DEPARTMENT OF WATER AFFAIRS AND FORESTRY (DWAF)

PROJECT 2006-304

RESOURCE MANAGEMENT PLAN (RMP) FOR ROODEPLAAT DAM

FEBRUARY 2008
REPORT 4: RMP

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DOCUMENT REVIEW RECORD

DATE	REPORT STATUS	WRITTEN BY	REVIEWED BY	RECEIVED BY	
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2008/02/07	Final	H. Bhana E. vd Walt	D. Gertzen	TTT and public	PSP

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ANNUAL REVIEW
Due date: February 2009, 2010, 2011, 2012

FIVE (5) YEARLY REVIEW
Due date: February 2013

EXECUTIVE SUMMARY

This Resource Management Plan (RMP) is the management, development and institutional plan for Roodeplaat Dam and has been compiled based on the framework set out on the following pages.

Roodeplaat Dam which is referred to in this document consists of the water surface as well as the surrounding State land and private land where DWAF is the servitude holder, utilised by the Department of Water Affairs and Forestry (DWAF) and various stakeholders. It is a dam of national importance.

The plan compiled through the RMP process is based on the principles underlying sustainability and addressing environmental and community involvement aspects.

As a document to guide the management of Roodeplaat Dam, based on the inputs of all stakeholders, the plan also serves as the basis for monitoring both performance and compliance regarding the various Key Performance Areas (KPAs) with respect to the National Water Act (Act No. 36 of 1998) (NWA).

Land and water use options identified as possibilities at Roodeplaat Dam include:
- Conservation;
- Sport;
- Accommodation and leisure activities, and
- Tourism.

The primary purpose of the Roodeplaat Dam is to supply potable water to the surrounding urban areas for domestic/industrial use and for irrigation purposes on properties listed on the List of Rateable Areas under the Pienaars River Government Water Scheme. However, the need to *realise the full potential of the dams including recreational and tourism related development required the compilation of a RMP.*

The RMP comprises three sections, the first addressing the background; encumbrances to the plan, and challenges facing the management authority (institution responsible for managing recreational water use as delegated) (“The Place”).

The second section outlines the role players for Roodeplaat Dam (“The People”).

The third section consists of an integrated environmental management plan and a zoning plan (“The Plan”).

“The Plan” addresses four KPAs – Resource Management, Utilisation, Benefit Flow Management (community involvement and beneficiation) and Institutional Arrangements for Implementation of the RMP. Within each area the plan provides insight into the specific rationale regarding the KPAs, the objectives, the policy and strategies, as well as operational guidelines and action projects which will focus the management decisions, actions and initiatives.

Various zones have been proposed in the conceptual zoning plan for Roodeplaat Dam and include management interventions pertaining to access, utilisation and development as illustrated in the zoning plans contained herein.

To effectively and efficiently manage the implementation of the plan, an institutional structure is proposed.

Undertaken in this manner this RMP will facilitate the sustainable utilisation of Roodeplaat Dam.

The process for the compilation of the RMP is summarised in Figure 1.

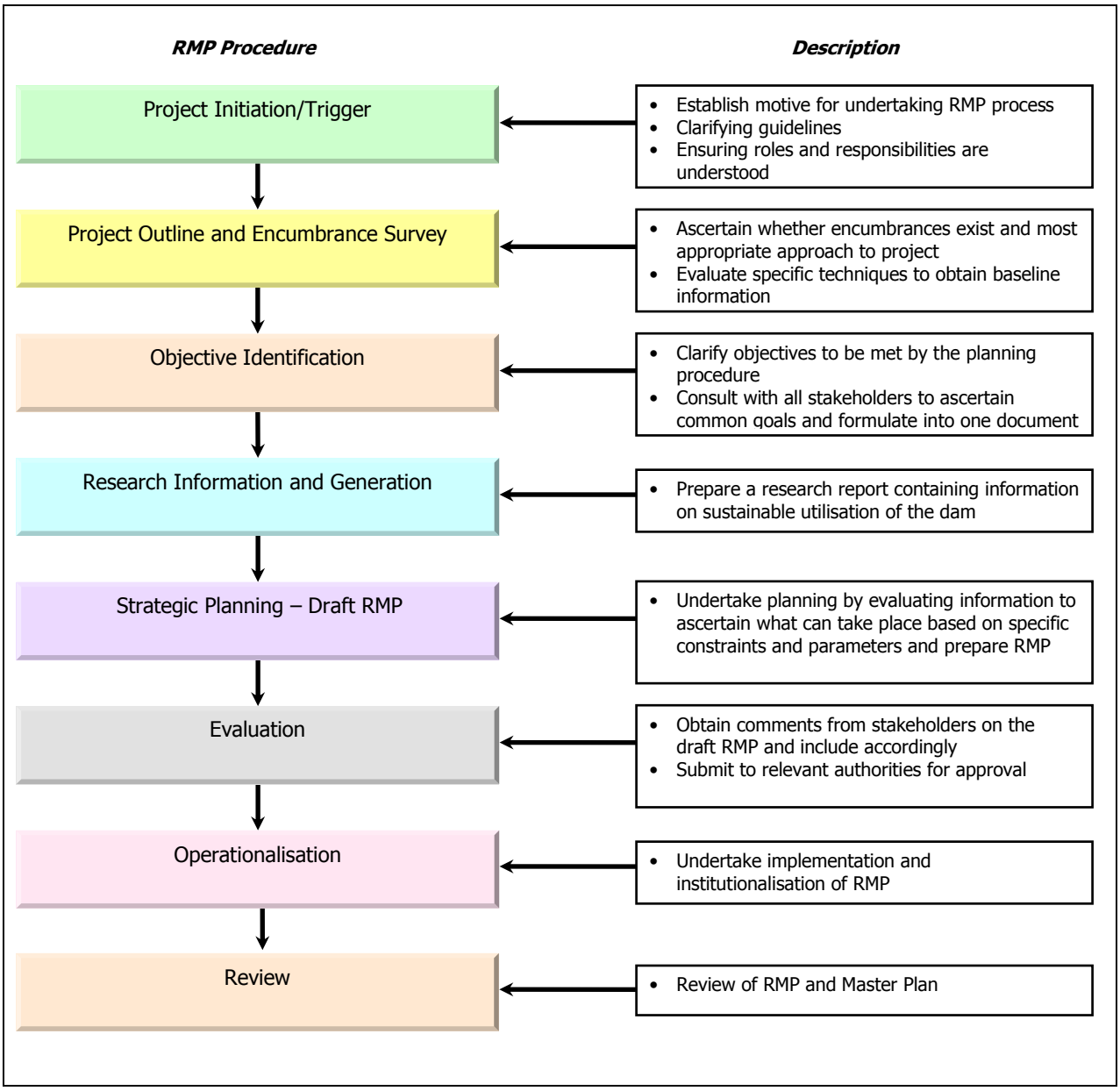

Figure 1: RMP Compilation Procedure

RMP REVIEW FRAMEWORK

Overview

The Resource Management Plan (RMP) process has an integrated planning component and operational planning component, each with a five (5) year time frame that is reviewed annually.

Integrated Planning Components

A RMP is the primary overarching planning document that describes the administrative and legal framework, contextual background, public participation process followed, vision/mission statements, prioritised management objectives, zoning as well as management policy framework and guidelines. The RMP forms the framework within which all the other planning components are developed. Within the framework of the RMP, a *Zoning Plan* provides a strategic guideline for the utilisation and development of the water resource and water resource infrastructure within the constraints of the receiving environment. Operational plans, programmes and procedures that support the RMP are either in place or will be compiled where these do not exist.

Authorisation of RMPs

These plans are authorised by the relevant Regional Chief Director and the Deputy Director General of the National Water Resource Infrastructure Branch of the DWAF in terms of Section 113 of the National Water Act (Act No. 36 of 1998) and operationalised through the following two operational planning components.

Operational Planning Components

A 5-year Consolidated List of Action Projects is included in the RMP that operationalises (or actions) the projects identified in the RMP. These Action Projects are operational management components that identify the tasks, activities, programmes and procedures that need to be undertaken in the achievement of the RMPs objectives. The Action Projects are items to which responsibilities, timeframes, budgets and resources can be attached.

With expenditure estimates drawn from the Action Projects, a Business Plan can be developed. The Business Plan is primarily aimed at describing the manner in which the RMP is to be financially resourced. It may address issues of operational efficiency and the optimisation of income generation opportunities in order to bridge any possible shortfalls between required operational expenditure and committed budget allocations.

Authorisation of Action Projects

Once the Action Projects have been approved by DWAF, these Action Projects are finalised according to the committed budget allocations and other expected financial income.

RMP Planning & Review

The RMP requires both annual and 5-yearly revisions to ensure that management objectives remain relevant and management actions are continually improved. Figure 2 illustrates the annual and 5-yearly planning and review cycles.

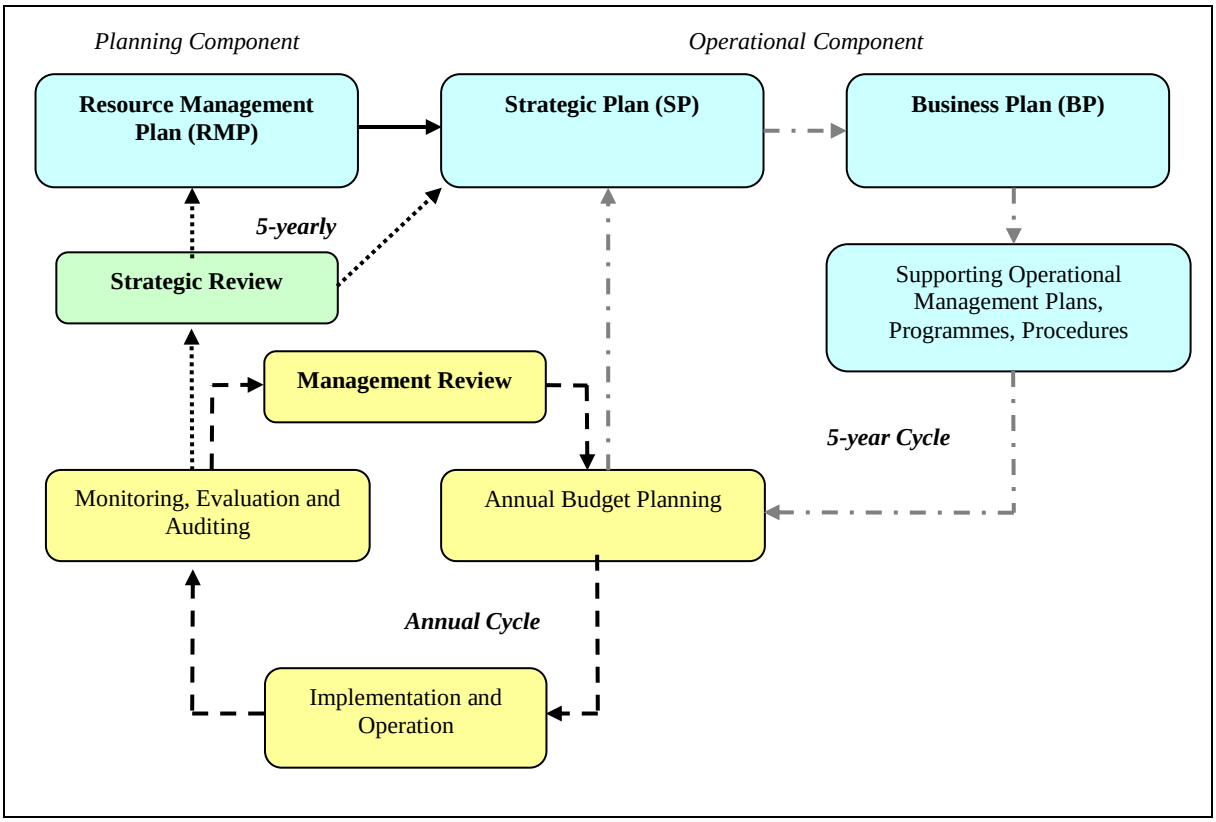

Figure 2: RMP Review Framework

Planning Process

The rationale of a RMP is to assist DWAF and the management authority in ensuring sustainability by protecting the integrity and value of water resources, providing measurable benefits to host communities, and enhancing the satisfaction of users.

DWAF and the management authority can ensure that their objectives, as well as those of relevant stakeholders are attained in an acceptable and appropriate manner by addressing the needs and expectations of resource managers, communities, and users by defining the processes that contribute to sustainability and monitoring the performance of these processes.

Continual improvement can be achieved by using an ISO 9000 based management system as a framework, and the system provides DWAF and the management authority with confidence that their policies are relevant and acceptable to all stakeholders.

The procedure used during the planning process is based on DWAF's *Guidelines for the Compilation of Resource Management Plans* ensuring the involvement of all

stakeholders, as well as interested and affected parties. Opportunity was provided to all participants to actively participate in the planning, discussions and compilation of the management plan, compliant to the prescripts of the National Environmental Management Act (Act 107 of 1998), as well as Chapter 3 of the Constitution of South Africa (Act No. 108 of 1996). This approach ensures inclusivity, transparency and builds trusts amongst participants. Refer to Appendix A for a stakeholder list.

The planning procedure for Roodeplaat Dam's proposed RMP consisted of three distinct phases, namely:

Phase 1: The first phase aimed at ensuring the support of key stakeholders. This phase mainly addressed the encumbrances to the process, attaining institutional support and identifying participants to the process.

Phase 2: The second phase aimed at ensuring broad stakeholder involvement, building capacity within the stakeholders and providing the stakeholders with relevant information to assist in decision making.

Phase 3: The third aimed at achieving recommendation for the RMP, prior to submitting the plan to DWAF for approval.

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LIST OF ACRONYMS AND ABBREVIATIONS

BEE	Black Economic Empowerment
COT	City of Tshwane
DEAT	Department of Environmental Affairs and Tourism
DLA	Department of Land Affairs
NDPW	Department of Public Works (national)
DWAF	Department of Water Affairs and Forestry[1]
Gautrans	Gauteng Department of Public Transport, Roads and Works
GDACE	Gauteng Department of Agriculture, Conservation and Environment
EIA	Environmental Impact Assessment

[1] Some functions and responsibilities of the DWAF may be delegated to the proposed South African National Water Resources Infrastructure Agency.

EMP	Environmental Management Plan
EMS	Environmental Management System
IDP	Integrated Development Plan
KPA	Key Performance Area
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NWA	National Water Act (Act No. 36 of 1998)
PPP	Public Private Partnership
RMP	Resource Management Plan
RQO	Resource Quality Objectives
SA	South Africa
SDF	Spatial Development Framework
SMS	Short Message Service
SPC	Strategic Plan for Commercialisation
TTT	Technical Task Team
WTW	Water Treatment Works
WWTW	Waste Water Treatment Works

1. THE PLACE

1.1 *INTRODUCTION*

The Minister of the DWAF, as the public trustee of the nation's water resources, must through the department ensure that the water resource which constitutes the Roodeplaat Dam is inter alia protected and managed in a sustainable and equitable manner, for the benefit of all persons and in accordance with the NWA mandate.

The decision to undertake the compilation of a RMP for Roodeplaat Dam was triggered by various factors. The RMP process triggers are summarised below:

- Water resource conservation value
  The Roodeplaat Dam as a water resource has conservation value and it is essential that the resource is effectively and efficiently managed. The RMP, together with DWAF's Geographic Decision Support System will provide resource managers with a platform to effectively and efficiently manage the water resource.

- Water Quality
  Water quality at the dam is considered aesthetically poor, and there is concern over potential occurrence of cyanobacteria, algae and water hyacinths (*Eichhorinia crassipes*), which have during various periods covered large areas of the water surface.

- Zoning Plans
  An integral component of water resource management is the zoning plan of the water resource. The zoning plan compiled for the dam in May 1997 is outdated and requires review.

- Recreational Industry Involvement
  Some of the land around the dam is privately owned and the water surface is currently being unlawfully utilized for recreational purposes. Furthermore, there is also uncertainty regarding agreements pertaining to utilization of land within the dam boundary line.

  The dam is also utilized for various sports and by various sporting federations such as Rowing SA, Swimming SA, motor boating, canoeing and water-skiing. The dam is the only natural 2 km rowing course in the country and caters for the national rowing championships.

- Community Participation and Beneficiation
  Through effective management of the water resource and surrounding State land, and the controlled use and development thereof, the true recreational potential of the dam and its surroundings can be unlocked. To ensure sustainability and socio-economic development, it is imperative that local communities participate in and benefit from the opportunities emanating from the use and development of the dam. The facilitation of controlled tourism development is accompanied with community participation and beneficiation. The Tourism BEE Scorecard contained in the PPP Toolkit for Tourism stipulates that local communities must benefit from such opportunities.

