being 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 its own funds and not for improvements made out of funds provided by the Lessor, and for improvements made before the completion of this Agreement by the Lessee, and actually existing at the time the lease is cancelled or amended. The Lessor reserves the right in its absolute discretion to decide for what improvements it shall pay compensation in terms of this clause.

18.3 No compensation shall be payable unless the Lessee shall have deposited with the Lessor within one month after the completion of such improvements a Certified Statement showing the actual capital cost thereof. The Lessor shall be entitled, if it so wishes, to inspect the Lessee's books of account to verify the said Statement.

18.3.1 Compensation in terms of Clause 20.2, if paid, shall be calculated according to the formula:

$$\text{Compensation:} \quad \frac{CX}{Y}$$

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 Clause 20.3 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.

18.4 The Lessor shall have the right at any time, through the Executive Director, Corporate Finance or his nominee, to have access to the books, accounts, records, etc. kept by the Lessee and the Lessee shall submit financial statements should these statements be called for by the Lessor.

18.5 The grant of the lease hereby constituted shall under no circumstances be deemed to confer any real right of servitude of any kind in favour of the Lessee. Upon a demand, made in terms of the Lease, by the Lessor for quiet

18.3 No compensation shall be payable unless the Lessee shall have deposited with the Lessor within one month after the completion of such improvements a Certified Statement showing the actual capital cost thereof. The Lessor shall be entitled, if it so wishes, to inspect the Lessee's books of account to verify the said Statement.

18.3.1 Compensation in terms of Clause 20.2, if paid, shall be calculated according to the formula:

Compensation: $\frac{CX}{Y}$

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 Clause 20.3 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.

18.4 The Lessor shall have the right at any time, through the Executive Director, Corporate Finance or his nominee, to have access to the books, accounts, records, etc. kept by the Lessee and the Lessee shall submit financial statements should these statements be called for by the Lessor.

18.5 The grant of the lease hereby constituted shall under no circumstances be deemed to confer any real right of servitude of any kind in favour of the Lessee. Upon a demand, made in terms of the Lease, by the Lessor for quiet possession of the Land, the Lessee shall be bound to give such possession without any right of retention or right of compensation whether for useful or necessary expenses.

18.6 The Lessee shall at the expiration of this lease or renewal thereof restore and deliver up to the Lessor the Land in a condition substantially the same as that existing at the commencement of the lease satisfactory to the Lessor.

19. DOMICILIUM

19.1 The Lessor chooses domicilium citandi et executandi for all purposes hereunder at:

The Civic Centre, 12 Hertzog Boulevard, Cape Town,

or such other address as it may from time to time advise the Lessee of in writing.

19.2 The Lessee chooses domicilium citandi et executandi for all purposes hereunder at the Edith Stephens Wetland Park, Lansdowne Road, Philippi or the postal address

P O Box 529
Howard Place
7450

or such other address being, however, an address in the Republic of South Africa as it may from time to time advise the Lessor of in writing.

19.3 Any notice to be given in terms of this Lease by the Lessor to the Lessee or vice versa shall be given in writing and sent by pre-paid registered post or be delivered by hand and if sent by pre-paid registered post shall be deemed to have been received TEN (10) DAYS after posting.

19.4 The Lessee undertakes to notify the Lessor within TEN (10) DAYS of any change in the Lessee's postal address.

20. NO OFFER TO LEASE

This lease document should not be construed, nor is it an offer to lease Land either by the Lessor or its agent. Prior to duly authorised signature by the Lessor, the Lessor may at its sole discretion refuse to accept this lease at which time no agreement shall exist nor shall the Lessor or its agent be liable for any damages of any nature whatsoever, which damages may arise as a result of the Lessors refusal to accept this lease, thereby failing to enter into an agreement with the Lessee.

Addendum

The Environmental Management Branch exonerates the Municipal Property Branch from paying any service charges.

The Environmental Management Branch exonerates the Municipal Property Branch from providing security on site. This will remain the responsibility of the Environmental

Management Branch.

Signed at Cape Town this 4 day of June 2003

ACTING DIRECTOR: PROPERTY MANAGEMENT

For and on behalf of the City of Cape Town the lease having been duly authorised by resolution of the dated .

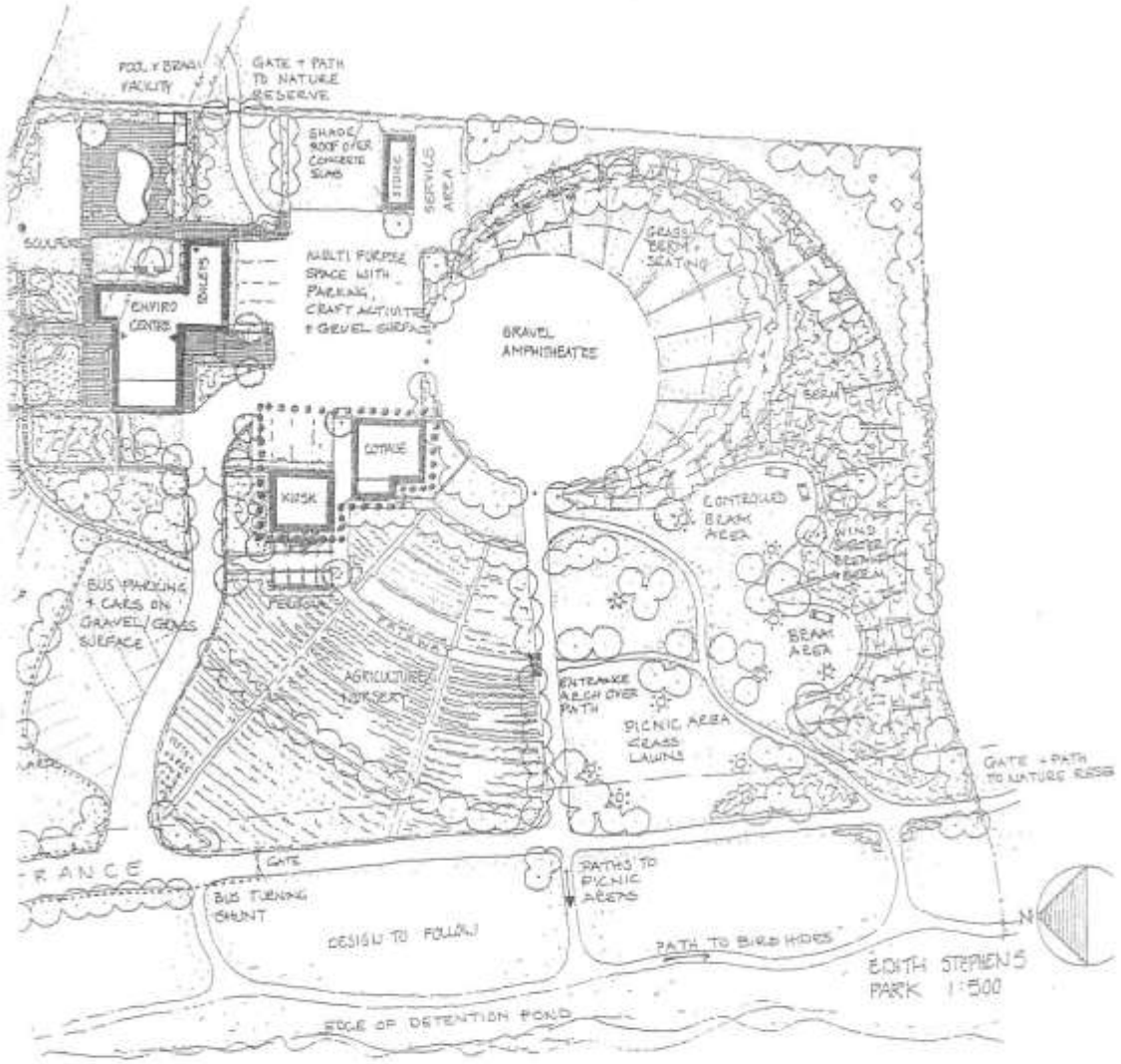
Signed on this 27th day of March at Cape Town in the presence of the undersigned witnesses:

AS WITNESSES:

1 .....

M. Ainslie ..... 2. .....

LESSEE


GATE + PATH TO NATURE RESERVE
SHADE ROOF OVER CONCRETE SLAB
SERVICE AREA
GRASS BERM + SEATING
MULTI PURPOSE SPACE WITH PAVING, CRAFT ACTIVITY + GRAVEL SURFACE
ENVIRO CENTRE
GRAVEL AMPHITHEATRE
COTTAGE
KIOSK
CONTROLLED BURN AREA
BERM
BUS PARKING + CARS ON GRAVEL / GRASS SURFACE
AGRICULTURE NURSERY
ENTRANCE ARCH OVER PATH
PICNIC AREA GRASS LAWNS
GATE + PATH TO NATURE RESERVE
GATE
BUS TURNING SHUNT
PATHS TO PICNIC AREAS
DESIGN TO FOLLOW
PATH TO BIRD HIDES
EDITH STEPHENS PARK 1:500
EDGE OF DETENTION POND
LEASE AREA FOR P.S.P.

VANGUARD DRIVE
LANSDOWNE ROAD
EDITH STEPHENS
WETLAND PARK

B. SPECIES CHECKLISTS

Appendix 3: Plant list for Edith Stephens Nature Reserve

Family	Scientific names	Common names	Red Data Status
AMARYLLIDACEAE	Amaryllis belladonna	March lilly	
APONOGETONACEAE	Aponogeton angustifolius		
ASTERACEAE	Arctotheca calendula		
FABACEAE	Aspalathus hispida		
ASPARAGACEAE	Asparagus capensis		
COLCHICACEAE	Baeometra uniflora		
CYPERACEAE	Brunsvigia orientalis		
AIZOACEAE	Carpobrotus edulis		
IRIDACEAE	Chasmanthe aethiopica		
AMARANTHACEA	Cheponopodium sp		
RESTIONACEA	Chondropetalum monilifera		
ASTERACEAE	Chrysanthemoides monilifera		
ROSACEAE	Cliffortia sp		
ASTERACEAE	Conyza canariensis		
ASTERACEAE	Cotula coronopifolia		
ASTERACEAE	Cotula turbinate		
ASTERACEAE	Cotula vulgaris		
CRASSULACEAE	Crasula decumbens		
CRASSULACEA	Crassula glomeranta		

CRASSULACEAE	Crassula natans		
POACEAE	Cynodon dactylon		
CYPERACEAE	Cyperus papyrus		
CYPERACEAE	Cyperus tenellus		
BORAGINACEAE	Echium plantageneum		
POACEAE	Ehrharta calycina		
ASTERACEAE	Felicia tenulla		
IRADACEAE	Ferraria cripa		
CYPERACEAE	Ficinia dumensis		
FUMARIACEAE	Fumaria muralis		
IRIDACEAE	Geissorhiza aspera		
IRIDACEAE	Geissorhiza juncea		
GERANIACEAE	Geranium incanum		
IRIDACEAE	Gladiolus quandragulus		
CELASTRACEAE	Gymnosporia buxifolia		
ASTERACEAE	Helichrysum sp		
BRASSICACEAE	Heliophila pusilla		
CYPERACEAE	Hellmuthia membranacea		
IRIDACEAE	Hesparantha falcate		
HYDRODICTYACEAE	Hyrdodictyon africanum		
RESTIONACEAE	Ischyroleopis sabulosa		
ISOETACEAE	Isoetes capansis		
POACEAE	Isolepis cernua		
MESEMBRYANTHEMACEAE	Jordaaniela dubia		

JUNCACEAE	Jancus cephalotes		
JUNCACEAE	Jancus kraussii		
HYACINTHACEAE	Lachenalia aloides		
HYACINTHACEAE	Lachenalia arbuthnotiae		
HYACINTHACEAE	Lachenalia orchioides		
ERICAEAE	Leucodendron levisanus		
POACEAE	Langurus ovatans		
AIZOACEAE	Lamprunthus reptans		
CYPERACEAE	Mariscus thumbergii		
ASTERACEAE	Metalasia muricata		
IRIDACEAE	Mincranthus alopecuroides		
IRIDACEAE	Mincranthus junceus		
ORCHIDACEAE	Monadenia bracteata		
OXALIDACEAE	Oxalis caprina		
OXALIDACEAE	Oxalis pes-caprae		
GERANIACEAE	Pelargonium anethifolium		
GERANIACEAE	Perlagonium capitatum		
GERANIACEAE	Perlagonium myrrhifolium		
GERANIACEAE	Perlagoniun triste		
PLANTAGINACEAE	Plantango crassifolia		
ASTERACEAE	Plecostachys serpyllifolia		
POTAMOGETONACEAE	Potamogeton pusillus		
ANACARDIACEAE	Rhus glaunca		

