NATIONAL WATER RESOURCE INFRASTRUCTURE (NWRI)

Resource Management Plan ROODEKOPJES DAM

REPORT – Volume 4 of 5

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WATER IS LIFE - SANITATION IS DIGNITY





Department: Water and Sanitation REPUBLIC OF SOUTH AFRICA



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- Department of Environmental Affairs;
- Department of Public Works;
- North West Department of Rural, Environment and Agricultural Developments;
- Department of Rural Development and Land Reform;
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Annual Review of Business Plan	December	2019 ¹	2020	2021	2022	2023
Five (5) Yearly Review of RMP	December			2023		

¹ The implementation of the RMP and BP requires a year budget planning prior to operationalisation.

AMENDMENTS PAGE

Revision No:	Description	Date
01	Draft RMP for DWS Review	21/11/2016
02	Draft RMP for public to Review	07/03/2017
03	Final Draft RMP for DWS to Review	05/05/2017
04	Final RMP for DWS Approval	14/07/2017
05	Final RMP for DWS Sign off	16/08/2017

LIST OF ACRONYMS

ΑτοΝ	Aid(s) to Navigation
BPDM	Bojanala Platinum District Municipality
BID	Background Information Document
BP	Business Plan
CATHSSETA	Culture, Arts, Tourism, Hospitality, Sport Sector, Education and Training Authority
CD: IO MANCO	Chief Director: Infrastructure Operations Management Committee
CIWSP	Co-operative Inland Waterways Safety Programme
CoGTA	Department of Corporative Governance and Traditional Affairs
CPSI	Centre for Public Service Innovation
CPF	Community Police Forum
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DHS	Department of Human Settlements
DoT	Department of Transport
DPW	Department of Public Works
DRDLR	Department of Rural Development and Land Reform
DSR	Department of Sports and Recreation
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
EMF	Environmental Management Framework
FSL	Full Supply Level
GIAMA	Government Immovable Asset Management Act
GP	Guideline Program
GPS	Global Positioning System
GVD	Gross Value Added
GWWs	Government Waterworks
I&APs	Interested and Affected Parties
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IDP	Integrated Development Plan
IEE	Integrated Environmental Engineering
IRMP	Integrated Resource Management Plan
КРА	Key Performance Area
LAAP	Local Accountable AtoN Parties
LED	Local Economic Development
MLM	Madibeng Local Municipality
NDT	National Department of Tourism
NEMA	National Environment Management Act, 1998 (Act No. 107 of 1998)
NEMPAA	National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)
NPSC	National Project Steering Committee
	National Treasury
	National water Act, 1998 (Act No. 36 of 1998)
NWEPWP	North west Expanded Public Works Programme
	National Water Resource Intrastructure
NWRS	National Water Resource Strategy

ОМС	Operational Management Committee
PP	Public Participation Process
PPP	Public Private Partnership
PSP	Professional Service Provider
QDS	Quarter Degree Square
READ	Department of Rural, Environment and Agricultural Development
RLM	Rustenburg Local Municipality
RMP	Resource Management Plan
SAMSA	South African Maritime Safety Authority
SAPS	South African Police Service
SASACC	South African Sports Angling and Casting Confederation
SASCOC	South African Sports Confederation and Olympic Committee
SDF	Spatial Development Framework
SWOT	Strengths, Weaknesses, Opportunities and Threats
ТР	Tourism Potential
WfW	Working for Water
WWTWs	Waste Water Treatment Works

EXECUTIVE SUMMARY

Mandate: The Department of Water and Sanitation (DWS), through the National Water Act, 1998 (Act No. 36 of 1998), is mandated to protect aquatic and associated ecosystems and their biological diversity. The Minister of Water and Sanitation, as the custodian of the nation's water resources must ensure that the Government Waterworks (GWWs), including Roodekopjes Dam, are protected, used. developed, managed and controlled in a sustainable manner, for the benefit of all. To assist the Minister in attaining the mandate, and to ensure that access to, and use of, the dam is equitable, the DWS initiated and commissioned the development of the Resource Management Plan (RMP) for Roodekopjes Dam.

Purpose of the RMP: The RMP is a plan which aims to regulate access and the recreational utilisation of a water resource and the surrounding state land, in ways which promote community participation and beneficiation, environmental conservation and unlock socioeconomic potential of the water resource.

According to DWAF (2006), the use and management of the GWWs for recreation purpose needs to be based on Integrated Resource Management Plan (IRMP) included within the RMP.

Location of the dam: Roodekopjes Dam is a concrete gravity and earthfill type of dam which impounds Crocodile and Gwatlhe River. It falls under wards 1 and 14 of Madibeng Local Municipality (MLM) and ward 30 of Rustenburg Local Municipality (RLM), which forms part of the Bojanala Platinum District Municipality (BPDM) in the North West Province, South Africa. Its GPS coordinates are: **25°24'24''S 27°34'39''E**.

Purpose of the dam: The primary purpose of Roodekopjes Dam is to provide raw water for irrigation, and Industrial and Domestic use.

The dam also currently offers recreational activities such as angling, camping, game farming and angling boating.

The dam is also popular for angling competitions, which target carp and catfish.

Dam ownership and management: Roodekopjes Dam is owned by the DWS. Crocodile (west) Irrigation Board was appointed by DWS to manage the primary use of the dam. There is one (1) public access point next to the dam wall. Users also access the dam through the private properties such as the camping and angling clubs adjacent to the dam. However, the dam is not fenced all around and this provide an opportunity for criminals and illegal fishers to access the area.

There is currently no institutional structure to manage the recreational use of the dam. However, the structure has been proposed in the RMP. The recreational institutional structure is necessary for the effective management of the Roodekopjes Dam for recreational purposes.

Stakeholder engagement: The success of the development and implementation of the RMP depends on the role players and their level of participation. It is thus recognized that different roles and responsibilities of the stakeholders [Authorities and Interested and Affected Parties (I&APs)], their relationship towards each other and the steps in the planning procedure are imperative in the successful development of the RMP. As such, proper consultation with the public was done in order to help in producing a credible RMP.

DWAF's Guidelines for Public Participation (2001) outlines three (3) broad phases for public participation namely the **Planning**, **Participation** and **Exit phase**.

During the **Planning phase** a site inspection was conducted and literature reviewed in order to gather baseline information about the dam. A process was also established to get into contact with the I&APs and relevant authorities to ensure co-operative interests and support in the RMP project.

The **Participation phase** entailed three (3) important aspects, namely:

- Informing stakeholders about the RMP project;
- Meeting the stakeholders to present the RMP process; and
- Giving Feedback in the form of meeting minutes, follow-up emails, telephonic and direct communication.

During the **Exit phase**, a draft RMP was presented to the stakeholders for comment and inputs. The Exit phase entailed two (2) important aspects, namely:

- Ensuring that all goals, challenges, concerns, objectives and the vision of the dam are identified and documented in the RMP; and
- Officially ending the public participation process.

Identified objectives and vision: During the Authority and Public Meetings issues of concerns were raised from which common objectives were identified and a vision for the dam, for a period of 20 years, were formulated by the stakeholders.

The identified key common objectives are:

- To have Roodekopjes Dam free of Alien Invasive Vegetation in order to support the proposed recreational activities and to maintain the native ecological aspect of the area.
- To improve and maintain a high water quality standard of the dam.
- To promote safety against crocodile attacks in the dam.
- To maintain and enhance the ecosystem's composition, functioning, integrity and character over time and space. Also to utilize

the dam in a sustainable and appropriate manner to support current and future generation needs.

- To promote, accommodate and manage a variety of activities and facilities within the dam basin in a manner that enhances the user's experience and minimizes the impact on the resource.
- To provide equitable, compactable and adequate access control at the dam.
- To ensure public safety regarding the recreational use of the dam.
- To meet the user needs and satisfy government requirements regarding the standard of activities and facilities, appropriateness of land use, compliance with applicable legislation and rights of use as well as access to the dam.
- To establish bird watching and environmental education.
- Introduce aquaculture at the dam.
- To promote sustainable subsistence fishing and angling sport at the dam.
- To provide recreational users with clear rules and to be delegated with the authority to enforce them.
- Uplift the Local Economy and increase Benefit Flows to the surrounding communities through community empowerment.
- To establish an effective institutional structure that can manage the use of water for recreational purpose in an acceptable manner, which is also representative of all the Stakeholders.

A vision for the dam, for a period of 20 years, was formulated by stakeholders to be as follows:

"To have a sustainable recreational and commercial area which is free from crime, pollution and Alien Invasive plants species for the benefit of the community".

The aforementioned objectives and vision are aimed at supporting the attainment of DWS's vision, mission and objectives. **Tourism Potential:** The following were identified as some of the potential recreational developments at the Roodekopjes Dam that could enhance tourist attraction:

• Establishment of a bird watching.

- Provision of suitable recreational infrastructures slipways, jetties, angling banks, etc. in order to support angling sport at the dam.
- Development of a garden park.