In an effort to ensure that the biodiversity and resources of Roodeplaat Dam are protected, used, developed, conserved, managed and controlled in a sustainable and appropriate manner, and to ensure that the access to and use of the dam and surrounding land is equitable, the DWAF commissioned the compilation of an integrated RMP for Roodeplaat Dam.

DWAF has appointed Vela VKE Consulting Engineers, supported by Exigent Engineering Consultants to compile a RMP for Roodeplaat Dam (DWAF Project 2006-304).

The procedure applied during the planning process was designed and based on the DWAF, 2006 Guidelines for the Compilation of Resource Management Plans ensuring the involvement of all stakeholders, as well as interested and affected parties. Opportunity was provided to all participants to actively participate in the planning, discussions and compilation of the management plan, compliant to the prescripts of the NEMA as well as Chapter 3 of the Constitution of South Africa. This approach ensures all-inclusiveness, transparency and builds trusts among all participants. Refer to Appendix A for a list of all stakeholders.

The purpose of the RMP for Roodeplaat Dam is to ensure the attainment of the NWA Section 2 objectives, including that:

- access to water is equitable;
- past gender and racial discrimination is redressed;
- the utilisation of the water is efficient, sustainable and beneficial;
- social and economic development is facilitated;
- provision is made for the growing demand for water use, in particular the use of water for recreational purposes;
- both the aquatic and associated ecosystems, inclusive of their biodiversity, are protected;
- pollution and degradation of the water resource is reduced and prevented;
- international obligations can be met;
- dam safety is promoted, and
- representative institutions are established.

The aim thus of the Roodeplaat Dam RMP is to provide a broad policy framework, setting out key objectives, defining responsibilities and operational guidelines for sustainable management and development of the water resources and mainly surrounding State owned land but may also include privately owned land where DWAF is the servitude holder. As a planning tool the management authorities for Roodeplaat Dam will use this plan for decision-making purposes, as well as an awareness tool for staff, neighbours and water users as to the vision and operational guidelines of the dams.

Additionally, the RMP for Roodeplaat Dam will serve as regulation in terms of section 26 of the NWA and guide the management authorities in its provision of general access to and use of the dam, while DWAF will be responsible and accountable for specific approvals such as water use authorizations, PPPs and management contracts.

The intention is also that the Roodeplaat Dam RMP informs and is incorporated into the IDP process for the Local and District Municipalities as well as other provincial and national planning initiatives.

1.2 *PURPOSE, SIGNIFICANCE AND CHALLENGES*

1.2.1 Purpose and Significance of Roodeplaat Dam

The construction of Roodeplaat Dam was completed in 1959, and it is situated approximately 24km north east of Pretoria. At full capacity the water surface of the dam has a surface area of approximately 395ha. The dam is located within the Nokeng tsa Taemane Local Municipality within the Metsweding District Municipality. The dam is also part of the Dinokeng Project being carried out by the Gauteng Provincial Government. Dinokeng is an initiative to establish a prime tourist destination, which focuses on nature, cultural, and historical attractions close to Johannesburg and Pretoria (Dinokeng 2007). Figure 3 illustrates the location of the dam.

The dam was originally constructed to supply water for irrigation purposes, but it has been subsequently utilised for the supply of potable water to the northern suburbs of Pretoria. Various land users are involved with the dam, such as federations, government institutions and private owners (private persons own land that abut the water's edge through servitudes of storage). Activities on the dam and surrounding areas include, power boating, canoeing, rowing, angling, picnic sites, camping facilities, eco-tourism, accommodation and conference facilities (DWAF 2006a).

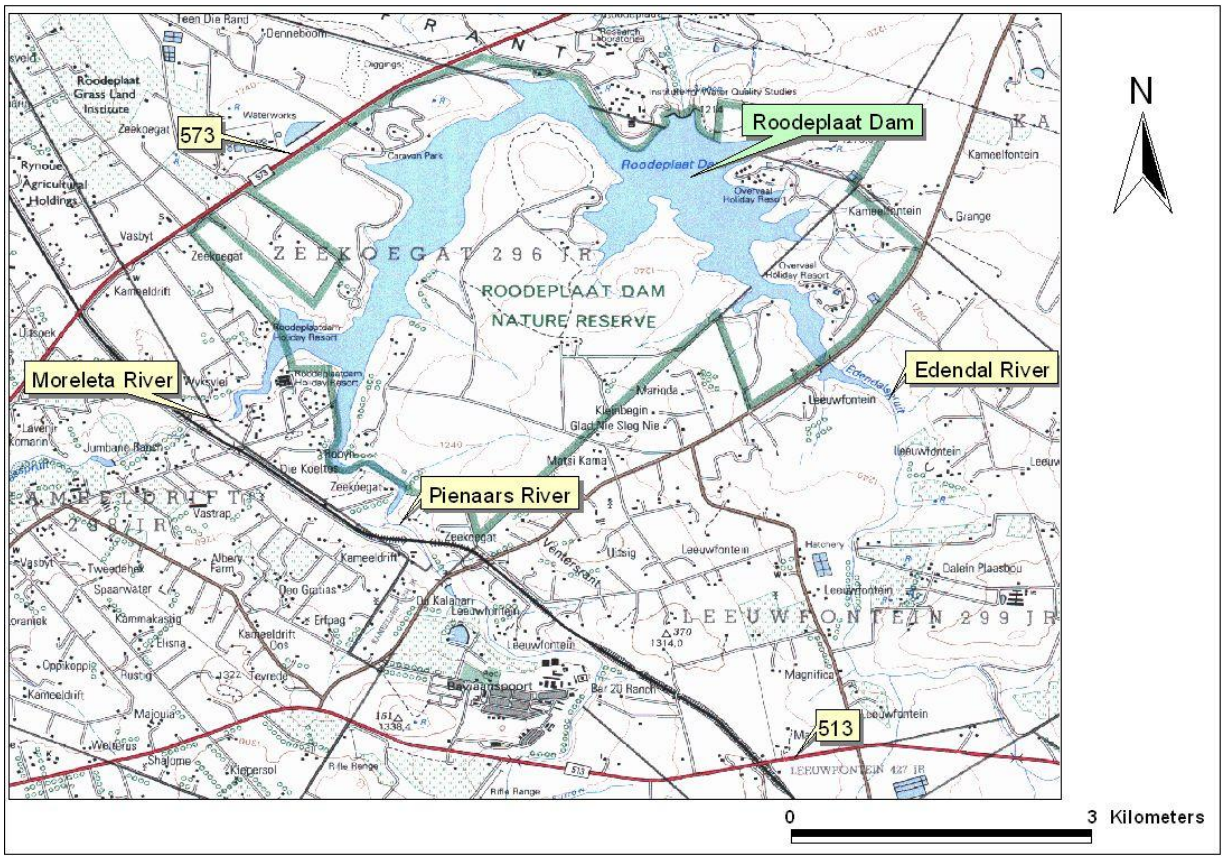

Figure 3: Locality of Roodeplaat Dam

1.2.2 Challenges at Roodeplaat Dam

Sustainability is a term that is often used, yet seldom understood in terms of its complexity and implications and is thus the overarching challenge facing the management authority[2] of Roodeplaat Dam. Without a focus on sustainability, the dam will never reach their optimal potential nor contribute to the attainment of the objectives set out in the RMP and legislation such as the NWA. Through the protection and sustainable utilisation of the resources of Roodeplaat Dam it is believed that substantial financial, social and environmental benefits will be generated, making the management thereof both meaningful and viable.

The broad encumbrances that exist and will have to be overcome in the planning and operation of the RMP are summarised below:

- Presence of invasive alien vegetation;
- High levels of erosion and sedimentation;
- Presence of red data species;
- Impacts on the ecological integrity by recreational users;
- Unlawful use of water surface and State land;
- Conflicting policies of government departments;
- Conflicting user needs and expectations; and
- Absence of an appropriate flood management zone, posing a safety risk to users.

1.3 ADMINISTRATIVE AND LEGAL FRAMEWORK

1.3.1 Legal Requirements

The principles underlying the RMP for Roodeplaat Dam are based on general principles guiding the attainment of sustainability – sound resource management; equitable and appropriate community involvement and beneficiation; the creation of viable and sustainable business opportunities, and clear policies, objectives and operational guidelines.

A legal survey illustrated that within the South African context, ensuring compliance with relevant legislation is pivotal to the attainment of sustainability. At Roodeplaat Dam, not only is the NWA applicable, and is it imperative that all actions are compliant with relevant legislation, regulations and planning frameworks such as:

- **National Water Act:** The NWA recognizes that water is a scarce resource: it is a natural resource that belongs to all of South Africa's people. The National Government is responsible for the nation's water resources and their use, which the ultimate aim of water resource management is to achieve sustainable utilization of water.
- **National Environmental Management Act:** The principles underpinning environmental management contained in the NEMA, must be taken into account by any organ of state in the exercise of any power that may impact on the environment.

[2] The management authority is an institution that is delegated the responsibility for managing recreational water use based on the RMP and associated Recreational Water Use Policy. KPA4 in section 3 of this document provides further detail regarding the management authority.

- **National Environmental Management: Biodiversity Act:** The aim of this act is to provide for the management of South Africa's biodiversity with NEMA's framework.
- **National Environmental Management: Protected Areas Act:** The Protected Areas Act provides for the protection and conservation of ecologically viable areas, which are representative of South Africa's diversity, as well as natural landscapes and seascapes.
- **Conservation of Agricultural Resources Act:** Regulations 7 and 8 deals with the protection of "vleis"/ wetlands and water courses, while regulations 15 and 16 deals with invasive plant species and bush encroachment.
- **Convention of Biological Diversity:** South Africa is a signatory of the Convention on Biological Diversity, and therefore has a duty to conserve and rehabilitate biological resources which are considered important for the conservation of biological diversity.
- **Species of Concern:** The IUCN has a system in place which classifies species as threatened. Threatened species are those that are in danger of becoming extinct and the protection of these species is vital.
- **Environmental Impact Assessment Regulations:** The process required for obtaining environmental authorization in terms of the NEMA involves one of two pathways. Depending on the regulation the activity is listed under, the authorization process will either follow the Basic Assessment Process or the Scoping/Environmental Impact Assessment Process.
- **Operational Policy Document on Using Water for Recreational Purposes:** This policy is the main guideline in support of the RMP process with regards to the basic principles, policy, strategies and actions for regulating the use of water for recreational purposes.
- **Guidelines for the Compilation of Zoning Plans for Government Waterworks:** The Policy is a framework policy designed to establish the objectives and principles regarding the recreational water use of government waterworks as well as the various tools for policy implementation.
- **Decision Support System for the Policy on Development at State Dams**: Uncontrolled development increasingly takes place at Government Dams, which affects the operation of the dams in respect of the yield, water quality and safety and places the Department at risk to claims for damages and loss of life.
- **Merchant Shipping (National Small Vessel Safety) Regulations, 2007:** The Department of Transport has published the said regulations during August 2007, to regulate inland motor vessels, regarding aspects such as classification, vessel safety and certification, authorization, enforcement etc.
- **National Treasury PPP Toolkit for Tourism:** This toolkit is to assist the process of development of tourism-based businesses on state-owned land. The Toolkit should make it easier for institutions and the private sector to enter into tourism-related partnerships on state property managed by national and provincial government institutions.
- **General Public Participation Guidelines:** Public participation refers to the ongoing interaction between role-players, such as interested and affected parties, stakeholders and compliance organizations in order to achieve informed decision making during the RMP process.
- **Considerations on the Institutional Arrangements for Managing Use of Water for Recreational Purposes:** This paper outlines some of the institutional issues at a local level and makes recommendations about the conditions under which different institutional management arrangements may be considered.
- **Methodology for Carrying Capacity Assessment for the Use of Water for Recreational Purposes:** The carrying capacity of a water resource represents

the maximum level of visitor/recreational use and related infrastructure that the water resource and surrounding area can accommodate, without diminishing user satisfaction or adverse impacts upon the local or host community, the economy and culture of the area.

- **National Water Resource Strategy:** The First Edition of the National Water Resource Strategy describes how the water resources of South Africa will be protected, used, developed, conserved, managed and controlled in accordance with the requirements of the policy and law. The central objective of managing water resources is to ensure that water is used to support equitable and sustainable social and economic transformation and development.
- **Government Notice R 654 of 1964**: Regulations framed in terms of paragraph the Water Act, 1956 (Act No. 54 of 1956) to regulate access and use of government waterworks for recreational purposes.

The RMP process also takes cognizance of the following legislation:

- The Constitution of South Africa (Act No. 108 of 1996),
- Environmental Conservation Act (Act No. 73 of 1989),
- Public Finance Management Act (Act No. 1 of 1999),
- National Heritage Resources Act (Act No. 25 of 1999),
- Broad-based Black Economic Empowerment Act (Act No. 53 of 2003),
- Occupational Health and Safety Act (Act No. 85 of 1993),
- Communal Land Rights Act (Act No. 11 of 2004),
- Restitution of Land Rights Act (Act No. 22 of 1994),
- Land Administration Act, 1995 (Act 2 of 1995),
- State Land Disposal Act (Act No 48 of 1961),
- Intergovernmental Relations Framework Act (Act No. 13 of 2005),
- Local Government: Municipal Systems Act (Act No. 32 of 2000),
- National Heritage Resources Act (Act No. 25 of 1999),
- Human Tissue Act (Act 65 of 1983 as amended),
- Intergovernmental Relations Framework Act, 2005 (Act 13 of 2005),
- Disaster Management Act (Act No. 57 of 2002),
- Development Facilitation Act (Act No. 67 of 1995),
- Municipal By-laws,
- Municipal Finance Management Act (Act no. 56 of 2003),
- Municipal Systems Act (Act No. 32 of 2000),
- Municipal Structures Act (Act No. 117 of 1998),
- Water Services Act (Act No. 108 of 1997) as amended.

Not only do these Acts, regulations and frameworks guide specific decisions and actions, they also provide the framework for monitoring performance and compliance, and provide guidelines regarding contravention, offences and penalties.

1.3.2 Regional Planning Concepts

Roodeplaat Dam falls within the jurisdiction of Metsweding District Municipality and Nokeng Tsa Taemane Local Municipality in Gauteng, as illustrated in Figure 4.

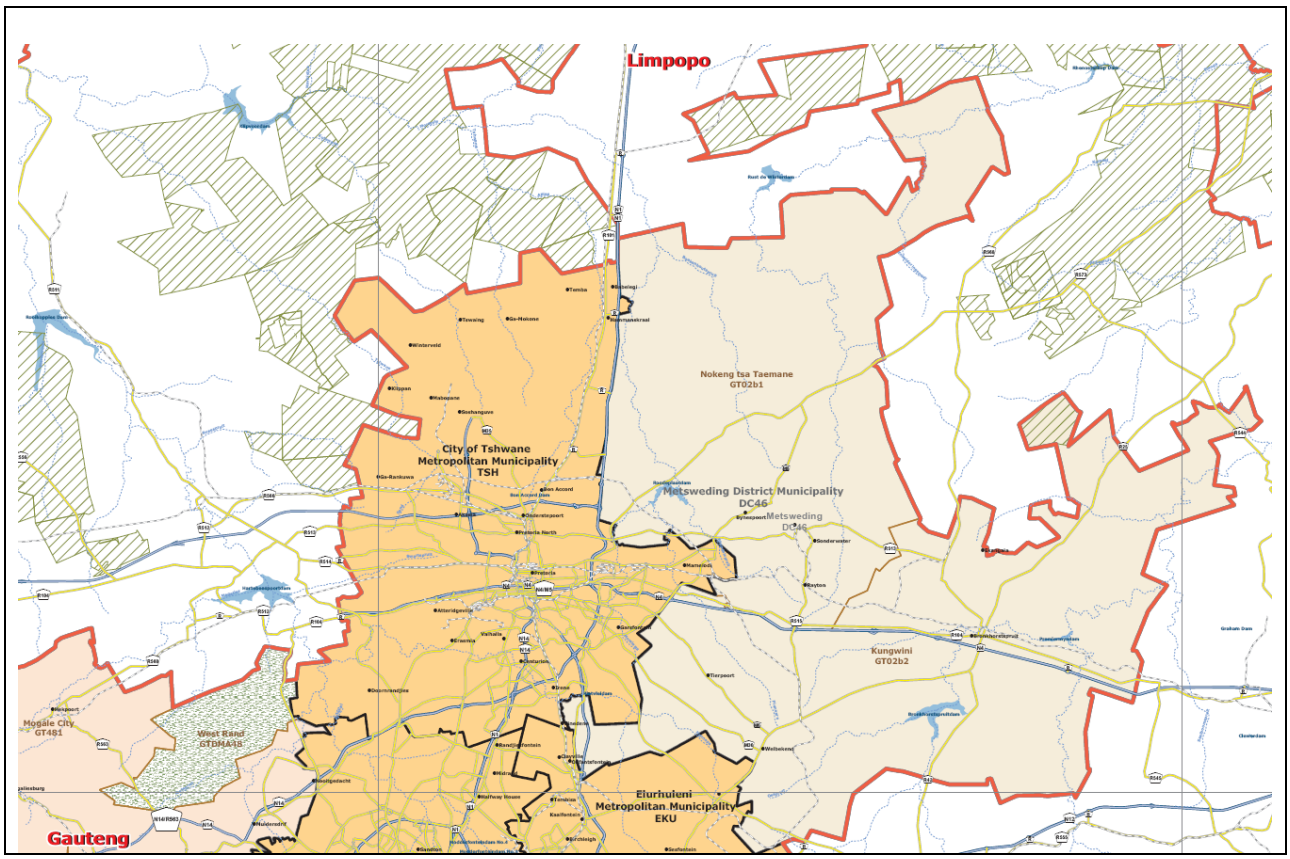

Figure 4: Metsweding District Municipality and Nokeng Tsa Taemane Local Municipality

The Nokeng Tsa Taemane Local Municipality's SDF identifies the majority of the area surrounding the Roodeplaat Dam as a core conservation area. It further identifies the Roodeplaat Dam fringe area as included in the Dinokeng tourism initiative. For each of the afore-mentioned zones, the SDF contains land use guidelines. The intended land use in terms of the Dinokeng Feasibility Report differs from that contained in the SDF. Furthermore, the Gauteng Conservation Plan developed by the GDACE has identified most of the surrounding areas as irreplaceable, and will most likely only accept low intensity activities.