ANACARDIACEAE	Rhus laevigata		
IRIDACEAE	Romulea rosea		
AIZOACEAE	Ruschia macowanii		
LAMIACEAE	Salvia Africana-lutea		
CHENOPODIACEAE	Sarcocornia capensis		
ORCHIDACEAE	Satyrium odorum		
CYPERACEAE ASTERACEAE	Schoenus nigricans		
ASTERACEAE	Senacio burchellii		
ASTERACEAE	Senacio elegans		
ASTERACEAE	Senacio littoreus		
ASTERACEAE	Senacio pterophorus		
IRIDACEAE	Sparaxis bulbifera		
HYPOXIDACEAE	Spiloxene aquatic		
POACEAE	Sporobolus virginicus		
POACEAE	Stenotaphrum secundatum		
FABACEAE	Sutherlandia frutescens		
SANTALACEAE	Thesrum strictum		
ASPHODALACEAE	Trachyandra ciliate		
ZYGOPHYLLACEAE	Tribubulus terrestris		
TROPAEOLACEAE	Tropaeolum majus		
TYPHACEAE	Typha capensis		
ASTERACEAE	Ursinia anthemoides		
HAEMODORACEAE	Wachendorfia paniculata		
IRADACEAE	Watsonia meriana		

CAMPANULACEAE	Wimmerella secunda		
ARACEAE	Zantedeschia aethiopica		

Appendix 4: Mammal list for Edith Stephens Nature Reserve

Family name	Scientific name	Common name
MUSTELIDAE	Aonyx capensis	Cape clawless otter
BATHYERGIDAE	Georychus capensis	Cape dune molerat
CHRSYCLORIDAE	Chrysocloris asiatica	Cape golden mole
BATHYERGIDAE	Cryptomys hottentotus	Cape molerat
MURIDAE	Mus minutoides	Pygmy mouse
MURIDAE	Mus musculus	House mouse
MURIDAE	Otomys irroratus	Vlei rat
MURIDAE	Rattus norvegicus	Brown rat
MURIDAE	Rhabdomys pumilio	Striped field mouse
MURIDAE	Tatera afra	Cape Gerbil

Appendix 5: Bird list for Edith Stephens Nature Reserve

Family name	Scientific name	Common name
PODICIPEDIDAE	Podiceps cristatus	Great crested grebe
PODICIPEDIDAE	Tachybaptus ruficollis	dabchick
PELECANIDAE	Pelecanuwhite onocrotauls	White pelicans
PHALACROCORACIDAE	Phalacrocorax licidus	White breasted cormorant
PHALACROCORACIDAE	Phalacrocorax africanas	Reed cormorant
ANHINGIDAE	Anhinga rufa	Darter
ARDEIDAE	Ardea cinerea	Grey heron
ARDEIDAE	Aredea melanocephala	Black headed heron
ARDEIDAE	Ardea purpurea	Purple heron
ARDEIDAE	Egretta garzetta	Little egret
ARDEIDAE	Egretta intermedia	Yellow billed egret
ARDEIDAE	Bubulcus ibis	Cattle egret
ARDEIDAE	Nycticorax nycticorax	Black crowned Night Heron
ARDEIDAE	Ixobrychus minutus	Little bittern
THRESKIORNITHIDAE	Threskiornis aethiopicus	Sacret ibis
THRESKIORNITHIDAE	Plegadis falcinellus	Glossy ibis
THRESKIORNITHIDAE	Bostrychia hagedash	Hadeda ibis
THRESKIORNITHIDAE	Platalea alba	African spoonbill
ANATIDAE	Dendrocygna bicolor	Fulvous duck
ANATIDAE	Thalassornis leuconotus	White backed duck
ANATIDAE	Alopochen aegyptiacus	Egyptian goose
ANATIDAE	Anus undulata	Yellow billed duck
ANATIDAE	Anas erythrophthalma	Red billed teal

ANATIDAE	Anus capensis	Cape teal
ANATIDAE	Anus smithii	Cape shoveler
	Netta erythrophthalma	Southern pochard
ELANIDAE	Elanus caeruleus	Black shouldered kite
FALCONIDAE	Falco rupicolis	Rock kestrel
PHASIANIDAE	Ptenistes capensis	Cape francolin
WUMIDIDAE	Numida meleagris	Helmeted guineafowl
	Porphyrio madagascariensis	Purple gallinule
RALLIDAE	Galinula chloropus	moorhen
RALLIDAE	Fulicica cristata	Red knobbed coot
ROSTRATULIDAE	Rostratula benghalensis	Painted snipe
CHARANDRILDAE	Vanellus coronotus	Crowned plover
CHARANDRILDAE	Vanellus armatus	Black smith plover
CHARANDRILDAE	Charadrius tricollaris	Three blanded plover
SCOLOPACIDAE	Tringa glareola	Wood sand piper
SCOLOPACIDAE	Tringa nebularia	greenshank
ROSTRATULIDAE	Gallinango nigripennis	Ethiopian snipe
RECURVIROSTRIDAE	Himantopus himantopus	Black winged stilt
LARIDAE	larus vetula	Kelp gull
LARIDAE	Larus hartlaubii	Hartlab`s gull
LARIDAE	Chlidonias leucopterus	White winged tern
COLUMBIDAE	Columba livia	Feral pigeon
COLUMBIDAE	Columba guinea	Rock pigeon
COLUMBIDAE	Streptopelia semitorquata	Red-eye dove

COLUMBIDAE	Streptopelia senegalensis	Cape turtle dove
COLUMBIDAE	Streptopelia senegalensis	Laughing dove
APOPIDAE	Apus melba	Alpine swift
ALCEDINIDAE	Ceryle rudis	Pied king fisher
HIRUNDUNIDAE	Riparia palucodia	Brown-throated martin
HIRUNDUNIDAE	Riparia cincta	Banded martin
COVIDAE	Corvus albus	Pied crow
COVIDAE	Corvus splendens	House crow
PYCNONOTIDAE	Pycnonotus capensis	Cape bulbul
AEROCEPHALIDAE	Acrocephalus gracilirostris	Cape reed warbler
CISTICOLIDAE	Cisticola juncidis	Fantailed cisticola
CISTICOLIDAE	Cisticola tinniens	Levaillant`scisticola
CISTICOLIDAE	Prinia malucosa	Spotted prenea
MOTACILLIDAE	Motacilla capensis	Cape wagtail
MOTACILLIDAE	Anthus cinnamomeus	Grassveld pipit
MOTACILLIDAE	Macronyx capensis	Orange-throated longclaw
PRIONOPIDAE	Onchychognathus morio	Red -winged starling
PRIONOPIDAE	Sturnus vulgaris	Eurasian starling
NECTARINIDAE	Nectarinia famosa	Malachite sunbird
PASSERIDAE	Passer domesticus	House sparrow
PLOCEIDAE	Ploceus capensis	Cape weaver
PLOCEIDAE	Ploceus velatus	Masked weaver
PLOCEIDAE	Eupleceus orix	Red bishop
EMBERIZIDAE	Eupleceus capensis	Yellow-rumped widow
PLODEIDAE	Vidua macroura	Pintailed whydah

FRINGILLIDAE	Serinus canacolis	Cape canary
FRINGILLIDAE	Serinus sulphuratus	Bully canary
FRINGILLIDAE	Serinus flaviventris	Yellow canary

Appendix 6: Reptile list for Edith Stephens Nature Reserve

Family name	Scientific name	Common name
SCINCIDAE	Acontias meleagris	Cape legless skink
GECKONIDAE	Afrogecko porphyreus	Marbled leaf-toad Gecko
CHAMELEONIDAE	Bradypodion pumilum	Cape dwarf chameleon
TESTUDINIDAE	Chersina angulata	Angulated tortoise
COLUBRIDAE	Duberria litrix	Common slang eater
COLUBRIDAE	Lamprophis aurora	Aurora house snake
COLUBRIDAE	Lamprophis guttatus	Olive house snake
PELOMEDUSIDAE	Pelomedusa subrufa	Marsh Terrapin
PELOMEDUSIDAE		Cross marked grass snake
COLUBRIDAE	Psammophylax rhombeatus	Rhombic skaapteker
PSEUDASPIDIDAE	Pseudaspis cana	Mole snake:
SCINCIDAE	*Trachylepis capensis*	Cape skink

Appendix 7: Amphibian list for Edith Stephens Nature Reserve

Family name	Scientific name	Common name
BUFONIDAE	*Amietophrynus pantherinus*	August toad, Panther toad snoring toad, leopard toad
RANIDAE	*Strongylopus grayii*	Clicking stream frog
RANIDAE	*Tomopterna delalandii*	Cape sand frog
PIPIDAE	*Xenopus laevis*	Common platanna

Appendix 8: City of Cape Town vegetation summary, 2008

Summarized Descriptions of National Vegetation Types Occurring in the City of Cape Town

Patricia Holmes, Biodiversity Management Branch, July 2008

The following descriptions reflect the latest national vegetation information available[1] [2] and the vegetation units described below (in alphabetical order) form the basis for the latest terrestrial conservation planning done in the City. Vegetation types are landscape-scale units of biodiversity that comprise a range of different plant communities and habitats. For example, calcrete outcrops and wetlands occur within particular vegetation types and contribute to overall biodiversity in those vegetation types. In addition, where two different vegetation types meet, there may be an abrupt vegetation boundary, reflecting a sudden change in underlying geology and soils, or else a wide transition zone – often called an ecotone – where physical changes are more gradual and attributes of both vegetation types are mixed.

It is important to note that all fynbos and renosterveld vegetation types are fire-prone and require periodic fires to regenerate their full species complement and prevent plant extinctions. Fire-return intervals are generally prescribed at between 8-30 years for fynbos and 4-10 years for renosterveld, with factors such as rainfall and soil-type playing a role in growth rates and required burning schedules. In the Cape Town area the natural fire season (and the optimal season for biodiversity conservation) is summer (January to March). By contrast, fire is not essential (but may occur occasionally) in strandveld and forest vegetation types.

Atlantis Sand Fynbos

(Previously described as Sand Plain Fynbos)

Distribution: Western Cape Province: Rondeberg to Blouberg on the West Coast coastal flats; along the Groen River on the eastern side of the Dassenberg-Darling Hills through Riverlands to the area between Atlantis and Kalbaskraal, also between Klipheuwel and the Paardeberg with outliers west of the Berg River east and north of Riebeek-Kasteel betweeen Hermon and Heuningberg.

[1] Based on: Mucina L & Rutherford M L (editors) 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19, SANBI, Pretoria; Driver A (in prep) Threatened ecosystems for listing under NEM:BA 2008, South African Biodiversity Institute, Pretoria.

[2] See Table 1. and accompanying vegetation map

Altitude 40–250 m. 37.5% of this vegetation type occurs within the City and 62.5% outside the City. However, transformation rates are higher nationally (49%) than inside City borders (43%).

Vegetation & Landscape Features: Moderately undulating to flat sand plains with a dense, moderately tall, ericoid shrubland dotted with emergent, tall sclerophyllous shrubs and an open, short restioid stratum. Restioid and proteoid fynbos are dominant, with asteraceous fynbos and patches of ericaceous fynbos in seepages.

Geology & Soils: Acidic tertiary, grey regic sands, usually white or yellow.

Climate: Winter-rainfall regime with precipitation peaking from May to August. MAP 290–660 mm (mean: 440 mm). Mists (fogs) common in winter and supplying additional precipitation. Mean daily maximum and minimum temperatures 27.9°C and 7.0°C for February and July, respectively. Frost incidence about 3 days per year.

Endemic Taxa: Low Shrubs*: Leucospermum parile, Erica malmesburiensis, Serruria linearis, S. roxburghii, S. scoparia.* Herb*: Steirodiscus speciosus.*

Conservation: Critically endangered as it contains 100 Red Data species. Target 30%. About 6% conserved in Riverlands, Paardenberg and at Pella Research Site. Some 47% has been transformed, mainly for cultivation (agricultural smallholdings and pastures), by urban sprawl of Atlantis and for setting up pine and gum plantations. Woody aliens include *Acacia saligna*, *A. cyclops* and various species of *Eucalyptus* and *Pinus*.