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- Appendix C: Newspaper Advert
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- Appendix F: Comments and Responses Register

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND OF ROODEKOPJES DAM

Roodekopjes Dam is a concrete gravity and earthfill type of dam which impounds Crocodile and Gwatlhe River. It falls under wards 1 and 14 of Madibeng Local Municipality (MLM) and ward 30 of Rustenburg Local Municipality (RLM), which forms part of the Bojanala Platinum District Municipality (BPDM) in the North West Province, South Africa. Its GPS coordinates are: **25°24'24"S 27°34'39"E**. The dam is located north west of Brits, roughly 100km from Pretoria. (Refer to **Figure 1**).

The dam lies within the A21J and A21K quaternary drainage of the Upper Crocodile Sub Management Area which form part of the Crocodile West Marico Catchment Management

Area. It is situated a few kilometers downstream from Hartbeespoort Dam on the Crocodile River.

The primary purpose of Roodekopjes Dam is to provide raw water for irrigation, industrial and domestic use. It also currently offers recreational activities such as angling, camping, game farming and angling boating. The dam is also popular for angling competitions, which target carp and catfish. The main land use types around the dam is agriculture (crop production) and tourism in the form of angling and lodges.

Roodekopjes dam is owned by Department of Water and Sanitation (DWS) whilst most of the land surrounding the dam belongs to private individuals and Department of Public Works (DPW). Crocodile (west) Irrigation Board was appointed by DWS to management the primary use of the dam.

Roodekopjes Dam Profile		
Location	South Africa	
Province	North West	
District Municipality	Bojanala District Municipality	
Local Municipality	Madibeng Local Municipality (ward 1 and 14) and	
	Rustenburg Local Municipality (ward 30)	
Nearest Town	Brits	
Completion Year	1986	
GPS Coordinates	25°24'24"S 27°34'39"E	
Purpose	Irrigation	
Owner	DWS	
Water Management Area	Crocodile (West) and Marico Catchment Area	
Quaternary Catchment	A21J and A21K	
Catchment Area (km ²)	6120	
River	Crocodile and Gwatlhe River	
Capacity (m ³)	103 000 000	
Surface Area (ha)	1571	
Wall type	Concrete Gravity & Earthfill	
Wall Height (m)	25	
Length (m)	3910	

Table 1: Roodekopjes Dam Profile

Source: Department of Water Affairs (List of registered dams; March 2015)



Figure 1: Locality Map of Roodekopjes Dam

1.2 **BIO-PHYSICAL ENVIRONMENT**

1.2.1 Climate

The Roodekopjes Dam is situated in an area referred to as a local steppe climate (SA weather Service). According to Climate Data.Org, the climate of the area is classified as BSk (Cold semiarid climates). The area experience little rainfall throughout the year, where the least amount of rainfall occurs in July with an average of 5 mm and the greatest amount of precipitation occurs in January, with an average of 110 mm. January is the hottest month of the year, at an average temperature of 23.4°C. The lowest average temperatures in the year occur in June, when it is around 11.7°C. (Refer to **Figure 2** for the average temperatures and rainfall patterns for the area in 2016).



Figure 2: Average Temperature and Rainfall of the area

1.2.2 Flora

According to Mucina et al (2006), the dam is located within the Central Sandy Bushveld ecosystem which is characterised by Savanna Biome. The Terrestrial and Aquatic alien vegetation identified at the dam is explained in detail below.

1.2.2.1 Terrestrial Alien Vegetation

Alien species were either intentionally or unintentionally introduced to South Africa. Some plants have been introduced with the intent of aesthetically improving public recreation areas or private properties, whilst others are introduced for ornamental or timber uses.

During the site inspection at Roodekopjes Dam, the Giant Reed Grass (*Arundo donax*) was identified in the area (refer to **Figure 3**). According to SA Invasive Species, "The Giant Reed tend to compete with and replaces indigenous species. It also forms very dense stands on riverbanks, and in riverbeds, which results in the narrowing of water channels, increased siltation and the exclusion of smaller and less vigorous riverbank species".

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According to Bell (1997), a waterside plant community dominated by Giant reed can also reduce canopy shading of the in-stream habitat, which may result in increased water temperatures. This may also lead to decreased oxygen concentrations and lower the diversity of aquatic animals.



Figure 3: Giant reed grass

1.2.2.2 Aquatic Alien Plant Species

According to Invasive Species of South Africa there are twenty (20) Invasive Aquatic Plants in South Africa e.g. Water Hyacinth, Azolla, Parrots feather, etc.

Aquatic Alien Plants Species tends to have impact on the dam as well as the recreational activities (e.g. they Interfere with or prohibit recreational activities such as swimming, fishing, and boating; give water bad taste and odor; interfere with a balanced fish population).

Roodekopjes Dam is infested with the Water Hyacinth (Eichhornia crassipes), which is classified a Category 1 plant under the CAR Act (Conservation of Agricultural Resources Act, 1983) Act No. 43 of 1983 stating that a category one plant is prohibited and must be controlled. According to D Sharp (2014), Water Hyacinth is globally the worst invasive aquatic plant as it can double in biomass every 5-7 days in ideal conditions. Refer to **Figure 4**.



Figure 4: Existing Water Hyacinth

1.2.3 Fauna

1.2.3.1 Fish Species

Roodekopjes Dam is rich in fish diversity which plays a major role in the ecological balance of the aquatic ecosystem and also serve as a food source for local subsistence fishermen (refer to **Figure 5**).

Currently, there is a high level of recreational angling activity on the dam, and the area is popular for angling competitions, which target carp and catfish. The dam is currently a fixture on the Gauteng leg of the SA Bass Cast for Cash tournament trail (Tapela, Brits & Rouhani, 2015).



Figure 5: Fishing at the dam

The dam used to contain sixteen (16) fish species, however, only five (5) fish species are currently left. Gillnets which is often more than 100 m is one of the main contributor of fish species decline ². "It also appears as if unlawful syndicates are also involved".

The dam is currently facing with the challenge of poor water quality and this can have negative impact on the quality of fish as they are most likely to bio-accumulate the contaminants from the aquatic environment into their tissue, and they pose health risks to the people who consume them.

1.2.3.2 Crocodiles

Roodekopjes Dam lies on the Crocodile River and it is infested with crocodiles. It was indicated during the Stakeholder meetings that many people have been attacked by crocodiles while fishing and boating at the dam.

Crocodiles are part of the biodiversity as they also add to human wonder and enjoyment of nature and should be protected as such. Ecologically, they serve as apex predators, keeping prey populations in check. Crocodiles also provide commercial, nutritional, and aesthetic benefit. However, larger crocodiles can be very dangerous to human beings through attacks.

1.2.3.3 Bird Species

According to DEA (2005), Roodekopjes Dam has some surrounding wetland habitat which attracts water birds. The dam has attracted approximately 257 different red data bird species due to its diverse biodiversity (refer to **Figure 6** below). The presence of variety bird species attracts lots of bird watchers tourist.



Figure 6: Bird species at Roodekopjes Dam

1.2.4 Topography

According to AGIS Atlas Viewer, the dam is situated in an area with reasonably gentle topography. The plains of the area has open low hills and ridges.

1.2.5 Geology and Soil

Roodekopjes Dam is situated in an area underlain by granite of the Lebowa granite suit and some granophyre of the rashoop granophyre (Mucina et al, 2006). The geology of the area is also dominated by dolerite leading to the dominance of shallow to moderately deep structured soils, often with vertic properties in lower lying areas and drainage depressions. Refer to **Figure 7** for the geology map.

² Comments from Public meeting



Figure 7: Geology of the Area

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1.2.6 Hydrology

1.2.6.1 Surface Water

The dam lies within the A21J and A21K quaternary drainage of the Upper Crocodile Sub Management Area which form part of the Crocodile West Marico Catchment Management Area and it impounds the Crocodile River.

The Crocodile West and Marico Catchment Management Area is one of the many water stressed catchments in South Africa (DWA, 2012). Surface water resources of the Crocodile River catchment are used extensively, with the main water users being agriculture, industry, mining and urban areas.

The dam was originally built for the purpose of irrigation and now also supply water to Magalies Water Works for human consumption to millions of people. **Figure 8** show the fluctuations of water level over a year.



Figure 8 : Fluctuations of Roodekopjes Dam water level over a year (DWS, 2015)

1.2.6.2 Water Quality

The term water quality is used to describe the physical, chemical, biological and aesthetic properties of water, all of which determine its fitness for use and its ability to maintain the health of aquatic organisms (DWAF, 1996). Water quality therefore expresses the suitability of water to sustain various uses or processes. Any particular use will have certain requirements for the physical, chemical or biological

characteristics of water. Consequently, water quality can be defined by a range of variables which limit water use. Human health is directly affected by the proximity, availability and quality of water resources.