Additionally, the COT, as a result of increased development, constructed a WTW to supply the Northern areas of Pretoria with potable water from Roodeplaat Dam. COT is planning an upgrade of the WTW.

From the above, it is clear that various local, regional provincial and national government departments are involved. It is hence imperative that planning and development is integrated. The need for inter-governmental co-operation cannot be overemphasized.

1.3.3 Existing Agreements

An investigation into existing agreements during the research phase of this project revealed that for most of the users and operators, agreements, leases and authorizations are either non-existent or outdated.

There are, however, existing agreements in place between DWAF and the COT in terms of the necessary permits that are required for:

i) the abstraction of water at the Roodeplaat WTWs, and
ii) the discharge of water to the dam from the COT WWTW.

1.4 *BACKGROUND TO ROODEPLAAT DAM*

A comprehensive Research Report has been prepared during the RMP Process and has been reviewed during the Research Phase of this project. Provided below is a brief summary of this information.

1.4.1 Bio-physical Environment

1.4.1.1 Topography

Roodeplaat Dam is situated approximately 24km north east of Pretoria, north of the Magaliesberg. The topography surrounding the dam is relatively flat and does not constitute a constraint to potential development surrounding the dam. The flat topography facilitates easy access to the water surface and presents opportunity for various activities such as camping and angling.

The major tributaries to the dam are the Hartbeesspruit/Morelettaspruit, the Pienaars River and the Edendalspruit which enter the dam from the south and exit in a northerly direction beyond the dam wall.

1.4.1.2 Geology

Geologically, the terrain is underlain by three geological units. The eastern and south-eastern section of the dam is underlain by the Rayton Formation of the Pretoria Group, within the Transvaal Supergroup. The northern section of the dam is underlain by the Pienaars River Complex, within the Alkaline complexes. The western section of the dam is underlain by the Rashoop Granophrye Suite of the Bushveld Complex.

1.4.1.3 Ecology

The vegetation type surrounding the dam is classified as Marikana Thornveld. This type is characterized by open *Acacia karroo* woodland with dense shrub areas along drainage lines, termitaria and on rocky outcrops. Dominant tree species include *Acacia caffra*, *Acacia gerrardii, Acacia karroo, Rhus lancea* and *Ziziphus mucronata.* The shrubs *Euclea crispa, Olea europaea subsp. africana, Rhus pyroides* and *Diospyros lycioides* are usually present. This vegetation type is endangered with less than 1% statutorily conserved. This may be a constraint as all development must be restricted to ensure the future existence of this vegetation type. Detailed site specific assessment will be required prior to development to determine whether proposed development may proceed in light of the presence of this endangered vegetation type.

The area surrounding the Roodeplaat Dam is classified by the Gauteng Conservation Plan as either irreplaceable or important in terms of the presence of sensitive features. The majority of the sensitive areas is covered in primary vegetation and has habitat for plant species in one of the three threatened categories. The following Red Listed (threatened/endangered) plant species may occur in the area surrounding the dam:

- *Trachyandra eruthrorrhiza;*
- *Bowiea volubilis;*
- *Ceropegia decidua subsp. Pretoriensis;*
- *Delosperma gautengense;*
- *Schizoglossum umbelluliferum; and*
- *Trachyandra erythrorrhiza*.

Some areas surrounding the dam also have habitat for Red Listed birds and locations for Red Listed invertebrates has been recorded around the dam. Sensitive features are already protected to a certain extent in the Roodeplaat Nature Reserve which is situated south of the dam.

The dams provide ideal habitat for water fowl such as herons, crested coots, darters, cormorants etc. The area is rich in bird species and various mammal species have been resettled in the nature conservation areas (e.g. impala, red hartebees, blue wildebeest and zebra). Various amphibian, reptile and smaller mammal species have previously been recorded.

The presence of sensitive features (vegetation and animal life) does not necessarily pose constraints in terms of the management of the dam. Existing conservation initiatives serve to protect these features and the importance of conservation in the area is recognized by tourism operators. The natural resource base provides the foundation for tourism development in the area. It is hence in the interest of tourism development that emphasis is placed on the conservation value of the dam and the surrounding area.

The SDF for the area also acknowledges identified sensitive features and identifies the majority of the area surrounding the Roodeplaat Dam as a Core Conservation Area where, for instance, no subdivision will be allowed. Land uses that could be permitted by the local authority on application should be low-key and of low intensity and include:

- Any land use viewed by the authorised authorities (Nokeng tsa Taemane Local Municipality, DWAF, DEAT, and Gautrans) as being compatible with conservation, sport, recreation and tourism; and
- Any use/ land use/component required to ensure effective and functional operations and management of the Roodeplaat Dam (and Nature Reserve) such as but not limited to offices, works, supporting infrastructure, research and laboratories or similar purposes.

The SDF also provides land use guidelines for properties within all zones affected by riverine fringe conservation areas. Primary permissible land uses in these areas include natural open space, bird-watching, hiking, horse trails or similar purposes.

Development in the area surrounding the dam will be subject to detailed site specific assessments to determine the presence of rare and/or endangered species prior to permission being granted by GDACE for establishment.

1.4.1.4 Problem Plants

Continuous monitoring and pro-active management of problem plants in the dam and in the surrounding area is imperative.

Floating problem aquatic plants that occur in the dam include the following:

- *Eichhornia crassipes (water hyacinth);*
- *Anabaena circinalis (algae);*
- *Mycrosystis aeruginosa (blue-green algae, toxic); and*
- *Melosira granulate (a diatom).*

The water hyacinth (*Eichhornia crassipes*) has been identified as a major problem, with the species historically invading large areas of the dam’s surface. This results in restricted access and reduced surface area for recreational use.

The water hyacinth has been declared a Category 1 weed and is no longer permitted to occur on any property in South Africa. These plants may not be planted or propagated in any way and existing individuals should be removed. Working for Water, in collaboration with DWAF, implemented initiatives to control the hyacinths on the dam's surface. The hyacinth is sprayed and physically removed by representatives from Working for Water.

Exotic species that occur on the shoreline surrounding the dam include the Bluegum *(Eucalyptus sp.),* Grey Poplar *(Populus x canescens),* Syringa (*Melia azedarach),* Queen of the Night (*Cereus jamacaru) Sesbania, Opuntia and Lantana*. These species must be monitored and removed on a continuous basis.

1.4.1.5 Water Quality

The quality of the water in the Roodeplaat Dam has long been a cause for concern. Water quality at the dam is considered poor and concerns exist about the occurrence of Cyanobacteria, Algae and water hyacinths (Eichhorinia crassipes).

Eutrophication, phytoplankton blooms and changes to the phytoplankton composition are some of the major problems facing the managers of Roodeplaat Dam. Eutrophication refers to the enrichment of a water body with plant nutrients, and the symptoms associated with this enrichment.

A direct result of eutrophication is an increase in the overall productivity of a water body, which may include an increase in algae and aquatic macrophyte biomass. Excessive growth of algae (microscopic plant growth) causes problems to most water uses. This leads to the following specific water quality problems (DWAF, 1998)

- Water purification costs are increased due to filter clogging, increased chemical dosing, as well as the need for more advanced treatment processes to remove tastes and odours associated with some algal species;
- Higher levels of control and operating expertise are required to produce safe potable water;
- Toxins which are produced by certain organisms, such as Microcystis, may result in livestock and fish deaths, as well as skin irritation and gastroenteritis in recreational water users;
- Extensive deoxygenation of the lower layers of water bodies during stratification may cause disturbances in biological activity and water chemistry, which influence the capacity of the impoundment to support biological diversity;
- Aesthetic degradation of water surfaces may occur as a result of algal scums and overabundant aquatic macrophyte growth;
- The economic value of land adjacent to the water body could be decreased because of the detrimental effect that the algae and/or aquatic macrophytes have on the aesthetic value of the water body (DWAF, 1998).

The origin of the extremely high and increasing nutrient loads into the system can be attributed to:

- High nutrient containing discharges from WWTWs (Zeekoegat and Baviaanspoort provide much of the inflow);
- Diffuse land-uses (including intensive, agricultural feedlot wastes); and
- Recirculation of nutrients from the bottom sediments and decaying plant material.

The dam is hypertrophic[3] and therefore has the potential to develop regular euthrophication problems. This implies that the system will experience growth of algae/cyanobacteria and other noxious aquatic plants on a regular basis. This is a result of excessive nutrient loads which stimulates the growth of algae and encourages the establishment of the invasive water hyacinth. An increase in total phosphorus concentration is accompanied by increases in *chlorophyll a concentration*. Although the dam is generally considered safe for water sports, swimming is not recommended with an increase in *chlorophyll a* concentrations (DWAF 1997).

The two major problems associated with cyanobacterial blooms are the production of taste and odours in the final drinking water and their ability to produce carcinogenic toxins that can cause severe human health impacts. If water containing high cyanobacterial toxin concentrations is ingested (in drinking or recreational water), they present a risk to animal and human health.

A density of 100 000 cyanobacterial cells per ml (equivalent of 50 µg/L of chlorophyll a) is a guideline for a moderate health alert in recreational waters. At this density 20 µg/L of microcystins are likely. These concentrations would result in cyanotoxin consumption close to the Total Daily Intake for an adult of 60 kg consuming 100 ml of water while swimming. However a child of 15 kg consuming 250 ml of water during extensive playing could be exposed to 10 times the Total Daily Intake. The health risk will also be increased if the person exposed is particularly susceptible (e.g. because of chronic hepatitis B).

DWAF, Resource Quality Services, is doing regular fortnightly sampling on the Roodeplaat Dam. DWAF is required to inform water users when water quality poses potential health risks. There is, however, at this stage, no long term strategy aimed at the improvement of water quality of the dam.

A further problem that occurs often is the rotting of algae especially at the inlets of the dam, resulting in bad odours that are unfavourable for recreational activities. Mismanagement in the disposal of sewage and litter in the upstream catchment may also be problematic.

1.4.1.6 Siltation

The dam is affected by siltation, which is a result of erosion due to uncontrolled and/or unmanaged construction and development as well as inadequate storm water management practices upstream of the dam. High levels of siltation poses a constraint as it affects water quality and reduces the volume of the dam, resulting in reduced availability of water and breeding and feeding habitat for various aquatic species and birds. In turn, this affects opportunities for conservation and recreational use.

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[3] *EUTROPHICATION is the process of nutrient enrichment of a system and its used to classify the stage at which this process is at any given time. The trophic status of the water body is thus used as a description of the water quality status of the water body regarding the nutrient enrichment. Different stages include: i) Hypertrophic, ii) Mesotrophic, iii) Eutrophic and iv) Oligotrophic. HYPERTROPHIC REFERS TO: Serious potential and current algal productivity normally associated with very high nutrient concentrations where plant growth is determined by physical factors. Water quality problems are serious and can be continuous. Dams that can be classified as Hypertrophic include: Bon Acord, Bronkhorstspruit, Hartebeespoort en Roodeplaat. However, Roodeplaat could also be classified more moderately as Mesotrophic. Mesoptrophic refers to serious potential and significant current algal productivity. Also intermediate levels of nutrients, fairly productive in terms of aquatic animal and plant life and showing emerging signs of water quality problems.*

1.4.1.7 Hydrology

The Roodeplaat Dam was built on the Pienaars River in 1959 to supply water to the Pienaars River Government Water Scheme, its main purpose, at that time, being irrigation for approximately 1 700 ha of irrigable land. By 1997, however, only 745 ha were under irrigation, of which 315 ha were used by the Roodeplaat Experimental Farm. The main purpose of the dam today is to supply potable water for urban use via water purification works operated by Magalies Water, located at Klipdrift and Wallmansthal.

Raw water from the Roodeplaat Dam is treated at the Roodeplaat and Wallmansthal WTWs, which are operated by Magalies Water. The dam has been identified to augment the supply of water to the northern areas of Tshwane through the Montana, Wonderboom and Magaliesberg reservoirs and supply directly to the Doornpoort area (COT 2007). The Wallmansthal WTW is currently operating at capacity and the need for upgrading this facility may be required depending on development proposals in the area (COT 2007).

The extraction of water for irrigation and urban use affects the water levels which in turn affects recreational use. The surface area of the dam at full supply level is approximately 395 ha.

The full supply capacity of the dam is 41.158 million cubic metres, of which 50% originates from return flows from the Baviaanspoort and Zeekoegat WWTW, which are operated by the COT. The Baviaanspoort WWTW is located approximately 10 km upstream of the Roodeplaat Dam on the eastern bank of the Pienaars River and has a 30 Mℓ/day capacity.

The Zeekoegat WWTW is located immediately to the west of the Roodeplaat Dam. The treated effluent flows into the Roodeplaat Dam via a short earth canal which passes through the Roodeplaat Nature Reserve. An important reason for the construction of the Zeekoegat WWTW in the Roodeplaat Dam catchment as that DWAF specifically requested that the treated water from the WWTW remain in the catchment due to expected increases in water demand from this impoundment.

The COT is currently planning to upgrade and extend the Zeekoegat WWTW (Iliso Consulting Engineers 2007). As a result of increasing development, which in turn leads to an increase in the discharge of wastewater, the Zeekoegat WWTW is operating above its design capacity of 30 Mℓ/day. In fact, WWTW routinely receives and treats dry weather flow of 40 Mℓ/day. The COT thus proposes to initiate a plant de-bottlenecking to increase the capacity of the Zeekoegat WWTW to 45 Mℓ/day. This will ensure that the WWTW is able to efficiently treat the current inflow of wastewater. In addition, the COT proposes to double the capacity of the WWTW to 85 Mℓ/day to meet future wastewater demands.

Both of the WWTWs have to comply with the Special Standard for phosphate, as promulgated in the NWA. Any programmes aimed at the rehabilitation of the dam will have to focus primarily on the management of the WWTWs.

1.4.1.8 Water levels

Low water levels have been identified as a serious constraint by majority of the user groups. Apart from rainfall and climatic conditions, various factors that affect the water level have been identified. The RMP needs to identify strategies that will assist in

maintaining water levels at an appropriate level to support sustainable use. Factors that affect water levels include:

- Abstraction of water may reduce water levels, in particular abstraction by Magalies Water;
- Increased return flows from the WWTWs, in particular additional flow as a result of the planned upgrade and extension of the Zeekoegat WWTW;
- Sedimentation due to unmanaged development upstream in the catchment and inadequate storm water management (reduce the size of the reservoir and may result in higher water levels); and
- Built up areas in the catchment that reduce infiltration and increase volume and rate of run-off (flooding and higher water levels).

1.4.1.9 Flood Management Zone

The constraints regarding the Flood Management Zone can be summarised as follows and are addressed in the RMP:

- Buildings and structures located within the 1:100 year flood line pose as safety risk and is a liability;
- Private land owners do not comply with DWAF's regulations with regards to the servitude area;
- Along certain areas no servitude of storage exists, e.g. at Hengelaarsvriend; and
- Sedimentation may present increased risk of flooding (rising water levels).

The state land survey has been finalized and is in process of being signed off by the relevant authorities. ***It should be noted that the dam boundary line illustrated in this document is the status quo as at 4 February 2008.***

1.4.2 Heritage and Cultural Data

During the process of compiling this RMP, no heritage or cultural issues emerged.

2. THE PEOPLE

2.1 Institutional and Operational Arrangements

Roodeplaat Dam falls within the jurisdiction of the Metsweding District Municipality and Nokeng Tsa Taemane Local Municipality.

