

# **THE AVIS DAM ENVIRONMENT**

## **GREENSPACE'S DRAFT MANAGEMENT PLAN**

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# **EXECUTIVE SUMMARY**

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## **Background**

Over the past ten years, several proposals have been made to the Windhoek Municipality to build a hotel near or at the Avis Dam. This resulted in the setting aside of Erf 2882, southeast of the main parking area, for this purpose in 1994. Public concern in response to these proposals prompted the establishment of Greenspace/Friends of Avis, a voluntary non-profit, non-governmental organisation. Greenspace's main objective is to facilitate the development and maintenance of a system of urban open spaces which offers Windhoek residents and visitors diverse natural recreation opportunities and maintains the environmentally appropriate and aesthetically pleasing nature of the current city. Friends of Avis is one of Greenspace's several active working groups. The Avis dam is considered an important subsystem in an overall system of urban open spaces.

## **History and environment**

The Avis dam was constructed in the South African colonial period and completed by the then SWA Administration for the Windhoek Municipality in 1933. The dam overflowed for the first time during the floods of April 1934, but has since exceeded 75% of its capacity during only four rainy seasons, the last one in March 1997.

The Avis dam area is located in semi-arid savanna and is composed of three main landforms:

- slopes and ridges of the foothills of the Eros and Auas mountains,
- riverbeds and
- floodplain with dam, comprising an attractive setting of comparatively unspoilt nature.

At present the dam and surrounding area house a representative example of 'Highland Savanna' flora and fauna, and provide valuable habitat for birds, mammals and other species.

The Avis dam is situated at the edge of Windhoek, next to the only eastern route into the city via the international airport on the Trans-Kalahari Highway from Botswana and South Africa. Its strategic location, together with its natural beauty, have made it a frequent target for commercial development. Avis dam has thus great potential as an eco-tourism destination.

## **Legal status**

The Avis dam area became a park in 1939 and remained unchanged for almost 40 years. In 1980 the area was validly set aside as a temporary park in terms of sections 177 and 231 of the Municipal Ordinance 13 of 1963. Thereafter, the Parks, Recreation Grounds and Camping Site regulations of 1977 were made applicable to the area, with the exception that dogs were not restricted. Despite its temporary legal status as a park, the area is zoned "undetermined" in the town planning scheme, which means that it can be used by the Municipality for any purpose it deems fit. In 1997, the Windhoek City Council leased the area to Greenspace for one year. This lease agreement, which expires in June 1998, excludes Erf 2882 and allows the Municipality to take back any other area it wishes for any purpose.

## **Approach**

Greenspace was formed through public initiative on commercial development at the dam, and has since then consistently pursued a policy of public consultation on, and research into, the dam's management. This included:

- A survey of views on use and management of the dam by the Cape Town based market research firm Quantum Research in 1995.
- Public meetings in 1996, 1997 and 1998 to solicit public opinion on the management of the dam, and the possible establishment of a trust fund.
- Commissioning of a baseline study and draft management plan.
- Publicising the Avis Dam Baseline Study and Draft Management Plan during 1997 and 1998 through public presentations, information displays at key points in the city, and media releases inviting public suggestion and comment.

The current document is based on input and feedback from the public, and thus incorporates public opinion on the future of the dam.

## **Current management strategies**

The main objective of the management plan is to preserve and manage the Avis dam basin as a distinctive yet integral part of Windhoek's future urban open space system. It thus aims for the best possible reconciliation between recreation and protection of the natural environment without changing the area's character.

The key issues currently addressed by Greenspace are:

1. Definition of boundary
2. Internal zoning
3. Access
4. Security.

### **1. Definition of boundary**

- Define the physical boundary that includes this perceptual extent of Avis Dam.
- Negotiate with the Municipality to redraw the boundaries of the lease area where necessary.
- Assess the need for denoting this boundary physically, by means of fencing, cables, etc.
- Install these physical structures according to priority.

### **2. Internal zoning**

Based on present use patterns, the mutual incompatibility of some activities, and the ecological sensitivity of certain areas, the following three main zones have been identified:

- The floodplain - for relatively static mass recreation: picnics, braais, etc.
- The dam-wall - for active recreation: walking, etc.
- The hill-sanctuary - limited numbers, focus on eco-tourism, sanctuary area for fauna and flora.

### **3. Access**

- Entrances are restricted to the two existing vehicular entrances (floodplain and dam-wall).
- Unauthorised vehicles of any kind are prohibited in the entire Avis dam area, except parking sites.

#### 4. Security

- Only parts of the Avis perimeter need to be fenced, e.g. adjacent to habitation and near potential trespassing points for vehicles.
- Cables will be used around parking areas to allow people access but not vehicles, security fencing only in selected spots.
- Security guards are established at peak periods.

#### **Future management options**

The key issues for a future management have been identified as:

- 1• Access
- 2• Security
- 3• Monitoring
- 4• Internal zoning
- 5• Development
- 6• Rehabilitation
- 7• Management body

##### 1. Access

- Establish a parking area at the municipal waterworks site and create an additional pedestrian entrance at the waterworks.
- Close the parking area at the south dam-wall and replace it with one at the waterworks.
- Establish with the Municipality a regular programme of access road and parking area maintenance.

##### 2. Security

- Extend security guard service to weekdays, depending on funding.

##### 3. Monitoring

- Establish a framework for monitoring by community game guards and volunteer patrollers, etc.

##### 4. Internal zoning

- Where necessary, carry out further environmental studies and consultations with individuals and organizations (e.g. Namibia Bird Club) on potential breeding sites, unique habitat and sensitive areas, and establish buffer zones according to findings of above study.
- Establish a small network of paths, following the policy of not separating paths unless absolutely necessary, for example where dog walkers, cyclists and horse riders would potentially conflict.
- Establish a corridor zone allowing animals relatively undisturbed access to water by encouraging people not to enter there at certain times.
- Allow low impact water sports such as swimming and non-motorised small boating (where the boat can be manually carried in and out from the nearest parking area).
- Investigate the possibility of an access road to an identified place at the water's edge, and a launching place at the floodplain side.

## 5. Development

- Any type of commercial development should relate to the character of the dam: this would include recreation and eco-tourism.
- Positioning of commercial development should be outside and adjacent to the defined dam area, with exception of “non-physical” commercial use - e.g. tours taken by operators.
- Facilitate environmental education activities by providing information in form of pamphlets, boards, tree labels etc.

## 6. Rehabilitation

- Rehabilitate slopes where off-road vehicles have caused serious erosion e.g. by creating embankments.
- Footpaths: close duplicating routes by packed stones and temporary signage, create embankments to slow down water flow (both on closed and existing routes).
- Parking area at dam: close top parking area, re-grade to more natural slope if required, re-plant area with indigenous trees.
- Alien vegetation: adoption of an entirely purist approach not recommended, rather remove only those species definitely encroaching upon habitat and preventing re-establishment of indigenous vegetation.
- Re-establishment of vegetation: re-introduction of *Aloe* to be considered.

## 7. Management body

- An Avis Dam Nature Reserve Management Committee is established consisting of 5-7 persons, representing the Municipality, the lessee, any approved commercial developer/s, the trust fund, and user groups. Their term of office would be as set out in a formal constitution.
- The management committee should operate by consensus in the interests of nature reserve conservation and management of the Avis dam and its surroundings.
- The committee should have the power to co-opt persons whose opinions, interests, expertise or resources could be of benefit to the area.

## SECTION ONE: SETTING THE SCENE

### 1.0 URBAN OPEN SPACES

#### 1.1 People and cities

We are not always consciously aware that as human beings we have lived for countless thousands of years in natural surroundings, and only a few thousand years in human-made surroundings such as villages, towns and cities. As people, we simply need some sort of access to nature - it's part of our evolutionary and biological make-up (Bell, Greene, Fisher & Baum, 1996). Yet Namibians live increasingly in cities. Some 25% already do, and this percentage increases every year. Windhoek's population - variously estimated at between 180 000 and 220 000, - grows by between 5-6% each year (Frayne, 1992).

#### 1.2 What is an urban open space?

An urban open space is any "green" or "soft" open space in the city such as its parks, gardens, riverside areas, undeveloped pieces of veld, and also the city's "hard" or "brown" spaces such as plazas, squares and malls, which usually contain some elements of nature, such as a fountain, or trees and flowers. An urban open space is basically an expression of nature in the city.

#### 1.3 Why Windhoek's urban open spaces are important

Windhoek's beautiful open spaces - its river beds with camelthorn and other indigenous trees, dams, attractive hill ridges, stunning mountain vistas, provide access to nature, right on our doorstep. Living in the city can be stressful, and nature has a **restorative influence** (Kaplan, 1983; Bell et al., 1996; Fiedeldej, 1994a). For those residents without own transport or little money, being able to "get away from it all" out of Windhoek is not an option - the city's natural open spaces are their most accessible pieces of nature. They provide opportunities, often at no cost, for active and passive recreation too.

A well-planned urban open space system provides not only access to the restorative benefits of nature, and a variety of active and passive recreation opportunities, but can contribute in other positive ways to quality of life for Windhoek residents:

- Carefully selected urban open space has potential **socio-economic benefits**. Viable inner city gardening and woodlot projects can create self-reliance opportunities and reduce the degradation that tree-cutting for fuel and income brings. Attractive urban open space also increases the city's tourism potential, and delays the onset of business's flight to the suburbs, which sets off inner city decay.