According to DWS (2013), the following were identified as the major problems regarding the water quality within the Crocodile (West) and Marico Catchment Management Area:

ROODEKOPJES DAM RESOURCE MANAGEMENT PLAN

Water Quality Issue	Driver	Effects
Eutrophication	Wastewater Treatment Works (WWTWs), intensive use of non-organic agricultural fertilizers.	Algal growth, smell, toxic algae, water treatment extra costs, taste and odour; irrigation clogging, aesthetic, recreational water users.
Microbial	WWTWs; informal dense settlements;	Recreational users, poor bacterial water
contamination	vandalism of sewage reticulation system and pumping infrastructure sewage spills into receiving streams.	quality; impacts on downstream users; Low dissolved oxygen and ecosystem impacts; water borne disease.
Salinization	Mines; WWTWs and agricultural runoff.	Irrigation system clogging; soil salinity; water treatment costs.
Toxicants	Pesticides, DDT for malaria control.	Fish mortality, human health, and bioaccumulation.
Suspended solids (turbidity, sedimentations)	Land degradation and overgrazing; soil erosion; mining; informal dense settlements, subsistence agriculture.	High suspended solids during high flows; silting up of rivers, weirs and dams; loss of habitat, increased water treatment costs; irrigation clogging.

 Table 2: Major Water Quality Issues within the Crocodile West and Marico CMA

Roodekopjes Dam is currently facing with the challenge of poor water quality. According to Tapela, Brits & Rouhani (2015), the dam is being polluted by heavy metals from mining activities, run off from agricultural fields, sewage effluents, urban run-offs and uncontrolled dumping by informal settlement dwellers.

According to Van Ginkel (1999); Mogakabe and Ginkel (2008), the Roodekopjes Dam is classified to be in a hypertrophic state, and is known to experience severe cyanobacterial blooms. Proliferation of these blooms makes the dam to appear green. The dam is known to be among the dams in the North West Province with a serious problem of eutrophication due to nutrient load (Rouhani, 2004).

It was indicated during the public meeting that the water quality of the dam is deteriorating at an alarming rate and the water pollution is being doubled by polluted water coming in from Hartbeespoort and Vaalkop Dams. It was further indicated that untreated sewage effluent is released freely into the dam and no action is

Copyright 2017 © Department of Water and Sanitation, 2017 Volume 4 of 5 taken by DWS. Refer to **Figure 9** for the dam state of water.



Figure 9: State of Roodekopjes Dam Water Quality

The water quality data for the dam was obtained from DWS (Resource Quality Services). The water quality samples were collected in November 2015 and the results were analysed in April 2016. The results concluded that the water quality of Roodekopjes Dam is not very poor as seen visually (refer to **Table 3**). However, it was spotted during the site inspection that there is presence of excessive algae, debris and poorly treated sewage effluent which can also contribute to poor water quality.

Characteristics	Tests Results	Water Quality Target Range (Recreational Purposes)	Description
Clarity (Secchi disc, m)	-	3.0	No information available.
pH (pH units)	8.55	6.0 - 9.0	No significant effects on health due to toxicity of Quality Range dissolved metal ions and protonated species, or on taste are expected. Slight metal solubility may occur at the extremes of this range.
Total Dissolved Solids	435	0 - 450	No health effects associated with the electrical conductivity of water.
Nitrates (mg/L)	0.27	0 - 6	No adverse health effects.
Chloride (mg/L)	61.59	0 - 100	No aesthetic or health effects. Possible increase in the corrosion rate in domestic appliances.
Ammonia (mg/L)	0.05	0-1.0	No health and or aesthetic effects can occur.
Sulphate (mg/l)	79.97	0 - 200	No health or aesthetic effects are Experienced.
Electrical Conductivity (mS/m)	63.18	0 - 70	No health effects associated with electrical conductivity of the water.

Table 3: Water Quality variables at Roodekopjes Dam (DWS, RQS)

1.3 USES AND USERS OF THE DAM

1.3.1 Primary Function of the dam

1.3.1.1 Domestic Use

The dam was originally built for the purpose of domestic, irrigation and industrial use. It was also indicated that the dam will also supply water to the Madupi Power Station in the near future³. In 1985 a channel was built to convey water from the Roodekopjes Dam to the nearby Vaalkop Dam which supplies water to RLM (J.van der Walt, C. Van der Walt & Ceronio, 2004).

1.3.1.2 Irrigation Use

The main land use types around the dam is agriculture (crop production). The dam provides irrigation water to majority of agricultural based activities within and downstream of the area.

1.3.2 Secondary Function of the Dam

1.3.2.1 Recreational Use

There are different recreational activities that are currently taking place at and around the dam. The following recreational activities are taking place at the dam:

- Angling;
- Camping;
- Game Farming;
- Angling Boating; and
- Birding.

The area is popular for angling competitions, which target carp and catfish. The dam is currently a fixture on the Gauteng leg of the SA Bass Cast for Cash tournament trail (Tapela, Brits & Rouhani, 2015).

³ Comment from Crocodile (West) Irrigation Board

1.4 RECREATIONAL INSTITUTIONAL STRUCTURE

There is currently no institutional structure that is managing recreational use of the dam. The Institutional Structure should be established and formalised as per the DWAF's considerations on the Institutional Arrangements for Managing Use of Water for Recreational Purposes guideline (2003).

1.4.1 Management of Water Surface

The management of the surface water in terms of operation of the Dam is done by Crocodile (West) Irrigation Board.

In addition to the DWS, Local Accountable AtoN Parties (LAAP) and other Bodies providing access to Government waterways and watercourses have a responsibility to ensure that the required fixed and/or floating AtoN are provided after obtaining the necessary support from DWS and thereafter the permission by SAMSA.

1.4.2 Access

The public access is controlled by the Irrigation Board, however, the dam is not fenced all around and this provide an opportunity for criminals and illegal fishers to access the area. Users also access the dam through camping and angling clubs adjacent to the dam.

1.5 SAFETY

1.5.1 Safety of Navigation

There is currently no fixed and floating Aids to Navigation (AtoN) and Demarcation Markers in place.

1.5.2 Public Safety

According to the stakeholders, the crime rate at the dam is a deterrent factor which prevent tourism to grow at Roodekopjes Dam. The dam is not fenced all around and this provide an opportunity for criminals and illegal fishers to access the area.

1.5.3 Incident Management

There is no specific Incident Management System in place to ensure that incidents are responded to in a co-ordinated manner.

1.6 EXISTING ZONING MAP

The Zoning map for Roodekopjes Dam was developed in 1999 (refer to **Figure 10** below). However, the plan did not consider economic and social issues, and lacked guidelines regarding institutionalisation, capacitation and empowerment for the implementation of the Zoning Plan. The existing Zoning Map will be updated while taking into account the current recreational activities and facilities; size of the dam; sensitivity of the area; as well as the identified objectives.



Figure 10: Existing Zoning Map for Roodekopjes Dam

1.7 SOCIAL-ECONOMIC ENVIRONMENT

1.7.1 Social Audit

The main purpose of social audit is to examine the general status of the study area and to determine issues that need to be addressed when developing the RMP in order to overcome potential difficulties in an area. The study area falls within Ward 1 and 14 of MLM and Ward 30 of RLM as shown in **Figure 11**. An understanding of socio-economic conditions of Ward 1, 14 and 30 can be used at a later stage to determine the impact of a RMP in the area in terms of changed socio-economic conditions. A social Audit which focused on the population composition of the ward, Education level and employment status was undertaken and is presented in section 1.7.1.1 to 1.7.1.4, respectively.



Figure 11: Boundaries of Ward 1 and 14 (MLM) and ward 30 (RLM)

1.7.1.1 Population Size

According to Census (2011), ward 1 has a population of about 9 517, ward 14 about 23 006, and ward 30 about 13531 (Refer to **Figure 12**). The dam can also contribute to the growth of the Municipal socio-economic status.



Figure 12: Population size of Ward 1 and 14 versus MLM

1.7.1.2 Education Level

The Census (2011) breaks down educational levels into each year of study. For the purpose of this report, the educational levels are grouped into key schooling, higher educational and no schooling categories. Educational data of ward 1, 14 and 30 could not be generated, as such the below figure only illustrate the overall education level of MLM and RLM.

As illustrated in **Figure 13** and **14**, 50% of residents in MLM and 55% in RLM have some secondary education, however, only 2% of the population in MLM have moved beyond schooling to receive some kind of higher education.



Figure 13: Educational Level of MLM



Figure 14: Educational Level of RLM

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1.7.1.3 Employment status

In terms of employment levels within Ward 1, 14 and 30, majority of residents are employed and only 9% of residents are unemployed. However, 20% of the residents are not economically active whereas 2% of them are discouraged workseekers suggesting that they no longer seek to become employed (Census, 2011). Refer to **Table 4** and **Figure 15**.

 Table 4: Employment status of Ward 1, 14 and 30 (2011)

Description	Ward 1 (2011)	Ward 14 (2011)	Ward 30 (2011)
Employed	1, 680	10, 880	5, 277
Unemployed	881	2, 108	1, 218
Discouraged work- seekers	376	370	270
Not economically active	2, 909	3, 464	2, 706
Not applicable	3671	6, 184	4, 059



Figure 15: Employment Status of Ward 1, 14 and 30

1.7.2 Gross Value Added

Gross Value Added (GVA) is defined as the total value of all the goods produced in a specified area during a specific period. Quantec Research classified the major sectors within the MLM and RLM into Primary sector which involves direct use of natural resources, Secondary sector involving manufacturing and Tertiary sectors, which comprises of services.