Boland Granite Fynbos

(Previously described as Mesic Mountain Fynbos)

Distribution: Western Cape Province: Upper slopes and summits of Paardeberg and Paarl Mountain as well as the lower slopes of mountains spanning the Groenberg and Hawequasberge (western foothills near Wellington), Pniel (Simonsberg and Groot Drakenstein Mountains and Klapmutskop), Franschhoek (Middelberg, Dassenberg, Skerpheuwel, Middagkransberg), Stellenbosch (Jonkershoek Valley and northern side of the Helderberg) and Helderberg Municipality (including lower south- and west-facing slopes of Haelkop and the Hottentots Holland Mountains and also the free-standing Skapenberg). It also occurs in the Du Toitskloof and Wemmershoek Valleys, Kaaimansgat and lower Stettynskloof, with outcrops on the Bottelary Hills and Kanonkop (near Pella). Altitude 150–650 m, reaching 850 m in places. 14.3% of this vegetation type occurs within the City and 85.7% outside the City, with similar transformation rates inside and outside the City.

Vegetation & Landscape Features: Moderately undulating plains and hills, varying from extensive deep soils, to localised deep soils between large granite domes and sheets. A fairly dense, 1–2 m tall closed shrubland with occasional low, gnarled trees dotted through the landscape. A diverse type, dominated by scrub, asteraceous and proteoid fynbos (with *Protea repens, P. burchelli, P. laurifolia* with *Leucadendron rubrum* and *L. daphnoides* as dominants on drier slopes, *Leucospermum grandiflorum* or *L. guenzii* dominant in seepage areas, and *P. neriifolia* and *Leucadendron sessile* on moist slopes), but with patches of restioid and ericaceous fynbos in wetter areas. Waboomveld is very typical and very extensive within this unit.

Geology & Soils: Cape Granite Suite rocks (Paardeberg, Paarl, Stellenbosch and Wellington Plutons). Soils usually of Glenrosa, Mispah forms, or red-yellow apedal. Freely draining soils are dominant, with exposed dome rock and large boulders.

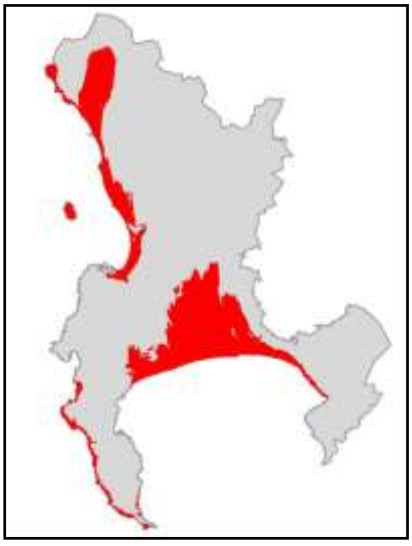
Climate: MAP 610–2 220 mm (mean: 985 mm), peaking from May to August. Mean daily maximum and minimum temperatures 26.6°C and 5.9°C for February and July, respectively. Frost incidence 2 or 3 days per year. The mean rainfall for this type is well below the 1 400 mm limit suggested by Campbell (1985) for fynbos on granite. Mists are common in winter.

Endemic Taxa: Tall Shrub*: Leucospermum grandiflorum.* Low Shrubs*: Aspalathus cephalotes subsp. cephalotes, A. stricticlada, Erica fausta, E. hippurus, E. lerouxiae, E. setosa, Leucospermum lineare, Lobostemon hottentoticus, Psoralea gueinzii, Pteronia centauroides, Serruria gracilis, Xiphotheca elliptica.* Succulent Shrubs*: Erepsia lacera, Lampranthus leptaleon, L. rupestris, Oscularia paardebergensis.* Herb*: Argyrolobium angustissimum.* Geophytic Herbs*: Babiana noctiflora, Ixia cochlearis, Lapeirousia azurea, Watsonia amabilis.* Succulent Herb*: Conophytum turrigerum.*

Conservation: Vulnerable. Target 30%. Some 14% statutorily conserved in the Hawequas, Hottentots Holland and Paarl Mountain Nature Reserves, with a further 34% found in Hawequas, Hottentots Holland mountain catchment areas and Helderberg and Paardenberg Nature Reserves. More than a half of the area has been transformed for vineyards, olive groves and pine plantations. Most common woody aliens include *Pinus pinaster*, *Hakea sericea* and *Acacia saligna*.

Cape Flats Dune Strandveld

(Dune Thicket)



Distribution: Endemic to Cape Town; mainly coastal, altitude 0-80m, but reaching 200m in places

Vegetation & landscape: flat to slightly undulating dune field landscape covered by tall evergreen, hard-leaved shrubland with abundant grasses and annual herbs in gaps. Structurally, strandveld is a tall, evergreen, hard-leaved shrubland with abundant grasses, annual herbs and succulents in the gaps. Examples of prominent shrub species include *Euclea racemosa*, *Metalasia muricata*,

Olea exasperata, *Chrysanthemoides monilifera* and *Roepera flexuosum*. Strandveld has few endemic species compared to fynbos. 100% of this vegetation type occurs within the City and 56% is transformed.

Geology & Soil: tertiary to recent calcareous sand of marine origin. Outcrops of limestone found on the False Bay coast.

Climate: Mean Annual Rainfall 350mm in N to 560mm in S.

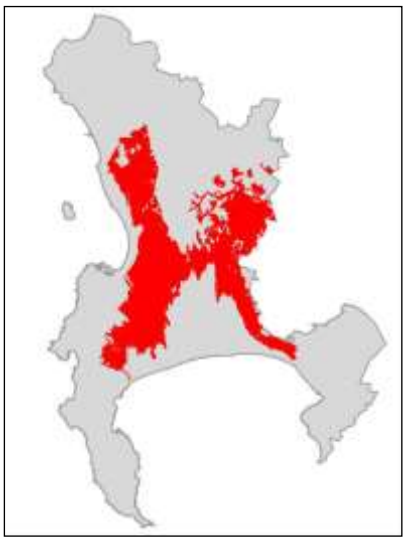
Endemic: *Lampranthus tenuifolius*

Conservation: Endangered: target 24%; 6% conserved.

Cape Flats Sand Fynbos

(Sand Plain Fynbos)

Distribution: Largely ndemic to the City of Cape Town: Cape Flats from Blouberg and Koeberg Hills west of the Tygerberg Hills to Lakeside and Pelican Park in the south near False Bay, from Bellville and Durbanville to Klapmuts and Joostenberg Hill in the east, and to the southwest of the Bottelary Hills to Macassar and Firgrove in the south. Altitude 20–200 m. Nearly 100% of this vegetation type occurs within the City and 85% is transformed.



Vegetation & Landscape Features: Moderately undulating and flat plains, with dense, moderately tall, ericoid shrubland containing scattered emergent tall shrubs. Proteoid and restioid fynbos are dominant, with asteraceous and ericaceous fynbos occurring in drier and wetter areas, respectively.

Geology & Soils: Acid, tertiary, deep, grey regic sands, usually white, often Lamotte form.

Climate: Winter-rainfall regime with precipitation peaking from May to August. MAP 580–980 mm (mean: 575 mm). Mists occur frequently in winter. Mean daily maximum and minimum monthly temperatures 27.1°C and 7.3°C for February and July, respectively. Frost incidence about 3 days per year. This is the wettest and the coolest of the West Coast sand fynbos types.

Endemic Taxa: Low Shrubs: *Erica margaritacea, Aspalathus variegata* (probably extinct), *Athanasia capitata, Cliffortia ericifolia, Erica pyramidalisW, E. turgida, E. verticillata, Leucadendron levisanus, Liparia graminifolia, Serruria aemula, S. foeniculacea, S. furcellata.* Succulent Shrub*: Lampranthus stenus.* Geophytic Herb: *Ixia versicolor.* Graminoids: *Tetraria variabilis, Trianoptiles solitaria.*

Conservation: Critically endangered. Target 30%. Less than 1% statutorily conserved as small patches in the Table Mountain National Park as well as some private conservation areas

such as Plattekloof 430 and Blaauwberg Hill. This is the most transformed of the sand fynbos types—more than 85% of the area has already been transformed (hence the conservation target remains unattainable) by urban sprawl (Cape Town metropolitan area) and for cultivation. Most remaining patches are small pockets surrounded by urban areas, for example Rondevlei, Kenilworth, Milnerton, 6BKD, Plattekloof, and Rondebosch Common. Most of these patches have been identified as 'Core Conservation Sites'. They are mismanaged by mowing, fire protection and by alien plant invasion. Mowing eliminates serotinous and taller species, while fire protection results in a few common thicket species (e.g. *Carpobrotus edulis*, *Chrysanthemoides monilifera*), replacing the rich fynbos species. Alien woody species include *Acacia saligna*, *A. cyclops* and species of *Pinus* and *Eucalyptus*. Dumping and spread of alien grasses (both annual and Kikuyu *Pennisetum clandestinum*) are also a major problem. Alien acacias result in elevated nutrient levels and a conversion to *Eragrostis curvula* grassland and near-annual fires. Some 94 Red Data sand fynbos plant species occur on the remnants within Cape Town. The endemics include six species listed as extinct in the wild, some of which are being reintroduced from botanical gardens.

Cape Lowland Freshwater Wetland

Distribution: W Cape; altitude from 0-400m. 14.7% of this vegetation type occurs within and 85.3% outside the City. However transformation rates are higher inside City borders (55%) than nationally (22%).

Vegetation & landscape: flats & depressions with extensive tall reeds of *Phragmites australis* & *Typha capensis*, temporarily or permanently flooded restiolands, sedgelands & rush-beds as well as macrophytic vegetation embedded in permanent water bodies. . Important species include *Senecio halimnifolius, Paspalum vaginatum, Pennisetum macrourum, Triglochin bulbosa, Bolboschoenus maritimus* and *Juncus krausii*.

Geology, soil & hydrology: substrate built of fine sandy, silty or clayey soils over young Quaternary sediments, largely derived from weathering Cape Supergroup shales & granites & Table Mountain sandstones. In places, especially on shales, these wetlands can acquire a brackish character.

Endemic: Low shrubs: *Passerina paludosa*; water bodies: Aquatic herbs: *Aponogeton angustifolius, A. distachyos, Cotula myriophylloides*.

Conservation: Critically endangered; Target 24%, some 14% conserved in Cape Peninsula & Agulhas National Parks, Rondevlei, Zandvlei etc.

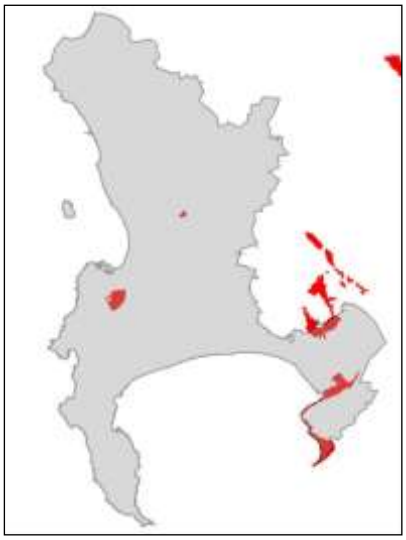
Cape Winelands Shale Fynbos

Incorporating **Peninsula Shale Fynbos**

Distribution: Western Cape Province: Higher hills and lower mountain slopes in the Stellenbosch and Somerset West areas, in patches from Blousteen on Clarence Drive at Koeëlbaai to south of Elsenberg and within the Jonkershoek Valley, with pockets on the Cape Peninsula at Devils Peak, the Tygerberg Hills on Kanonkop, Groenberg near Wellington and the upper Franschhoek Valley. Altitude 0–700 m. 37.5% of this vegetation type occurs within and 62.5% outside the City. However, transformation rates are higher nationally (54%) than inside City borders (46.3%).

Vegetation & Landscape Features: Moderately undulating plains and steep slopes against the mountains. Vegetation is a moderately tall and dense shrubland dominated by proteoid and closed-scrub fynbos in structural terms.

Geology & Soils: Acidic, moist clay-loamy, red-yellow apedal and Glenrosa and Mispah forms derived from Malmesbury Shales.



Climate: MAP 520–1 690 mm (mean: 865 mm), peaking from May to August. This is the shale fynbos unit with the highest rainfall. Mean daily maximum and minimum temperatures 26.4°C and 6.6°C for February and July, respectively. Frost incidence 2 or 3 days per year.