The NDPW is the custodian of State land surrounding the dam. The DWAF is ultimately responsible for the water surface and State owned land within the dam boundary line. It should be noted that the NDPW is in the process of reviewing and vesting the State land with various government user departments[4].

There are large portions of State owned land around the dam. GDACE is responsible for the management of the Roodeplaat Nature Reserve and Gautrans is responsible for the management of the Roodeplaat Nature Resort. There are also portions of land within the dam boundary line not owned by the State and in certain instances servitude of storage does not exist.

COT, a neighbouring municipality, is also a stakeholder since the dam supplies potable water to the northern areas of Pretoria. COT's implementing agent in this regard is Magalies Water.

2.2 Socio-economic Environment

The dam and surrounding land is currently being used for a variety of leisure and sporting activities. These include accommodation, food and beverage and a range of sporting activities such as swimming, boating, jet-skiing, fishing, canoeing and rowing.

Dinokeng has been adopted as one of the Gauteng Province's Blue IQ projects. It has been identified as one of ten projects of the Provincial Government, designed to maximise jobs in the area and to stimulate economic development. The Roodeplaat Dam is included in one of the three major hubs of the Dinokeng project.

To maximise the investment in the area and promote socio-economic development, it is important that the private sector is engaged. Through PPPs and co-management agreements, the true potential of the dam can be realized.

All possible PPPs on state land around Roodeplaat Dam will mainly be initiated by Dinokeng, who is in the process of setting up a master plan for development around the dam and have been involved in the RMP process.

2.3 Stakeholder Engagement Process

To meaningfully engage stakeholders, a public participation process was formulated to objectively identify the needs and expectations of all I&APs. The process included the following phases:

- **Planning Phase:** The first phase aimed at ensuring the support of key stakeholders. This phase mainly addressed the encumbrances to the process, attaining institutional support and identifying participants to the process.

[4] At the time of compilation of this report, the completion date of the vesting process was not known.

- **The Participation Phase:** The second phase aimed at ensuring broad stakeholder involvement, building capacity within the stakeholders and providing the stakeholders with relevant information to assist in decision making.

- **The Exit Phase:** The third aimed at achieving recommendation for the RMP, prior to submitting the plan to DWAF for approval and implementation.

A detailed description of the entire public participation process is contained in the Objective Definition Report, prepared during the Objective Identification Phase of the project.

It should be noted that the process of public input and participation will undoubtedly continue to reveal needs, expectations and issues, even beyond the approval of the RMP. Every effort should be made to ensure that these are acknowledged and addressed through the management authority. Ongoing public interest, support and engagement are vital to unlock the true potential of the dam.

2.4 The Role Players

At the initial public meeting on 12 May 2007, different user groups were identified and representatives of each group were identified to participate in TTT meetings, where specific objectives for each group were developed. These user groups are summarised below:

1) Private Land Owners;
2) Tourism;
3) Rowing and Swimming SA;
4) Fire and disaster control;
5) Local Black Community;
6) Fishing and Angling;
7) Motorised Boating and Water Ski;
8) Downstream Users and Irrigators;
9) Commercial and other uses; and
10) Government.

Appendix A contains the stakeholder list for Roodeplaat Dam and indicates the user group for each stakeholder.

The objectives set by the user groups 1-9 above are contained in the following section of this document.

2.5 *Inter-governmental Forum*

The members comprising user group 10 (government) were invited to attend Inter Governmental Forum meetings dealing specifically with government requirements and to ensure that the RMP is integrated into government planning at a local, regional, provincial and national level. Listed below are various departments that were invited to attend forum meetings:

a) DEAT;
b) DWAF;

c) NDPW;
d) Gautrans;
e) GDACE;
f) The Dinokeng Blue IQ Project;
g) Nokeng tsa Teamane Local Municipality;
h) COT (Water and Sanitation);
i) Metsweding District Municipality;
j) Department of Sport, Recreation, Art and Culture;
k) South African Sports Commission;
l) South African Police Service Water Wing;

However, to date, no common objectives have been set for the above user group. Attendance at such meetings has been poor from certain government departments and there has been insufficient participation.

Each entity has its own objectives for the area based on its particular mandate. It is important that these objectives are evaluated and aligned to ensure effective integration, cooperative governance and sustainable use of the Roodeplaat Dam and its surrounds.

3. THE PLAN

3.1 *STRATEGIC FRAMEWORK*

DWAF is the custodian of South Africa's water and forestry resources and is primarily responsible for the formulation and implementation of policy governing this sector and also promotes effective and efficient water resources management to ensure sustainable economic and social development.

3.1.1 DWAF's Vision

DWAF has a vision of being:

'a country that uses water … productively and in a sustainable manner for social and economic activities; in a manner that promotes growth, development and prosperity of all people to achieve social justice and equity.'

3.1.2 DWAF's Mission

As sector leader, the mission of DWAF is to serve the people of South Africa by:

- guiding, leading, developing a legislative framework for regulating and controlling the water sector;
- conserving, managing and developing water resources in a scientific and environmentally sustainable manner in order to meet the social and economic needs of South Africa, both now and in the future;
- educating the people of South Africa on ways to manage, conserve and sustain water resources;
- cooperating with all spheres of Government, in order to achieve the best and most integrated development, and
- creating the best possible opportunities for employment, the eradication of poverty and the promotion of equity, social development and democratic governance.

3.1.3 Key Objectives of the Department

The Department's key focus areas and strategic objectives are as follows:

- Ensure reliable and equitable supply of water for sustainable economic and social development including the eradication of poverty;
- Ensure the protection of water resources;
- Develop effective water management institutions;
- Align staff, stakeholders and general public to a common vision for Integrated Water Resource Management and develop, capacitate and empower them in best practices thereof;
- Ensure provision of basic water supply and sanitation for improved quality of life and poverty alleviation;
- Ensure effective and sustainable delivery of water services to underpin economic and social development;
- Ensure effective Water Services Institutions;

- Ensure effective local-level operations and management of DWAF water services schemes;
- Promote and support sound policy and practice of water supply and sanitation to achieve millennium targets in Africa;
- Promote Integrated Water Resource Management in Africa in support of the New Partnership for Africa's Development.

To guide initiatives aimed at attaining DWAF's vision, mission and objectives, an operational policy regarding the use of water for recreational purposes has been developed. This policy addresses planning, safety, authorisation, equity, communication, capacity building, institutions and linkages, legislative and legal framework, and monitoring and information management, and provides strategic direction to the Roodeplaat Dam RMP.

3.2 Vision and Objectives for Roodeplaat Dam

3.2.1 Vision

The vision for the Roodeplaat Dam was developed by the stakeholders and can be summarised as:

A commitment to manage, conserve, develop and utilise the resource in a sustainable, equitable and appropriate manner in order to maximise the potential of Roodeplaat Dam.

3.2.2 Key Management Objectives

To realise the vision for the dam, the following key objectives were acknowledged by the stakeholders:

- To manage the resource through communication and according to government's requirements (i.e. legislation) and to ensure safety in and around the dam at all times;
- To maintain the water quality and quantity and to ensure access to the dam as well as a healthy environment;
- To meet and satisfy quality and standards of infrastructure and facilities and to clarify rights of use at Roodeplaat Dam;
- To meet the user needs, encourage tourism and to conserve and protect the aquatic resource for recreational use;
- To uplift the local economy and increase benefit flows to the surrounding communities;
- To ensure training and education programs as well as maintenance regarding all aspects of utilisation of Roodeplaat Dam.

3.3 *MANAGEMENT APPROACH*

To ensure that the RMP contributes to the attainment of the objectives set by its stakeholders, a process approach based on the ISO 9000 management system forms the basis of the management approach for Roodeplaat Dam. The rationale for this approach is to assist DWAF and the management authorities in ensuring sustainability by protecting the integrity and value of environmental resources, providing measurable benefits to host communities, and enhancing the satisfaction of users (refer DWAF's *Guidelines for the Compilation of Resource Management Plans*).

Without a plan it will be impossible to co-ordinate and manage the activities required to unlock the potential of the dam. Only by measuring the performance of specific actions and operational guidelines against objectives will it be possible to effectively manage the water resources. The structure of the plan is based on KPAs, aimed at attaining the management objectives set for Roodeplaat Dam by the stakeholders. The management framework is illustrated in Figure 5.

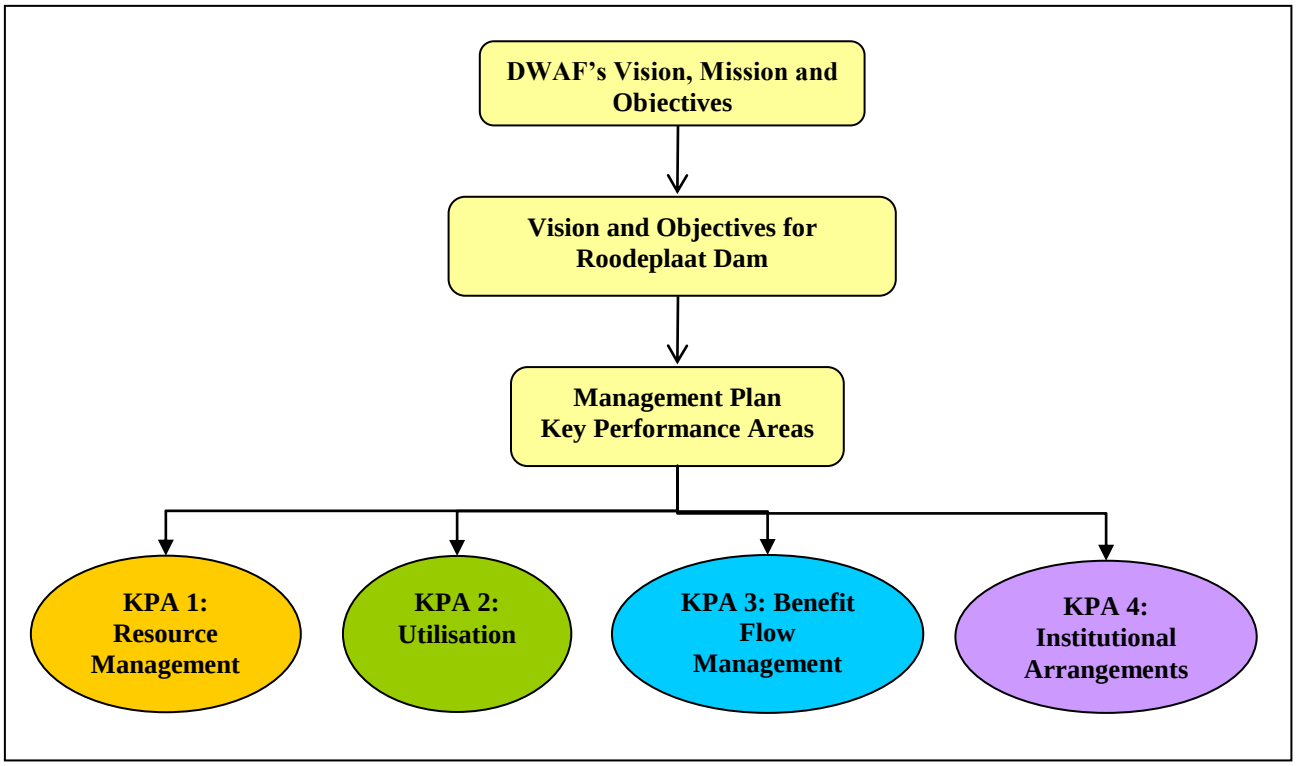


Figure 5: Management Framework

3.4 *KEY PERFORMANCE AREAS*

Each KPA is divided into management fields, which are structured in tabular format for ease of reference. The tables are to be understood as follows:

- The **Objective** represents the desired state or outcome. The question that needs to be asked is: *What do we want?*
- **Priority** indicates the level of importance within each KPA. Priority is measured in terms of, high, medium and low. The question that needs to be asked is: *How important is this objective?*
- The **Rationale** is the motivation for striving towards a specific objective. It can be based on an issue or could give insight to the current state. The question that needs to be asked is: *Why?*
- **Management Support** refers to the required resources that would be needed. These could be internal or external. The question that needs to be asked is: *What support do we need in order to implement?*
- **Policies and Guidelines** are the vehicle that provides direction on how to achieve the objective. This can imply reference to existing legislation, regulations and policies or may in many cases offer specific guidance. The question that needs to be asked is: *How do we get there?*
- **Action Projects** are deeds which are quantifiable and can be carried out. For business planning purposes it is then possible to specify each Action in terms of responsibility, schedule, budget and monitoring. The question that needs to be asked is: W*hat do we need to do?*
- **Rank** indicates for the overall level of importance of all action projects and aims to provide guidance as to the sequence of Action Projects. The question that needs to be asked is: *When should it happen?*
- **Indicators** are used to measure the effectiveness of the Action Projects. The question that needs to be asked is: *Has it worked?*

Documented below in this section are the KPAs for the dam, developed to attain the defined common objectives.

3.4.1 KPA 1: Resource Management

Table 1: Water Quality

Objective	**Priority: High**
To improve and maintain the water quality of the Roodeplaat Dam.	
Rationale	
Water quality is a key issue that needs to be addressed to ensure the sustainable use of the dam by all water users. The dam is situated within an urban context and is subject to various sources of pollution within the catchment. Due to its proximity to the city it is very popular for recreational use. The dam is hypertrophic and exhibits regular euthrophication problems. Poor water quality affects the cost associated with water purification and may result in loss of biodiversity and affects recreational use. Algal scums and overabundant aquatic mycrophytes affect the aesthetic value of the dam and recreational use. At the same time, recreational use does impact on the water quality, which in turn not only has an effect on this use, but can also affect the environmental integrity of the resource and downstream use. The two main point sources of pollution (phosphates) are the Baviaanspoort and Zeekoegat WWTWs.	
Management and Other Support	

- Government Departments that concern themselves with water quality and environmental health need to be involved. This would include the COT, the Metsweding District Municipality, the Nokeng Tsa Taemane Local Municipality and Magalies Water.
- Water Quality is monitored on a fortnightly basis by DWAF's Resource Quality Services Division. Regular reporting and feedback to users, via established communication channels, are required.
- Existing projects/programmes relating to water quality within the catchment should be harmonized and inform the RMP (Integrated Water Quality Management Plan for the Roodeplaat Dam and the Water Quality Objectives Report for the Hartebees/Morelettaspruit, Pienaars River and Edendalspruit).

Policy and Guidelines

Use

- The South African Water Quality Guidelines constitute the primary reference when determining the water quality requirements of water users. The dam is used for most recreational uses with full contact recreational use being the recreational use category with the strictest criteria requirement. Full contact recreational use involves full-body water contact, and includes activities such as swimming and diving. It differs from other recreational categories in the extent of water contact, the age group of users and the health status of users.
- With the National Water Act, 1998 (Act No. 36 of 1998), the concept of RQOs was introduced. Resource Quality means the quality of all the aspects of the water resource, which includes water quality, water quantity, as well as the aquatic ecosystem quality. Thus water quality management now also takes responsibility for in-stream and riparian habitat, as well as the quality of aquatic biota. The purpose of RQO's is to establish clear goals relating to the quality of the relevant water resource and to be able to use this as a benchmark.

Pollution

- Focus should be on proactive management of identified and potential pollution sources. This includes excessive and uncontrolled public use of the dam, storm water discharge from hard and denuded surfaces, liquid waste treatment, storage and handling of fuel, upstream pollution by various agricultural and residential related activities and destruction of riparian habitat including sponge areas.
- A policy should be in place that addresses the management of chemicals as well as waste on site. The use of herbicides, pesticides and fertilizers should be discouraged. The use of hazardous materials (fuel, oils etc) should be according to the Occupational Health and Safety Act, DWAF requirements and should generally be stored within a bunded area. Liquid waste should be released back into the environment according to DWAF standards. Solid waste, including rubble should be removed and not be left to wash into the dam.
- Pollution sources within the catchment will inevitably affect the dam. As these are outside of the dam's sphere of influence, these sources need to be dealt with via cooperative linkages with environmental initiatives as well as through the appropriate government channels. An integrated management approach is required to ensure that the resource is not adversely affected by activities within the catchment.
- Increased development around the dam will automatically increase the intensity of storm water runoff. Of concern are not only the sediment volumes, but also other pollutants contained in the storm water such as nutrients, toxic chemicals and bacteria. An effective storm water management plan should aim to minimize the pollutants contained in water from entering the dam. Although much can be done to prevent the occurrence of pollutants on surfaces in the first place, additional measures should be considered to remove pollutants present in the runoff. Detention ponds or similar attenuation structures should be developed to allow gravitational settling of pollutants and sediments.

Monitoring

- Results from regular monitoring can indicate increased levels of pollution and may trigger action measures to reverse the water quality deterioration. Monitoring will indicate if these

objectives are achieved and also indicate red flag scenarios where certain uses might be at risk.