- Social research shows a strong link between environmentally responsible behaviour and early/ ongoing exposure to attractive urban nature (Hungerford & Volk, 1990). Such actual exposure, supported by **environmental education**, together establish a culture of environmental sensitivity. The contribution that a well-planned urban open space system could make here, is obvious.
- Windhoekers have low political consciousness levels – they are on the whole apathetic in influencing the decision-making process. Again, social research suggests that this may be linked to a lack of the necessary political competence skills. Community management of urban open spaces in partnership with the Municipality, could present **capacity-building opportunities** for Windhoek residents as they learn first-hand how to participate in local government. Participation in any level of the political process **empowers**. Usually, people who have political competence, are often environmentally responsible as well (Irwin, 1991; Lefcourt, 1976 cited in Viljoen, Van Staden, Van Deventer & Grieve, 1987).

#### 1.4 The vulnerability of urban open space

It is important to remember that urban open space is a non-renewable resource - once lost, it can not be re-created. We need to ensure that this natural urban resource, is protected for the sustainable<sup>1</sup> use of Windhoek's residents and tourists.

As the city's population grows, the Municipality is compelled to re-allocate financial resources towards providing shelter and basic services for its citizens. It comes under increasing pressure to sell undeveloped land -- especially on the urban fringes -- for residential and commercial development. This is where Greenspace can and does play an important role in providing a forum and action focus for the public, and in encouraging the Municipality towards integrated planning and sustainable development.

## 2.0 GREENSPACE'S ROLE IN WINDHOEK'S URBAN OPEN SPACES

### 2.1 The beginning

The idea of Greenspace was born in December 1994 during a public meeting which had been convened by Earthlife in response to a proposed commercial development project at the Avis dam.

Shortly thereafter, Greenspace established itself as a voluntary Namibian NGO which focuses its energies and activities on Windhoek's urban open spaces generally. Its primary objective is to establish in close co-operation with the Municipality of Windhoek, a viable system of open spaces in the city, based on the principles of MOSS - the Metropolitan Open Space System.

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<sup>1</sup> Sustainable development is generally considered to be development which "meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, p. 43)

## 2.2 The Metropolitan Open Space System

The Metropolitan Open Space System - MOSS - is a holistic planning approach to urban open spaces which recognizes their intrinsic value within the urban system.

MOSS utilizes inputs from professionals, experts, and the public in planning the system, the objectives of which are

- \*biological conservation
- \*natural area protection: hills, rivers, outcrops, floodplains
- \*riverbed and water quality control
- \*stormwater management and runoff control
- \*aesthetic relief/visual amenity
- \*environmental education
- \*public health improvement through accessible, pleasant and safe open spaces

In turn, these objectives contribute towards

- \*ensuring that integrated urban open space system planning becomes an inherent part of the city's overall structure plan/guide plan
- \*encouraging people to use and care for the open spaces in the system.
- \*establishing and maintaining a meaningful open space system which links established, proposed and potential conservation areas, natural and modified urban open space, parks, sports and recreation areas, riverbeds and unused land.

*a The Avis dam is one subsystem in an overall system of urban open spaces which together should offer Windhoek residents and visitors diverse nature and recreation opportunities and experiences. It should not be considered, or managed, as a subsystem which must serve all possible recreation needs in the city.*

Greenspace, which has adopted MOSS principles and practice, believes it can through public debate and action, make a valuable contribution to the sustainable protection and development of our urban nature, in the context of economic and social justice for all. Greenspace is structured in such a way that it can both respond to local communities who wish to play an active role in the conservation and development of an urban open space nearby them, and take a pro-active role in promoting the importance of urban open space in city living. It can be both a forum for public opinion, and it can mobilize community action.

## **2.3 Greenspace's achievements and constraints**

Since its inception, Greenspace has

- Established a generally co-operative working relationship with the Windhoek Municipality on urban open space policy,
- Served as a forum for public opinion on the Avis dam, the Van Rhijn dam and the Ludwigsdorf Cemetery and Riverbed project [the latter at the request of the National Monuments Council],
- Initiated, and obtained sponsorship for the Goreangab Action Project, which works closely together with the Katutura Youth Enterprise Centre, Greenwell Matongo community, Penduka and others,
- Continued its initial commitment to the protection and appropriate development of the Avis environment through Greenspace Friends of Avis, which leases the Avis dam area from the Municipality (lease period expires in June 1998),
- Conducted public awareness campaigns, including the erection of informative signage at the Avis Dam, and initiated the "Avis Eco-Kids" environmental education project,
- Partially secured the Avis dam area and the safety of its users through the provisioning of fencing and part-time parking security guards.

## **2.4 Greenspace's mission statement for the Avis dam area:**

*To contribute to the sustainable protection, development and management of the Avis dam environment by the Windhoek Municipality, through public discussion and participative community action.*

Greenspace feels that to date this approach has been both valuable and successful, and intend to continue pursuing this policy.

## **3.0 ASSETS AND LIMITATIONS OF THE AVIS DAM AREA**

### **3.1 Overview**

This section highlights the closely inter-related social, natural, historical and legal dimensions of the dam, sometimes in unavoidably natural scientific or otherwise formal language. Wherever possible, such descriptions have been complemented by excerpts from on-site interviews on how users *experience*<sup>2</sup> the various aspects of the dam described next.

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<sup>2</sup> From "Urban open space and the Avis dam: open space or "place"?", S. Harper, draft MA Research Psychology thesis, University of Pretoria, 1998

## 3.2 History

The Avis dam's history is closely linked with Windhoek's history. Its construction was already planned in 1898 by Th Rehbock of the German Colonial Administration. The dam wall was to be sited across the narrow pass below the present FM tower (Lau & Stern, 1990). The dam's construction at its present site began in the South African colonial period, and was completed by the then SWA Administration for the Windhoek Municipality in 1933. The dam overflowed for the first time during the floods of 2 April 1934. Since then, it has only exceeded 75% of its capacity during four rain seasons<sup>3</sup>, the last one being in March 1997.

*"I know the area well ja and I mean its certainly the first time that I've seen it you know with so much water in it ....It's actually really quite beautiful"*

The original road to Gobabis passed through the dam; and parts of one of its embankments can still be seen in the area. Remains of stone structures, the original purpose of which is not yet established, and scatterings of glass, metal and ceramic fragments can be found along the former road. It has been suggested that some archeological sites are present, but these must still be documented (Burke, 1997).

## 3.3 The biophysical dimension<sup>4</sup>

### ◆ Geographical location

The lease area is situated partly in Township Nr. 70 and partially in Windhoek townlands (Windhoek Municipality files), and occupies some 230-290 Ha (Windhoek Municipality/ Greenspace lease agreement, 1997).

### ◆ Climate

The Avis dam area is located<sup>5</sup> in semi-arid savanna with average rainfall of 300 to 400 mm. From 1930 until 1968, there was a rainfall station at the dam itself, and during this period, rainfall averaged 389mm, per year<sup>6</sup>. Rainfall measured over a period of 76 years at St. Paul's school nearby, averaged 356mm per year. The maximum measured in one season was 736mm in 1949/50, and the minimum 119mm in 1929/30. The highest temperatures are measured in December with an average daily maximum of 31°C, the coldest temperatures in July with an average daily minimum of 2-3°C.

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<sup>3</sup> 1948/49, 1949/50, 1962/63, and 1996/97 (Water Affairs and Windhoek Municipality data)

<sup>4</sup> Much of the ecological information is taken [sometimes verbatim] from Dr. Antje Burke's "Avis Dam Environmental Baseline Study and management plan", Windhoek, June 1997.

<sup>5</sup> 22° 34'S 17° 7'E (Water Affairs rainfall data)

<sup>6</sup> Water Affairs and Meteorological Office rainfall data

#### ◆Hydrology

The catchment of the Avis dam consists of 3 main tributaries with Klein Windhoek River being the largest tributary. Inflow data during the period of 1971-1996 varied between 5000 cubic metres in 1991/92 and 1510000 cubic metres in 1985/86. The 1997 inflow had the effect of filling the dam from about 5 percent to almost 80 percent full.

*" when it came in down in flood last year [there were so many people] walking along there I once called it the Windhoek waterfront! "*

#### ◆Geology, soil and landforms

Interlayered schist of the Damara Sequence forms the underlying geological stratum of the majority of the Avis area overlaid by sand, gravel and silt deposits along the major river courses (Geological Survey, in Burke, 1997). The area comprises 3 main landforms:

- slopes and ridges of the foothills of the Eros and Auas mountains
- riverbeds
- floodplain.

*" and the surrounding is so nice also .... if you take a photograph of the Auas mountains for instance it's beautiful..."*

The slopes and ridges consist largely of psammitic and calcareous schist with occasional bands of amphibolite and quartzite running in southwest-northeast direction through the study area. About 450 million years of erosion shaped this precambrian basement into the undulating hills perceived today. The substrate of this landform is hence predominantly rocks with pockets of poorly developed soil below rock overhangs, in crevices and other small scale topographic features where soil can accumulate.

*" ...some people also have to have their fun but they're destroying the soil at the back there .... I have seen it and I was angry..."*

The Klein Windhoek and Avis Rivers and their tributaries scoured riverbeds into the basement rock and deposited sand, gravel and silt during flooding events. The construction of the Avis dam in 1933 altered the natural flow patterns and resulted in the creation of a floodplain with silt being deposited regularly in the eastern section of the Klein Windhoek River. Although these sand and silt deposits are more favourable substrates for plant growth, these habitats experience frequent disturbance through flooding events. Therefore they are particularly prone to invasion by alien species, which are environmentally undesirable.

#### ◆Vegetation

Windhoek lies in the centre of the Highland savanna vegetation which is characterized by a variety of Acacia trees such as *Acacia hereroensis*, *A. hebeclada* and *A. reficiens* (Giess, 1971). According to the dominant landforms, three vegetation types can be distinguished in the study area:

- vegetation of slopes and ridges
- vegetation of riverbeds
- floodplain vegetation.