Endemic Taxon: Geophytic Herb*: Moraea aristata.*

Conservation: Vulnerable, but well conserved. Target 30% already reached since about 25% is statutorily conserved in the Table Mountain National Park, Helderberg and Hottentots Holland Nature Reserves. An additional 25% enjoys protection in mountain catchment areas (Hottentots Holland, Hawequas). The rest of the area has been transformed, mainly for pine plantations and vineyards as well as by urban development in the Cape Town metropolitan area. Essentially only the steeper upper portions remain. The notable woody aliens include *Pinus pinaster* and *Hakea sericea*.

Elgin Shale Fynbos

(Mesic Mountain Fynbos)

Distribution: Western Cape Province: Elgin Basin east of Grabouw and Villiersdorp Basin around Vyeboom, with pockets to the north at the uppermost part of Stettynskloof, Kaaimansgat and Rooihoogte Pass, and at the Steenbras Dam to the west. Altitude 200–450m. 3% of this vegetation type occurs within and 97% outside the City. However transformation rates are higher nationally (76%) than inside City borders (39%), thus City land is crucial to meet national conservation targets.

Vegetation & Landscape Features: Undulating hills and moderately undulating plains and steep slopes of adjacent mountains. An open to medium dense tall proteoid shrubland over a matrix of moderately tall and dense evergreen shrubs, dominated by proteoid, asteraceous and closed-scrub fynbos, and ericaceous fynbos in the wetter facies.

Geology & Soils: Acidic, moist clay-loam, Glenrosa or Mispah forms derived from Bokkeveld Group shales.

Climate: Winter-rainfall regime, with MAP 560–1 300 mm (overall mean: 830 mm), peaking from May to August. Mean daily maximum and minimum temperatures 26.2°C and 6.2°C for February and July, respectively. Frost incidence 2 or 3 days per year.

Endemic Taxa: Low Shrubs: *Leucadendron elimense subsp. vyeboomense, L. globosum.*

Conservation: Critically endangered. The target of 30% is double that of the remaining natural distribution. Some patches of the unit are statutorily conserved in the Theewaters and Limietberg Nature Reserves. The privately owned Solva Farm (near Grabouw) has probably the best preserved patch of this rare fynbos type. Almost 80% of the areas have been transformed, with cultivation accounting for almost 60% (mainly fruit orchards, pine plantations and the flooded area of the Theewaterskloof and Steenbras Dams). This region is characterised by very intensive and profitable agricultural land. Aliens *Pinus pinaster* and *Hakea sericea* are problems in the remaining remnants.

Hangklip Sand Fynbos

(Sand Plain Fynbos)

Distribution: Western Cape Province: Cape Peninsula on old dune fields at Hout Bay, in the Fish Hoek gap (between Fish Hoek and Noordhoek) and on Smith's Farm (Cape Point Nature Reserve). Further on it occurs on the coastal flats from Rooiels and Cape Hangklip to Hermanus and it is well developed at the Bot River estuary. Altitude 20–150 m. 41.8% of this vegetation type is found within and 58.2% outside the City. 38.2% is transformed within the City and 31% nationally.

Vegetation & Landscape Features: Sand dunes and sandy bottomlands supporting moderately tall, dense ericoid shrubland. Emergent, tall shrubs in places. Proteoid, ericaceous and restioid fynbos are dominant, with some asteraceous fynbos also present. On the coastal fringe this unit borders on strandveld. The deep soils of the coastal plains are replaced by shallow soils on mountain slopes on the northern edge. Hangklip Sand Fynbos occurs mainly on old dunes, but the high rainfall and leaching allows many typical sandstone fynbos species to occur on older deposits as well, so that this unit is not as floristically distinct as other sandstone fynbos units. 31% of this vegetation type occurs within and 69% outside the City, with similar transformation rates (40%) inside and outside the City.

Geology & Soils: Leached, acid Tertiary sand in coastal areas, derived mostly from dunes. Soils generally of Lamotte or Houwhoek forms or grey, regic sands.

Climate: MAP 520–1 170 mm (mean: 750 mm), peaking from May to August. By far this is the wettest of all the sandstone fynbos types. Mean daily maximum and minimum temperatures 25.9°C and 7.5°C for January–February and July, respectively. Frost incidence about 3 days per year.

Endemic Taxa: Low Shrub: *Muraltia minuta.* Succulent Shrub: *Lampranthus serpens.* Herb*: Hypertelis trachysperma.* Geophytic Herb: *Haemanthus canaliculatus.* Graminoid*: Ischyrolepis feminea.*

Conservation: Vulnerable. Target 30%. About 20% statutorily conserved in the Table Mountain National Park, Kogelberg Biosphere Reserve and Kleinmond Nature Reserve, with an additional 3% protected in private conservation areas such as Sea Farm and Hoek-van-die-Berg. There are several reserves between Pringle Bay and Hermanus, but they are badly mismanaged with a continual attrition of reserves with sewerage farms, graveyards, golf courses and squatters and over-harvesting of flowers and plants for oils. Some 31% has been transformed, mostly by development of holiday home settlements (coastal platform between Pringle Bay and Hermanus), but also by cultivation and building of roads. Alien woody plants include *Pinus pinaster*, *Acacia cyclops*, *A. saligna*, various *Eucalyptus* species and very many other species in localised patches.

Kogelberg Sandstone Fynbos

(Mesic Mountain Fynbos)

Distribution: Western Cape Province: From Franschhoek, Groot-Drakensteinberge and Simonsberg (near Stellenbosch) in the north passing southwards between Gordon's Bay and Bot River to Cape Hangklip and Kleinmond in the south including the Jonkershoek, Stellenbosch, Franschhoek, Groenland, Hottentots Holland, Kogelberg and Palmietberge Mountains. Altitude 20–1 590 m at summit of Somerset Sneeukop. 10.3% of this vegetation type occurs within and 89.7% outside the City. Levels of transformation nationally are higher (12%) than inside City borders (1%).

Vegetation & Landscape Features: High mountains with steep to gentle slopes, and undulating plains and hills of varied aspect. General appearance of vegetation low, closed shrubland with scattered emergent tall shrubs. Proteoid, ericaceous and restioid fynbos dominate, while asteraceous fynbos is rare. Patches of Cape thicket are common in the northern areas; in the south similar habitats are occupied by scrub fynbos. Numerous seeps and seasonally saturated mountain-plateau wetlands (locally called 'suurvlakte') are very common and support restioid and ericaceous (dominated by Bruniaceae) fynbos.

Geology & Soils: Acidic lithosol soils derived from Ordovician sandstones of the Table Mountain Group (Cape Supergroup). Deep sandy blankets (whitish, nutrient-poor acidic sand) develop in depressions and on slopes resisting erosion.

Climate: MAP 670–3 000 mm (mean: 1 330 mm), peaking markedly May to August. This region has the highest recorded rainfall in the Cape (see section 2.4.2 of this chapter). Mean daily maximum and minimum temperatures 24.0°C and 6.1°C for February and July, respectively. Frost incidence 2 or 3 days per year. The summit cloud (the 'Hottentot's Blanket') is a regular feature in summer when the Southeaster (part of the global system of trade-winds) brings heavy mist precipitation to the summits and adjacent south-facing and east-facing slopes.

Endemic Taxa: This is the heart of the Cape flora - a true crown jewel of the temperate flora of the world. The species-level endemism is staggering (195) and this vegetation type contains two endemic genera *Charadrophila* and *Glischrocolla.* Examples of endemics*:* Small Tree*: Mimetes arboreus.* Tall Shrubs*: Protea stokoei, Aspalathus globosa, A. stokoei, Cliffortia heterophylla, Liparia calycina, Mimetes hottentoticus, Orothamnus zeyheri.*

Conservation: Critically endangered as it contains 100 Red Data species. Target 30%. The unit is statutorily well conserved (58%) in the Hottentots Holland and Groenlandberg Nature Reserves and especially in the Kogelberg Biosphere Reserve (including Kogelberg and Kleinmond Nature Reserves). An additional 18% protected in the Hottentots-Holland Mountains catchment area. Some 17% transformed (pine plantations, cultivation, urban sprawl and spread of informal settlements). Aliens *Pinus pinaster* and *Hakea sericea* have been targeted for clearing, but remain of concern in some areas.

Lourensford Alluvium Fynbos

Distribution: Endemic to the City of Cape Town: Low-lying areas between Firgrove and Gordon's Bay, including much of the Strand and Somerset West, extending up the Lourens River Valley to the Sawmill above Lourensford Estate. Altitude 20–150 m. 100% of this vegetation type occurs within the City and transformation level is high at 93%.

Vegetation & Landscape Features: Low-lying plains supporting low, medium dense shrubland with short graminoid understorey. Restioid and asteraceous fynbos are dominant, although there is some evidence that proteoid fynbos might once have been dominant. Some remnants are exceptionally rich in geophytes.

Geology & Soils: Plinthic, duplex, silty soils often with small cobbles and pebbles embedded. Found over Cape Suite granite and metasediments of the Tygerberg Formation (Malmesbury Group).

Climate: Winter-rainfall climate peaking from May to August. MAP 470–980 mm (mean: 640 mm). Mean daily maximum and minimum temperatures 26.0°C and 7.4°C for February

and July, respectively. Frost incidence infrequent. This is the only alluvium fynbos under strong maritime influence.

Endemic Taxa: None.

Conservation: Critically endangered. Less than 1% conserved in the Helderberg and Harmony Flats Nature Reserves. The conservation target of 30% is unattainable since more than 90% of the area has been transformed for urban development (Helderberg Municipality), cultivation, pine plantations and roads.

Remarks: This unit falls within areas farmed since earliest colonial times (Farm Vergelegen of W.A. van der Stel since 1700). Most of the remnants are transformed by grazing, mowing and changes in fire regime, and it is uncertain what has been lost and whether the remaining patches are representative of the original vegetation type.

Peninsula Granite Fynbos

(Mountain Fynbos)

Distribution: Endemic to the City of Cape Town: Lower slopes on the Cape Peninsula from Lion's Head to Smitswinkel Bay almost completely surrounding Table Mountain, Karbonkelberg and Constantiaberg through to the Kalk Bay Mountains. South of the Fish Hoek gap, it is limited to the eastern (False Bay) side of the Peninsula from Simon's Bay to Smitswinkel Bay, with a few small patches between Fish Hoek and Ocean View. Altitude 0–450 m. 100% of this vegetation type occurs within the City and 65% is transformed.

Vegetation & Landscape Features: Steep to gentle slopes below the sandstone mountain slopes, and undulating hills on the western edge of the Cape Flats. Medium dense to open trees in tall, dense proteoid shrubland. A diverse type, dominated by asteraceous and proteoid fynbos, but with patches of Restio and ericaceous fynbos in wetter areas. Waboomveld is extensive in the north and heavily encroached by afrotemperate forest in places. South of Hout Bay, the dwarf form of *Protea nitida* is dominant, so that there are no emergent proteoids. Groves of Silver Trees (*Leucadendron argenteum*) occur on the wetter slopes.

Geology & Soils: Deep loamy, sandy soils, red-yellow apedal or Glenrosa and Mispah forms, derived from Cape Peninsula Pluton of the Cape Granite Suite.

Climate: Typical winter-rainfall climate peaking from May to August. MAP 590–1 320 mm (mean: 960 mm). Mean daily maximum and minimum temperatures 26.0°C and 7.2°C for February and July, respectively. Frost incidence 2 or 3 days per year. The climate of this unit is almost identical to that of Boland Granite Fynbos, but shows a far stronger maritime influence.

Endemic Taxa: Low Shrubs*: Cliffortia carinata, Gnidia parvula, Hermannia micrantha, Leucadendron grandiflorum.* Succulent Shrubs*: Erepsia patula, Lampranthus curvifolius. Herb: Polycarena silenoides.* Geophytic Herb*: Aristea pauciflora.* Graminoid*: Willdenowia affinis.*

Conservation: Endangered. Target 30%. Conserved in the Table Mountain National Park as well as on the premises of the Kirstenbosch National Botanical Garden. However, much of the conserved fynbos has been transformed into Afrotemperate Forest due to fire protection policies at Orangekloof and Kirstenbosch and a reluctance to use fire in green belts and on the urban fringe. The effective fynbos area conserved is thus much lower. A total of 56% transformed, mostly Cape Town urban areas (40%) on low-lying flat areas, including vineyards and pine plantations (13%). The most common alien woody species include *Acacia melanoxylon*, *Pinus pinaster* and numerous other more localised invasive alien species, reflecting the long history of colonisation and the relatively fertile soils.