- Successful water quality management relies on the integration of diverse factors into a holistic management system. Water quality monitoring needs to assimilate the other monitoring programmes in the catchment, including the monitoring of effluent discharge.
- Interventions will be required if monitoring indicates a trend of deterioration in the water quality and the risk that some water uses might be at stake.

Action Projects

i. Establish links between the RMP and other projects aimed at the improvement of water quality within the catchment to ensure that water quality objectives exist for the dam in particular.
ii. Research the status of the aquatic resource and associated ecosystem, with a view on developing a comprehensive set of baseline data report for future monitoring purposes. Produce a Status Quo Report on the water quality for the dam (once-off).
iii. Implement a quarterly water quality reporting programme for the next 5 years, where after the frequency of reporting could be reduced.
iv. Establish a forum that should meet every second month to discuss and action issues pertaining to water quality.
v. Implement a procedure for the pro-active identification and rectification of problems that occur at the dam as a result of a reduction in water quality (e.g. spills etc). Set up a dedicated telephone number or e-mail where problems that are identified by users could be reported to. (Linkages with Table 9: Integrated Notification System must be established).
vi. Undertake a review of the pollution loads that are contributed by point sources of pollution.
vii. Undertake an audit to determine if the existing monitoring points at the dam are sufficient and include and map key monitoring points upstream of the dam.
viii. Review the success of the implementation of methods to combat pollution and algal growth at the Hartbeespoort Dam and determine the potential success of introducing these programmes at the Roodeplaat Dam.

Indicators

i. Representation of the management authority on the Task Team for the preparation of the Water Quality Objectives Report for the Hartbeesspruit, Pienaars River and Edendal Spruit.
ii. Water Quality Objectives in place.
iii. Status Quo Report in place.
iv. Quarterly Reporting in place.
v. Water Quality Forum in place.
vi. Procedure for the pro-active identification and rectification of problems in place.
vii. Communication channel in place.
viii. Results of the review of pollution loads contributed by WWTWs.
ix. Monitoring points reviewed, captured on national grid and in place.

Table 2: Water Quantity

Objective	**Priority: High**
To maintain water levels at an appropriate level to support sustainable recreational use.	

Rationale

The current low water level has been identified as a serious constraint by majority of user groups. Apart from rainfall and climatic conditions, various factors that affect the water level have been identified:

- The abstraction of water for urban use and irrigation reduces water levels, in particular

abstraction by Magalies Water;
- Return flows from the WWTWs, in particular expected additional flow as a result of the planned upgrade and extension of the Zeekoegat WWTW, may increase water levels ;
- High levels of siltation not only affects water quality, but also reduces the volume of the dam (i.e. the size of the reservoir), resulting in reduced availability of water and breeding habitat for various aquatic species and birds. This affects opportunities for conservation and recreational use. High levels of siltation also result in higher water levels. High levels of silatation is a result of unmanaged development upstream in the catchment and inadequate storm water management (reduce the size of the reservoir and results in higher water levels); and
- Built up areas in the catchment that reduces infiltration and increase volume and rate of run-off (flooding and higher water levels).

Management and Other Support

- Local government departments that concern themselves with abstraction need to be involved. This would include the COT, the Metsweding District Municipality and the Nokeng Tsa Teamane Local Municipality.
- The Advisory Committee must have access to relevant information. Liaison with the management authority, Resource Quality Services and the DWAF Regional Office is imperative.

Policy and Guidelines

- An erosion control programme should be implemented by all developments surrounding the dam to prevent excessive siltation.
- Establish an effective communication channel to ensure regular and timeous reporting with regards to water levels to users. The internet could be a useful tool and warnings via sms could be considered. This aspect is further addressed in Table 9: Integrated Notification System.

Action Projects

i. DWAF has initiated the compilation of a model to determine optimal level of use to ensure that levels are not drawn below the minimum threshold (sustainable yield). This model should be finalized during 2008 and implemented. This will be result in restrictions being imposed on users to ensure no extraction in the event of the water level dropping to the minimum threshold.
ii. Establish a programme for the proactive management of inlets, thereby reducing high levels of siltation.
iii. Undertake a silt survey to determine the extent of siltation and determine actions for remediation, during 2008.
iv. Compile and implement an Erosion Control and Monitoring Programme, including a storm water management policy with a focus on standards for future acceptance of storm water discharge and a storm water attenuation system for existing runoff.
v. Design and implement a storm water attenuation system for existing runoff.
vi. Ensure co-operative governance in terms of authorization and management of upstream development.

Indicators

i. Level indicator report.
ii. Programme for the management of inlets in place.
iii. Results of the silt survey and action programme for remediation in place.
iv. Erosion Control and Monitoring Programme in place.
v. Storm water attenuation system in place.
vi. Storm water effectively managed.

Table 3: Alien Vegetation

Objective	**Priority: High**
To have the Roodeplaat Dam and area surrounding the dam free of invasive alien vegetation.	
Rationale	
Alien and invasive plants have a detrimental effect on the natural ecology of the dam and its surroundings. These species result in a decrease of indigenous biodiversity and result in the overall degradation of the ecological integrity of the dam and its catchment. Water hyacinth is a major problem on the surface of the dam, restricting access and recreational use. Exotic species that occur on the shoreline and surrounding the dam include the Bluegum *(Eucalyptus sp.),* Grey Poplar *(Populus x canescens),* Syringa *(Melia azedarach)* and Queen of the Night *(Cereus jamacaru).* The further spreading can have a detrimental effect on the ecology of the dam and affects the natural aesthetic of the area in general.	
Management and Other Support	
• Planning and execution of eradication programs must be done in cooperation with Working for Water. • Synchronise eradication projects in the catchment by engaging adjacent landowners and local environmental initiatives.	
Policy and Guidelines	
<u>Remediation</u> • The control of invasive plant species is addressed under the Conservation of Agricultural Resources Act. Relevant legislation as well as municipal by-laws must be complied with. • Combating must be based on the latest alien plant control technology and knowledge. Preference should be given to non-chemical eradication methods wherever possible. Due to the negative impact of aerial spraying on riparian vegetation, such spraying may only be used as a last resort. • Allow only weed free vessels to enter or exit the dam. <u>Horticulture</u> • Exotic species must be removed and replaced with appropriate indigenous trees, where appropriate. • No alien vegetation may be introduced anywhere within the dam boundary line and only indigenous planting schemes will be permitted.	
Action Projects	
i. Determine the success of current Working for Water initiatives to eradicate water hyacinths, identify opportunities and constraints. ii. Ensure that required resources are available for the removal of water hyacinths when action is required, especially during December and January. iii. Quantify and qualify the extent of invasive alien vegetation in order to have a base line survey. iv. Continuous removal of problem plants within the dam boundary line. v. Rehabilitate infested areas with suitable endemic species. vi. Continuous monitoring of occurrence of problem plants on the dam surface and within the dam boundary line. vii. Develop an inspection and cleaning mechanism to ensure that vessels entering the dam do not contaminate it with alien vegetation.	
Indicators	
Use the base line survey to measure the effectiveness of the eradication programme and adapt actions accordingly. Indicators for the effectiveness can be measured as: i. A decrease in stands of alien species within the dam boundary line; and	

ii. Water surface free of water hyacinth.

Table 4: Biodiversity

Objective	**Priority: Low**
To maintain and enhance eco-system composition, functioning, integrity and character surrounding the dam to sustain tourism potential of the area.	
Rationale	
The natural resource base provides the foundation for tourism development in the area. It is in the interest of tourism development that emphasis is placed on the conservation value of the dam and the surrounding area. The SDF for the area acknowledges identified sensitive features and identifies the majority of the area surrounding the dam as a Core Conservation Area. The importance of maintaining the existing natural resource base is recognized by tourism operators.	
Management and Other Support	
• The SDFs, the Dinokeng Master Plan, Gauteng Conservation Plan or any other framework plans with an ecological component, need to be consulted for guidance with regards to planning that may affect biodiversity or for guidance on biodiversity issues itself. This includes responsible government departments, i.e. the GDACE as well as relevant components of the local authorities.	
Policy and Guidelines	
<u>Conservation</u> • Due to the construction of the dam, the aquatic system can no longer function as a truly natural system. The policy is to apply management interventions that strive towards achieving sustainability. The biodiversity, biophysical processes, non-renewable resources and landscape of the dam need to be well conserved through consistently applying adaptive management processes, which include research, knowledge sharing as well as the review of such processes. • Apply environmental best practice management guidelines within an integrated EMS for the dam, especially when there is a risk of development related activities impacting on the environment. Although certain components or developments might operate according to an sovereign EMP, such should nevertheless be integrated into an overall EMS. An EMS (or EMP) should be desirable, irrespective if an EIA was undertaken. • Strategically important habitats (inlets and shorelines) need to be protected and managed to ensure their ecological functioning. As such the conservation focus should be on these areas. <u>Soils</u> • The soil resource needs to be conserved by ensuring that accelerated erosion caused by the activities of man is attended to. In most cases this can be achieved by maintaining a healthy and diverse cover of indigenous vegetation. • In areas of intense human use (sand roads, camping sites, areas of concentrated storm water runoff, etc) the best known means of protecting the soil mantle needs to be applied. Monitor the condition of the soil and the rate of erosion and / or rehabilitation closely and adapt actions accordingly. <u>Vegetation</u> • The endemic vegetation of the area should be conserved and promoted. The unsolicited collection, harvesting, destruction and removal of plant material need to be prevented. Removal of plant material should only take place if this is in terms of a rehabilitation programme, for an authorised construction activity or for general veld management purposes (fire breaks, bush encroachment, etc).	

- All developments should be properly planned, based on a proper and detailed survey, in order to avoid the unnecessary removal of plant material.
- Where vegetation has deteriorated or been lost, it needs to be rehabilitated. Seed with a species cocktail adapted to reflect the local indigenous flora. Any new tree planting needs take cognisance of dam safety requirements.
- Rare plant species or those found to be increasingly rare must be adequately protected.
- A horticultural approach to the landscape may only be applied within the medium and high impact development zones. Generally, landscaping within the areas identified for development within medium and high impact development zones, should be kept to a minimum.
- The occurrence of alien invasive species should be monitored and these species must be eradicated using appropriate methods, on a continuous basis.

Fauna

- Consumptive utilisation should be limited to angling. Hunting or any other destruction or capturing of animals would not be considered a permitted activity.
- Rare animal species or those found to be increasingly rare and their associated breeding sites need to be adequately protected.
- Problem animals should be controlled in a manner that does not compromise the environment or the utilisation potential of the dam.

Action Projects

i. Develop an integrated EMS for the dam.
ii. Ensure compliance with the NEMA and EIA regulations.
iii. Devise a Programme to determine the status of rare, threatened and endangered plant and animal species and adapt management interventions accordingly. Undertake a biodiversity assessment and prepare a biodiversity management plan.
iv. Install buoys at all Conservation Zones, as per the Zoning Plan.
v. Monitoring of compliance with the zoning plan.
vi. Identify areas where vegetation has deteriorated and rehabilitate accordingly.

Indicators

i. EMS in place.
ii. Records of non-compliance.
iii. Biodiversity Management Plan in place.
iv. Presence / absence of environmental degradation.
vii. Presence / absence of key species.

Table 5: Cultural and Heritage Resources

Objective	**Priority: Low**
To primarily identify, acknowledge and conserve resources of paleontological, archaeological, historical, cultural and religious significance.	
Rationale	
No heritage or cultural issues have arisen to date. The significance of heritage and cultural resources is duly noted and this objective has been included and defined to pro-actively manage undiscovered resources.	
Management and Other Support	
The management authority must ensure that through linkages with government and other stakeholders, an awareness of related issues is maintained.	
Policy and Guidelines	

Objective	Priority: Low
Not applicable.	
Action Projects	
None. Projects should be identified if the need arises.	
Indicators	
Not applicable.	

3.4.2 KPA 2: Utilisation

Table 6: Public Access, Use and Development

Objective	Priority: Medium
To enable broad public enjoyment of the water resource and surrounding State land through controlled authorized access and associated infrastructure development.	
Rationale	
The proximity of the Roodeplaat Dam to developed areas, coupled with its large surface area and surrounding State land makes it an ideal destination for recreational use. Potential exists for accommodation, house-boats and various sports and leisure activities including boating, canoeing, swimming, jet-skiing, fishing, picnicking and camping. It is important that the recreational potential of the water surface and surrounding State land is realized.	
Management and Other Support	
• The necessary authorisations for access, use and development within the boundary line must be approved by DWAF prior to any actions. • Linkages must be established with relevant government departments and federations where appropriate.	
Policy and Guidelines	
<u>Access and Use</u> • The dam must remain available for broad public recreational access and use, above commercial or private interests. • Public access and use should be equitable, compatible and safe. • Fees for access & use should be determined as prescribed in terms of Section 113 of the NWA. • Entry fees may be levied for public access and use. However, fees need to be reasonable to ensure the dam remains an affordable destination. • Access and use must be in accordance with the Zoning Plan (Figure 8) contained herein. <u>Development</u> • Any development within the dam basin is subject to relevant legislation and policies. • All development must conform to the Zoning Plan (Figure 8) contained herein. <u>Existing Use</u> • For most users and operators, the necessary agreements and authorisations are either outdated or non-existent. Existing use must be regularised, and is addressed in Table 12: Regularisation of Existing Use . <u>Commercialisation</u> • Unlocking the full potential of commercial recreation of the dam will simultaneously promote	

socio economic development within the surrounding areas.

- National, provincial and local government identify the tourism sector as a vehicle for job creation, skills development, SMME development and broad-based black economic development. Furthermore, there is opportunity for private sector involvement through the public-private partnership mechanism. The market identifies a need for commercial tourism and this objective will ensure that the dam potential is fully realized. Government initiatives include:
  a) The identification of Roodeplaat Dam as one of three tourist hubs as part of the Dinokeng Project.
  b) The local municipality's IDP which identifies the tourism potential of the dam and its surroundings.
  c) In response to market demand regarding commercial development on the water surface and surrounding state land, DWAF is in the process of finalising a Strategic Plan for Commercialisation in terms of National Treasury's PPP Guidelines.

Operation

- All uses and operations must be in accordance with industry norms and standards.

Action Projects

i. Pending the finalisation of the NDPW's vesting process, evaluate the development potential in terms of the Zoning plan and prepare and implement a development strategy.

Indicators

i. The development strategy must be finalized within four months of the finalization of the vesting process.
ii. The implementation of the development strategy must be as defined therein.

Table 7: Private Access and Use

Objective	**Priority: Medium**
To enable adjacent landowners and residents access to and use of the water resource.	
Rationale	
Land uses surrounding the dam include various smallholdings and residential estates. Current activities undertaken include accommodation, conference centres and various leisure and sporting activities such as boating, canoeing, swimming, jet-skiing, fishing, picnicking and camping. It is hence crucial that dedicated lawful and controlled access is provided for private land owners.	
Management and Other Support	
• All necessary authorisations for use and development within the dam boundary/servitude line where applicable should be approved by DWAF prior to any actions. • Linkages must be established with relevant private land owners.	
Policy and Guidelines	
Access and Use • Where applicable all necessary authorisations for use and development within the dam boundary/servitude line where applicable should be approved by DWAF prior to any actions. • The dam must remain available for broad public recreational access and use, above commercial or private interests. • Private access and use should be equitable, compatible and safe. • Water use charges should be levied for access to and use of the water. Charges should be regulated through agreements as determined through the NWA.	

• Where appropriate, co-management agreements between DWAF and various private land owners can be effected to realize the true potential of the dam. • Access and use must be in accordance with the Zoning Plan contained herein. <u>Development</u> • Any development within the dam basin is subject to relevant legislation and policies. • All development must conform to the Zoning Plan contained herein. <u>Existing Use</u> • For most users and operators, the necessary agreements and authorisations are either outdated or non-existent. • Some private land owners utilise land within the dam boundary line since this line was not previously identified by DWAF. • In some instances, private land owners own land up to the water surface and no servitude of storage is registered for DWAF. • Existing use must be regularised, and is addressed in Table 12: Regularisation of Existing Use . <u>Operation</u> • All uses and operations must be in accordance with industry norms and standards.
Action Projects
i. Pending the regularization of existing uses, relevant agreements and co-management agreements must be drawn up with all affected private land owners.
Indicators
i. Agreements on record.

Table 8: Sporting Activities and Events

Objective	**Priority: High**
To provide exclusive and dedicated time and space for organized sporting events to take place in a manner that is safe and meets the participant's expectations.	
Rationale	
Roodeplaat Dam is used by various national user groups, including rowing, swimming and canoeing and it is important through integration to meet the needs and expectations of all groups.	
Management and Other Support	
• The management authority must ensure integration and co-ordination. • Various sporting groups and federations must provide relevant input.	
Policy and Guidelines	
• Management and operational guidelines and should be developed. • The Zoning Plan must be adhered to. • The industry norms and standards for all sporting codes must be adhered to.	
Action Projects	
i. Prepare and implement an activity management plan for each sporting code.	
Indicators	
i. Successful and integrated use of the water surface by various sporting federations.	