#### Vegetation of slopes and ridges

Moderate to steep slopes of various aspects harbour tall open shrubland characterized by shrubby forms of *Acacia mellifera*, *Acacia hebeclada*, *Catophractes alexandrii* and *Montinia caryphyllacea* which reach collectively up to 10% vegetation cover. Most shrubs rarely exceed 2m height. Frequent accompanying species are the perennial grasses *Cenchrus ciliaris* and *Pennisetum foermeranum* as well as the herbs *Tribulus zeyheri* ('duiweltjies') and *Talinum caffrum*. Occasional trees such as *Boscia albitrunca*, *Combretum apiculatum* and *Ozoroa crassinervia* break up the shrubland. Other common shrubs in this vegetation type, although only locally exceeding more than 1% cover, are *Leucosphaera bainesii*, *Euclea undulata*, *Grewia retinervis*, *Acacia ataxacantha*, *Manuleopsis dinteri*, *Tarchonanthus camphoratus* and *Rhus marlothii*. A mosaic of small scale topographic features in form of shady rock overhangs and crevices filled with soil provide habitats for a variety of ferns, mosses and lichens and other shade loving species. An assortment of geophytes, for example *Albuca* species, *Boophane disticha*, *Dipcadi* species and *Oxalis purpurascens* appear at the beginning of the rainy season. The slopes and ridges also harbour species of conservation importance, such as *Aloe littoralis* and *Stapelia* species.

" I come from (region X) ..... I can't get used to these doringbome and little bossies and so that's not to me the main thing but it's the open space and the water "

" I think it's the .....freedom and the veld. I'm .. I'm very fond of the veld .....very very fond"

#### Vegetation of riverbeds

Although less diverse in species than the slopes, the riverbeds close to the dam harbour open woodlands characterized by sweetthorn trees, *Acacia karoo*, which reach up to 6m height. Vegetation cover is highly variable ranging from localized thickets with up to 50% cover to open areas with no vegetation cover at all. Some of the shrub species from the slopes, e.g. *Rhus marlothii*, *Leucosphaera bainesii* and *Zygophyllum pubescens*, occur at the edge of the riverbeds forming a transition between riverbed and slopes. Largely short-lived grasses, such as *Enneapogon cenchroides*, and weedy herbs (e.g. *Bidens bipinnata*, *Schkuhria pinnata* and *Tagetes minuta*) and the indigenous creeper *Citrullus lanatus* occur as a ground layer, indicating a frequent disturbance by the river.

"...this is *Acacia karoo*... that one. And it was so nice, it was just standing on the side from the lake there... and its quite nice to see in the evening... but now the tree is dead and I'm sorry..."

#### Floodplain vegetation

Apart from occasional *Acacia erioloba* trees on higher ground, the floodplain vegetation is dominated by short-lived weedy herbs and mainly annual grasses, such as *Chloris virgata*, *Enneapogon cenchroides* and *Eragrostis echinochloidea*. Invasive exotic species, i.e. *Argemone mexicana*, *Datura innoxia* and *D. stramonium* dominate large parts of the floodplain. Frequent flooding prohibits the establishment of long-lived shrubby and more diverse herbaceous vegetation. As in the riverbeds, vegetation cover is highly variable reaching near 100% in monotypic stands of *Datura*, but showing no vegetation cover where the vegetation is regularly disturbed either by flooding or human interference (e.g. soil removal and off-road driving).

"I dislike the [offroad drivers] ...spoiling the vegetation and the natural part about everything here"

#### ◆ Avifauna

A total of 187 bird species has been observed over the past 5 years at Avis Dam and surroundings. Seventeen of these species, e.g. Blackbreasted snake eagle, Redknobbed coot, Moorhen, Barn owl and Red bishop, were observed to breed in the area. Water related birds make up 28% of the observed species.

"... if they want to, if they want to really keep this as a...wetland and for the birds which...you can't even see a bird on the dam any more ... not a duck ... they should start excluding the ...(motorbikes)"

"en ag ... daar anderkant swem 'n paar eentjies wat 'n ou mee kyk ..".

#### ◆ Reptiles

Ten species of frogs are known to occur in the Highland savanna area, about 30 species of lizards, geckoes, skinks and agamas, and 40 species of snakes. A large portion of these are likely to occur in the Avis dam area; amphibians in the vicinity of open water, and reptiles mainly in rocky habitats such as slopes and ridges.

#### ◆ Mammals

Small mammals which potentially occur in the Avis area encompass several species of bats, shrews, mice, gerbils, hares, mongooses and rats. Rock dassies, porcupines, ground squirrel and black backed jackal occur in the area, as well as the aardvark which is listed in Namibia's draft red data book of threatened mammal species. Recent antelope sightings include kudu and steenbok, which frequently drink at the dam.

"... now and then we do see some animals in the mountains, my dogs chase after them..."

"...it was three days ago I think ....about twenty five to thirty baboons on the railway bridge."

◆ Invertebrates

The highland savanna area harbours 20 species of scorpions, 24 species of solifuges and 90 species of spiders, some of which occur in the Avis area.

*"Are the ants worrying you? Shall we go somewhere else?... well maybe a bit closer to the water ... that might put them off"*

◆ Although no fish have been recorded to occur in the dam, fish have been seen<sup>7</sup> since the 1997 inflow, and people have been observed fishing at the dam.

### 3.4 The dam's psycho-social assets

In its location conveniently close to Windhoek, the dam fulfils an important social-recreational function for many of Windhoek's citizens (Quantum Research, 1996) *across the former colour bar*<sup>8</sup>, and across Windhoek's well-documented disparate socio-economic groups (Frayne, 1992). It represents a conveniently situated outdoor classroom for ongoing environmental education for all age groups.

Other than the opportunities which the Avis dam environment offers for recreation and relaxation, some of the qualities of the area most appreciated by the visitors interviewed, whether it is their first time there, or whether they are regulars, are

- the presence of water
- the dam's perceived relatively undisturbed natural state,
- its perceived tranquillity
- its perceived sense of freedom and unrestraint
- its perceived beauty
- its perceived restorative benefits.

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<sup>7</sup> Oral communication, Alan Walkden-Davis, March 1998.

<sup>8</sup> From research in "User perceptions of the Avis dam environment: its quality and future management", S. Harper, draft MA Research Psychology thesis, University of Pretoria, 1998

***The appreciation of these qualities is not an elitist phenomenon.***

An extensive literature review has shown that "researchers from a variety of *different* disciplines, using *different* perspectives on landscape aesthetics and psychological benefits, and focusing on *different* levels of human functioning, have provided consistent findings that natural landscapes in their unspoilt form, and especially in the case of a visible or known water presence, elicit higher aesthetic ratings than any other kind of landscape that has so far been investigated, together with consistent reports of highly restorative psychological benefits" (Fiedeldey, 1995) - in short, people like apparently unspoilt nature more.

- 4 *Any proposed development should understand, and respect, that the dam's inherent and largely unspoilt naturalness, is the essential quality which sets it apart from other recreation opportunities in Windhoek.***

Clearly, the siting and design of any development, commercial or otherwise, should be in harmony with the dam's essence as experienced by users.

### **3.5 Economic value**

The Avis dam is situated conveniently close to Windhoek's city centre, and to many of its suburbs. It is also situated adjacent to the only route into the city from the east, the international airport, and the recently-opened Trans-Kalahari Highway through Botswana to South Africa. Its strategic location, together with its natural beauty, have made it a frequent target for commercial development. Its potential value as an eco-tourism destination should be considered.

*"it's really the only area you can go to in Windhoek you know where you can get out a bit .... there's not really much on offer at all [in Windhoek generally] I mean especially with a bit of water and so on ..... so I feel its got a hell of a lot of potential..."*

This aspect has been more fully analysed in the discussion document submitted to the Municipality on the alternative proposals for siting any commercial development in the dam area<sup>9</sup> (See annexure). The main points proposed in this document are that any development should not destroy the value of the dam area, which lies in its unspoilt natural character.

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<sup>9</sup> Greenspace discussion document: Development proposals for Avis dam erf 2882, and suggested alternative siting , 4 May 1998

Recent background to the issue of development

For the past ten years, there has been sporadic interest in building a hotel near or at the dam. The first proposal for hotel development was in 1988<sup>10</sup>, but this did not materialize. This was followed by a lull, and then the proposed commercial development by a Malaysian company in 1994<sup>11</sup>. (The setting aside of Erf 2882 for this purpose, first considered in 1988 by the Council, but only registered at the Deeds Office in May 1994<sup>12</sup>, appears linked to the Malaysian proposal.) Because of limited funds and other priorities, commercial development is an increasingly attractive option to the Municipality for financing the preservation and maintenance of the area<sup>13</sup>. In commenting on the Council's recent decision<sup>14</sup> to auction erf 2882 to the higher of two bidders, one councillor observed that environmental concerns should not outweigh developmental concerns. Instead, a healthy balance should be found between business, economic and environmental interests (Allgemeine Zeitung, 27 March 1998).

- 4 ***Greenspace is not opposed in principle to development, commercial or otherwise, at the dam. It is concerned that any development should not lessen, or damage, or destroy, those very qualities which set the Avis dam area aside from its urban environment, and which constitute its enduring appeal through seasons, and years.***

Both the discussion document on development proposals for Avis dam submitted to the Windhoek Municipality on 5 May 1998, and this draft management plan are concrete evidence of Greenspace's conviction that sustainable urban open space management, and sound socio-economics, are not conflicting but complementary goals. We trust that the Municipality shares this longterm vision.