Figure 16 and **17** illustrate the MLM and RLM GVA per sector for 2013 and it shows that the greatest contribution for MLM is from Secondary Sector (Manufacturing) whereas the greatest contribution for RLM is from the Primary Sector (mining and quarrying). This data was taken from the MLM IDP (2011-2016) and RLM IDP (2013). The variables are explained below:

Primary Sector:

- Agriculture, forestry and fishing; and
- Mining and Quarrying.

Secondary Sector:

- Manufacturing;
- Electricity; and
- Construction.

Tertiary Sector:

- Trade;
- Transport and Communication;
- Finance and Business Services; and
- Community, social and personal services.

The North West Province economy mainly receives its income from mining activities, which generate more than half of the province's gross domestic product and provides jobs for a quarter of its workforce.

The RMP can contribute to the growth of the Municipal economic sectors, and this can be in the form of fishing, finance, business services, catering and accommodation, transport, and communication.



Figure 16: GVA for MLM in R million at 2013 constant prices

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Figure 17: GVA for RLM in R million at 2013 constant prices

1.7.3 Community Beneficiation

It is DWS's belief that Local Communities should equally share the benefits emanating from the utilisation of the dam for recreational purposes, by ensuring that they have both physical access to the resource, as well as access to the waterbased recreation economy.

According to DWAF (2006), by ensuring that the Local Communities move beyond merely being affected by or living close to a water resource, but rather undertaking the transition to become participants will ensure that water resources can and will be protected by the people closest to and most affected by the dam. The community will benefit in amongst others the following ways:

- By having equitable access to the dam.
- The community needs will be addressed in an appropriate and equitable manner.
- By being safe while accessing and using the dam.
- By being given first preference when there are employment opportunities and skills development.
- Through the PPP.
- By participating in decision-making with respect to major developments planned or proposed for the dam (through the Dam Management Committee).

CHAPTER 2: LEGISLATIVE FRAMEWORK

The RMP forms the overarching framework for the management of Roodekopjes Dam. It is informed by relevant policy, legislation and planning documents administered by other government departments, most of which are herein under discussed. Similarly, these government departments are required to use the RMP to inform the development of future policy, legislation and planning documents.

- The Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996), Section 24: Provides that, everyone has a right to an environment that is not harmful to their health or well-being.
- II. Conservation of Agricultural Resource Act, 1983 (Act No. 43 of 1983): Provides for control over the utilization of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith. Regulation 7 and 8 within the same Act deals with the protection of wetlands and water courses, while regulations 15 and 16 deals with Alien Invasive Plant Species and bush encroachment.
- III. Consideration on Institutional Arrangement for Managing Use of Water for Recreational Purposes (DWAF, 2003): It outlines some of the institutional issues at a local level and makes recommendations about the conditions under which different Institution Management arrangements may be considered.
- IV. General Public Participation Guidelines (DWAF, 2001): Public Participation refers to the ongoing interaction between Role Players and all stakeholders that is aimed at improving decision making during planning, design,

implementation and evaluation of all projects within the state, this includes the proposed development of the RMP.

- V. Government Immovable Asset Management Act, 2007 (Act No. 19 of 2007): To provide for a uniform framework for the management of an immovable asset that is held or used by a national or provincial department; to ensure the coordination of the use of an immovable asset with the service delivery objectives of a national or provincial department; to provide for issuing of guidelines and minimum standards in respect of immovable asset management by a national or provincial department; and to provide for matters incidental thereto.
- VI. Government Notice R654 dated 1 May 1964, in terms of the Water Act, 1956 (Act No. 54 of 1956): Regulates access and use of government waterworks for recreational purposes.
- VII. Guidelines for Compilation of Resource Management Plans (DWAF, 2006): Directs and guides the development of RMPs by providing insight into the purpose and objectives of these plans, the procedure for its compilation and structure of such documents.
- VIII. Merchant Shipping (National Small Vessel Safety) Regulations (2007): These Regulations provide *inter alia* for:
 - Requirements for vessel safety;
 - Crewing requirements and responsibilities;
 - Controlled events such as competitions and regattas; and
 - Responsibilities of authorised agencies (governing

boards/clubs/organisations and regulating authorities).

These Regulations apply to the Department of Water and Sanitation as they are applicable to all inland and sheltered waters and as the Department and its agencies are allowing access to government waterworks for recreational boating vessels.

- IX. Methodology for Carrying Capacity Assessment for the Use of Water for Recreational Purposes (DWAF, 2003): 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.
- X. National Environmental Management Act, 1998 (Act No. 107 of 1998): NEMA serves as South Africa's Environmental Framework Legislation. It was designed to provide for co-operative and Integrated Environmental Governance by establishing a general framework for decision-making on matters affecting the environment.
- XI. National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) and Related Regulations: This Act aims to provide the framework, norms and standards for the conservation, sustainable use and equitable benefitsharing of South Africa's biological resources.

The Alien and Invasive Species Regulations for this Act came into effect 01 October 2014. NEMBA together with these Regulations aim to prevent the introduction and spread of alien and invasive species across South Africa.

- XII. **National Environmental Management:** Protected Area Act, 2003 (Act No. 57 of 2003): The aim of this Act is to provide for the protection and conservation of ecologically viable areas, which are representative of South Africa's Biodiversity, as well as natural landscapes and seascapes.
- XIII. National Treasury Public Private Partnership (PPP) Toolkit for Tourism, 2005: This toolkit assist the process of development of tourism-based businesses on State-owned Land. The Toolkit 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.
- XIV. National Water Act, 1998 (Act No. 36 of 1998): The purpose of the Act is to ensure that the nation's water resources protected, used, developed, are conserved, managed and controlled in a sustainable and appropriate manner, for the benefit of all. Furthermore Section 113 of the Act states that the water of a government waterworks and surrounding state owned land may be available for made recreational purposes, subject to controls determined by the Minister and regulations made by the Minister.

Using water for recreational purposes is a water use under Section 21K and can be exercised as permissible use of water under Schedule 1 of the Act. However, this provision does not cater for commercial use hence the RMP should be implemented in line with General Strategic Plan for commercialisation of Tourism Public Private Partnerships at Government Waterworks, 2009 and PFMA Treasury Regulation 16. Once the RMP has been approved, the RMP will regulate access and use of the dam. It is important to note that users will need to comply with other relevant legislation.

- XV. Operational Policy: Using Water for Recreational Purposes (DWAF, 2004): This policy is the main guideline in support of the RMP process with regards to the basic principles, policies, strategies and actions for regulating the use of water for recreational purposes.
- XVI. Public Finance Management Act (PFMA) (Act No. 29 of 1999): Section 76 of the Act secures transparency, accountability and sound management of the revenue, expenditure, assets and liabilities of government departments. The Act promotes the objective of good financial management in order to maximise service delivery. The Act allows DWS to enter into PPP agreements with the private sector for the commercial use of state assets.
- XVII. Safety at Sport and Recreational Events Act, 2010 (Act No. 2 of 2010): Events management is addressed by Safety at Sport and Recreational Events Act (Act No. 2 of 2010). This act deals with ensuring responsibility for safety and security at events. The act deals with among other things,
 - Responsibility for safety and security at the events;
 - Risk categorization of events; and
 - Safety certificates.
- XVIII. South African Maritime Safety Authority Act, 1998 (Act No. 5 of 1998): One of SAMSA's three legislative mandates is "to ensure safety of life and property at sea". The Act enables SAMSA to administer and execute the relevant maritime legislation.

XIX. Water Services Act (Act No. 108 of 1997): The Act outlines the roles and responsibilities for the supply of water and sanitation to citizens. It also recognises the rights of all humans to basic water supply and sanitation services.

The RMP process also takes cognizance of the following Legislations, Policies, Programmes and Reports:

- Broad-based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003).
- Communal Land Rights Act, 2004 (Act No.11 of 2004).
- Disaster Management Act, 2002 (Act No. 57 of 2002).
- Integrated Development Plan of RLM (May 2011).
- Intergovernmental Relations Framework Act, 2005 (Act No.13 of 2005).
- Land Administration Act, 1995 (Act No. 2 of 1995).
- Local Economic Development Strategy of RLM (2012).
- Local Government: Municipal Systems Act, 2000 (Act No. 32 of 2000).
- National Heritage Resources Act, 1999 (No. 25 of 1999).
- North West Strategic Environmental Assessment (2004).
- Occupation Health and Safety Act, 1993 (Act No. 85 of 1993).
- Policy for the small scale fisheries sector in South Africa (Department of Agriculture, Forestry and Fisheries, 2012).
- Restitution of Land Rights Act, 1994 (Act No. 22 of 1994).
- RLM draft water service by-law (2013).
- Soil Conservation Amendment Act, 1977 (Act No. 22 of 1977).
- South African Water Quality Guidelines for Recreational Use (DWA, 1996).
- Spatial Development Framework of MLM (2015).