Table 9: Integrated Notification System

Objective	**Priority: High**
To ensure that users are accurately and timeously notified of matters affecting their safety and involvement at the dam.	
Rationale	
During the process of developing this RMP and defining the KPAs, the importance for an integrated notification system was identified.	
Management and Other Support	
• The management authority must ensure that the system is developed and maintained. • Linkages must be established with the local and district municipalities regarding disaster management.	
Policy and Guidelines	
The following should be considered for the system: • Information to be conveyed and the frequency and priority thereof; • The user groups; • The medium of communication to be used, such as SMS technology, advanced signage, billboards, etc. and the operation and maintenance of the system; • Linkages with the local and district municipalities' proposed disaster management centres; and • The resources required for such a system.	
Action Projects	
i. Develop and implement an integrated notification system.	
Indicators	
ii. A survey can be conducted by end-users of the system to ascertain its efficiency and compliance with its requirements.	

Table 10: Infrastructure and Services

Objective	**Priority: Low**
To ensure that necessary services (such as water and sanitation, electricity, roads, telecommunication, and waste disposal) and associated infrastructure are provided to facilitate controlled development of the water resource and surrounding State land.	
Rationale	
Adequate infrastructure and services exist in the vicinity of the dam, however, should further development take place and the tourism facilities be improved, the number of people utilising the dam will undoubtedly increase which will in turn necessitate increased service and infrastructural capacity. To unlock the true recreational potential of the water resource, it is imperative that the water resource and surrounding State land is developed, taking cognizance of Zoning Plan. Proposed development must progress in an environmentally sound and controlled manner.	
Management and Other Support	
• The management authority is responsible for ensuring the co-ordination of relevant government departments and other stakeholders.	

• Other local, provincial and national departments are responsible for providing services and associated infrastructure in accordance with their mandates. • Adjacent land owners must be consulted when necessary.
Policy and Guidelines
Infrastructure Development • Infrastructure development must be authorised by DWAF, aligned with the RMP and evaluated and recommended by the management authority. It must further comply with all regulatory requirements (NEMA, NWA, National Heritage Resources Act, etc), municipal planning ordinances and any other relevant regulatory requirements. • Infrastructure needs to be developed according to spatial restrictions prescribed by the different zones, buffer lines, relevant flood lines as well as sensitive features such as wetlands and shore line vegetation. • All planning, development and maintenance of infrastructure must conform to relevant industry legislation, policies and guidelines. Services and Associated Infrastructure • The management authority is responsible for ensuring the co-ordination of relevant government departments to ensure that adequate planning and development takes place to facilitate infrastructure development on the water surface and surrounding State land. • All planning and development must conform to relevant industry legislation, policies and guidelines.
Action Projects
i. Prepare an inventory of existing infrastructure and services to facilitate integrated management. ii. Monitor and update the above-mentioned inventory regularly, ensuring linkages with the proposed development strategy in Table 6: Public Access, Use and Development.
Indicators
i. Inventory list finalized within three months of RMP's operationalisation.

Table 11: Carrying Capacity

Objective	**Priority: Medium**
To promote, accommodate and manage a variety of activities and facilities at the dam in a manner that enhances the user experience and minimizes the impact on the resource.	
Rationale	
Roodeplaat Dam is popular for a variety of uses and users. Excessive use of the resource will not only impact on the environment, but will also affect user safety and satisfaction. Carrying capacity is an effective management tool to control access, utilisation and development at the dam. Excessive use of the resource may not only impact on the water resource (pollution) and environment (soil compaction, littering, destruction of vegetation, etc), but will also affect safety and visitor experience. Increasing numbers of visitors result in social impacts measured by overcrowding, accidents, conflicts, noise, etc.	
Management and Other Support	
• The involvement of the relevant industry with regards to user experience and other aspects such as safety is imperative. • Environmental and other planning institutions including relevant government departments need to be consulted when establishing density controls.	
Policy and Guidelines	

Permitted uses

- Permitted uses on the water surface and surrounding land that DWAF is responsible for is as contained in the Concept Zoning Plan.

Density controls

- In order to address future concerns regarding the over exploitation of the resource and user experience, further density controls may be required. This should be addressed as the need arises. A variety of visitor management techniques need to be considered, broadly based on what the available natural, infrastructural and human resources can accommodate.
- The density controls are established for normal operational use and may only be relaxed for certain organised events and if sufficient management control can ensure safe operation and minimal environmental impact. Consent would be required from DWAF in each case.

Vessels

- Vessel area requirements, relationships and classification are based on the *Guidelines for the Compilation of Zoning Plans for Government Waterworks.* The procedure is based on the *Methodology for Carrying Capacity Assessment for the Use of Water for Recreational Purposes*.
- Attached as Appendix B is the carrying capacity calculation for Roodeplaat Dam. The Real Carrying Capacity has been set at 62 motorised boats The Effective Carrying Capacity has not been determined since the management capacity is currently being finalised. Subsequent to the finalisation of the Effective Carrying Capacity, allocations of vessels for each zone can be finalised.
- Vessels need to be counted at the launching facilities. The number of non-motorised vessels needs to be determined once Effective Carrying Capacity has been confirmed.
- As the water level drops, pro rata changes would need to be made based on the water surface area of the High Activity and Low Activity Zones. Tables indicating surface area and adjusted Effective Carrying Capacity should be prepared based on dam levels.
- For all vessels, the Merchant Shipping (National Small Vessels Safety) Regulations must be adhered to.

Infrastructure and Access Points

- A Launching Facility (*access D*) purely for DWAF's management purposes west of the Safety and Security Zone.
- A Primary Public Launching Facility (*access C*), situated between the Safety and Security Zone and the jet-ski area. This area must be large enough to hold boats in a controlled area, from which they can access the water surface.
- A Public Launching Facility (*access A*) at on the western bank of the Pienaarsriver inlet, north of the buoy line. Bass fishing boats will be launched from this access point only, at idling speed. Motorized maintenance and coaching boats required by RowSA, with a motor size limited to 15 Hp, may be launched from this point as well.
- Two newly proposed Private Access Points at Sable Hills (a*ccesses F and G*). These access points will be conditional to an agreement between the land owner, custodian of the water resource and other users/operators.
- Two Private Access Points at the Edendal Spruit inlet (*accesses H and I*), providing access to the water surface to private land owners, for motorized and non-motorized vehicles.
- One Limited Public Access Point (*access B*) at the RowSA facilities, west of the central buoy line, providing access for non-motorised vessels as well as motorized maintenance and coaching boats, with a motor size limited to 15 Hp. Public access at this point will be limited and based on agreement between the custodian of state land, custodian of the water resource and the access provider. All agreements should comply with relevant legislation, policy and guidelines. This implies that general public access may be provided from this point, based on prior approval and subject to certain conditions, stipulated by the access provider.
- A Limited Public Access Point (*access E*), situated in the Roodeplaat Nature Reserve.

Access at this point will be limited and based on agreement between the custodian of state land, custodian of the water resource and other users/operators. All agreements should comply with relevant legislation, policy and guidelines. This implies that general public access may be provided from this point, based on prior approval and subject to certain conditions, stipulated by the access provider.
- All access points may be utilised for official access as required for official purposes attending to resource management activities as prescribed by the NWA.

Other
- Thresholds should be considered for organised events, especially when the events are large public events, which may have a regular impact on other uses or on the resource.
- Other carrying capacity assessments should be undertaken as the need arises. Where local guidelines are not available, international publications should be consulted. Where it is anticipated that limits of acceptable change could be exceeded, carrying capacity assessments should be undertaken prior to the activity being undertaken or facility being developed.

Action Projects

i. Determine the Effective Carrying Capacity and allocations of vessels for each zone.
ii. Develop and implement a customised control and monitoring programme for each of the various carrying capacity aspects.

Indicators

Thresholds need to be strictly monitored according to the control and monitoring programme. Indicators for the effectiveness of density controls can be measured as:
- Physical presence versus the specified carrying capacity;
- Compliance of users with regards to the thresholds;
- Amount and seriousness of incidents;
- Responsiveness, satisfaction of and awareness among users; and
- Realisation of control and monitoring systems.

Table 12: Regularisation of Existing Use

Objective	**Priority: High**
To evaluate the existing uses of the dam basin and adjacent state and privately owned land to ensure that usage is lawful and that the necessary permits and authorizations are in place.	
Rationale	
Throughout the RMP compilation process, it has been alleged that for certain land and water uses, the necessary permits and authorizations are not in place. For other utilisation KPA's to be achieved, it is imperative that all usage is regularized.	
Management and Other Support	
• The management authority is responsible for overall management and co-ordination of the proposed action project. • Various national, provincial and local government departments must provide information regarding land and water use authorisations.	
Policy and Guidelines	
• The data obtained during the process of the RMP compilation, as documented in the Research Report, should be used as a starting point. • DWAF should be consulted with regard to water use authorisations, as contained in the DWAF's authorisation and management system. • Legal advice should be obtained to ensure that the recommended methodology is in	

accordance with all relevant legislation.
Action Projects
i. Embark on a project to evaluate the current use of the dam basin and adjacent state and privately owned land and regularize unlawful usage.
Indicators
i. A database of all permits and authorizations for water surface and land use, highlighting whether use is legal or illegal. If illegal, time frames for regularization must be stated.

3.4.3 KPA 3: Benefit Flow Management

Table 13: Local Economic Development

Objective	**Priority: Low**
To ensure that local communities participate and benefit in local economic development initiatives occurring in and around the dam.	
Rationale	
National, provincial and local governments identify the tourism sector as a vehicle for job creation, skills development, SMME development and broad-based black economic empowerment. It is essential that local communities derive benefits from tourism projects implemented.	
Management and Other Support	
• The management authority is responsible for overall co-ordination and ensuring benefit flows. • The local black community user group must provide relevant input. • Linkages must be established with relevant government departments.	
Policy and Guidelines	
• Establish linkages with tourism initiatives. • Recognise, train, capacitate and empower individuals from the surrounding community with proven interest and entrepreneurial skills. Through regular communication with community groups, it will be possible to become more sensitized to community perceptions, as well as to expose entrepreneurs to the opportunities that are available.	
Action Projects	
i. Compilation of a database of job seeking individuals and SMMEs from the local community and ensure that it is regularly updated and monitored. ii. Implement skills development programmes where opportunities exist. iii. Ensure that BEE is attained in any PPP projects.	
Indicators	
i. Measure capacitation of individuals and SMMEs through database mentioned previously.	

3.4.4 KPA 4: Institutional Arrangements for Implementation

Table 14: Institutional Plan

Objective	**Priority: High**
To ensure that a suitable institutional structure with the appropriate powers and delegations is in place to effectively manage the recreational use of the water resource in accordance with this RMP.	
Rationale	
To select an appropriate authority to manage recreational water use for this dam, consideration was given to various aspects, including legislation, DWAF policy, DWAF's planning frameworks and current institutional frameworks. In terms of DWAF's guideline, Considerations on the Institutional Arrangements for Managing Use of Water for Recreational Purposes (2003), potential management authorities include a management committee, private sector agent, public sector agent, component within the DWAF, Water User Association (WUA) established expressly for managing recreational water use, or WUA established for managing the operation of the water works for consumptive uses and delegated responsibility for recreational use. Within a national planning context, it is important to note that plans are being developed to restructure the DWAF's National Water Resource Infrastructure Branch. Ultimately, the afore-mentioned branch will be isolated from DWAF and evolve into the South African National Water Resource Infrastructure Agency, a utility. The establishment of a WUA is dependent upon the finalization of the institutional framework linked to the above re-structuring. Currently, a Dam Control Committee is in operation. This committee comprises various land owners and users. However, this arrangement is not formalized. Furthermore, a management committee will not have the necessary powers and delegations to effectively manage recreational use. Additionally, there are linkages with local, provincial and national government departments, as described in the 'Regional Planning Concepts' section of this document. Considering the above, the most appropriate institutional plan for Roodeplaat Dam is as illustrated in Figure 6 below. **The management authority referred to within this document is hence the DWAF supported by an Intergovernmental Forum and an Advisory Committee**.	
Management and Other Support	

• DWAF support will include:
  o Internal resources;
  o Professional Service Provider (management and co-ordination);
  o Transaction Advisors for any PPPs;
  o Specialists for other areas;
• Various government departments must participate and provide relevant input in terms of their relevant mandates.
• Other interested parties must participate through the advisory committee.	

Policy and Guidelines	

<u>Government Departments</u>
• Relevant government departments must ensure that in terms of their mandate, approvals and agreements are in place with:
  o Commercial and non-commercial operators and users and
  o Other government departments where necessary.	

- All agreements and approvals must be compliant with relevant legislation, regulations policies and guidelines.
- The effectiveness of the management authority must be reviewed regularly.
- An intergovernmental forum must be used as a platform for communication.

Advisory Committee

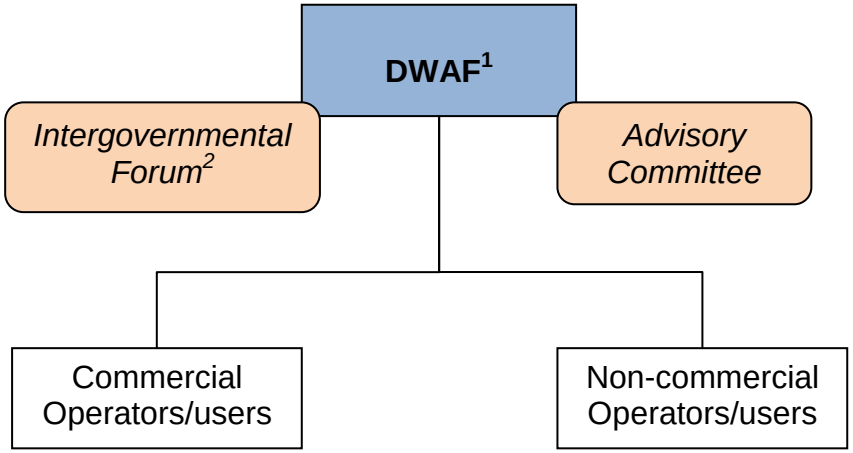
- An advisory committee, consisting of representatives of the stakeholders, should be constituted. The purpose of this committee will be to provide the DWAF with insight into the needs and expectations of the host community and the various stakeholders while also serving as medium to convey DWAF's objectives and decisions to community members.
- Additionally, the advisory committee will use the RMP as an accountability tool to measure the performance of DWAF regarding the management of the dam and surrounding resources; the degree to which the economic potential has been unlocked; and, the benefits accruing to the stakeholders.
- The initial advisory committee should be established using the non-governmental members of the RMP TTT. The needs and expectations of the community will continue to unfold and input from various stakeholders must be provided through the relevant institutional structures.
- The RMP TTT members should be consulted with regard to its structure and operational aspects.

Action Projects

i. Prepare a roll-out strategy for the establishment of the management authority, defining clearly the functions and responsibilities of all parties.
ii. Implement the strategy developed in the previous action project, by establishing and operationalising the proposed institution.

Indicators

i. The above-mentioned strategy must be finalized within three months of the operationalisation of this RMP.
ii. The management authority must be established within five months of the operationalisation of this RMP.



Legend
Agreements/approval ————————

Notes:
1. DWAF support will include:
    - Internal resources,
    - Professional service provider (management and co-ordination),
    - Transaction advisors for any PPPs, and
    - Specialists for other areas
2. The Intergovernmental Forum will include relevant national, provincial and local government departments *such as* NDPW, DEAT, GDACE, Gautrans, Metsweding District Municipality, Nokeng tsa Taemane Local Municipality and COT.

Figure 6: Institutional Proposal

4. CONCEPT MANAGEMENT PLAN

4.1 Process

The zoning of Roodeplaat Dam has been undertaken to ensure organised development, equitable visitor access, sound resource management and optimal benefits to the community.

Information that was gathered during the Research Phase as well as the existing zoning plans for the Roodeplaat Dam facilitated the development of the Concept Zoning Plan (Figure 8). The Concept Zoning Plan is aimed at directing activities and development both on the water surface and land surrounding the dam. The final Zoning Plan will serve as a tool for decision support to ensure the sustainable utilization of the resource. The zoning process is illustrated in Figure 7.

It should be noted that the Concept Zoning Plan is based on the full supply level. Adjustments must be made subsequent to the finalisation of the dam balancing studies.