### **3.6 The legal dimension**

The Avis dam area became a park by Government Notice in 1939 in terms of the Parks Regulations of 1929. Its status as a park remained unchanged for almost 40 years, until the 1939 Government Notice was repealed by the Parks, Recreation Grounds and Camping Site Regulations of 1977. Because of technical-legal reasons, these latter regulations could *not* be made applicable to the dam area, though the City Council passed a resolution to this effect (Council resolution 696/9/79). In 1980, following the correct legal procedures, the area was validly set aside as a temporary park in terms of sections 177 and 231 of the Municipal Ordinance 13 of 1963, with the consent of the Executive Committee. Thereafter, the 1977

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<sup>10</sup> Minutes of a special meeting held in the Municipality's committee room, 29 November 1994 on the proposed development at the Avis dam. (L/Avis/W)

<sup>11</sup> Avis dam recreational club development. Objections, suggested solutions and proposal for a nature reserve submitted to the Windhoek City Council by Namibian Greenspace Project, January 1995

<sup>12</sup> Deeds Office, Folio 2882 Klein Windhoek

<sup>13</sup> Two interviews with municipal officials in the Town Planning and Property and Protection Services Divisions in December 1997, and February 1998 respectively

<sup>14</sup> Municipal Council agenda, 25.03.1998

regulations were made applicable to the area, with the exception that dogs were not restricted (Municipal Council of Windhoek correspondence files). Appropriate municipal signage making the regulations known was erected at both the dam and the floodplain entrance to the dam. Despite its temporary legal status as a park, the area is zoned "undetermined" in the town planning scheme, which means that it can be used by the Municipality for any purpose it deems fit.

*"I mean there's no signs there anymore everything's been demolished and so on and this is what I'm afraid of ....nothing ever happens "*

**4 The dam's legal status needs to be such that the flora and fauna of the area, as well as its relatively natural state, are unequivocally and unambiguously protected. Practical suggestions to achieve this appear in the land use section.**

### 3.6.1 Current status

In 1997, the Windhoek City Council leased the area [Municipal Council of Windhoek lease agreement 1997] to Greenspace for one year. This lease agreement, which expires in June 1998,

- *Excludes erf 2882, currently the subject of an invitation to tender to potential developers, and*
- *Allows the municipality to take back any other area within the lease area it wishes, for any purpose.*

Greenspace considers both of these qualifications as potential problems in establishing a coherent management system which would adequately protect the area's particular value as natural open space.

## SECTION TWO: THE DRAFT MANAGEMENT PLAN

### 4.0 PUBLIC PARTICIPATION

Greenspace was born from public initiative during a meeting in 1994 on commercial development at the dam, and has since then consistently pursued a policy of public consultation on, and research into, the dam's management. The Namibia Bird Club petition of 1994 on the Avis dam and surrounding area (November 1994) in response to the proposed Malaysian development, was followed by

- a survey of views on use and management of the dam by the Cape Town based market research firm Quantum Research in 1995
- a public meeting at the SKW on 25 September 1996 to solicit public opinion on the management of the dam, and the possible establishment of a trust fund
- presentation to the public of Dr. Burke's Avis dam baseline study and draft management plan, at the Forum, 10 July 1997
- an information display on the draft management plan at the Wernhill Shopping Centre on 18 October 1997, accompanied by a questionnaire completed by interested passers-by
- a permanent display at Mike's Kitchen during November 1997, which included some of Greenspace's proposals for the management plan, and requested public input
- a public meeting at Thuringer Hotel on the proposed Peppercorn Hotel development, 5 November 1997
- a presentation of the draft management plan at the Wilde Eend, 8 November 1997
- a qualitative study of users' experiences of the Avis dam, 1998 [ongoing]
- intermittent mass media notices inviting public comment on the draft plan
- public meeting on this master development plan for the Avis dam environment, 12 May 1998.

4 ***Greenspace is therefore confident that its assessment of the Avis dam's economic, psycho-social and ecological resources, and the principles which underpin the draft master development plan, are a fair reflection of public opinion.***

## **5.0 AIM AND OBJECTIVES OF THE PLAN**

### **5.1 Aim**

To preserve and manage the Avis Dam basin as a distinctive yet integral part of Windhoek's future urban open space system.

### **5.2 Objectives**

1. to preserve and enhance the quality of the environment by guarding the character of the Avis dam area
2. to rehabilitate the natural environment where needed and ensure sustainable land use to prevent future degradation
3. to conserve the area's fauna and flora
4. to provide for a wide range of both nature-based recreational opportunities
5. to ensure compatibility of use between activities, and between activities and environment
6. to obtain and manage necessary funding for the above
7. to ensure public participation in, and support of, the management process
8. to manage all of the above in a consistent and sustainable manner.

## 6.0 LAND USE: DEVELOPMENT, REHABILITATION AND CONSERVATION

The land use proposal is based on the key objectives of the management plan. Its *guiding principle* is the best possible reconciliation between recreation and protection of the natural environment with retention of the area's character as the primary objective. The concept of 'sharing' needs to be reiterated here. Rather than set up a few overall scenarios, the approach has been firstly to establish the key issues, and then to propose strategies or actions to deal with them. These are NOT cast in stone. They are open for discussion, initially through public consultation, then review by experts in various fields, as well as discussion with the Municipality before tentative finalisation in June 1998. Ongoing public review of the plan forms an integral part of Greenspace's adaptive approach to management of the area.

The key issues in terms of land use, have been identified as:

1. Definition of area and boundary
2. Internal zoning
3. Circulation and infrastructure
4. Development, rehabilitation and conservation
5. Linkages and expansion
6. Timetable & phasing

### 6.1 Definition of the area and boundary

The definition of the place, the dam area, in terms of the references of users and the common view, constitutes the Avis Dam basin which includes the gravel parking areas, the current expanse of water, the floodplain, and the first range of hills beyond, and the skyline that encompasses all these:

**everything included within sight when a person is on the dam wall**

not just the lease area. This concept is extremely important and is shown on the accompanying map. The issue of erf 2882 is very important. A proposal has been made by Greenspace for the deregistration of this erf and its re-incorporation into the lease area, with alternative siting suggestions for development (as discussed below and in the discussion document).

*Strategy action:*

- define the physical boundary that includes this perceptual extent of Avis Dam
- negotiate with the Municipality to redraw the boundaries of the lease area where necessary

- assess the need for denoting this boundary physically, by means of fencing, cables, etc.
- install these physical structures according to priority.

## 6.2 Internal zoning:

The investigation into internal zoning was based on combination of natural features, human activities, type of ecology and level of sensitivity. Some zoning is deemed to be necessary in order to manage the area consistently, and to reduce conflict between activities as well as the environment, but the general consensus thus far has been that it should preferably be with a broad brush. We should not hedge users in with rules, regulations and restrictions, but aim at co-operative tolerance and reciprocal consideration between users.

A start was made by identifying the existing patterns of use of the Dam and the recognition of two main areas of use - the "floodplain" and the "dam-wall" (see accompanying map). These also linked with clear differences in natural features.

The floodplain is predominantly used by people for picnicking and a stay of several hours - choosing a spot under a favourite tree and spending the day there in family or larger groups, with refreshments brought along, having a braai, playing music, etc. The dam-wall is a route used mainly by single people or smaller groups to walk, jog, exercise their dogs, commune with nature. The general visit here is an hour or two.

### a) Social factors in determining zoning:

Some activities cause friction between users, and some affect the natural environment adversely. Completely unrestricted use will not be a viable option. Activities have to be assessed for their compatibility with each other and the environment. Criteria will be established for this assessment, on a scale of 1 - 10, and the following is a preliminary list not necessarily in order of importance:

Negative criteria to assess compatibility:

- soundscape: noise/ quietness level. Does it disturb people, fauna?
- physical damage to environment
- safety of people - those participating in activity themselves, and people adjacent
- pollution (litter, noise, smells/ noxious gases)
- visual intrusion
- restricting freedom of access/ entry

Positive criteria:

- rehabilitation of habitats
- encouragement of community awareness of environment/ environmental education

- promotion of opportunities for informal socialising
- increasing beneficial recreation/ leisure opportunities
- preserving opportunities for semi-wilderness experience *in the city*

Following the above criteria and assessment, four categories for activities are delineated:

- 1• to allow -- relatively neutral in its effect (A)
- 2• to prohibit -- incompatible and detrimental to the ecology and users (P)
- 3• encourage -- positive and enhancing the Dam experience and character (E)
- 4• limited to certain areas -- not compatible with other activities (L)

(See system for listing activities and assessing them by means of table in Annexure C.)

b) Biophysical factors in determining zoning:

The type of habitat and level of sensitivity also has to play a role in determining the zoning. Certain high risk areas have been identified using gradient as a main risk indicator - the steeper the area, the more risk of human traffic causing erosion. See Annexure B. A further environmental impact assessment will look at issues such as breeding sites, unique habitat, etc. once the lease is secured and funding obtained for the study. The issue of buffer zones will then also be considered. Preliminary thoughts have thus been directed to adding a third zone to the two already mentioned, which encompasses the mass of hills to the north-east of the Dam. This area not only is the most untouched environmentally, but also stands the greatest risk from abuse by 4x4's, poaching, etc. This has been labelled the hill-sanctuary, and has great potential for enhanced environmental conservation and education.

c) The three main zones identified thus far, are:

- the floodplain -- for relatively static mass recreation: picnics, braais, etc.
- the dam-wall -- for relatively active recreation: walking, etc.
- the hill-sanctuary -- limited numbers, focus on eco-tourism, haven area for large mammals

The intention is to phase off activities on the east side of the dam, to reduce impact, while catering for higher impact on west side.

d) Methods of control & encouragement:

*Suggested strategies*

In principle, controls should be subtle, aimed at raising awareness and encouraging emergent community identification of the Dam basin as "theirs". Proposals for these are

- indications that the area is "owned", eg. through discreet signage [Greenspace will give attention to the siting of its own and municipal signage]
- occasional visible presence of Greenspace members

- information pamphlets encouraging a "carry-in/carry-out -- leave nothing but footprints policy"
- active encouragement of widely based share-holding in whatever management and funding mechanisms are established
- enlargement of Friends of Avis group to involve most or all dam area users in some way

### 6.3 Access, circulation and infrastructure

#### a) Access and entry points:

The number and position of entry points to the Dam will greatly affect its quality, preservation and management. At present there is the entrance to the floodplain off Sam Nujoma Drive, from the south side only (traffic travelling from town) and the gravel parking area at the south end of the dam-wall which is reached by means of the gravel road branching off Avis Road. For the present, in order to facilitate management, it is suggested that entrances are restricted to the two existing vehicular entrances (floodplain and dam-wall).