- Spatial Development Framework of RLM (2005).
- State Land Disposal Act, 1961 (Act No. 48 of 1961).
- > Safety of Navigation: In addition to its common-law responsibility, DWS is, in terms of the requirements described in the National Water Act, Act No 36 of 1998, amongst others, responsible for the safety of GWWs. DWS, its delegated public sector partner, or a delegated water management institution, has therefore the responsibility to provide the required fixed and/or floating AtoN for general navigation. In addition to the DWS, Local Accountable AtoN Parties (LAAP) and other Bodies providing access to Government waterways and watercourses have a responsibility to ensure that the required fixed and/or floating AtoN are provided after obtaining the necessary support from DWS and thereafter the permission by

SAMSA. In order to demarcate specific zones/areas, standardised demarcation markers are to be used in conjunction with the relevant AtoN.

SAMSA Marine Notices and its Directive on the Standardisation of fixed and floating AtoN and Demarcation Markers on all navigable Inland Waterways in the Republic of South Africa.

The aim is to enhance the development of a best practice model to ensure a safe and structured inland maritime environment and culture, whilst protecting the country's precious water resources.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. This list is not extensive, other legislation could be applicable.

CHAPTER 3: WHAT IS A RESOURCE MANAGEMENT PLAN

3.1 DEFINITION OF A RMP

A Resource Management Plan (RMP) is a plan which aims to regulate access, and the recreational utilisation, of a water resource and the surrounding state land, in ways which promote community participation and beneficiation, environmental conservation and unlock socio-economic potential of the water resource.

Recreational use includes activities ranging from leisure, sport to culture and religion. Although recreational use does not involve consumption of water, it is still a major water use and needs to be managed effectively with minimal negative environmental impacts and to ensure communities have access to water based economy.

3.2 PURPOSE OF RMP

The main aim of RMPs will be to attain the objectives underlying sustainability and to compile functional, workable sustainable access and utilisation plans for water resources. Without approved management plans relating to water resources utilized for recreational purposes, it is difficult for informed decisions to

be made, necessitating a precautionary approach to access, utilisation and development proposals.

One of the components of the RMP process is to implement an Institutional Plan for effective management of GWWs. The focus on the Institutional Plan is accompanied by a Zoning Plan which is influenced by current and potential recreational uses. The RMP also outlines the Strategic Plan for all the identified objectives for the dam. In addition, a Financial Plan is incorporated into the Business Plan (BP) and provides guidance on funding requirements and funding options to implement the potential recreational activities at the dam.

3.3 PROCESS TRIGGERS

Trigger Factors are factors that have encouraged DWS to initiate and commission the development of RMPs.

A number of generic factors have been identified by DWS for the development of RMPs, however, the Process Facilitator identified site specific trigger factors for Roodekopjes Dam, as illustrated in **Table 5**.

Table 5: Trigger Factors for the Development of Roodekopjes Dam RMP

Trigger Factors	Description
Trigger Factors Resource Management	 Aquatic Alien Invasive Plant species: Roodekopjes Dam is infested with Aquatic Alien Invasive Plant Species such as Water Hyacinth. The Water Hyacinth mats clog waterways, making boating, fishing and almost all other water activities impossible. Water Hyacinth can kill indigenous species e.g. fish, by cutting off the sunlight and oxygen and this also degrade the water quality. The dam is also infested by the Giant Reed Grass which can decrease oxygen concentrations and lower diversity of aquatic animals within the dam. Water Quality The water quality of the dam is deteriorating at an alarming rate. There is
	presence of excessive algae, debris and poorly treated sewage effluent.

ROODEKOPJES DAM RESOURCE MANAGEMENT PLAN

Trigger Factors	Description		
	• Due to the current level of water pollution the diversity of fish and birds has diminished through the years.		
Resource Utilisation	 Public Safety The crime rate at the dam is a deterrent factor which prevent tourism to grow at Roodekopjes Dam. The dam is infested by crocodiles. It was indicated that a lot of people have been attacked by crocodiles while fishing and boating. Crocodiles will also prevent water contact recreational activities. The presence of dead woods and old buildings inside the dam also pose a threat to boaters and other aquatic animal species. 		
Community Participation and Beneficiation	 Community Participation and Beneficiation The previously disadvantaged local communities are still experiencing problems with regards to physical access as well as access to water-based economy of the resource. According to Tapela, Brits & Rouhani (2015), local subsistence fishers perceive that, although the dam is used by all racial group, the white racial group have greater access to the dam through their private properties than the other racial group. 		
Public Policy	 Local Planning Initiatives The Roodekopjes Dam should be integrated in other local planning initiatives and decision support tools such as the Madibeng Local Municipality (MLM) Integrated Development Plan (IDP), Spatial Development Framework (SDF) and Local Economic Development (LED). 		
3.4 RMP DEVELOPMENT PROCESS

The RMP is developed in accordance to the RMP Guideline Procedure DWAF (2006) as illustrated in **Figure 18** below:

Phase 1: Process Initiation	 Establish motive for undertaking RMP process. Ensuring roles and responsibilities are understood.
Phase 2: Project Outline and Encumbrance Survey	•Ascertain whether any encumbrance exist and the most appropriate approach to the project
Phase 3: Objective Identification	•Consult with stakeholders to ascertain common goals and formulate into one document
Phase 4: Research/ Information Generation	•Prepare a Research Report containing information on sustainable utilisation of the dam.
Phase 5: Integrated Management, Zoning and Institutional Planning	 Undertaking planning through a consultative process and by evaluating information to ascertain what can take place based on specific constrains and parameters. Outcome: Draft RMP (Institutional Plan, Zoning Plan (Water Surface & Shoreline) ,Financial Plan and Strategic Plan)
Phase 6: Evaluation	 Obtain comments from stakeholders on the draft RMP and amend accordingly. Outcome: Revised RMP Submit the Revised RMP to PSC and Public for final review.
Phase 7: Decision making and Operationalisation	 Obtain approvals and support from relevant Authorities. Undertake implementation and institutionalisation of the RMP. Outcome: Approval of the RMP and Implementation

Figure 18: RMP Procedure

3.5 RMP PLANNING STAGES

3.5.1 Desktop Study

The desktop study was conducted with the aim of acquiring background information about the Roodekopjes Dam. This was done through literature review. This study provided information such as the location of the dam, user groups, current activities, previous studies conducted for the dam.

3.5.2 Site Inspection

A site inspection was conducted at Roodekopjes Dam on **11 November 2015** to gather baseline information using a checklist questionnaire. The site inspection was undertaken with the DWS delegates (DWS IEE, Northern Operational Champion and Crocodile (West) Irrigation Board representative). Photos of the study area were also taken during the site inspection.

3.5.3 Public Participation

Public Participation process (PP) is a process in which potential Interested and Affected Parties (I&APs) are given an opportunity to comment on or raise issues relevant to specific matters. The three (3) fundamental and theoretical objectives of PP process as stipulated in the DWAF's Guideline for Public Participation (2001) are:

- To improve decision-making;
- To bring about sustainable development; and
- To normalise the attitudes of Stakeholders (Authorities and I&Aps).

A Public Participation was conducted in order to acquire information for Phase 2 (Encumbrance Survey), Phase 3 (Objective Identification) and Phase 4 (Research/ Information Gathering) from stakeholders, which was used to complete Phase 5 (Integrated Management, Zoning and Institutional Planning). In order to successfully complete the RMP, it is essential that the information obtained in the previous phases is utilised as planning input. The public participation process for this project was formulated to include the following objectives:

- The identification of role players;
- The introduction of the RMP project to role players and inform them about their roles and responsibilities;
- The engaging of the Stakeholders (Authorities and I&APs) in the planning process;
- The answering of questions and noting of concerns;
- The identification of important issues, problems, conflicts and alternatives;
- Identification of the overall vision of the dam;
- The elimination of false expectations and preconceptions; and
- The creation of awareness amongst users.

DWAF's Guidelines for Public Participation (2001) outlines three (3) broad phases for public participation namely the **Planning**, **Participation** and **Exit** phase. Summarized below are the aspects of each phase and the approach for this project.

3.5.3.1 The Planning Phase

The Planning Phase entails three (3) important aspects namely;

- Decision analysis;
- Participation planning; and
- Implementation planning.

During the **Planning Phase** a site inspection and literature review was conducted to gather baseline information about the dam. A process was also established to get into contact with the I&APs and relevant Authorities to ensure cooperative interests and support in the RMP project.

3.5.3.1.1 The Role Players

It is recognized that different roles and responsibilities of the Stakeholders (Authorities and I&Aps), and their relationship towards each other and the steps in the planning procedure are imperative in the successful development of the RMP. It is also important that proper consultation with the public is done in order to produce a credible RMP. The success of this RMP is dependent on the level of involvement by the various Stakeholders. Numerous Stakeholders were identified and invited to participate in an open and consultative process. (See attached registered stakeholder list in **Appendix A**). The Stakeholder list is updated on a continual basis throughout the RMP process.

3.5.3.2 Participation Phase

The **Participation Phase** entails three (3) important aspects:

- Informing stakeholders explained briefly under **3.5.3.4 (Advertising Process).**
- Meeting the stakeholders explained briefly under **3.5.3.5 (Direct Communication).**
- Feedback it is of utmost importance that feedback is directed to and from stakeholders. In this project feedback thus far has been given in a form of minutes of the meetings and follow up e-mails.