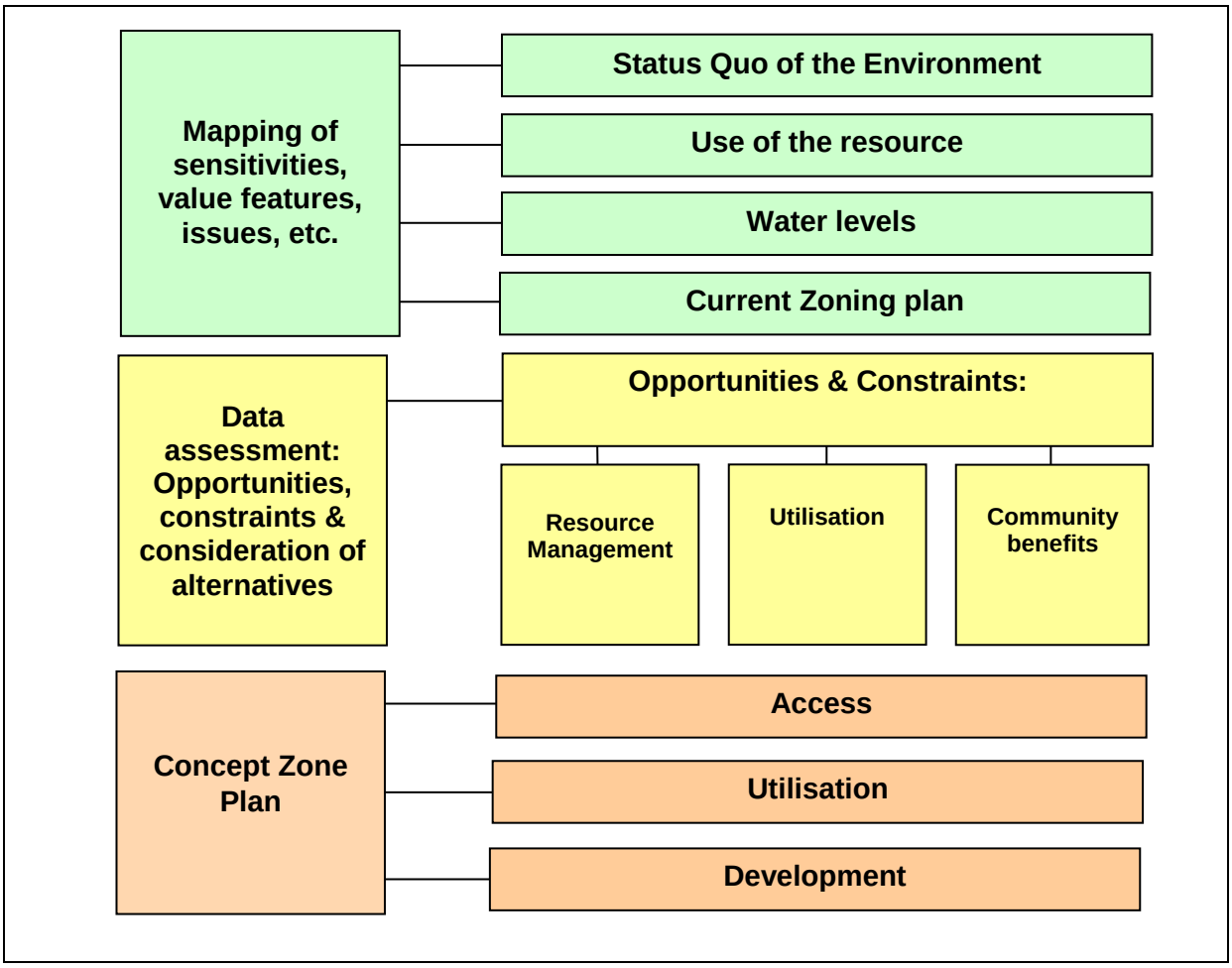


Figure 7: Zoning Process

To effectively zone a resource an assessment of all relevant information must be undertaken to ascertain habitat and landscape sensitivity. Following this sensitivity

analysis, an assessment of the environmental characteristic was undertaken. This assessment entails the determination of current environmental character status, opportunity for use, access and development based on a spectrum of the environmental limitations and stakeholder objectives.

Where relevant, aspects of the KPAs are spatially depicted in the Concept Zoning Plan (Figure 8).

The following zones have been identified as a result of the zoning process:

Water Surface Zones

- Safety and Security Zone,
- High Impact Activity Zone,
- Low Impact Activity Zone, and
- Conservation Zone.

Waterfront Zones

- Safety and Security Zone,
- Access / Buffer Zone,
- Conservation Zone,
- High Impact Development Zone,
- Medium Impact Development Zone, and
- Low Impact Development Zone.

Each Zone is described in a corresponding table. The tables are to be understood as follows:

- **The Objective** represents the desired state for this zone. The question that needs to be asked is: What do we want?
- **The Character** describes the physical attributes of the zone. The question that needs to be asked is: What is there and what should it be like?
- **Spatial Guidelines** provides a framework for opportunities in terms of access, utilization and development. The question that needs to be asked is: Where can what be done?

4.2 *The Zones*

4.2.1 Water Surface Zones

Table 15: Safety and Security Zone

Objective
To protect the dam wall and outlet works, to ensure the safety of the public and to have sufficient room for DWAF operation and management purposes.
Character
• This zone is applicable to the area surrounding the dam wall and outlet works and hence applies to areas demarcated on the water surface and on adjacent land. • It is required that the security area boundary is a minimum distance of 100m from the dam wall and outlet works or spillway. • The combined size of the Safety and Security Zone (water and land) is 2.1 ha. • This zone is not adversely affected by the water level.
Spatial Guidelines
<u>Access</u> • Access is limited to DWAF and for management purposes only. • There will be no recreational access to this zone. Signage should clearly indicate this. <u>Utilisation</u> • No recreational use may take place in this zone, unless specifically so authorized by DWAF. <u>Development</u> • There will be no recreational development in this zone. • Fences may be erected as is required for safety, security and management control purposes.

Table 16: High Impact Activity Zone

Objective
To provide designated, controlled and safe environment for high intensity use water activities.
Character
• The dam is divided into two main activity zones, namely a high activity zone and a low activity zone. These areas are separated by a buoy line, situated at the centre of the dam. The high activity zone forms the eastern section of the dam. It is situated where the reservoir is at its deepest. Should the water level drop and the surface area of the dam be reduced, it will reduce accordingly. • There will be one opening towards the low activity zones. • The size of the high impact activity zone is 155.5 ha. • The high activity zone is associated with high speed, wake and noise activities, e.g. motor boating and water skiing. • Provision is made for the operation of two floating houseboats. • Provision is made for jet skiing in a small area east of the public access point. • Audio-visual impacts will be most prevalent from this zone.

Spatial Guidelines
Access (refer to Figure 8 for an illustration of access points) • This zone will contain the following access points: i. A Primary Public Launching Facility (*access C*), situated between the Safety and Security Zone and the Jet Ski area. This area must be large enough to hold boats in a controlled area, from which they can access the water surface. ii. Two newly proposed Private Access Points (*accesses F and G*). These access points will be conditional to an agreement between the custodian of land, the custodian of the water resource and other users/operators. iii. Two Private Access Points (a*ccesses H and I*) at the Edendal Spruit inlet, providing access to the water surface to private land owners, for motorized and non-motorized vehicles. iv. A Launching Facility (*access D*) purely for DWAF's management purposes west of the Safety and Security Zone. i. One Limited Public Access Point (*access E*), situated in the Roodeplaat Nature Reserve. Access at this point will be limited and based on agreement between the custodian of state land, custodian of the water resource and other users/operators. All agreements should comply with relevant legislation, policy and guidelines. This implies that general public access may be provided from this point, based on prior approval and subject to certain conditions, stipulated by the access provider. • Large vessels such as sailing boats (7m plus) must be counted via the Primary Public Launching facility located in the High Impact Activity Zone, prior to launching at these launching facilities. • Docking, mooring and launching may only be from these launching facilities. Vessel numbers must be controlled and counted at these facilities. • The only other vessel access is via entry points in the Low Impact Activity Zone. Utilisation • This zone caters for high intensity uses relating to power driven vessels such as motor boating, water skiing and Jet Skiing. • Although this is a high intensity use zone, non-motorised vessels may use this zone. • A restriction of 70 m from the shoreline acting as a buffer, is placed on all power driven vessels. The purpose of this quasi-transition is for the safety of bathers, anglers and other vessel users as well as to protect the ecology of the shoreline. This water buffer area is situated along the entire shoreline and may only be crossed for launching purposes. Development • The identified launching facilities must provide enough slipways for safe launching of vessels, it must provide sufficient docking (jetties or similar) and mooring facilities in excess of the carrying capacity. It must be possible to regulate the number of vessels entering the water surface (manned-gate or similar counting mechanism) from these facilities. Effective Carrying Capacity should be monitored from these points. Boats mooring or docking at the jetty will not be counted as being on the water surface. • This zone must be clearly buoyed off from the Low Activity Zones and the Safety Zone.

Table 17: Low Impact Activity Zones

Objective
To provide designated, controlled and safe environments for low intensity use water sport

activities. The main purpose of Low Impact Activity Zones is to provide a buffer between High Impact Activity Zones and Conservation Zones. Low Impact Activity Zones allows for low intensity and / or nature based leisure activities, i.e. activities associated with little or no wake, e.g. rowing, canoeing, angling etc.

Character

- The following Low Impact Activity Zones have been identified:
  - i. A large area that forms the western part of the dam, stretching from the central buoy line southwards towards the Moreletta/Hartbeesspruit and Pienaars River inlets, which are demarcated conservation zones and separated from the Low Impact Activity Zone with buoys. This area includes:
    - The rowing lanes required by the RowSA; and
    - An area to be used for bass fishing, 50m from the shoreline, east of the rowing lanes. This area should be appropriately buoyed off to separate bass fishing and rowing lanes.
  - ii. Three Low Impact Activity Zones east of the High Impact Activity Zone, adjacent to the Sable Hills residential estate.
  - iii. A Low Impact Activity Zone west of the High Impact Activity Zone, adjacent to the Roodeplaat Nature Reserve.
  - iv. A Low Impact Activity Zone situated south of the edge of the High Impact Activity Zone at the bridge crossing the Edendal Spruit inlet, the latter being zoned for conservation purposes. Low Impact Activity Zone must be a minimum of 500 m in length, stretching from the bridge, towards the conservation zone. Leeuwfontein Estate is situated on the western waterfront and Riverside Estate to the east.
- The combined size of the Low Activity Zone is 180.2 ha, and is reduced as the level of the dam drops, affecting the rowing lanes in particular.
- External audio-visual impacts are limited and it has a moderate sense of solitude.

Spatial Guidelines

Access (refer to Figure 8 for an illustration of access points)
This zone will contain the following access facilities:

- ii. One Limited Public Access Point (*access B*) at the RowSA facilities, west of the central buoy line, providing access for non-motorised vessels as well as motorized maintenance and coaching boats, with a motor size limited to 15 Hp. Public access at this point will be limited and based on agreement between the custodian of state land, custodian of the water resource and access provider. This implies that general public access may be provided from this point, based on prior approval and subject to certain conditions, stipulated by the access provider.
- iii. One Public Launching Facility (*access A*) at on the western bank of the Pienaarsriver inlet, north of the buoy line. Bass fishing boats could be launched from this access point only, at idling speed. Motorized maintenance and coaching boats required by RowSA, with a motor size limited to 15 Hp, may be launched from this point as well.
- iv. One Limited Public Access Point (*access E*), situated in the Roodeplaat Nature Reserve. Access at this point will be limited and based on agreement between the custodian of state land, custodian of the water resource and other users/operators. All agreements should comply with relevant legislation, policy and guidelines. This implies that general public access may be provided from this point, based on prior approval and subject to certain conditions, stipulated by the access provider.

Utilisation

- This zone caters for low intensity uses relating to non-motorised vessels, except those used for maintenance, coaching and bass fishing.
- A 50m restriction is placed on vessels from the shoreline as a buffer. The purpose of this quasi-transition is for the safety of bathers, anglers and other vessel users as well as to protect the ecology of the shoreline. This water buffer area is situated along the entire shoreline and may only be crossed for launching purposes.
- Sailing vessels have temporarily been excluded from the low impact activity zone, until such time that the management authority is informed that interest has developed to utilize the low activity zone for sailing, following which, time management should be implemented for this zone.

Development
- The launching facilities must include slipways for the safe launching of vessels.
- Vessels which are not active on the water surface should be taken off the water. Docking and mooring facilities will not be provided, unless this is in conjunction with a manned gate for controlling and counting.
- Further launching facilities must consist of a demarcated 10m wide cleared shoreline area. Slipways and docking and mooring facilities will not be provided at tertiary launching facilities. Vessels which are not active on the water surface should be taken off the water.
- This Zone must be clearly buoyed off between the High Activity Zone and the Conservation Zones. There will be one opening towards the High Activity Zone.
- No facilities or infrastructure may be constructed within this Zone.

Table 18: Conservation Zones

Objective
To conserve and protect sensitive aquatic habitat at the inlets of the dam.
Character
• The areas associated with the Moreletta/Hartbeesspruit, Edendal Spruit and Pienaars River inlets are classified as conservation zones. • Areas demarcated for hyacinth/biocontrol are considered as conservation zones. • The combined size of conservation zones on the water surface is 56.56 ha.
Spatial Guidelines
Access • No access to the conservation zones associated with river is allowed. • Access for bio-control purposes are provided for with areas demarcated for that purpose, DWAF/Working for Water only. Utilisation • No use is permitted within conservation zones. • Fishing is generally not permitted in conservation zones. • Bank fishing is allowed in the area demarcated for that purpose, north of the Conservation Buffer Zone at the inlet of the Hartebees/Moreletta Spruit. Development • Ecologically sensitive areas surrounding the inlets of the rivers are classified as conservation areas, allowing for limited/no access. Activities such as bird watching and hiking trails could be permitted. • No facilities may be constructed within these Zones, unless authorized by DWAF.

4.2.2 Waterfront Zones

Table 19: Waterfront Zones

Objective
To ensure that the area between the Dam Boundary Line and the Full Supply Level is managed and developed where appropriate, based on the regulations and guidelines provided by DWAF.
Character
DWAF is ultimately responsible for the water surface and State owned land within the dam boundary line, which is required to ensure the safe operation of the dam. It is imperative that existing uses within the Dam Boundary Line are regularized (this is addressed in Table 12).
Spatial Guidelines
The Waterfront Zone comprises of various terrestrial zones, which is defined by the Dam Boundary Line, a Buffer Line, the High Flood Level and the Full Supply Line (Refer to Figure 8 for an illustration of these lines). i) <u>The Dam Boundary Line</u> • The Dam Boundary Line defines the area required by DWAF to ensure the effective management and safe operation of the dam. • The area below the Dam Boundary Line must be State Owned. Where this is not the case, the situation must be rectified by registering a Servitude of Storage for this purpose. • It should be noted that the Dam Boundary Line illustrated in • is the status quo on 4 February 2008. The NDPW is in the process of vesting State owned land. Irrespective of the outcome thereof, the principles contained in this RMP will continue to be applicable. ii) <u>The Buffer Line and Access/Buffer Zone</u> • The Buffer Line is situated below the Dam Boundary Line. • The area between the buffer line and the high flood line is referred to as the Access and/or Buffer Zone. The entire waterfront area surrounding the dam is affected by this Zone. This zone purely serves to provide access from adjacent land, over state land, to the water surface, if permitted by DWAF. • No structures for accommodation purposes or any other roofed structure will be allowed within the buffer zone. • Approval needs to be obtained for all other structures (e.g. jetties, hides, braai facilities, hiking trails, etc.) should the need arise. Environmental Impact Assessments are a prerequisite for prospective development, all applications for development and activity relating to the dam will be subject to evaluation and approval by DWAF and DEAT. • Proposed new camping and ablution facilities may only be provided in the area between the Buffer Line and the Dam Boundary Line. iii) <u>The High Flood Line</u> • The High Flood Level is defined by the 1:100 year flood line. • No buildings and/or structures are allowed within the 1:100 year flood line, as these pose as safety risks and are a liability to DWAF.

- Existing structures within the 1:100 year flood line must be regularized, as discussed in Table 12.
- Bank fishing is allowed within the High Flood Line.

iv) The Full Supply Line
- This line defines the maximum area occupied by the dam, at full capacity.

A. Conservation Zones:
- The Access/Bufffer Zone surrounding the inlets of the Hartbees/Moreletta Spruit, Pienaars River and Edendal Spruit serves as Conservation Areas. These zones apply to ecologically sensitive areas. The shoreline area links the terrestrial and aquatic components, which need to be conserved as one resource.
- Areas classified as conservation zones must remain undeveloped.
- Limited or no pedestrian access is allowed, and access should be from adjacent properties.
- Activities such as bird watching and hiking may be permitted, on defined hiking routes / tracks only.
- Fishing will not be permitted within conservation areas surrounding inlets to the dam. Controlled fishing may be permitted within conservation areas located in the area north of the Conservation Buffer Zone in the Hartbees/Moreletta Spruit inlet, but not within areas demarcated for bio-control.
- Fishing will not be allowed from the Roodeplaat Nature Reserve.
- No vessel access to the water surface will be permitted, unless it is by DWAF for management or research related purposes.