#### *Future possible strategies/actions:*

- establish a parking area at the municipal waterworks site (to link with possible commercial development discussed later) from which pedestrian access might be obtained
- create an additional pedestrian entrance at the waterworks
- close the parking area at the south dam-wall and replace it with one at the waterworks, in order to have less disturbance on the south side
- establish with the Municipality a regular programme of access road and parking area maintenance.

#### b) Security, fencing, monitoring & access control, payment:

The establishment of a physical boundary is becoming an increasingly important issue. Fencing of the area is not financially viable, and Greenspace recommends shoring up the boundary at two priority areas adjacent to parking sites. Different levels of priority will be established in relation to edges such as against the national road, against the commonage farms to the northeast, etc. The physical nature of these needs to be determined: i.e. cables around parking areas to allow access to people but not vehicles, security fencing adjacent to habitation that might pose a threat to the wildlife.

#### v Access

is an issue of extreme importance:

- *Actions and strategies:*
- Scramblers, quads and other motor vehicles should not be allowed into the floodplain area.
- Possible supervision of visitors must be investigated, depending on funding as well as increased usage of

- the area. This would imply full-time staff who might double as security.
- In the long-term, entry may have to be restricted to certain hours, such as the daylight hours.
- Possible levies, such as the hire of a picnic/ braai-site, must be investigated as a potential means of protecting the facilities and generating minor revenues for their upkeep.

#### v Monitoring

It is unrealistic for Greenspace as a voluntary organization to patrol the entire area in the immediate future.

#### *Strategies for long-term consideration:*

- community game guards
- volunteer patrollers, etc.

#### v Security

The security guards at the dam-wall parking area on weekends have so far been very widely supported.

- *Strategies:*
- Extending service to weekdays, depending on funding, when the usage is very much less, or at least for the late afternoon hours.

#### c) Parking:

Greenspace recommends restricting parking in the lease area to two places: south of the dam-wall and at the entrance to the floodplain. A parking area at the floodplain would alter some of the current usage patterns there, but could also benefit the area by reducing degradation, noise levels, poaching, wood-cutting, and dumping.

- *Suggested actions/strategies for consideration:*
- Create parking area at floodplain to cater for present and projected number of vehicles. (Check estimates of number of vehicles with the Municipality).
- Both parking areas to be fenced in such a way that unauthorized vehicular access is restricted, but pedestrian access not.
- Consolidate parking area at south dam-wall into single parking area below the earth-cut, to make it less obtrusive, and more easily monitored. Determine extent to which it must be enlarged to deal with current and projected usage figures. Surfacing to remain permeable as far as possible, in line with current conservation practices world-wide. This decision will be re-evaluated from time to time.

d) Traffic type, compatibility & zoning (relating extensively to activity analysis):

In order not to restrict users too much, the policy is NOT to separate paths unless it is absolutely necessary to do so. For example, in the case of:

v Animal disturbance

Dogs often disturb nesting birds, and people disturb mammals coming down to the water to drink.

• *Strategies:*

- Establish a corridor zone allowing animals relatively undisturbed access to water by encouraging people not to enter there at certain times.
- Approach Bird Club to help identify one zone, e.g. at the back in the valley where the minimal disturbance of fauna zone is envisaged, where dogs may not move along the water's edge.

v Foot-traffic

Walking, jogging, dog-walking, etc. generally creates little disturbance, except a measure of erosion (see rehabilitation for suggestions on combating this). There is an already existing "informal" network of paths in the area; formalizing these, and familiarizing users about their existence, would open up exploration possibilities, reduce congestion [and so opportunities for conflict] in certain areas; and also reduce the perceived crowding experienced at certain times of the day.

*Strategies:*

Establish a formal network or footpath system with the following elements

- a round the boundary walk - as the longest walk, to promote control & surveillance, and express the ritual involved in circumnavigating the "property",
- to create linkages between existing and new paths to form the network,
- to create and consolidate paths that follow contours,
- to create paths to look-out points,
- to name routes and look-out points,
- to close duplicating paths that promote erosion.
- to establish a hiking trail access point which would connect to the planned Windhoek circumnavigation hiking route.

v Mountain bikes and horses

Mountain bikes at speed and horses can present an actual and a perceived threat to pedestrians and dog-walkers, and vice versa. Greenspace proposes establishing a system of bridle paths for mountain-bikes and horses, either separately or together, where riding can happen at speed.

*Strategies:*

The local riding club, and mountain bike club will be approached:

- to map and propose these routes for discussion,
- and once accepted broadly, to demarcate the routes, perhaps with signs on stones,
- and to assist in producing brochures to make it widely known.

v Off-road vehicles

The issue of two and four-wheel motorbikes, four-wheel drive vehicles, etc. has been extensively considered. The consensus amongst Greenspace members and the majority of dam-users is that motorized vehicles of any kind produce too much noise, damage the environment through erosion and air-pollution, and present a safety hazard to others.

• *Strategies:*

- Continue to ban unauthorized motor vehicles from the entire area, except access roads and parking.
- Negotiate joint strategy with Municipality for controlling access by quad bikes and scramblers
- Retain the roads in the hill-sanctuary zone which have been created historically by the Municipality as walking trails and for emergency access, but the degradation at the floodplain cliffs is to be rehabilitated.

v Water sport

The current water level has sparked an increased use of the dam for water sport. Opinion seems split between not allowing anything "unnatural" on the surface water, and allowing all forms of boating that do not generate noise.

• *Strategies:*

- Allow swimming, when water quality justifies this
- Allow any form of boating which does not generate noise or discharge, i.e. non-motorized boating.
- Allow any form of boating where the boat can be manually carried in and out (over the head, not dragged) from the nearest parking area -- in line with a carry in-carry out policy.
- Investigate the option of providing an access road to an identified place at the water's edge, and a launching place at the floodplain side.

*Summary:*

Overall infrastructure layout maps summarizing these recommendations will be produced for management purposes, and converted to simpler orientation maps for users.

## 6.4 Development, rehabilitation and conservation

As frequently previously noted, Greenspace is in favour of development, as long as it is appropriate and does not change the fundamental character of the dam, which is

**“natural, unspoilt, unbuilt and quiet; as well as free, accessible and unrestricted”**

and is not detrimental to the environment.

In the discussion document previously referred to, an investigation into types of development was done. From this two main types of development, commercial and non-commercial as well as the environmental rehabilitation of the area, can be isolated:

### Commercial development

#### *Suggestions:*

- Any commercial development should fit the character of the dam, e.g. recreation and eco-tourism.
- Positioning of commercial development should be *outside and adjacent to* the defined dam area. This would also simplify issues of ownership, management and expansion.

### Non-commercial development

The aim will be to enhance recreation possibilities while minimising impact on environment, by providing low-key small-scale physical improvements, as well as services.

#### *Strategies:*

- Prohibit construction of physical structures (with the exclusion of braai-areas) If braai areas are provided, their construction will be unobtrusive and take into account that all rubbish in the floodplain at some stage washes into the dam.
- Focus on community education and information dissemination --
  - q Publish interpretative information,
  - q Provide and keep current a notice-board,
  - q Volunteer guides for a specific time on a specific day once a month,
  - q Affix labels on-site where applicable: e.g. naming trees [for example, on the "traditional" walk from the parking area to the end of the wall, at least 8 different tree species can be seen (M. Ochse, Greenspace and Tree Atlas Project member, oral communication, May 1998); ten most "commonly seen birds/ grasses/ small mammals, etc.
  - q Disseminate through labels, leaflets, display, lectures, hiking trails, etc.
- Construction of lookout points, picnic sites, campsites, hiking trail huts,

- Toilet facilities - very careful consideration must be given to any proposed construction of these at the floodplain (e.g. availability of sewerage, leakage risks, etc.),
- Rubbish bins: Vandalization, and baboons pose a threat. The bins could also be seen as detracting from area's "naturalness". If provided, rubbish removal by Municipality is to be negotiated,
- Possible sale of fire-wood is being considered to minimize the threat of tree-cutting.

### Rehabilitation

Although some areas clearly need rehabilitation, a more detailed assessment is needed to establish amount of degradation, priority areas and appropriate action. Thereafter a guide plan with recommendations must be drawn up. Preliminary findings do point to some areas requiring early attention:

#### *Strategies:*

- floodplain cliffs where off-road vehicles have caused serious erosion and ensuing degradation are seen as a first priority. Detailed approach depends on EIA findings, eg. create embankments to control waterflow, prevent traffic in the rehabilitation period, plant appropriate trees and shrubs, seed relevant grass-species to retain earth. Approach the National Botanical Research Institute for assistance.
- Footpaths: close duplicating routes by packed stones and temporary signage, create embankments to slow down waterflow (both on closed and existing routes),
- Parking area at dam: close top parking area, re-grade to more natural slope if required, re-plant area with trees
- Alien vegetation: adoption of an entirely purist approach not recommended, rather remove only those species definitely encroaching upon habitat and preventing establishment of indigenous vegetation
- Re-establishment of vegetation: re-introduction of *A/oe* species must be considered
- All of the above to form part of education effort.

## **6.5 Beyond boundary linkages: opportunities & threats:**

### v Opportunities

Avis dam must form an integral part of the city's potential greenbelt network.