3.5.3.3 Exit Phase

The **Exit Phase** entails two (2) important aspects namely:

- Ensuring that all goals, challenges, concerns, objectives and the vision for the dam have been identified and documented in the RMP.
- Officially ending the public participation process for the RMP process.

During this phase, a draft RMP was be presented to the stakeholders so that they can comment and give inputs.

3.5.3.4 The Advertising Process

3.5.3.4.1 Distribution of the Background Information Document (BID)

The purpose of this document was to provide Stakeholders (Authorities and I&APs) with the background information about the proposed RMP project and to introduce the processes to be followed in developing the plan. It also aimed to inform authorities and I&APs on how to fully participate in the process and to encourage active attendance in Stakeholder engagement meetings. The BID was compiled from the information collated through the desktop study and site inspection (See attached **Appendix B**).

3.5.3.4.2 Newspaper Advert

A Newspaper advert regarding the RMP project was placed in **Brits Pos** Newspaper. The advert invited the public to attend the Public Participation Meeting. The advert was published in English on **07 July 2016**. Furthermore, an advert for the draft RMP was advertised on Eikestadnuus newspaper on **09 March 2017**. (See attached **Appendix C**).

3.5.3.4.3 Flyers Compilation and Distribution

Flyers were also used as a form of notification, they aimed at informing the I&APs about the public consultative meetings. The flyer detailed a brief description of the RMP, meeting date, time, venue and relevant contact details. The flyers were compiled in English and were distributed on **07 July 2016**

The flyers for the draft RMP were distributed on **09 March 2017** (See attached **Appendix D**).

3.5.3.5 Direct Communication

3.5.3.5.1 E-mails

Meeting invitations were sent out to authorities and I&APs notifying them about the scheduled consultative meetings. The invitation entailed the BID, meeting venue and time. The email notification was sent out on **07 July 2016**. Moreover, the meeting invites for the draft RMP were sent out on 07 March 2017 (See attached Appendix E).

3.5.3.5.2 Authority Meeting

The initial Authorities meeting was held on **26** July 2016 at Crocodile (West) Irrigation Board Hall.

The purpose of the meeting was:

- To present the RMP, its goal and the objectives of the project to the authorities; and
- To allow the authorities an opportunity to participate in the project by sharing information on their respective mandates.

The draft RMP was presented to the authorities on **23 March 2017**.

3.5.3.5.3 Public Meeting

The initial public meeting was held on **26 July 2016** at **Crocodile (West) Irrigation Board Hall**. A platform was also given to I&APs to identify encumbrances/ challenges that might hinder the progress of the RMP as well as to identify objectives and vision for the Roodekopjes Dam.

Table 6: RMP Planning Partners and their Respective Mandates

The draft RMP was presented to the Public on **23** March **2017**.

3.5.3.6 Comments and Responses Register

A copy was circulated on **08 March 2017** (See attached **Appendix F**).

3.5.4 Planning Partners

RMPs are developed through a process of cooperative governance and Stakeholder participation. The distinctly different roles and responsibilities of the stakeholders, and their relationship towards each other and the steps in the planning procedure are imperative in the success compilation of the RMP.

The RMP provides for coordination between different governments and agencies to ensure that not only the objectives of DWS are attained, but also the objectives of other relevant Government Departments are attained. Such Departments includes among others as outlined in **Table 6**.

Department/ Implementing Agency	Mandate
Madibeng Local Municipality (MLM)	The dam is within the jurisdiction of the Municipality.
Rustenburg Local Municipality	Small portion of the dam falls within the jurisdiction of RLM (ward 30).
Department of Agriculture, Forestry and Fisheries (DAFF)	The purpose of DAFF includes sustainable development and management of resources to maximizing the economic potential of the fisheries sector while protecting the integrity and quality of the country's aquatic ecosystems. Operation Phakisa expansion to inland dams is one of DAFF initiative aimed at unlocking economic potential of fisheries sector within the inland water. The latter programme will be used as benchmark for implementation of conservation policies while implementing job creation within fishery and fish processing market.
Department of Rural Development and Land	The department will assist in terms of Land Claims/Ownership
Reform (DRDLR)	issues.
Department of Environmental Affairs (DEA)	Responsible for Biodiversity Management within the dam including Invasive Alien Species.

Department/ Implementing Agency	Mandate			
Department of Public Works (DPW)	Has the power to regulate and control the use of state land outside the GWWs. In this regard, lease agreements or permits will be required from the department as some of the recreational activities will overlap into the state land.			
Department of Transport (DoT)	Responsible for legislation, policy and regulations for all transportation in South Africa, including shipping and other transport by water or sea also inland waterways.			
National Treasury (NT)	The use of State assets is governed by National Treasury Regulations, requiring DWS to plan concessions in compliance or association with National Treasury, guided by the Tourism Public Private Partnership (PPP) Toolkit of 2005.			
South African Maritime Safety Authority (SAMSA)	One of SAMSA's three legislative mandates is "to ensure safety of life and property at sea". The Act enables SAMSA to administer and execute the relevant maritime legislation.			

3.6 RMP DATA ANALYSIS

3.6.1 Encumbrance Survey (Phase 2)

The purpose of the Encumbrance Survey is to investigate/ ascertain whether any encumbrances exist around the dam and other factors that may influence the development and implementation of the RMP. The survey also identifies the information that is required for effective decision-making regarding the RMP (DWAF, 2006).

3.6.1.1 The Identified Encumbrances

The identified encumbrances will assist DWS to identify hindrances and other factors that may influence the development and implementation of the RMP. The identified encumbrances are broken down into **Biophysical and Social**.

Tables 7 - 8 outline the summary of limitationsthat might affect the development orimplementation of the RMP for the dam.

Table 7	: Summary	of Biophysical	Encumbrances
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Item	Description			
Flora	 The Giant Reed Grass is highly flammable throughout the year and this makes the area to be prone to fire. Furthermore, due to dense stands of the Giant Reed, native plants are typically displaced and the animals associated with these native plants are unable to utilize Giant Reed and as such their populations decline. The Giant Reed also have the ability to consume large quantity of water which will reduce the water level of the dam. The existing Water Hyacinth mats clog waterways, making boating, fishing and almost all other water recreational activities impossible, as such the implementation of the RMP will be affected. 			
Fauna	 Bioaccumulation of contaminants in the dam have a negative impact on the health status of fish and ultimately cause fish to be unsuitable for human consumption. The continuous use of Illegal gillnets can deplete the remaining five (5) fish species if not resolved urgently. The population size of bird species is declining at an alarming rate and this is due to the use of gill nets since birds are easily caught in the nets. Furthermore, extensive pollution at the dam is also driving other bird species out of the area. The remaining bird species must be conserved to avoid extinction. 			

Item	Description			
	• Water contact recreational activities will not be possible due to the presence of crocodiles.			
Surface Water	• The dam basin is usually covered by water between the months of May – September, when the dam is at full capacity. Minimal developments such as Chalets cannot be established on the dam basin for safety purposes.			
Water Quality	• The impacts of pollution can be severe, as it does not only lead to massive destruction of ecosystems and habitats, but it also affects humans who rely on these ecosystems for their livelihoods and leads to substantial human health problems, especially among the young and tourists who have not developed immunity to endemic diseases found in these waters.			

Table 8: Summary of Legal Encumbrances

Item	Description			
Land Ownership	• Uncertainty regarding DWS's land will affect the amendment of the existing Zoning map, as the zoning is limited to DWS's land.			
Lease Agreements	• The existing lease agreements between DWS and adjacent land owners as well as DPW need to be revised immediately after the approval of the RMP. This is to align the agreements with the objectives of the RMP.			

Table 9: Summary of Social Encumbrances

ltem	Description				
Social Audit	• Majority of residents in the area will not have received any kind of training to equip themselves to become active participants in the tourism sector due to the low percentage of the population that have furthered their studies in higher education. This can also affect the level of community participation in the implementation of the RMP.				

Upon identifying the encumbrances, objectives needed to be identified in order to facilitate a planning procedure aimed at the compilation of a RMP. It is essential to clarify objectives to be met by the planning procedure (DWAF 2006).

3.6.2 SWOT Analysis and Objective Identification

The SWOT Analysis was conducted to gather Strengths and Opportunities that define the potential of the dam whereas the challenges regarding the dam where identified through Weaknesses and Threats. The common key objectives were formulated and identified from the **Strengths** and **Opportunities** of the dam. Moreover, the vision for the dam for a period of 20 years was formulated by stakeholders from the identified objectives.

3.6.2.1 SWOT Analysis Approach

There were issues of concerns that were raised in the stakeholder engagement meetings prior to conducting the SWOT Analysis. Other challenges or encumbrances that may hinder the progress of the dam's RMP process were identified by the stakeholders following the SWOT analysis approach as illustrated in **Table 10**.