Peninsula Sandstone Fynbos

(Mesic Mountain Fynbos)

Distribution: Endemic to the City of Cape Town: Confined to the Cape Peninsula, from the tip of Lion's Head and Table Mountain (Cape Town) to Cape Point and Cape of Good Hope and including Constantiaberg and Swartkopsberge. Altitude range 20–1 086 m at Maclear's Beacon on Table Mountain. 100% of this vegetation type occurs within the City and it is 3% transformed.

Vegetation & Landscape Features: Gentle to steep slopes, with cliffs in the north, over a 50 km long peninsula. Vegetation is a medium dense, tall proteoid shrubland over a dense moderately tall, ericoid-leaved shrubland—mainly proteoid, ericaceous and restioid fynbos, with some asteraceous fynbos.

Geology & Soils: Acidic lithosol soils derived from Ordovician sandstones of the Table Mountain Group (Cape Supergroup), Lamotte forms prominent.

Climate: MAP 520–1 690 mm (mean: 780 mm), peaking May to August. Mean daily maximum and minimum temperatures 25.0°C and 7.2°C for February and July, respectively. Frost incidence 2 or 3 days per year. Southeasterly cloud (the famous 'Table Cloth'), accompanied by high wind, brings heavy mist precipitation at higher altitudes to southern and eastern slopes in summer. The region is under strong maritime influence—no part is more than 7 km from the sea.

Endemic Taxa: Extremely rich in endemic species (146); e.g.: Small Tree*: Mimetes fimbriifolius.* Tall Shrubs: *Erica caterviflora, Leucadendron macowanii, L. strobilinum, Liparia laevigata.*

Conservation: Endangered as it contains 65 Red Data species. Target 30%. Statutorily well conserved (90%) in the Table Mountain National Park. About 25% transformed (urban sprawl, pine plantations). *Acacia melanoxylon* and *Pinus pinaster* are occasional woody aliens. Many local patches of alien vegetation are very dense.

Peninsula Shale Renosterveld

(West Coast Renosterveld)

Distribution: Endemic to City of Cape Town: Signal Hill and on the lower northern slopes of Table Mountain and Devil's Peak; approximately centred on the city bowl of Cape Town. Altitude 0–350 m. 100% of this vegetation type occurs within the City and it is 89% transformed.

Vegetation & Landscape Features: Gentle to steep lower slopes with tall, open shrubland and grassland, typically with renosterbos not appearing very prominent. This vegetation is very grassy due to frequent fires and lack of grazing. On Devil's Peak these 'renosterveld grasslands' are frequently mowed for grazing. On south-facing slopes and upper slopes this unit merges into fynbos. The early successional stages are dominated by *Asparagus capensis*, *Hyparrhenia hirta*, *Haemanthus sanguineus*, various *Oxalis* species and resprouting *Rhus lucida*, after which tussock grasses, shrubs and ferns emerge. After only 12 months the reseeding species start to become more obvious.

Geology & Soils: Clay soils derived from shale of the Tygerberg Formation, Malmesbury Group; Glenrosa, Mispah and Lamotte forms prominent.

Climate: MAP 480–870 mm (mean: 720 mm), peaking markedly from May to August. This is the wettest renosterveld type by far. Mean daily maximum and minimum temperatures 26.7°C and 7.8°C for February and July, respectively. Frost incidence 2 or 3 days per year.

Endemic Taxa: None.

Conservation: Critically endangered vegetation unit. Target of 26% is unattainable since 89% of the area has been totally transformed (urban sprawl, cultivation and building of road infrastructure). It is statutorily conserved in the Table Mountain National Park (10%). A fair proportion of the conserved area on Devil's Peak is covered by pine and gum parkland. These should be restored to renosterveld as soon as possible. Notable aliens include various species of *Acacia* (especially *A. melanoxylon*).

Southern Afrotemperate Forest

(Afromontane Forest)

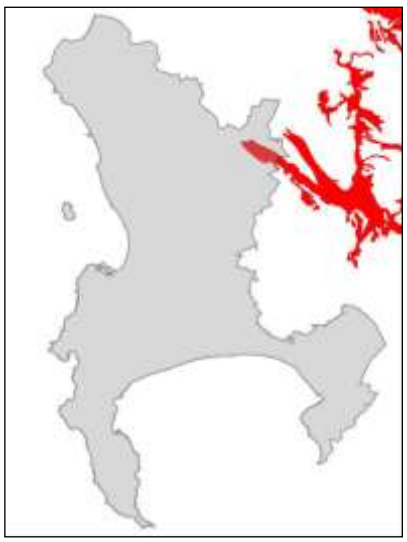
Distribution: W Cape & E Cape, largest complex in southern Cape (Knysna-Tsitsikamma). 0.4% of this vegetation type occurs within and 99.6% outside the City. Higher transformation rates occur nationally (21%) than inside City borders (1%).

Vegetation & landscape: Tall multilayered afrotemperate forests dominated by yellowwoods, *Ocotea bullata*, *Olea capensis* and others. The emergent tree species have a subtropical affinity and are mostly widespread throughout South Africa. Tree species which occur in Cape Town Southern Afrotemperate Forest patches include *Podocarpus latifolius*, *Rapanea menaphloeos*, *Cunonia capensis*, *Curtisia dentata* and *Kiggelaria africana*. Well developed shrub understorey and herb layers.

Geology & soils: vary from shallow forms to sandy humic forms derived from TMG sandstones and shales of Cape Supergroup & partly also from Cape Granite.

Endemic taxa: Tall Tree: *Platylophus trifoliatus*; small trees: *Apodytes geldenhuysii*, *Cryptocarya angustifolia*, *Virgilia oroboides* subsp. *ferruginea*, *V. oroboides* subsp. o*roboides*. Megaherb: *Strelitzia alba*; geophytic herbs: *Amauropelta knysnaensis*, *Clivia mirabilis*, *Freesia sparrmannii*, *Polystichum incongruum*. Graminoid: *Schoenoxiphum altum*.

Conservation: Least concern. Target 34%. More than half of extant forest enjoys statutory conservation in Garden Route. Virtually all Southern Afrotemperate Forest in Cape Town is conserved in the Table Mountain National Park.



Swartland Alluvium Fynbos

Distribution: Western Cape Province: Swartland lowlands at west-facing piedmonts of the Groot Winterhoekberge near Porterville, Saronberg, Elandskloofberge to the Limietberge near Wellington; broad valley bottoms of the Paarl, Drakenstein, Franschhoek and Banhoek Valleys, with some extensions west of Paarl Mountain and to Klapmuts. Altitude 60–250 m, rarely reaching 350 m. 3.7% of this vegetation type occurs within and 96.3% outside the City. Lower rates of

transformation occurred nationally (73%) than inside City borders (95%).

Vegetation & Landscape Features: Moderately undulating plains, adjacent mountains and in river basins. The vegetation is a matrix of low, evergreen shrubland with emergent sparse, moderately tall shrubs and a conspicuous graminoid layer. Proteoid, restioid and asteraceous fynbos types are dominant, with closed-scrub fynbos common along the river courses. Ericaceous and restioid fynbos found in seeps.

Geology & Soils: Alluvial gravel and cobble fields typically resting over Malmesbury Group schists and phyllites (in the northern part of the area) as well as over Cape Suite granites (in Drakenstein Valley from Wellington to Franschhoek) and on Malmesbury Group sandstones from Simondium to Klipheuwel.

Climate: Seasonal, winter-rainfall regime, peaking from May to August. MAP (mean: 655 mm) varies broadly from 320–980 mm (close to foot of mountains). Mean daily maximum and minimum temperatures 29.5°C and 6.0°C for February and July, respectively. Frost an infrequent phenomenon. This is the wettest and hottest alluvium fynbos type.

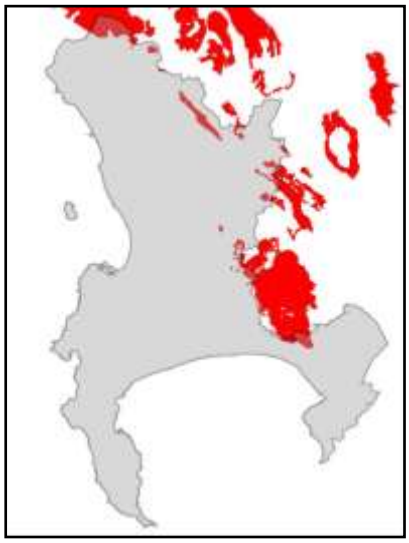
Endemic Taxa: Low Shrubs: *Diastella buekii, Erica alexandri, E. bakeri, Marasmodes duemmeri, M. undulata, Phylica stenopetala, Protea mucronifolia.* Succulent Shrub: *Lampranthus schlechteri*. Geophytic Herbs: *Brunsvigia elandsmontana, Bulbine monophylla, Geissorhiza furva, Moraea villosa subsp. elandsmontana, Watsonia dubia.*

Conservation: Critically endangered. Target 30%. Nearly 10% conserved in the Waterval Nature Reserve, Winterhoek (mountain catchment area) and private reserves such as Elandsberg, Langerug and Wiesenhof Wildpark. More than 75% already transformed for vineyards, olive orchards, pine plantations, urban settlements and by building of the Voëlvlei and Wemmershoek Dams. Alien *Acacia saligna* and *Hakea sericea* are prominent in places.

Swartland Granite Renosterveld

(West Coast Renosterveld)

Distribution: Western Cape Province: Discrete areas in the Swartland: largest patch centred on Darling from Ratelberg in the north to Dassenberg near Mamre and Pella; several centred on Malmesbury from Darmstadt in the north to the lower slopes of the Perdeberg (and small patches to the west towards Atlantis); east of Wellington from Micha to Valencia, lower surroundings of Paarl Mountain; Joostenberg, Muldersvlei, Bottelaryberg, Papegaaiberg (Stellenbosch West), to Firgrove and northern Somerset West. Altitude 50–350 m. 6.8% of this vegetation type occurs within the City and 93.2% outside the City. Lower rates of transformation occurred nationally (75%) than inside City borders (86%).



Vegetation & Landscape Features: Moderate foot slopes and undulating plains supporting a mosaic of

grasslands/herblands and medium dense, microphyllous shrublands dominated by renosterbos. Groups of small trees and tall shrubs are associated with heuweltjies and rock outcrops.

Geology & Soils: Coarse sandy to loamy soils of a variety of forms ranging from Glenrosa and Mispah, to prismacutanic and pedocutanic diagnostic horizons to red-yellow apedal soils all derived from Cape Granite. The soils can contain a considerable volume of moisture in winter and spring.

Climate: MAP 360–790 mm (mean: 520 mm), peaking from May to August. Mists common in winter. This is the wettest renosterveld unit. Mean daily maximum and minimum temperatures 27.7°C and 6.7°C for February and July, respectively. Frost incidence about 3 days per year.

Endemic Taxa: Low Shrubs*: Agathosma hispida, A. latipetala, Aspalathus glabrata, A. rycroftii.* Succulent Shrubs*: Antimima menniei, Erepsia hallii, Lampranthus citrinus, L. scaber, Phyllobolus suffruticosus, Ruschia klipbergensis.* Herbs*: Arctopus dregei, Oncosiphon glabratum*. Geophytic Herbs*: Babiana pygmaea, B. regia, B. rubrocyanea, Geissorhiza darlingensis, G. eurystigma, G. malmesburiensis, G. mathewsii, G. radians, Haemanthus pumilio, Ixia aurea, I. curta, Lachenalia purpureo-caerulea, Moraea amissa, Oxalis stictocheila, Watsonia humilis.*

Conservation: This is a critically endangered vegetation unit of which almost 80% has already been transformed due to prime quality of the land for agriculture (vineyards, olive orchards, pastures) and also by urban sprawl. Hence the conservation target of 26% remains unattainable. Only very small portions (0.5%) enjoy statutory protection in the Paarl Mountain Nature Reserve and Pella Research Site, and also (2%) in the Paardenberg and Tienie Versveld Flower Reserve near Darling. Alien grasses are particularly pervasive, the most important being *Lolium multiflorum, Avena fatua* and *Bromus diandrus*. Alien woody species include *Acacia saligna, Pinus pinaster* as well as various species of *Eucalyptus*.

Swartland Shale Renosterveld

(West Coast Renosterveld)

Distribution: Western Cape Province: Large, generally continuous areas of the Swartland and the Boland on the West Coast lowlands, from Het Kruis in the north, southwards between the Piketberg and Olifantsrivierberge, widening appreciably in the region around Moorreesburg between Gouda and Hopefield, and encompassing Riebeek-Kasteel, Klipheuwel, Philadelphia, Durbanville, Stellenbosch to the south and Sir Lowry's Pass Village near Gordon's Bay. Altitude 50–350 m. 9.8% of this vegetation type occurs within and 90.2% outside the City. Similar transformation rates occur nationally (92%) and inside City borders (91%).