#### *Strategies:*

- Keep in mind the possibility of expansion to the northeast, possibly with a longterm vision of a large sustainable wildlife sanctuary.
- Seek linkages with urban open spaces in Ludwigsdorf and the Avis residential areas, as well as the city-wide hiking trail network and existing paths.

## v Threats

Peripheral threats must be addressed and planned for, including the possibility of urban development eventually encircling the dam. The nearby municipal dump-site, with its increased landfill and potential noxious hazards, will also be investigated in conjunction with the Municipality and other relevant bodies.

### *Strategy:*

- Ensure a buffer zone for the dam against urban encroachment by appropriate zoning.

## **6.6 Phasing/ timetable:**

Programming the management system depends very heavily on whether Greenspace is awarded an extension of the lease, the resolution of a number of matters in the lease agreement, and secure funding. Obtaining the extended lease would create access to additional funding. The program is also dependent on the type of management body and financial management system decided on. A preliminary program might consist of separating establishment actions from maintenance actions. The most urgent priorities are incorporating erf 2882 into the lease area and fencing and securing the boundary in sensitive areas. These must be addressed forthwith by Greenspace and the City Council.

## **7.0 LEGAL PROTECTION FOR THE AREA**

The following scenarios have been considered:

### Scenario 1

The Municipality assumes full responsibility for the area:

- From rates and taxes, provision is made each year in the Municipal Parks and Gardens budget.
- The Municipality further zones the area as a *park* under the provisions of Local Authorities Act.
- Entry and other fees may be charged by the Municipality.
- The area is developed as the Municipality decides fit, in consultation with ratepayers.

### Scenario 2

The Municipality zones the area as *private open space* and leases it to Greenspace, or any other body with similar aims and objectives

- Minimum lease term is thirty years
- Erf 2882 is re-incorporated into the lease area
- The area may be used only for those activities designated by the lessee.
- Fees may or may not be charged by the lessee.

### Scenario 3

The area becomes a conservancy in terms of the Nature Conservation Ordinance (4/75).

- At present, the provisions of the Ordinance apply to the establishment of conservancies in rural areas only. Therefore, this is not an option at this stage.
- However, it could be an option, if the envisaged "Parks and Wildlife Management Act" makes provision for urban conservancies.

### Scenario 4

The Municipality applies to the Ministry of Environment and Tourism for the area to be declared a "private game reserve". The Ministry would then submit the Municipality's application to Cabinet for approval.

### Scenario 5

The Municipality zones the area as *public open space* and leases it to Greenspace, or any other body with similar aims and objectives.

- Minimum lease term is thirty years.
- Erf 2882 is re-incorporated into the lease area.
- No part of the lease area may be used for any purpose other than those appropriate to public open space activities, except by written mutual agreement between lessor and lessee.

The last scenario, that of *public open space*, is the option favoured both by Greenspace and the general public consulted at the public meeting of 12 May 1998.

## **8.0 FUNDING**

The following funding scenarios, which are not mutually exclusive, were considered:

### Scenario 1

An appropriate proportion of existing rates and taxes, is budgeted for protection and maintenance of the area, or a new levy for urban open spaces is implemented.

### Scenario 2

A fixed amount of the income generated by any commercial development at or near the dam is paid to the Municipality, or to the lessee of the area, or both, for maintenance and protection.

### Scenario 3

A trust fund is established specifically for the Avis dam area, to which private individuals and corporate business may contribute, for the area's protection and maintenance.

- the fund may be administered by its own board of trustees, or directors; OR,
- the fund is administered as a separate fund by the Namibia Nature Foundation, which administers many other similar funds. A 6%-12% administration fee will be involved.

The trust fund option has won the most support from the users and members questioned.

## 9.0 MANAGEMENT BODY FOR THE AREA

Whether the Municipality, or an interested group, or trustees administer the area, ***Greenspace believes that there should be a body in which all stakeholders in the area are represented. This body should have real powers to administer the area.***

### *Strategies:*

- An Avis Dam Nature Reserve Management Committee is established.
- It should consist of 5-7 persons representing the Municipality, the lessee, any commercial developer/s, the trust fund, and user groups. Terms of office would be set out in a formal constitution.
- The management committee should operate by consensus in the interests of nature reserve conservation and management of the Avis dam and its surroundings.
- The committee should have the power to co-opt persons whose opinions, interests, expertise or resources could be of benefit to the area.

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## **ANNEXURES**



## GREENSPACE

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FRIENDS OF AVIS  
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07.09.05

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DISCUSSION DOCUMENT<sup>15</sup>:  
DEVELOPMENT PROPOSALS FOR AVIS DAM AND  
SUGGESTIONS FOR ALTERNATIVE SITING

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### INTRODUCTION:

The Avis Dam area has over the last few years been mooted by the Windhoek Municipality on a number of occasions as being an ideal site for development. This development is proposed as that of an hotel. Greenspace Friends of Avis took on a one-year lease of the area, excluding the erf 2882 set aside for the hotel, as part of its campaign to promote and preserve green urban open spaces in Windhoek. The lease is due to expire in June of this year, and the management plan for the area, which is in the process of being drafted, will request that the lease is renewed for a longer period, in order to complete its aims.

The municipality's announcement that it was going to put erf 2882 out to tender shortly, took Greenspace completely by surprise. The organisation had been under the impression (formed by assurances from the Municipality that it would keep us up to date), that we would be consulted or at least informed of such intentions if they were in the pipeline. The announcement has pre-empted certain proposals we wanted to make in our management plan and still wanted to get public approval for.

This document is thus a preliminary proposal drawn up in haste, in order to consult with the Municipality of Windhoek on the proposed sale of erf 2882. We apologise in advance for any errors that might result from the speed at which this is being drawn up.

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<sup>15</sup> By N Maritz, current chairperson: Greenspace

PART 1:

“SETTING THE SCENE”:  
QUESTIONS ON DEVELOPMENT AND THE AVIS DAM

A. Why is it proposed to have development at Avis Dam or anywhere else in the city for that matter? What is “good” about development?

- 1• The city needs to get money into the municipal coffers by sale of land and through the imposition of rates and taxes in order to provide services for its residents and maintain existing infrastructure.
- 2• The municipality needs to encourage business and entrepreneurship to provide employment to local people.
- 3• The municipality rightly want to increase the tourism potential of the city, to get more people visiting from outside to visit the city, as well as provide more recreational opportunities for residents.
- 4• Private individuals or companies want to develop businesses in order to make money.

B. What is the current value of the Avis Dam in its present state to the city of Windhoek?:

- 1• It is extensively used by Avis residents and others for recreation, which takes the following forms:
  - exercise in a natural & safe environment: walking, jogging, cycling, horse-riding
  - social interaction: groups exercising, picnicking, and mixing, school groups, etc.
  - environmental interaction: bird-watching, nature-study, education
  - stress-relief
  - enjoyment of scenic beauty
- 1• It is frequently visited by tourists for the same reasons as residents and in addition is a well-preserved natural habitat and wetland, with an abundance and high diversity of flora and fauna - long-term assets in terms of environmental status and a tourism drawcard.

In other words, it is a highly successful combination green urban open space, utilised for recreational purposes as well as providing a long-term environmental resource. Its CHARACTER is its value.

C. Why is the Avis Dam area a desirable site for commercial development, i.e. what potential value does it hold?

- It provides unspoilt, natural scenic beauty, attractive to tourists who find Windhoek not up to their expectations of wild Africa. As well-preserved natural habitat and wetland it is attractive to tourists and therefore has high ecotourism value.
- By exploiting this attraction, it could generate revenue for the city and the developer.

One can deduce from this that the same aspects that make the Dam so attractive and valuable now, are the things that make it attractive to development. Therefore, its potential value is based on its character as well. This leads one to the fourth question:

D. What is the element lacking in the current value that proposed development aims to provide through realising the potential value?:

- REVENUE: The Dam at present does not generate funds for the city.

From this one can draw the conclusion that the “problem” with Avis Dam at the moment is that it does not generate any money for the Municipality either directly or indirectly. It is seen as an area with the potential to do so and thus will not be “safe” unless it can be made to fulfil this requirement.

It would therefore be completely unrealistic for Greenspace to expect that the area can be left without any development whatsoever. The increase in numbers of people using the area also points to the fact that a laissez-faire attitude to the area will only allow it to steadily degrade over time. It must clearly be stated, as had been done before, that Greenspace is NOT against development in the area. Our concern is that the development must be of such a nature as to preserve and enhance the positive aspects of the dam which already exist (not to kill the goose that lays the golden eggs.), in other words a reconciliation between present value and potential value.

## PART 2:

### THE WAY FORWARD, OR HOW TO ACHIEVE RECONCILIATION BETWEEN PRESENT VALUE AND POTENTIAL VALUE:

#### A: Guiding principle, definition of value, definition of area:

In line with the research that Greenspace has done to date, we would like to suggest that certain guidelines for development of the Avis Dam are drawn up. What follows is a suggested outline, and the detailed guidelines should be finalised through consultation with the community and the municipality.

The guiding principle for development of the Avis Dam area should be, most importantly:  
Do not spoil the character of the place, as this is the thing that makes it so desirable.

Therefore one needs to define this character clearly. According to Greenspace's research, done as part of a Master's degree in environmental psychology<sup>16</sup>, Avis Dam's character in short is that of an area that is:

“natural, unspoilt, unbuilt and quiet; as well as free, accessible and unrestricted”.

The definition of the place, the dam area, in terms of the references of users and the common view, constitutes the Avis Dam basin which includes the gravel parking areas, the current expanse of water, the floodplain, and the first range of hills beyond, and the skyline that encompasses all these

everything included within sight when a person is on foot within this area

- not just the lease area. This concept is extremely important.