 Table 10: SWOT Analysis for Roodekopjes Dam

3.6.2.2 Objective Identification (Phase 3)

Objectives were identified by all the stakeholders in order to ascertain common goals. These objectives address the following questions:

- What do we want?
- How are we going to achieve this?
- Who will be involved?
- By when would we like to achieve our goals?
- Why would we want to achieve our goals?

The set common key objectives were derived from the SWOT Analysis for the Roodekopjes Dam and have been categorized into three (3) Key Performance Areas (KPAs) as illustrated below:

KPA 1: Resource Management

- To have Roodekopjes Dam free of Alien Invasive Vegetation in order to support the proposed recreational activities and to maintain the native ecological aspect of the area.
- To improve and maintain a high water quality standard of the dam.
- To promote safety against crocodile attacks in the dam.
- To maintain and enhance the ecosystem's composition, functioning, integrity and character over time and space. Also to utilize the dam in a sustainable and appropriate manner to support current and future generation needs.
- To update the existing Zoning Plan which will integrate conservation, recreation and development whilst not retarding the primary functions of the dam.

KPA 2: Resource Utilisation

• To promote, accommodate and manage a variety of activities and facilities within the dam basin in a manner that enhances the user's experience and minimizes the impact on the resource.

- To provide equitable, compactable and adequate access control at the dam.
- To ensure public safety regarding the recreational use of the dam.
- To meet the user needs and satisfy government requirements regarding the standard of activities and facilities, appropriateness of land use, compliance with applicable legislation and rights of use as well as access to the dam.
- To establish bird watching and environmental education.
- To promote sustainable harvesting of fish as a renewable resource.
- To provide recreational users with clear rules and to be delegated with the authority to enforce them.

KPA 3: Benefit Flow Management

- Uplift the Local Economy and increase Benefit Flows to the surrounding communities through community empowerment.
- To establish an effective institutional structure that can manage the use of water for recreational purpose in an acceptable manner, which is also representative of all the Stakeholders.

3.6.2.3 Vision for Roodekopjes Dam

The vision of the dam was formulated by Stakeholders to be as follows:

"To have a sustainable recreational and commercial area which is free from crime, pollution and Alien Invasive plants species for the benefit of the community".

The Action Projects or Programmes that were proposed to assist in terms of achieving the identified objectives is detailed in **section 4.3** below (The Strategic Plan).

3.6.3 Research/ Information Generation (Phase 4)

The aim of undertaking the Research Phase was to collect the relevant data about the dam. This will serve as a decision-making guideline tool, guided by the objectives set for the dam and any limitations due to encumbrances. The report documents the following research data as illustrated in **Figure 19** below:



Figure 19: Detailed Desktop Analysis Data

The main aim of the research was to identify the dam tourism development potential and also to evaluate the practicability/feasibility of the identified objectives.

3.6.3.1 Tourism Development Potential

The dam is a significant tourism node which offers some water based recreational activities such as angling, picnicking, camping, game farming, etc. The dam has also attracted a number of lodges, resorts, angling and camping clubs. The area has tourism development potential that will assist in terms of unlocking the socioeconomic potential of the dam. According to SASACC, it is believed that Roodekopjes Dam has a bright future and can prosper, only if the right decisions regarding the use and management are made.

3.6.3.2 Feasibility of Potential Objectives

According to DWAF (2006), the feasibility of the proposed objectives need to be determined in light of the local environmental conditions.**Table 11** shows the practicability of all proposed recreational objectives.

Table 11: Feasibility of Potential recreational Objectives

KPA 1: Resource Manageme					
	Objective		Status Quo		Practicability
•	To have Roodekopjes Dam free of Alien Invasive Vegetation in order to support the proposed recreational activities and to maintain the native ecological aspect of the area.	•	Roodekopjes Dam is infested with Aquatic Alien Invasive Plant Species (Water Hyacinth) and the Terrestrial Alien Invasive plant species (Giant Reed Grass). The further spreading of these species can have a detrimental effect on the ecology of the dam and the natural aesthetic of the area in general.	•	Working for Water (WfW) and North West Expanded Public Works Programme (NEPWP) as well as compliance of all users to all relevant Legislations, Regulations and dam rules can assist to minimise the Alien Invasive Plants Species at the dam. The use of wash bay and the appropriate zoning, along with the deployment of AtoN and demarcation markers can assist to prevent the introduction of Alien Invasive Plant Species, however, this should be established in accordance with the Cooperative Inland Water Safety Programme (CIWSP) best practice model.
•	To improve and maintain a high water quality standard of the dam.	•	The water quality of the dam is deteriorating at an alarming rate. There is presence of excessive algae, debris and poorly treated sewage effluent.	•	Enforcement of all relevant environmental legislations (e.g. NWA and NEMA) at the dam can assist to improve the dam's water quality. The components of CIWSP should be implemented at the dam to achieve this objectives.
•	To promote safety against crocodile attacks in the dam.	•	Roodekopjes Dam lies on the Crocodile River and it is infested with crocodiles which are widely considered as the dangerous animals. It was indicated during the Stakeholder meetings that many people have been attacked by crocodiles while fishing and boating at the dam. Although crocodiles are important part of the biodiversity, they pose danger to the tourists and patrons who access the dam.	•	Communication signage alerting people of areas populated with crocodiles and also alerting people on how to act when they come across crocodiles. Tourists/ patrons visiting the dam should take note of the safety boards with the information of prohibited activities in and around the dam. Dam Management Committee (DMC) to develop the animal control protocol.
•	To maintain and enhance the ecosystem's composition, functioning, integrity and character over time and space. Also to utilize the dam in a sustainable and appropriate manner to support current and future generation needs.	•	According to DEA (2005), Roodekopjes Dam has some surrounding wetland habitat which attracts water birds (approximately 257 different red data bird species were attracted to the dam due to its diverse biodiversity). For these reasons it is desirable to maintain and improve the ecological state and also to minimize, remediate and mitigate any adverse effects.	•	Enforcement of all relevant environmental Legislations.

• To update the existing Zoning Plan which will integrate conservation, recreation and development whilst not retarding the primary functions of the dam.	 The existing Zoning Plan for Roodekopjes Dam is not effective. 	• The existing Zoning Map will be updated in accordance to the DWS Zoning Plan Guidelines and it will take into account the current recreational activities and facilities as well as the identified objectives.		
	KPA 2: Resource Utilisation			
Objective	Status Quo	Practicability		
 To provide equitable and adequate access control at the dam. 	 Roodekopjes Dam is being utilised by various nearby communities and as a result there is a need for adequate access control to prevent vandalism of the dam's fence and gates as well as to ensure user safety. 	 The dam rules relating to the dam access, fees payable for access, safety measures, speed limit applicable to the dam and the time in which the dam will be open to the public should be established in terms of DWAF Regulation R654. The appointment of safety and enforcement personnel is imperative to ensure compliance with the dam rules and other relevant legislations. The Business Plan will incorporate the objective and will include a cost structure that is market related and will be affordable to local visitors and tourists. 		
 To ensure public safety regarding the recreational use of the dam. 	 The crime rate at the dam is a deterrent factor which prevent tourism to grow at Roodekopjes Dam. Currently there is no overarching safety system at the dam which is also preventing some of the angling competition to take place. 	 Establishment of Community Police Forum (CPF). Establishment of fence all around the dam to prevent access of criminals to the dam. Appoint safety officers to monitor dam access points and to ensure that the dam safety rules are adhered to at all times. DMC in conjunction with SAPS to develop and establish safety plan in the area. 		
• To establish bird watching and environmental education.	 According to DEA (2005), Roodekopjes Dam has some surrounding wetland habitat which attracts water birds. The dam has attracted approximately 257 different red data bird species due to its diverse biodiversity. 	 Sufficient skilled guides to undertake the guiding of bird watching. Development of bird conservation plan. 		
• To promote sustainable harvesting of fish as a renewable resource.	 Roodekopjes Dam is rich in fish diversity which plays a major role in the ecological balance of the aquatic ecosystem and also serve as a food source for local subsistence fishermen. However, the dam used to 	• Allocate suitable fishing area on the zoning map in order to preserve the core habitats for nesting, resting, feeding and breeding of fish within the inlets.		

•	To provide recreational users with clear rules and to be delegated with the authority to enforce them.	•	contain sixteen (16) fish species and only five (5) fish species is currently left due to extensive illegal gill netting. There are lot of illegal activities undertaken at the dam such as gill netting, unauthorised developments, crime, etc. furthermore, noise pollution coming from the informal settlements in the vicinity of the dam have been reported to be one of the huge nuisance factor as it cause disturbance to other users and as well as residents around the dam.	•	Appointment of enforcement officers to effectively implement the dam rules. Develop information material (signage, pamphlets, etc.), to convey the dam rules. Implementation of CIWSP to promote safety at the dam.
			KPA 3: Benefit Flow Managem	ent	
	Objective		Status Quo		Practicability
•	Uplift the Local Economy and increase Benefit Flows to the surrounding communities through community empowerment.	•	Majority of the Local Communities are currently not benefiting from recreational activities conducted at the dam.	•	Establishment of functional and effective Institutional Structure that should have enough power to ensure that the Local Communities are getting benefits emanated from the dam use. The BP will detail how the previously disadvantaged communities will economically benefit from recreational opportunities.
•	To establish an effective Institutional Structure.	•	There is currently no recreational institutional structure for the dam.	•	The Institutional Structure should be established and formalised as per the DWAF's considerations on the Institutional Arrangements for Managing Use of Water for Recreational Purposes guideline (2003). This will assist to manage the recreational utilisation of

CHAPTER 4: INTEGRATED MANAGEMENT, ZONING AND INSTITUTIONAL PLANNING (PHASE 5)

The purpose of this phase is to evaluate the information obtained from previous stages to ascertain what could be achieved based on specific constraints and parameters of the various input factors such as biophysical, cultural and socio-economic, current institutional and needs of the dam users. The Integrated Resource Management Plan (IRMP) will take into account the following:

- Biophysical, cultural and socio-economic and User needs constraints;
- Development Potential and requirements;

- Site planning and Zonation;
- Programmes and Plans that will unlock the potential of the water resource; and
- Institution options and legal aspects required to create these programmes and plans.