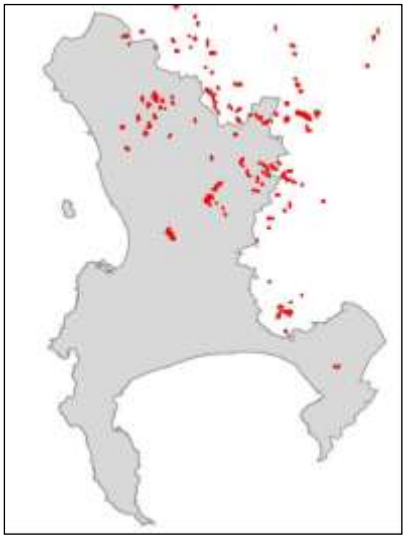
Vegetation & Landscape Features: Moderately undulating plains and valleys supporting low to moderately tall leptophyllous shrubland of varying canopy cover as well as low, open shrubland dominated by renosterbos. Heuweltjies are a very prominent local feature of the environment, forming 'hummockveld' near Piketberg and giving the Tygerberg Hills their name. Stunted trees and thicket are often associated with the heuweltjies. Disturbed areas are dominated by *Athanasia trifurcata* and *Otholobium hirtum*. Patches of *Cynodon dactylon* 'grazing lawns' also occur in abundance.

Geology & Soils: Clay soils derived from Malmesbury Group shales (specifically the Porterville Formation in the north and east and the Moorreesburg Formation in the west). The soils contain prismacutanic and pedocutanic diagnostic horizons and Glenrosa and Mispah forms are predominant.

Climate: Winter-rainfall regime, with MAP 270–670 mm (mean: 430 mm), peaking from May to August. Mean daily maximum and minimum temperatures 29.6°C and 6.3°C for February and July, respectively. Frost incidence 3 or 4 days per year. Mists are common in winter.

Endemic Taxa: Low Shrubs: *Leucadendron verticillatum, Aspalathus acanthophylla, A. horizontalis, A. pinguis subsp. longissima, A. pinguis subsp. occidentalis, A. puberula, A. rectistyla, Cliffortia acockii, Lotononis complanata, Serruria incrassata.* Succulent Shrubs: *Erepsia ramosa, Ruschia patens, R. pauciflora.* Herb: *Indigofera triquetra.* Geophytic Herbs*: Aristea lugens, Babiana angustifolia, B. latifolia, B. odorata, B. secunda, Hesperantha pallescens, H. spicata subsp. fistulosa, Lachenalia liliflora, L. mediana var. rogersii, L. orthopetala, Lapeirousia fastigiata, Moraea gigandra, M. tulbaghensis, Oxalis fragilis, O. involuta, O. leptocalyx, O. levis, O. macra, O. perineson, O. strigosa, Pelargonium viciifolium.*

Conservation: This is a critically endangered vegetation unit. Target 26%, but since 90% of the area has been totally transformed (mainly for cropland), the target remains unattainable. The remnants are found in isolated pockets, usually on steeper ground. So far only a few patches have been included in conservation schemes (e.g. Elandsberg, Paardenberg). Aliens include *Acacia saligna* (very scattered over 65%), *A. mearns*ii (very scattered over 62%) as well as several species of *Prosopis* and *Eucalyptus*. Alien annual grasses (species of *Anagallis, Avena, Briza, Bromus, Lolium, Phalaris* and *Vulpia*) are a primary problem in remnant patches. Other serious aliens include herbs such as *Erodium cicutarium, E. moschatum, Echium plantagineum* and *Petrorhagia prolifera*.



Swartland Silcrete Renosterveld

(West Coast Renosterveld)

Distribution: Western Cape Province: A highly fragmented type, scattered in form of small patches throughout the Swartland from near Firgrove and Kuils River in the south to Eendekuil to Piketberg in the north. Mostly embedded within Swartland Shale Renosterveld followed by Swartland Granite Renosterveld. The largest patch is at Oupas between

Moorreesburg and Mamre. Altitude 40–220 m. 14.8% of this vegetation type occurs within the City and 85.2% outside the City. However transformation rates are higher nationally (92%) than inside City borders (81%).

Vegetation & Landscape Features: Moderately undulating lowlands, often on elevated areas. An open, low, cupressoid- and small-leaved, low to moderately tall shrubland with many succulents, dominated by renosterbos.

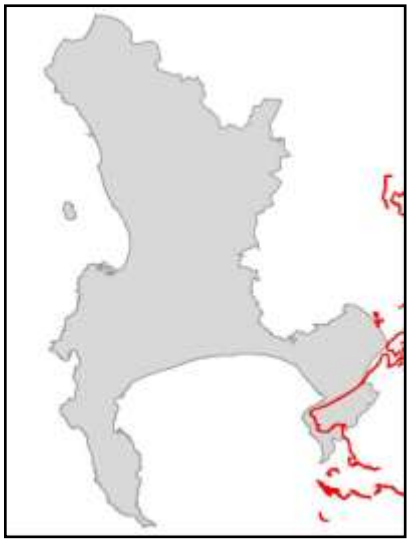
Geology & Soils: Remnants of silcrete layers over Malmesbury Group Shale and Cape Granite. Soils with prismacutanic and/or pedocutanic diagnostic horizons or plinthic catena are dominant.

Climate: MAP 250–650 mm (mean: 425 mm), peaking from May to August. Mists common in winter. Mean daily maximum and minimum temperatures 28.7°C and 6.8°C for February and July, respectively. Frost incidence 3 or 4 days per year.

Endemic Taxa: Low Shrub*: Marasmodes oligocephala.* Succulent Shrubs*: Lampranthus dilutus, Ruschia serrulata.* Geophytic Herb*: Babiana longiflora.*

Conservation: Critically endangered and the conservation target of 26% remains unattainable due to total transformation of 90% (mainly turned into agricultural land). Small patches (about 1%) are statutorily conserved in the Pella Research Site, and additionally in Paardenberg and Elandsberg. Remaining patches undergo transformation by overgrazing, fire protection, and spraying with herbicides and insecticides. Alien *Acacia saligna*, *A. mearnsii*, *Prosopis* and *Eucalyptus* are also problem in places.

Western Coastal Shale Band Vegetation



(Mesic Mountain Fynbos)

Distribution: Western Cape Province: Embedded within the mountain ranges of Elandskloof, Limietberge, Wellington Sneeukop, Slanghoek, Du Toitsberge, Klein Drakenstein, Wemmershoek, Stettyns, Franschhoek (including Victoria Peak and Emerald Dome), Groenland, Hottentots Holland (including Triplets and Somerset Sneeukop), and Kogelberg. These bands extend eastwards through the Kleinrivierberge, Caledon Swartberg and Bredasdorpberge. Also included are the shale bands of the Riviersonderend Mountains and of Potberg. Altitude 50–1 800 m. 2.5% of this vegetation type occurs within and 97.5% outside the City. Transformation is low: nationally (4%) and inside City borders (<1%).

Vegetation & Landscape Features: A narrow 80–200 m linear feature (up to 1 km wide in a few places and also forming rings on some ‘Sneeukop’ peaks), smooth and flat in profile compared to surrounding areas. The band supports diverse renosterveld and fynbos shrublands of all structural types including waboomveld at lower altitudes.

Geology & Soils: Clays derived from shale of the Cedarberg Formation.

Climate: MAP 280–2 000 mm (mean: 1 070 mm), peaking from May to August. Southeasterly cloud brings heavy mist precipitation at higher altitudes in summer. Mean daily maximum and minimum temperatures 24.3°C and 5.0°C for February and July, respectively. Frost incidence 2–10 days per year.

Endemic Taxa: Tall Shrub: *Protea lacticolor*. Low Shrubs*: Prismatocarpus cliffortioides, Protea caespitosa.* Succulent Shrub*: Lampranthus walgateae.* Geophytic Herbs*: Bobartia lilacina, Moraea lilacina.* Graminoid*: Pentameris hirtiglumis.*

Conservation: Least concern. The target of 30% has been achieved since almost 45% of the unit is protected in statutory and local authority reserves such as Limietberg, Kogelberg, Riviersonderend, Hottentots Holland, Theewaters, De Hoop and Waterval, while an additional almost 30% is protected in mountain catchment areas such as Hawequas, Riviersonderend and Hottentots Holland. Small patches are protected in a number of private reserves. Some 6% transformed by pine plantations. Aliens *Pinus pinaster* and *Hakea sericea* scattered on about half of the area of the unit.

Table 1. Major national vegetation types in Cape Town and their status[1]

National Vegetation Type	Historical area in Cape Town (km^2)	% in Cape Town	Current area in Cape Town (km^2)	Conserved or managed in Cape Town (km^2)	National Ecosystem Status*
Atlantis Sand Fynbos	278	39.8	166	4	CR
Boland Granite Fynbos	95	19.2	61	3	VU
Cape Flats Dune Strandveld	**401**	**100**	**180**	**64**	**EN**
Cape Flats Sand Fynbos	**547**	**100**	**77**	**5**	**CR**
Cape Winelands Shale Fynbos	41	37.5	22	18	VU
Elgin Shale Fynbos	2	0.9	2	<1	CR
Hangklip Sand Fynbos	34	41.8	21	14	VU
Kogelberg Sandstone Fynbos	107	11.7	106	75	CR
Lourensford Alluvium Fynbos	**48**	**100**	**3**	**2**	**CR**
Peninsula Granite Fynbos	**92**	**100**	**39**	**33**	**EN**
Peninsula Sandstone Fynbos	**215**	**100**	**209**	**202**	**EN**
Peninsula Shale Renosterveld	**24**	**100**	**3**	**0**	**CR**

National Vegetation Type	Historical area in Cape Town (km^2)	% in Cape Town	Current area in Cape Town (km^2)	Conserved or managed in Cape Town (km^2)	National Ecosystem Status*
Southern Afrotemperate Forest	3	0.4	3	3	LC
Swartland Alluvium Fynbos	17	3.7	<1	<1	CR
Swartland Granite Renosterveld	58	6.2	8	<1	CR
Swartland Shale Renosterveld	464	9.4	40	3	CR
Swartland Silcrete Renosterveld	10	10.1	2	2	CR
Western Coastal Shaleband Vegetn	3	3.0	3	2	LC
Azonal Vegetation Types					
Cape Inland Saltpans	2	3.0	2	2	LC
Cape Lowland Freshwater Wetlands	14	15.0	6	5	CR
Cape Seashore vegetation	3	4.0	3	2	LC

National vegetation types in **bold typeface are confined to Cape Town; CR = Critically Endangered, EN = Endangered, VU = Vulnerable, LC = Least Concern*

NB ADDITIONAL NATIONAL VEGETATION TYPES THAT OCCUR IN SMALL AREAS OF THE CITY

Terrestrial:

Southern Coastal Forest (147ha)

Swartland Alluvium Renosterveld (4ha)

Azonal:

Cape Coastal Lagoons (30ha)

Fresh Water lakes (82ha)

Appendix 9: Vegetation map for Edith Stephens Nature Reserve, 2002

C. OTHER DOCUMENTS

Appendix 10: Edith Stephens Nature Reserve zoning map

Appendix 11: Security audit executive summary, City of Cape Town Biodiversity Management Branch

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

Project Order No.: **4501377564**

Project Manager:

Bongani Mnisi

Biodiversity Management Branch

Area Manager: Northern District

Tel: 021 – 5144164

Fax: 021 – 5111951

Cell: 0835917791

E-mail: bongani.mnisi@capetown.gov.za

Lead Consultant:

Jan Phelan

Plan-It

Tel: 033 - 3302948

Fax: 033 - 3302948

Cell: 082 - 8760003

E-Mail: mwplanit@mweb.co.za

Conservation Management Consultant:

Harold Thornhill

Thorn-Ex

Tel: 033 - 3431814

Fax: 088 - 0333431819

Cell: 0824618043

E-mail: thornhillh@thorn-ex.co.za

Technology Consultant:

Jens von Fintel

Titan Security

Tel: 033 - 3943776

Cell: 5762406

E-mail: jens@titantech.co.za

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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 theses 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 form 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 RECOMENDATIONS

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 form 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:

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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	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	1. Conduct Institutional Governance Audit 2. Draft MOU's
Policy & Procedures	1. Management Policies, Goals, Objectives 2. Operational Procedures &Protocols	1. Develop management Policies Goals & Objectives 2. Develop Procedures and Protocols
Management	1. Consistency in personnel designations 2. Consistency in personnel functional content 3. Career pathing 4. Skills development 5. Reserve Management Standards	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	1. 3x Bushrangers 2. Small labor team 3. Staff must be trained in 4 wheel driving 4. Officers appointed as Peace Officers	1. Establish a MOU with Bulk Water 2. Replace damaged fences 3. Monitor Wood cutter activities 4. Permits must contain more information 5. Reserve map required 6. Curb illegal access 7. Regular perimeter patrols.	1. 4x4 vehicle in good condition 2. Office Trellidor and burglar bars 3. Demarcation of boundaries 4. Erect signage 5. Electric fence along north and north-eastern boundary 6. Basic staff equipment
Blaauwberg	6. 6x Bushrangers (2 x3-member teams) 7. 2 x Permanent Visitor Controller Off's 8. Officers appointed as Peace Officers 9. Station District Law Enforcement Component	4. Staff be appointed as Peace Officers 5. Law Enforcement Component duties expanded to cover "hot spots" in district. 6. Daily night shifts limited to conduct patrols across district and do ad hoc night time	1. Link present alarm system to security service provider. 2. Mount Day-Night camera to cover main resort area. 3. Active Monitor to monitor activities during peak periods. 4. Erect signage 5. Basic staff equipment
Rietvlei	1. 2 x Bushrangers 2. Officers appointed as Peace Officers	1. Regular perimeter patrols 2. Co-ordinate with MCM	1. Fence along R27 road. 2. Alarm systems at new facilities 3. Peak Inversion camera with recording facility for main gate 4. Fence open residential property boundaries 5. Patrol boat 6. Basic staff equipment
CENTRAL			
Bracken	1. 1x EE Officer/Community Officer.	1. Visible patrols 2. Liaison with Everite Hostel.	1. Ablutions at gate 2. Day-night camera for

	2. 1x Labourer		main access area. 3. Removal of derelict buildings 4. Guard monitoring 5. Clear alien vegetation along fences 6. Basic staff equipment
Durbanville	1. 2x Visitor Controller Officers 2. Officers appointed as Peace Officers	1. Boundary fence cleared of vegetation 2. Erect signage iro handling of unwanted pets	1. Steel gate at offices to be kept locked, and fitted with buzzer and solenoid access control 2. Video monitor for door 3. Service counter inside front door 4. Alarm system to include response 5. Long-range mobile panic buttons 6. Lighting at offices and main gate 7. Peak Inversion camera for main gate 8. Guard Monitoring system 9. Basic staff equipment
Tygerberg	1. Employ current 3 Contract Bushrangers 2. 2x Bushrangers 3. 1x Site Manager 4. 1x Foreman 5. 5x Llabourers 6. 1x Additional EE Officer/Community Liaison 7. 2x Visitor Controller Officers 8. Officers appointed as Peace Officers 9. Station District Law Enforcement Component	1. Attend Community Police Forum and Crime Watch meetings. 2. Bushrangers obtain drivers licenses 3. Staff presence over week-ends and after hours 4. All gate remotes currently issued be recovered immediately and re-issued under a new access signal code 5. Keys handed out should be retrieved and locks changed. 6. Kanonberg be afforded controlled access in the event of a fire.	1. Replace existing camera at main entrance gate with a Peak Inversion camera with recording facility 2. Present cameras be replaced with Day-Night cameras. 3. Plattekloof and Quarry area be re-fenced with electric fence 4. Perimeter road should be constructed where feasible 5. Flatrap razer coils installed on top of all fences and along bottom of select fences 6. Accommodation for Bushranger teams 7. Installation of trigger operated floodlight in

			darker area of parking 8. Additional mountain bike 9. Basic staff equipment
SOUTH			
Zandvlei	1. 3x Visitor Controller Officers 2. 3x Bushrangers 3. 4x Labourers 4. Officers appointed as Peace Officers	1. Cease involvement in public amenity facilities on eastern side 2. Formal gate control required during open hours 3. Formalise relationship with Mountain Men Security Services 4. Evening security at offices by private security service provider 5. Introduce ad hoc evening patrols 6. Formalise co-operation with Marine and Coastal Management regarding control at the estuary.	1. Northern access well designated and controlled access point 2. Signage at the entrance, parking areas & along the water 3. Re-fence office area with Diamond Razor Mesh 4. Provide appropriate security lighting 5. Replaced northern and western fence with Diamond Razor Mesh fence 6. New offices need to be completed & fitted with monitored alarm system and BX Outdoor Beams 7. Guard Monitoring system 8. Motorized boat 9. Basic staff equipment
False Bay	1. 9x Bushrangers 2. 4x Static Guards 3. Officers appointed as Peace Officers 4. Station District Law Enforcement Component	1. Regular patrols supported 2. Bushrangers and Visitor Control officers should be circulated & deployed to cover peak periods of public use within the Park. 3. Change permanent night shift to a planned basis during periods of specific risk or in response to specific incidents 4. Co-ordinate night activities with other law enforcement bodies 5. Visitor Controller Officers patrol Zeekoevlei picnic area during peak periods.	1. Establish two or three Bushranger bases 2. Re-fence southern and eastern boundary electric fence 3. Motorised patrol 4. 2x Quad 5. Install Guard Patrol Monitoring system 6. Fence Rondevlei offices and EE Centre with Diamond Razor Mesh Install additional trigger 7. 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
Edith Stephens	1. Replace "small plant operator" with a fence maintenance post.	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	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
EAST			
Wolfgat & Macassar	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	1. Weltevreeden 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	1. Demarcate reserve using cement poles 2. Erect signage 3. Move Macassar Gate 4. Basic staff equipment
Kogelberg	1. 1x Visitor Controller Officer 2. 3x Bushrangers 3. Officers appointed as Peace Officers	1. Improve communication services	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
Helderberg	1. 6 existing Labourers trained to level of Bushrangers 2. Officers appointed as Peace Officers	1. Develop system for evening monies 2. Regular perimeter patrols	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

COSTING

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

Fencing:

Diamond Razor mesh fencing installed per 100m R 440,00/meter

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 R 3400,00 excl

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 R 1500,00 excl.

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.

Long Range receiver – installed R 1100,00 excl.

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: Infrastructure development plan for Edith Stephens Nature Reserve, with costing, 2006

4. SUMMARY OF ESTIMATE COSTING:

4.1 Estimate Building Cost for Phase 1

Including: building works (foundations, floors walls, doors, windows, roofs), kitchen cabinets, sanitary fittings, electrical installation, internal plumbing and drainage to existing septic tank, water supply, stormwater drainage.

Excluding: siteworks not directly related to building construction, loose furniture and fittings, external paving and stone walling.

+ preliminaries + 10% contingency

= R 1,912,065.00 excl. VAT

Professional fees (incl. Architect, Quantity Surveyor, Structural Engineer, PLEA Consultant, excl. Civil Engineer)

= R 378,000.00 excl VAT

TOTAL R 2,610,674.10 incl. VAT

Solar water heater installed R10,000

Solar pump incl pump and panels R32,000

And installation

Wind turbine incl turbine, batteries R31,000

equip. to connect to

regular 220V circuit

and installation

TOTAL R252,000 excl. VAT

* Please note, certain of the building cost estimate sums could be deducted if associated alternative technologies were installed. For example, if the porous paving system is installed, the majority of the R20,300 allowed for stormwater drainage would be deductible.

4.3 Estimate Landscaping Cost

The Landscaping cost estimate include estimated pricing for low stone walls, earthworks, parking areas, tree planting, structures for composting, lapa, outdoor classroom and footpaths.

Total excl VAT R 415,000

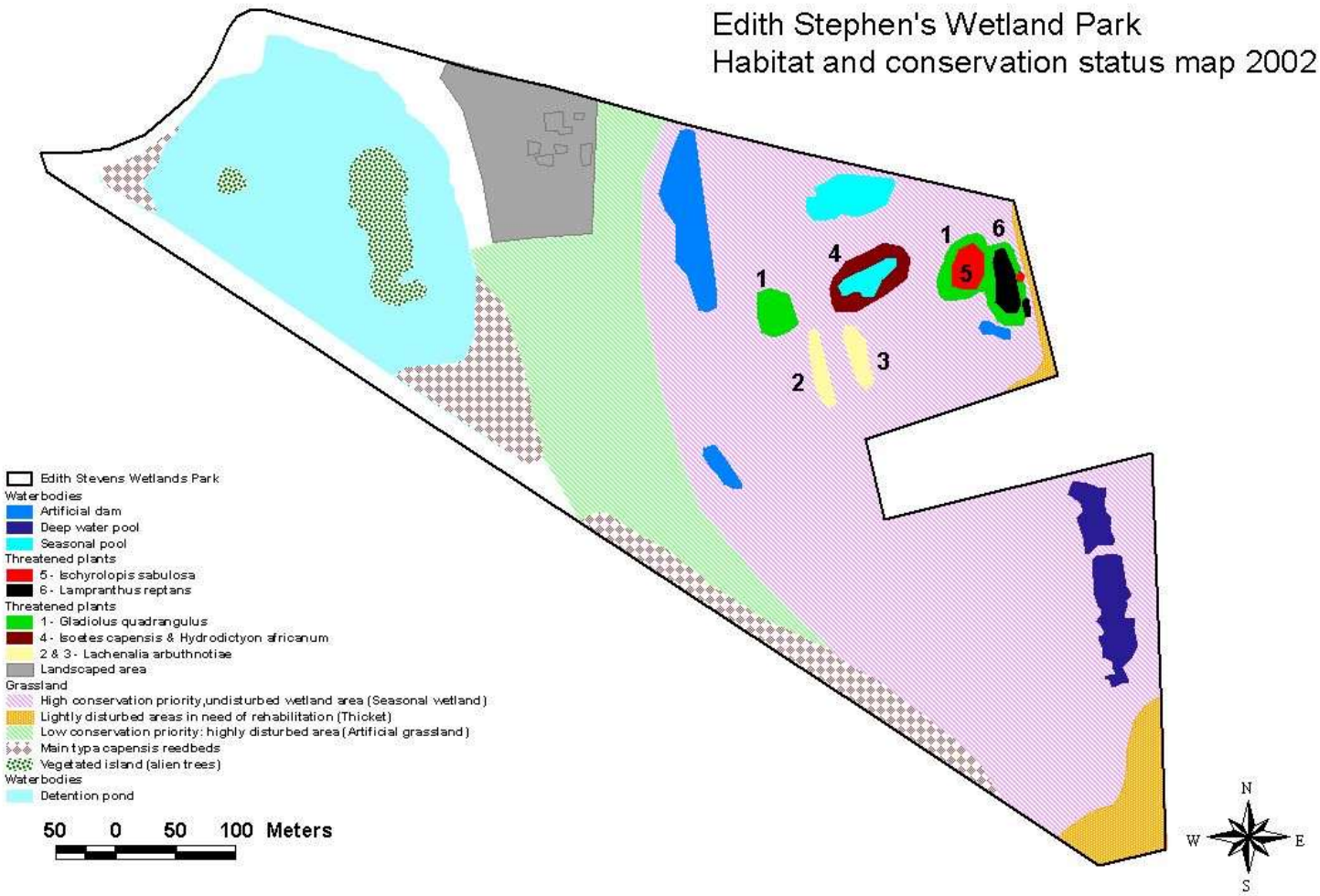
For further costing details please refer to:

Appendix B: Energy and Water Management Strategy; Component Pricing.

Appendix C: Bernard James and Partners, Quantity Surveyors; PRELIMINARY ESTIMATE OF COST.

Appendix D: Landscape Estimate Costing.