B. Development Zones:

Three types of development zones could be considered in instances where there is land available above the buffer line and within the Dam Boundary Line. The Concept Zoning Plan provides an indication of the areas, between the buffer line and dam boundary line, where development may be possible:

a) Low Impact Zones:
Low impact zones allows for sensitive development or low intensity use. These areas are ideal for camping facilities.

b) Medium Impact Zones:
Medium impact zones allows for small scale development, for example low density chalet developments or day visitor sites.

c) High Impact Zones:
High impact zones allows for large scale developments, for example high density holiday resorts with a variety of recreational and entertainment facilities. High density development zones should not be allowed in any area zoned for conservation purposes.

d) Tourism Node:
In light of the proposed tourism initiatives in the area, a tourism node has been proposed. Refer to Figure 8 for proposed location of the node.

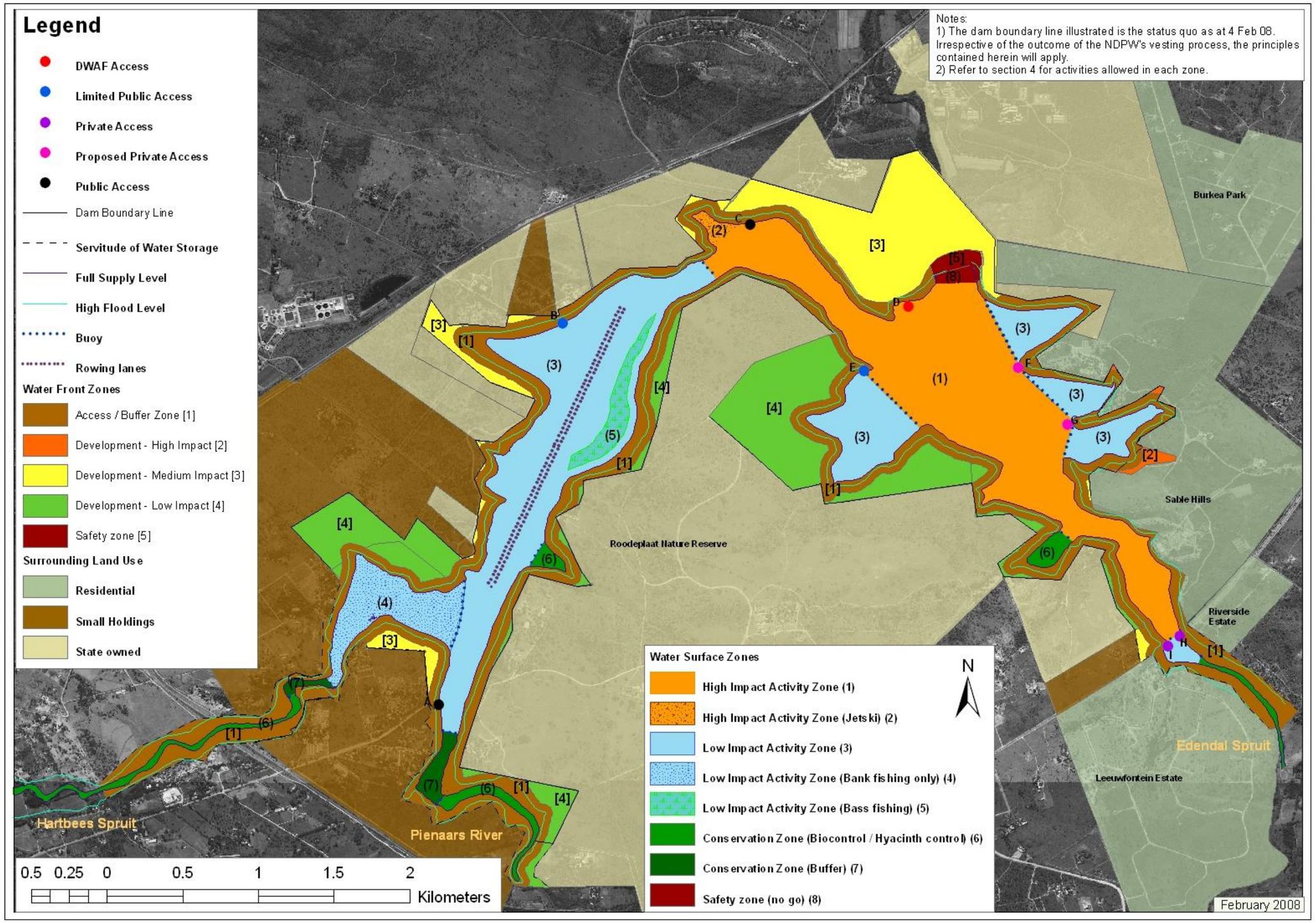


Figure 8: Concept Zoning Plan

5. CONSOLIDATED LIST OF ACTION PROJECTS

Priority	Action Project Description	KPA	Table
1	Prepare a roll-out strategy for the establishment of the management authority, defining clearly the functions and responsibilities of all parties.	4	14
2	Implement the strategy developed in the previous action project, by establishing and operationalising the proposed institution.	4	14
3	Embark on a project to evaluate the current use of the dam basin and adjacent state and privately owned land and regularize unlawful usage.	2	12
4	Pending the finalization of the vesting process, evaluate the development potential in terms of the Zoning plan and prepare and implement a development strategy.	2	6
5	Pending the regularization of existing uses, relevant agreements and co-management agreements must be drawn up with all affected private land owners.	2	7
6	Develop and implement an integrated notification system.	2	9
7	Implement a procedure for the pro-active identification and rectification of problems that occur at the dam as a result of a reduction in water quality (e.g. spills etc). Set up a dedicated telephone number or e-mail where problems that are identified by users could be reported to. Linkages with Table 9: Integrated Notification System must be established.	1	1
8	Quantify and qualify the extent of invasive alien vegetation in order to have a base line survey.	1	3
9	Undertake a review of the pollution loads that are contributed by point sources of pollution.	1	1
10	Establish links between the RMP and other projects aimed at the improvement of water quality within the catchment to ensure that water quality objectives exist for the dam in particular.	1	1
11	Undertake an audit to determine if the existing monitoring points at the dam are sufficient and include and map key monitoring points upstream of the dam.	1	1
12	Determine the success of current Working for Water initiatives to eradicate water hyacinths, identify opportunities and constraints.	1	3
13	Ensure that required resources are available for the removal of water hyacinths when action is required, especially during December and January.	1	3

Priority	Action Project Description	KPA	Table
14	Removal of problem plants within the dam boundary line.	1	3
15	Continuous monitoring of occurrence of problem plants on the dam surface and within the dam boundary line.	1	3
16	Develop an inspection and cleaning mechanism to ensure that vessels entering the dam do not contaminate it with alien vegetation.	1	3
17	Rehabilitate infested areas with suitable endemic species.	1	3
18	Research the status of the aquatic resource and associated ecosystem, with a view on developing a comprehensive set of baseline data report for future monitoring purposes. Produce a Status Quo Report on the water quality for the dam (once-off).	1	1
19	Implement a quarterly water quality reporting programme for the next 5 years, where after the frequency of reporting could be reduced.	1	1
20	Establish a forum that should meet every second month to discuss and action issues pertaining to water quality.	1	1
21	Review the success of the implementation of methods to combat pollution and algal growth at the Hartebeestpoort dam and determine the potential success of introducing these programmes at the Roodeplaat Dam.	1	1
22	Implement density controls	2	11
23	Prepare and implement an activity management plan for each sporting code.	2	8
24	Develop and implement a customised control and monitoring programme for each of the various carrying capacity aspects.	2	11
25	Undertake a silt survey to determine the extent of siltation and determine actions for remediation, during 2008.	1	2
26	DWAF initiated the compilation of a model to determine optimal level of use to ensure that levels are not drawn below the minimum threshold. This model should be finalized during 2008 and implemented. This will be result in restrictions being imposed on users to ensure no extraction in the event of the water level dropping to the minimum threshold.	1	2
27	Establish a programme for the proactive management of inlets, thereby reducing high levels of siltation.	1	2

Priority	Action Project Description	KPA	Table
28	Compile and implement an Erosion Control and Monitoring Programme, including a storm water management policy with a focus on standards for future acceptance of stormwater discharge and a storm water attenuation system for existing runoff.	1	2
29	Design and implement a storm water attenuation system for existing runoff.	1	2
30	Ensure co-operative governance in terms of authorization and management of upstream development.	1	2
31	Install buoys at all Conservation Zones, as per the Zoning Plan.	1	4
32	Monitoring of compliance with the zoning plan.	2	4
33	Ensure compliance with the National Environmental Management Act and Environmental Impact Assessment Regulations.	1	4
34	Devise a Programme to determine the status of rare, threatened and endangered plant and animal species and adapt management interventions accordingly. Undertake a biodiversity assessment and prepare a biodiversity management plan.	1	4
35	Identify areas where vegetation has deteriorated and rehabilitate accordingly.	1	4
36	Develop an integrated Environmental Management System (EMS) for the dam.	1	4
37	Prepare an inventory of existing infrastructure and services to facilitate integrated management.	2	10
38	Monitor and update the above-mentioned database regularly, ensuring linkages with the proposed development strategy in Table 7: Public Access, Use and Development.Table 6: Public Access, Use and Development	2	10
39	Compilation of a database of job seeking individuals and SMMEs from the local community and ensure that it is regularly updated and monitored.	3	13
40	Ensure that BEE is attained in any PPP projects.	3	13
41	Implement skills development programmes where opportunities exist.	3	13

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Appendix A: STAKEHOLDER LIST

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	Mr. M.J. Kekana	Ward 5 Nokeng Municipality	Councilor	012 734 6000/ 082 775 4892	012 808 1573	-		Plot 175, Spioonkop Street, Kameeldrift East, 0031
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	Felicia Masenya	Nokeng tsa Taemane Local Municipality		082 372 1038/ 012 734 6000	012 734 5795	-		PO Box 204, Rayton, 1001
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	David Siko	GSACR	SNR Act Co-ord	012 800 9213 / 083 306 2648	012 800 2130	davidsi@gpg.gov.za		
	Alison Burchell	S.A. Sports Commision	Chief Director: Client Services, Liaison, Events & Facilities	012 304 5258 / 082 990 3524	086 611 7008	Alison@srsa.gov.za	Regent Place 66 Queen Street Pretoria, 0001	Private Bag X896 Pretoria, 0001
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User group representatives & members								

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14	G Hurley	Land Owners User Group	Sabie Hills	082 555 4446	012 807 4888	inforwc@telkomsa.net		PO Box 32396, Glenstantia, 0010
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26	Louis Meintjes	Land Owners User Group	Dinokeng Grondeienaars Vereniging	012 732 0383/ 082 461 7262	0866 108 518	louis@agriwebsa.com		
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47	H.E. Steenkamp	Rowing, Canoeing & Evironment User Group	Roodeplaat Rowing Club	083 685 5574		hesteen@yahoo.com		365 22nd Avenue, Villeria
48	Brian Christie	Rowing, Canoeing & Evironment User Group	Roodeplaat Rowing & Canoeing	011 463 1976	012 463 1976	ansdale@mweb.co.za		P.O. Box 512, Cramerview, 2060
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57	GD Dickinson	Disaster&Fire Management User Group		072 691 4544/ 012 808 2722	012 808 2722	-		P.O. Box 11548, Hatfield, 018
58	Marie Krüger	Disaster&Fire Management User Group	Hoof Ramp bestuurder (Pienaarsrivier)	082 927 7736	012 808 5132	-		PO Box 912204, Silverton, 0127

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68	J Combrinck	Fishing & Angling User group	Land owner	012 548 2283	012 548 0183 086 656 8400	johan@afnet.org		PO Box 1326, Montana Park 0159
69	AC Kemp	Fishing & Angling User group	Land owner: Hengelaarsvriend	082 553 0630	012 808 0819	ackemp@sa247.co.za		PO Box 3164, Montana Park, 0159

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74	Graham Hurley	Motorised boating & water-ski User group	Sabie Hills	082 555 4446/ 012 348 0417	012 807 4888	inforwc@telkomsa.net		PO Box 32396, Glenstantia, 0010
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Appendix B: CARRYING CAPACITY

This assessment is based on the proposal as contained in the RMP and the Concept Zoning Plan. There will be access points (illustrated on Figure 8) as follows:

i. A Launching Facility (*access D*) purely for DWAF's management purposes west of the Safety and Security Zone.
ii. A Primary Public Launching Facility (*access C*), situated between the Safety and Security Zone and the jet-ski area. This area must be large enough to hold boats in a controlled area, from which they can access the water surface.
iii. A Public Launching Facility (*access A*) at on the western bank of the Pienaarsriver inlet, north of the buoy line. Bass fishing boats will be launched from this access point only, at idling speed. Motorized maintenance and coaching boats required by RowSA, with a motor size limited to 15 Hp, may be launched from this point as well.
iv. Two newly proposed Private Access Points at Sable Hills (a*ccesses F and G*). These access points will be conditional to an agreement between the land owner, custodian of the water resource and other users/operators.
v. Two Private Access Points at the Edendal Spruit inlet (*accesses H and I*), providing access to the water surface to private land owners, for motorized and non-motorized vehicles.
vi. One Limited Public Access Point (*access B*) at the RowSA facilities, west of the central buoy line, providing access for non-motorised vessels as well as motorized maintenance and coaching boats, with a motor size limited to 15 Hp. Public access at this point will be limited and based on agreement between the custodian of state land, custodian of the water resource and the access provider. All agreements should comply with relevant legislation, policy and guidelines. This implies that general public access may be provided from this point, based on prior approval and subject to certain conditions, stipulated by the access provider.
vii. A Limited Public Access Point (*a*ccess E), situated in the Roodeplaat Nature Reserve. Access at this point will be limited and based on agreement between the custodian of state land, custodian of the water resource and other users/operators. All agreements should comply with relevant legislation, policy and guidelines. This implies that general public access may be provided from this point, based on prior approval and subject to certain conditions, stipulated by the access provider.

All boats entering the water surface must be counted. Launching Facilities must contain all the necessary infrastructure needed: slipways, jetties, mooring sites and a counting mechanism.

All calculations are based using data pertaining to the Full Supply Level. As the water level drops, pro rata changes would need to be made based on the water surface area of the High Activity and Low Activity Zones.

A relaxation of the carrying capacity thresholds may be considered for organized events.

1. Determine Physical Carrying Capacity (PCC)

The maximum number of users that can physically fit into or onto a defined water resource, over a particular time:

PCC = A x U/a x Rf

Where:
A = 395.1 ha (Total Water Surface at Full Supply Level)
-29.7 ha (Conservation Zone)
-2.1 ha (Safety Zone)
-50.7 ha (quasi-transitional area 70 m buffer from shoreline of high impact activity zone)
= 312.6 ha

U/a = 1 boat/5 ha

Rf = 1 (Assume boats are permitted to be on water for entire day)

PCC = 312.6 X (1 boat/5 ha) x 1 = 63 boats

2. Determine Real Carrying Capacity (RCC)

The maximum permissible number of users to the water resource, once the corrective factors (Cf) derived from the particular characteristics of the site have been applied to the PCC:

RCC = PCC x (100 – Cf1)% x (100 – Cf2)% x … (100 – Cfn)%

Cf1: Structures on the Water Surface. Buoys and rowing infrastructure are a safety hazard as it restricts the movement of boats.

Surface coverage is:

1.88 ha (buoy lines High activity zone)
1.1 ha (buoy lines Low activity zone)
5.1 ha (rowing lanes)

= 8.1 ha

Corrective Factor 8.1 ha / 312.6 ha x 100 = 2.6 %

RCC = PCC – CF1
RCC = 63 x {100 – 2.6}/100
RCC = 63 x 0.974
RCC = 62

Therefore RCC = 62

3. Determine Effective Carrying Capacity

The maximum number of visitors that a site can sustain, given the management capacity (MC) available:

ECC = [Infrastructure Capacity x Management Capacity] x 100/RCC

Management Capacity (to be finalised as an action project)

Infrastructure Capacity

DWAF's Guide for the Compilation of Zoning Plans (1999) suggests that each slipway can handle 40 vessels per day. At 5 slipways (high impact zone, public and private, excluding restricted DWAF slipway) this amounts to 200 motorised vessels per day.

Therefore:

Infrastructure capacity = [40 vessels/day] x 5 slipways:
40 x 5 = 200

As this would apply either to entering or to retrieving a vessel from the water, 200 would need to be halved:
200 / 2 = 100

This represents the maximum amount of boats that can be launched (entering and retrieving) on any given day, given the current capacity of slipways.

It may be desirable to increase the amount of slipways in order to facilitate fast retrieving of vessels during inclement weather (these slipways could be for retrieving purposes only). These will need to be developed within the framework of the designated launching facilities.

4. Determine Allocations

Once ECC has been confirmed, allocations for each zone can be refined. This will be done through an action project.