In order to retain its value, development must not encroach visually or physically on the unspoilt nature of the dam, and therefore must be precluded from the defined area. It should also not prevent free access to the community. This would require that erf 2882 is re-integrated into the lease area and that alternative, less invasive sites are found to compensate for its loss. This suggestion might seem radical at first glance, but we would like to ask for an open approach to evaluate its potential. It does not mean precluding all development, only looking at alternative sites for it.

The key is thus to keep physical development out of the Avis Dam basin.

#### B: An assessment of types of commercial development:

Before considering alternative sites for commercial development, the following is a general discussion on the types of commercial development that could be considered in the Avis Dam area in terms of the appropriateness and viability (the definitions overlap, but the classification is for purpose of discussion):

##### 1• Industrial/Manufacturing :

There is almost no question that this would be totally undesirable for the area, from an environmental as well as a social point of view, especially considering the close proximity of residential areas. Of course, there is nothing specific in the Avis Dam area to attract industrial development, especially in view of the many more suitable sites in the city.

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<sup>16</sup> "Urban open space and the Avis dam: open space and place?" SA Harper, draft MA Psychology Research thesis, University of Pretoria Department of Psychology, May 1998

## 2• Residential :

This type of development , by its spread-out nature, high demand in services, privatisation and lack of control over implementation would immediately destroy the value of the Avis Dam. It also has limited scope for revenue as well as employment creation. It would also make the area exclusive and limit access to the community - we already have residential development in the surrounds and it thus makes more sense for it to be restricted to expansion of those existing areas without encroaching on the dam.

## 3• Commercial retail :

In a zoning context this type of development is not suitable in terms of the recently published WHK structure plan, which show a node developing at the Klein Windhoek shopping centre area, and another at Square Park. Retail will not be viable at the Dam area, especially as it is not in a through-traffic position, and its current use very much outside business hours. Even very small-scale specialist shops have been successful in Windhoek only in the city centre, commercial nodes, or on through-routes. The other crucial thing about this kind of development is that it needs structures and buildings that loudly proclaim their nature in order to attract customers. This naturally would destroy the character of the dam.

## 4• Commercial recreation (implying a market of locals):

Proposals have previously been made by Acplan for entertainment facilities, a day- visitors' centre with pools, controlled access braai-areas, music shows/band playing, kid's sport like roller-skating/ skateboarding, volleyball, basketball; restaurant/ tea-garden, coffee-shop. To assess viability one can make comparisons with for example Maerua Park (which had as original purpose a entertainment centre) and Wildlife Impressions, which aimed to draw tourists . Both these ventures are struggling financially, Maerua Park having compensated by creating a very large amount of office and commercial space, not entirely successfully, and Wildlife Impressions appearing to have misjudged the desire on the part of locals to view animals stuffed or in captivity.

In terms of appropriateness to the area: The developer who proposed the items at the beginning, spoke of 250 people a day at least to be viable. It is doubtful whether Windhoek has the capacity to carry such a centre, and in addition this amount of people would need extensive infrastructure provision, parking, etc. and would also generate an extraordinary amount of noise. The character of the dam area as natural and quiet would be destroyed. It would make more sense to create this kind of artificial environment in a place which has no environmental value to speak of and would actually be improved by this type of development, as well as locate it closer to the majority of Windhoek's population to ensure its viability.

In terms of the individual components, an assessment of each as below, and the issue of scale as discussed further on in the document, are both relevant.

## 5• Commercial tourism (implying a market of tourists):

(which can comprise any of the following: "zoo" or lion park/animals/boma, lookout points with paid entry, museum, chapel/conference centre ; hotel/ lodge/ guest-house; also tea-garden, restaurant, wine-bar, coffee-shop, etc.). These components seem on first impression much more suitable to both the character of the dam area and the benefits the dam can offer any development.

Taken individually though, one would find that some are more suitable than others, and some are only suitable if they are positioned in very specific relationships to the Dam. The assessment below, as well as the discussion on scale, again, are relevant to this type of development.

## 6. Large-scale commercial:

The idea which has been mooted here is of a stop-over for the new Trans-Kalahari Highway, a "gate-way to Windhoek". The first question that springs to mind is of direct access of Sam Nujoma Drive, which has been prohibited by the Traffic and Engineering Departments of the Municipality. The second issue is area of land available. The Avis Dam area does not have large

tracts of easily developable land and would not allow for a suitably large and expandable development. The third question is whether there is not much more suitable land opposite Sam Nujoma Drive, adjacent to say Bonmilk and Ehafo - flatter, larger, more accessible. The fourth question relates to the viability in view of competing developments arising along the road between the airport and Windhoek. The fifth question is whether such a development requires a site which has as its prime asset its natural beauty, which is at risk of destruction by the development itself. Numerous other issues could be posed here, most of them showing the inappropriateness of such a large-scale development at the dam. Avis Dam is already an asset to Windhoek, we should not seek to destroy it in search of another elusive asset which might be much better off in another position.

The preceding discussion on types of development, even though incomplete, clearly directs the conclusion that suitable types of commercial development for the surrounding area would be either in recreation, tourism or both. One can also deduct that the smaller and less invasive components would be more appropriate. These components should individually be assessed in terms of the following criteria. This will not be done in this document, but the principle of assessment should be established, and the points below serve as a starting point.

- benefits to be derived from siting at the Dam
- benefits to accrue to the Dam
- appropriate character
- appropriate scale
- land availability (size of coverage)
- financial viability
- day/night-time usage
- environmental compatibility during development
- environmental compatibility during use
- potential disturbance of soundscape
- availability in city
- possibility of other suitable sites

C: Overall scale: the issue of a single development:

Consideration can also be given to the fact that, though all the proposals so far assessed by Greenspace were mooted by single developers, they all had one thing in common:

they all proposed a diverse collection of elements.

None of them relied on a single venture, but had a collection of various enterprises: overnight accommodation, entertainment, catering establishments, etc. This provokes on to question why commercial development in the Avis Dam area should be limited to a single large development as opposed to several small ones?

It would be entirely feasible to consider dividing a development proposal into its smaller components, which can then occur on different sites and not all lumped together. They can be developed and run by a single large company, or by different small entrepreneurs. The sites can be located within the Avis residential area, or as extensions to the existing built-up area. The possibilities are far less restricted, and several advantages to this arrangement can be foreseen, for example:

- 1• The spreading of risk in an uncertain economic climate.
- 2• Allowing smaller entrepreneurs access to development in the city.
- 3• The promotion of local involvement in development - i.e. allowing local entrepreneurs access.
- 4• The possibility of locating development in Klein Windhoek and the Avis area in more suitable sites - adjacent to scenes of beauty, and not in the middle of them.

With reference to the above one could paraphrase Clem Sunter: "...we should change our focus from 19th century capitalism which propounds a few bosses and many exploited workers, to that of 21st century capitalism, which proposes a collection of small and medium-sized businesses, who work together for the common good..."

#### D: Alternative sites:

With the above discussion in mind, it is thought that an investigation into alternative sites would be a fruitful venture. In the immediate area of Avis Dam, we have established a few areas that might be suitable for commercial development of different kinds, would add to realise the potential of the dam, and yet not disturb or destroy its character. These sites are described below and on the accompanying map. Each area has its specific advantages and disadvantages, and some of these are analysed in the table. It must be noted that the ownership, value and services of these areas have not been investigated due to the time constraint, and that there are more issues that need to be investigated. Consultations with the community also should still play a role.

Another premise which has been assumed for the purpose of this study, is that the sites would accommodate small-scale developments. None of the sites are large or flat enough to carry large-scale ventures. Erf 2882 has been included in the assessment to evaluate its potential:

#### Comparisons between sites:

[please see next page]

SITE DESCRIPTION	SOME ADVANTAGES	DISADVANTAGES	NOTES
ERF 2882: (designated hotel site)	<ul style="list-style-type: none"> <li>steep, but even slope</li> <li>water view</li> <li>existing registered erf</li> </ul>	<ul style="list-style-type: none"> <li>visually intrusive</li> <li>services far to link</li> <li>difficult access</li> <li>limited view</li> <li>noise from freeway</li> <li>very strong community opposition</li> <li>environmentally inappropriate to dam</li> <li>erf not zoned yet</li> </ul>	<ul style="list-style-type: none"> <li>preferably to be deregistered &amp; included in Avis Dam lease area</li> </ul>

ALTERNATIVE SITES	SOME ADVANTAGES	DISADVANTAGES	NOTES
Hillside and valleys from end of Schuckmann street to above waterworks – top line of erf to be not higher than rest of houses.	<ul style="list-style-type: none"> <li>better water and distant view</li> <li>extension of existing housing, thus non-invasive</li> <li>natural beauty for certain functions</li> <li>extend existing services</li> <li>easy access</li> <li>quiet for hotel</li> <li>proximity to damwall for clientele on foot</li> <li>could enhance dam experience by facilities offered</li> <li>less noise pollution to dam</li> </ul>	<ul style="list-style-type: none"> <li>relatively steep</li> <li>not proclaimed/registered</li> </ul>	<ul style="list-style-type: none"> <li>suitable for small-scale guesthouse/ hotel with tea-garden, restaurant, etc.</li> <li>structure suitable in small units connected by pedestrian paths</li> <li>to protect trees and natural beauty of site as far as possible</li> <li>possible inclusion of waterworks building in future, which also has potential to be environmental education centre</li> </ul>