Appendix 13: Habitat and conservation status map, 2002



Appendix 14: Topographical information for Edith Stephens Nature Reserve

Appendix 15: Edith Stephens Nature Reserve METT-SA, 22 May 2007

REPORTING PROGRESS IN URBAN PROTECTED AREAS

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

Edith Stephens Wetland Park

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	EDITH STEPHENS WETLAND PARK		
Location of protected area (country and if possible, map reference)	SOUTH AFRICA, CAPE TOWN		
Date of establishment (distinguish between agreed and gazetted	*Agreed*	*Gazetted*	
Ownership details (i.e. owner, tenure rights etc.)	City of Cape Town / South African National Biodiversity Institute		
Management Authority	City of Cape Town		
Protected area size (ha)	34		
Staff numbers	*Permanent* 3	*Temporary* 3	
Budget	Annual Budget: R1640850.74 (Before the merge R250000)		
Designation (ICUN category), World Heritage, Ramsar etc	N/A		
Reason for designation	The discovery of the *Isoetes capensis*, by Edith Stephens. Later the area was extented to enable the City of Cape Town to create an urban park.		
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	Working for Wetlands, Primary Science Programme, Cape Flats Nature		
List two of the primary protected area objectives			
Objective 1	Develop the park into a place that people can appreciate for various reaons (benefits)		
Objective 2	Maintain the park to a standard that promotes community appeciation		
List the top two most important threat to the PA (and indicate reasons why they are selected)			
Threat 1	Invasive species		
Threat 2	No legal protection		
List top two critical management activities			
Activity 1	Rehabilitation and monitoring		
Activity 2	Community activities		
Date assessement carried out:	**15-Jul-07**		

Howard Langley Paul Britton 22 May 2007

Name of assessor:	Luzann Isaacs

Howard Langley Paul Britton 22 May 2007

MANAGEMENT EFFECTIVENESS TRACKING TOOL

1: Context : Where are we now?	Criteria	Value	Score	Comments	Next steps
1.1 Legal status **Does the PA have secure permanent conservation legal status?**	The PA's permanent legal conservation status is not secured by its current legal status eg Public Open Space	0		For the reserve to be a proclaimed as a nature reserve	To find out the process for this to happen. Who would take responsibility of the process. And remind people of the task that has to happen
	There is a formal agreement that the PA should be afforded the highest possible legal protection, but the process has not yet begun	1	1		
	The PA is in the process of being afforded the highest possible legal protection	2			
	The PA has Local Authority Nature Reserve status, or a higher level of legal protection	3			
1.2. Protected Area regulations	There are no legal mechanisms for controlling inappropriate land use and activities in the PA	0	0	As an interim measure the park can be zoned as a city park/open space area to protect the park from inappropriate land use and activities	Rezoning the area
	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			
	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		There is a limited knowledge of the regulations and by-laws, that lies with reserve manager alone. There are no regular patrols, but rather adhoc when the staff and manager is available	To fill the law enforcement post for the area that the site falls under, and to strengthen our relationships with the other law enforcement authorities in the area.
	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		As the site is reasonalbly small, the sites boundaries are known, to the local authority, and a large number of the surrounding community	The park has a conservation development framework that gives ideas for the demarcation of the boundaries. The management needs to identify the resources we have to start with it, and the ones we need to find fundin for
	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		At the moment there is lot of information scattered on little pieces of paper and in people's head. We are in the process of documenting this information.	Once the information has been documented, the next step would be for us to identify what are the gaps in our knowledge and start researching. Getting knowledgable people to assist with the research
	Information on critical habitats, species and cultural values of the PA is not sufficient to support planning and decision making	1	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			

	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	5		

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		There is huge demand for space of this area from the various users. Not only buildings but for people that use the area for walking. And to offer a space for people to experience a larger open space.	To look at adding the open spaces around Edith Stephens and peaking to other departments managing the area.
	Inadequacies in design mean that achievement of major objectives are constrained to some extent	1	1		
	Design is not significantly constraining achievement of major objectives, but could be improved	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		A draft management plan has been done, but was done in 2001 and not been reviewed.	To review the management plan and get it approved. Check who would be tasked with it in our department.
	A standard Management Plan is being prepared or has been prepared, but is not yet approved	1	1		
	An approved Management Plan exists and is being implemented, but has not been updated/reviewed during the past five years.	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		A CDF was drawn up, but after a workshop with various stakeholders it was decided that the CDF needs to be amended.	Needs to get interim official approval. Look at getting the CDF amended with the help of other departments in the City of Cape Town. And making sure the amendments take into consideration the stakeholders opinions.
	A CDF is being prepared or has been prepared but is not being implemented	1	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	We do communicate and interact with the community, institutional and other partners we work with.	
	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	4		

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		Monitoring & Evaluation programmes are not included here - refer to 4.13. We more or less know the reserch needs for the area. But only projects done by the nature conservation students and are not continous has the students are only here for a year.	To write down what the reserch needs are and start circulating them in the tertiary institutions.
	Research needs have been identified, but other than for ad hoc research, no management orientated research is being done.	1	1		
	There is considerable research work but only limited "management" orientated research is being done.	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		From huge amount of frustration of work that never get done. The capacity of the staff to do certain tasks are alos limited, due to lack of training. And the fact that we have new staff that came the abatoirs	We have been trying to get the labour broker staff permanent for them to acess training with the City of Cape Town. Training the staff in house on the reserve. Getting tuning for contract workers to assist during the periods when there are huge demands.
	HR capacity is inadequate for critical management activities	1	1		
	HR capacity is sufficient, but there are deficiencies in necessary skills for critical management activities	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	0	Before the budgets were merged Edith Stephens had a budget of R250 000, this money only covered the security and minimum maintemnance of the garden area. The budget never covered any building maintenance, electricity, water and other basic services. We struggle with this.	
	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			
	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			
	The budget is secure/guaranteed on a three year cycle	2			
	The PA is not reliant on external funding	2			
Subtotal		14	2		

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		We are measure in quarterly evaluations with Cape Flats Nature and a City official. We do struggle with getting to some of the tasks on the APO and funds (all to a great extent what can and cannot be done. It will be nice if our evaluations are broadened and a little more formal and expected. (Not something extra that we do because we are associated with Cape Flats Nature.	We have looked at critical times in the APO, when more people are required than what we have on site. We have requested funds from our department for resources and people during that time
	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	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	0	We have invasive species management plans that are updated and feeds into our APO. We have no set strategy for poaching, and fire. We do know when to put in our fire breaks and where. But many of these things are not written down.	To start keeping written record of the work we do, and start using the information we have to inform operational/management plans.
	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			
	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		Many of the staff we have is new or have been limited to work on basic maintenance work in the garden area. They have used their existing skills to assist with work and started to ask questions	That there needs to be formal way that they learn the skills needed to do the work they do and help them to feel confident in what they do
	Staff training and skills are low relative to the needs of the PA	1	1		
	Staff training and skills are adequate, but could be further improved to fully achieve the objectives of management	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 Is the budget managed to meet critical management needs?	Budget management is poor and significantly undermines effectiveness	0	0	We struggle with no admin support for a institution where admin is critical for daily operation. We order from a budget that was overspent on 6 months ago.	That there needs to adequate admin support for the area we work in, and the current budget be reviewed.
	Budget management is poor and constrains effectiveness	1			
	Budget management is adequate but could be improved	2			
	Budget management is excellent and aids effectiveness	3			
4.5. Operational equipment & infrastructure (as required for operational management purposes, but excluding tourism/visitor facilities)	There is little or no operational equipment & infrastructure	0		We have equipment on site, but are constantly requesting from other nature reserves for others. We have no operational area for the staff to work from, neither are meeting the health and safety regulations for the staff that we have on site. We have five people using one office	Implement the development plan. Buying equipment that is needed. Train people to use the equipment
	There is some equipment & infrastructure but these are wholly inadequate	1	1		
	There is equipment and infrastructure, but still some major gaps that constrain management	2			
	There is adequate operational equipment and infrastructure	3			
4.6 Maintenance of equipment & infrastructure Is equipment & infrastructure (including tourism/visitor facilities) adequately maintained?	There is no approved Maintenance Plan and no maintenance is taking place	0		We have fix things that break, there is no pro-active maintenance plan. And we fix what we can afford to fix.	We are in the process of writing a maintenance plan, with the maintenance department of the City of Cape Town.
	There is no Maintenance Plan and maintenance is taking place to an unsatisfactory standard	1	1		
	There is no Maintenance Plan, but maintenance is taking place to a satisfactory standard	2			
	There is an approved Maintenance Plan that is being fully implemented to a high standard	3			

4.7. Education and awareness programme Is there a planned education programme?	There is no education and awareness programme	0		We plan with our Education officers in the beginning of the year and review education programmes in the middle and end of the year.	
	There is a limited and *ad hoc* 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	2		
	There is a planned & effective education & awareness programme fully linked to the objectives and needs of the PA	3			
4.8. Government & commercial neighbours Is there co-operation with adjacent land users?	There is no contact between managers and neighbouring official or corporate land users	0		There is ad hoc contact with neighbouring communities, via community organisations and individual interested community people	It would be nice to have time to get to know all the neighbours.
	There is limited contact between managers and neighbouring official or corporate land users	1	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			
4.9. Advisory committee/forum An Advisory Committee of local representatives and specialists advises on PA management & development issues	There is no Advisory Committee/forum	0		*we have a forum that has input into the management on site, but that have struggled to meet this year.*	Time to organise these meeting have not been presented
	An Advisory Committee/forum is in the process of being established	1	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			
4.10. Community partners Do community partners have input to management decisions via the Advisory Committee?	Community partners have no input into decisions relating to the management of the PA	0		Our partners have no direct input into the management on site, but not via a local governance structure.	To make time to set up and re-establish the forum that once existed on the site
	Community partners have limited input into the PA's management decisions via local governance structures	1	1		
	Community partners contribute to some decisions relating to management via the PA's Advisory Committee	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		We have met with various local tourism operators via SONKE, which have held many events here. Which has given us the opportunity to meet some tour operators.	Is to develop a strong relationship with them, Edith Stephens is linked to a Cape Town wide tourism initiative, where we are informed of tourism activity around us. We need to get more involved. The question is how much
	There is contact between managers and tourism operators but this is largely confined to administrative or regulatory matters	1	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		We monitor our rehabilitation and invasive species management plan. We monitor our reptiles and small mammal and many other aspects of the reserve. But not all the aspects, like invertebrates, fish and water quality.	Monitoring and evaluations have to be standardised, for all aspects of the reserve (including education) and it needs to help strengthen what we are doing.
	There is some *ad hoc* 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		We have explored the use of the area for health activities, concerts and agriculture and are developing these kind of projects with the communities all the time	We need to strengthen these sort of projects and explore other possibilities

MANAGEMENT EFFECTIVENESS TRACKING TOOL

Subtotal			

22 May 2007

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			
	Visitor facilities and services are inappropriate for current levels of visitation or are under construction	1	1		
	Visitor facilities and services are adequate for current levels of visitation but could be improved	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			
	Some biodiversity, ecological and cultural values are being severely degraded	1	1		
	Some biodiversity, ecological and cultural values are being partially degraded but the most important values have not been significantly impacted	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	0		
	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			
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			
	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			
	The existence of the PA has delivered some minor short term community benefits	1	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			
Subtotal Score: Outcomes		14	4		

1: CONTEXT	VALUE	SCORE	
1.1. Legal status	3	1	
1.2. Protected Area regulations	3	0	
1.3. Law enforcement	3	1	
1.4. Protected area demarcation	3	2	
1.5. Resource Inventory	3	1	
Subtotal	**15**	5	
2: PLANNING			
2.1. Protected area design	3	1	
2.2. Management plan	3	1	
2.3. Conservation Development Framework	3	1	
Supplementary items	3	1	
Subtotal	**12**	4	
3: INPUTS			
3.1. Research	3	1	
3.2. Staff numbers	3	1	
3.3. Current budget	3	0	
Supplementary items	5	0	
Subtotal	**14**	2	
4: PROCESS			
4.1. Annual Plan of Operation	3	2	
4.2. Resource management	3	0	
4.3. Staff training	3	1	
4.4. Budget management	3	0	
4.5. Operational equipment & infrastructure	3	1	
4.6. Maintenance of equipment & infrastructure	3	1	
4.7. Education & awareness	3	2	
4.8. Government & commercial neighbours	3	1	
4.9. Advisory committee	3	1	
4.10. Community partners	3	1	
4.11. Commercial Tourism	3	1	
4.12. Monitoring & Evaluation	3	1	
Supplementary items	1	0	
Subtotal	**37**	12	
5: OUTPUTS/OUTCOMES			
5.1. Visitor facilities	3	1	
5.2. Condition assessment	3	1	
5.3. Access assessment	3	0	
5.4. Economic benefit assessment	3	2	
5.5. Community benefit assessment	3	1	
Supplementary items	1	0	
Subtotal	**16**	5	
TOTAL SCORE	**94**	**28**	30%

Summary and comment on score.
Urgent in depth and frank discussions with a wide range of innovative thinkers need to be held to determine the most appropriate "Desired State" of this area.
The low score is indicative of the very precarious state of this protected area.

Howard Langley Paul Britton 22 May 2007