In valley between koppies between gravel road to dam and Sam Nujoma Drive	<ul style="list-style-type: none"> <li>ltd. water view</li> <li>natural beauty</li> <li>not as invasive to dam basin</li> </ul>	<ul style="list-style-type: none"> <li>relatively steep</li> <li>services far to link</li> <li>difficult access</li> <li>noise from freeway</li> <li>not proclaimed/registered</li> </ul>	<ul style="list-style-type: none"> <li>suitable for small-scale guesthouse/ hotel with tea-garden, restaurant, etc.</li> <li>structure suitable in small units connected by pedestrian paths</li> </ul>
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SITE DESCRIPTION	SOME ADVANTAGES	DISADVANTAGES	NOTES
On western slope above floodplain (original site for Malaysian Clubhouse)	<ul style="list-style-type: none"> <li>• ltd. water view</li> <li>• natural beauty</li> <li>• not invasive to dam basin</li> </ul>	<ul style="list-style-type: none"> <li>• services far to link</li> <li>• access problem (could be solved)</li> <li>• noise from freeway</li> <li>• not proclaimed/registered</li> <li>• potential conflict with existing floodplain users (picnics and braais)</li> <li>• could restrict access to public to floodplain</li> </ul>	<ul style="list-style-type: none"> <li>• could be single structure</li> <li>• max 2 storey</li> <li>• recommendations as per Greenspace document Jan. 1995 re. clubhouse</li> </ul>
Boys Scouts House	<ul style="list-style-type: none"> <li>• existing structure</li> <li>• as is not invasive</li> </ul>	<ul style="list-style-type: none"> <li>• current lease agreement with Scouts make it not available for dev.</li> <li>• small site</li> <li>• additional dev. has potential for intruding</li> <li>• no water view</li> <li>• potential access problems ito flooding</li> </ul>	<ul style="list-style-type: none"> <li>• potential as environmental education centre</li> </ul>
Various sites across Sam Nujoma Drive	<ul style="list-style-type: none"> <li>• least invasive to dam</li> </ul>	<ul style="list-style-type: none"> <li>• possibly private land</li> </ul>	<ul style="list-style-type: none"> <li>• rival developments emerging already</li> </ul>

E: Conclusion:

With this document Greenspace would like to further a constructive dialogue on the opportunities available for maximising the potential value of the Avis Dam without damaging the current value it has, and even improving on the current value. The draft management plan which we are in the process of completing, is due to be presented to the public for their input on 12 May. This management plan intends to extend the proposals made here.

We hope that these ideas will be considered with interest and spark a creative process which in the end benefits the Avis Dam and all the players - residents, users, the wider Windhoek community, and the Municipality.

**ANNEXURE B**

**ACTIVITIES OBSERVED/REPORTED BY GREENSPACE MEMBERS  
AND OTHER AVIS DAM AREA USERS**



### **At the dam**

Arriving at parking area with dogs running free behind or alongside car;  
Sitting in the car at the parking area,  
Socializing,  
Walking,  
Jogging,  
Hill-climbing [last year's influx of water led to the creation of new paths],  
Walking with picnic basket,  
Swimming,  
Fishing,  
Walking with dogs off-leash,  
Playing with dogs in the water,  
Horse-riding,  
Bird- watching,  
Canoeing,  
Sailing,  
Paddling,  
Cycling,  
Scrambling,  
Off-road driving,  
Picnicking in the parking area [only seen once],  
Commercial photo-shoots and private photography,  
Sketching,  
Group functions,  
Bird-hunting and game poaching,  
Littering,  
Vandalism,  
Theft,  
Assault

### **At the floodplain**

Sitting in car [sometimes next to the water's edge; sometimes not],  
Driving around in car, with or without dogs running behind,  
4x4 driving in the river, often out under the bridge and back in again;  
Off-road driving up the hillsides,  
Scrambling/ quad driving in the plain and (now less often) in the hills;  
Walking with or without dogs off-leash,  
Jogging,  
Hill-climbing [the former 4x4 roads up the hills and the new footpath leading from the tree next to Dassie Rocks are favourites],  
Cycling,  
Extended picnicking [often several hours],

Music-playing,  
Drinking,  
Fire-making for braais,  
Overnight camping,  
Canoeing, sailing, paddling,  
Swimming [mostly kids],  
Commercial photo-shoots,  
Playing games in the river  
Parking next to the river when it comes down  
Bird-hunting and game poaching,  
Littering and dumping,  
Woodcutting,  
Soil and stone removal

***Greenspace and Friends of Avis warmly thank their members and other members of the public for contributing these observations.***

The above activities will be assessed by means of the following table:

ACTIVITY ASSESSMENT TABLE

ACTIVITY	NOISY	DAMAGE	UNSAFE	POLLUTE	UGLY	BARRIER	ECOLOGY	AWARENESS	INTERACTION	AWARENESS	A
1 walking •					1 1•						
2 jogging •					1 2•						
3 dog-walking •											
4 socialising •											
5 watersport: • rowing/boating • motorboating • swimming											
6 overnight camping •											
7 sand extraction •											
8 woodcutting •											
9 poaching •											

1 vandalism 0•											
1 theft/muggings 1•											
1 etc 2•											

## ANNEXURE C

### Proposed management programme

from “Baseline study and draft management plan for the Avis Dam area” (Burke (1997)).

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**Table 1            Management plan: Avis Dam and surrounds**

Management objectives

The Avis Dam area should serve low impact recreational activities as well as providing a sanctuary for wildlife and vegetation. A balance between both conflicting objectives can be achieved by developing appropriate controls in the management programme.

<b>Activity</b>	<b>Potential impact</b>	<b>Management programme</b>
Poaching	Reduction of wildlife	Prohibit poaching and implement strict penalties Monitor wildlife numbers
Littering	Negative visual impact Health risk Risk for wildlife	Prohibit littering and provide litter bins at focal points Ensure regular removal of litter from litter bins
Wood collecting	Damage of trees and shrubs Removal of organic matter	Prohibit wood collecting
Organised social events	Noise Damage to vegetation Creation of waste Defecation	Implement permit system with certain criteria
Camping	Disturbance of wildlife Creation of waste Defecation	Provide limited camping facilities
Defecation	Health and hygienic risk Negative visual impact	Provide ablution facilities at focal points (long-drops)
Braaing / picnicking	Negative visual impact Littering Negative influence on soil fauna and vegetation	Provide braai facilities at selected points
Taking dogs for walks	Disturbance of birds Tracks	Restrict entry to areas favoured by birds Provide trail network, advise visitors to use trails only
Environmental education	Tracks	Provide trail network, information boards, pamphlets on various aspects of wildlife / environment
Walking / hiking	Tracks	Provide trail network, advise visitors to use trails only
Scientific research	Tracks Disturbance of wildlife	Apply established permit system for research
Bird-watching	Tracks	Provide trail network

**Table 2 Management plan: Dam**

Management objectives

The dam has the potential to be used for water-related recreational activities as well as serving as a sanctuary for water birds. A balance between both conflicting objectives can be achieved by developing appropriate controls in the management programme.

<b>Activity</b>	<b>Potential impact</b>	<b>Management programme</b>
Fishing	Reduction of fish population Introduction of exotic fish	Monitor fish populations at regular intervals, implement licensing system Introduction of fish to be authorised by Ministry of Fisheries & Marine Resources
Boating, canoeing, surfing (non-motorised boating)	Disturbance of bird and fish breeding habitats	Restrict access to potential breeding grounds by demarcating areas
Swimming	Disturbance of fish and bird breeding habitats	Restrict access to potential breeding grounds by demarcating areas
Power boating	Disturbance of fish and bird breeding habitats Noise	Restrict access for power boats

**Table 3 Management plan: Floodplain**

Management objectives

Apart from natural disturbances, various activities have severely impacted the floodplain area in the past. These should be restricted to a minimum to allow re-establishment of vegetation, thereby controlling the negative effects of those impacts.

<b>Activity</b>	<b>Potential impact</b>	<b>Management programme</b>
Off-road driving	Removal of vegetation cover Erosion Tracks Dust Noise	Prohibit off-road driving Restrict access for motor vehicles
Soil removal	Exposure of roots, die-back of trees Removal of vegetation cover Erosion Tracks Dust	Prohibit sand removal
Horse riding	Tracks	Provide demarcated trails
Invasion of alien plant species	Repression of indigenous plants	Test various (non-chemical) eradication measures

**Table 4 Management plan: Slopes and ridges**

Management objectives

As the slopes present an example of Highland Savanna vegetation in an area potentially surrounded by urban development in the future, they should be preserved and allowed to restore to their natural condition.

<b>Activity</b>	<b>Potential impact</b>	<b>Management programme</b>
Off-road driving	Removal of vegetation cover Erosion Dust Noise Tracks	Prohibit off-road driving Restrict access for motor vehicles
Plant collecting	Removal of rare and protected species	Prohibit plant collecting
Mountain biking	Tracks Erosion	Provide demarcated trails
Horse riding	Tracks	Provide demarcated trails
Walking / hiking	Tracks	Provide trail network, advise people to use those trails only
Taking dogs for walks	Tracks	Provide trail network, advise people to use those trails only
Rock climbing	Tracks Disturbance of wildlife	Restrict climbing to specific areas

**Table 5 Management plan: Riverbeds and valleys**

Management objectives

Largely undisturbed at present and resilient through occasional flooding, the riverbeds form a ideal habitat for low impact recreational activities in a controlled manner.

<b>Activity</b>	<b>Potential impact</b>	<b>Management programme</b>
Off-road driving	Removal of vegetation cover Erosion Creation of dust Noise Tracks	Prohibit off-road driving Restrict vehicles and motor bikes to few demarcated parking areas
Wood-collecting	Damage of trees and shrubs Removal of organic matter	Prohibit collecting of firewood
Horse riding	Tracks	Provide demarcated trails
Walking / hiking	Tracks	Provide trail network and advise people to use those trails only
Taking dogs for walks	Tracks	Provide trail network and advise people to use those trails only
Mountain biking	Tracks Erosion	Provide demarcated trails

AVIS DAM  
MAPS OF THE GREENSPACE LEASE AREA AND SURROUNDS

General

Gradients

Internal zones