The IRMP is broken down into four (4) main plans namely the **Institutional Plan**, **Zoning Plan**, **Strategic Plan** and **Financial Plan** as illustrated by **Figure 20**.



Figure 20: Integrated Resource Management Plan

4.1 INSTITUTIONAL PLAN

The Institutional Plan provides a framework for the institutional arrangements at the dam. The proposed management systems includes three (3) committees namely; The Dam Management Committee (DMC), Operations Management Committee (OMC) and National Project Steering Committee (NPSC). The appointed management authorities by DWS at the dams, also form part of the institutional structure.

4.1.1 Dam Management Committee (DMC)

DMC refers to any party that is interested or affected by the dam and will assist in raising and addressing issues relating to the dam.

One of the main functions of the DMC is to give support to DWS in the management of the dam for recreational purposes. Moreover, to assess commercial opportunities at the dam. As such, an agenda item related to the Strategic Plan for commercialization is required. In addition, changes in water quality, developments in the area, status of Aquatic Invasive Species and education and information programmes should be discussed. The DMC must meet quarterly. The functions of the DMC include the following (amongst others):

- Seeking resolution for general management issues;
- Monitoring the practical implementation of the RMP and BP;
- Reviewing the feedback received from I&APs;
- Operational management of recreational activities such as ensuring the floating AtoN and demarcation markers are in place and setting times for use of the dam (no recreational activities can take place between sunset and sunrise);
- Conveying the Management Objectives and decisions pertaining to the dam to the relevant stakeholders; and
- Management of the incident management system and washbays.

Figure 21 illustrates the proposed user groups that will form part of the DMC



Figure 21: Proposed Dam Management Committee

The DMC will have a number of management tools which will enable proper management of the dam in line with existing Legislations and Regulations requirements.

4.1.1.1 Management Tools

Terms of Reference

The DMC and NPSC will be guided by Terms of Reference (ToR) regarding roles and responsibilities. ToR are not required for **OMC**. The ToR provide guidance on the following management aspects:

- Roles and responsibility of chairperson;
- Roles and responsibilities of members;
- Minutes and attendance requirements;
- Reporting requirements;
- Management of agreements;
- Management of access objectives;
- Management of development targets;
- Management of water quality monitoring;
- Management of the control of aquatic invasive species;
- Management of development pressure;
- Management of incident management system and wash bays; and
- Management of AtoN and demarcation markers.

Safety of Navigation Agreements

In addition to its common law responsibility, DWS is, in terms of the requirements described in the National Water Act, 1998 (Act 36 of 1998), amongst others, responsible for the safety of GWWs and watercourses, including its dams. DWS, its delegated public sector partner, or a delegated water management institution, has therefore the responsibility to provide the required fixed and/or floating Aids to Navigation (AtoN)⁴ for general navigation.

Agreements between SAMSA and DWS, other relevant Parties or Bodies are to be concluded to allow them to:

- Exhibit the relevant AtoN.
- Establish or deploy the relevant fixed and/or floating AtoN.

Agreements

One of the main management tool available is the use of agreements to ensure proper use of the dam in line with the RMP vision and objectives.

Access Agreements

All surface water and shoreline access must be formalised. The conditions for such access must be written into the agreement. All illegal practices must be addressed. Appropriate action must be taken to ensure that all parties comply with the requirements of the RMP.

Recreational Use Agreements

Recreational Clubs must enter into an agreement with DWS. All agreements must be finalised within twelve (12) months of the RMP being gazetted.

Furthermore, the existing agreements will be review within the 12 months of the RMP being approved. This is to ensure that the agreements are aligned with the objectives of the RMP.

Event Applications

The dam is also used for a number of competitive angling events. Events must be managed through an event application process. The events application will be submitted to DWS for approval. These applications must follow a specific template and will include the following:

- Number of participants.
- Emergency Response Plan.
- Advertising and branding (will need to be in line with DWS communication requirements).

types of such aids include <u>lighthouses</u>, <u>buoys</u>, <u>fog</u> <u>signals</u> and <u>day beacons</u>.

⁴ AtoN refers to any sort of marker which aids the traveler in <u>navigation</u>; the term is most commonly used to refer to nautical or aviation travel, common

• Access points to be used.

Furthermore, all Events must meet the requirements of the Safety at Sports and Recreation Act, 2010 (Act No 2 of 2010).

National Affiliations

All recreational clubs should be affiliated to a South African Sports Confederation and Olympic Committee (SASCOC) affiliated organisation. The development targets set by the National Organisations must be met.

4.1.2 Infrastructure Operations Management Committee (IOMC)

There is an existing Chief Director: Infrastructure Operations Management Committee (CD: IO MANCO) within Infrastructure Operations which comprises of all directors of four (4) operations (Northern, Southern, Eastern and Central) and is chaired by the Chief Director Infrastructure Operations within NWRI as illustrated by **Figure 22**.

The committee should meet quarterly discussing matters relating to operations and maintenance of all GWWs. RMP must be a standard agenda item. Any matters relating to the RMP that are outside the scope of DWS will be escalated to the NPSC.



Figure 22: Infrastructure Operational Management Committee

4.1.3 RMP National Project Steering Committee

NPSC is formed by DWS and is made up of representatives from National Government Departments and Implementing Agencies that are relevant in terms of managing the water resource.

The primary function of the NPSC is to provide guidance on recreational water use in terms of

their respective mandates as well as to ensure that continuous support by different Government Sectors is provided to the dam with the aim of achieving sustainable utilisation of the dam for recreational purposes. The NPSC should meet twice a year. **Figure 23** illustrates a typical example of Governmental Departments that will form part of the NPSC:



Figure 23: RMP National Project Steering Committee

The role of the relevant departments forming part of the NPSC is listed below:

Centre for Public Service Innovation (CPSI):

The CPSI is supporting a multi-departmental working group that is developing an innovative approach to inland water and safety integrity. The project, was initiated out of the need to find an innovative, practical and cost-effective way to implement SAMSA' vessel safety regulations on inland waterways and to implement responsible water use within the broader socio-economic context of the country.

The CIWSP is a project piloted by CPSI that is a partnership between multiple Government entities and between the Government and communities. The main aim of the project is to enhance the development of a best practice model to ensure safe and structured inland maritime environment and culture, whilst protecting the country's precious water resource.

Culture, Arts, Tourism, Hospitality, Sport Sector,

Education and Training Authority (CATHSSETA): CATHSSETA deals with the approval and financing of training relating to culture, hospitality, tourism and sport sectors.

<u>Department of Agriculture, Forestry and</u> Fisheries (DAFF):

The purpose of DAFF includes sustainable development and management of resources to maximizing the economic potential of the fisheries sector while protecting the integrity and quality of the country's aquatic ecosystems.

Operation Phakisa expansion to inland dams is one of DAFF initiative aimed at unlocking economic potential of fisheries sector within the inland water. The latter programme will be used as benchmark for implementation of conservation policies while implementing job creation within fishery and fish processing market.

Department of Corporative Governance and Traditional Affairs (CoGTA):

Its function is to develop national policies and legislation with regard to Provinces and Local government, and to monitor their implementation. Other function of the Department is to support Provinces and Local Government in fulfilling their constitutional and legal obligations.

Department of Environmental Affairs (DEA):

DEA is mandated to give effect to the right of citizens to an environment that is not harmful to their health or wellbeing, and to have the environment protected for the benefit of present and future generations. In relation to the RMP, the Department should ensure that Environmental Impact Assessments is undertaken for all activities that triggers EIA Regulations at the dam. Furthermore, DEA through WfW programme can assist to eradicate alien invasive plants species (Blue Gums and Parrot Furthers) and alien invasive fish species at the dam.

Department of Public Works (DPW):

DPW has the power to regulate and control the use of state land outside the GWWs. In this regard, lease agreements or permits will be required from the Department as some of the recreational activities will overlap into the State Land, e.g. trail running, biking and running.

Department of Rural Development and Land Reform (DRDLR):

The Department is tasked with the facilitation of land claims within the country. They are also involved in rural development by improving both economic infrastructure (such as roads, etc.) and social infrastructure (e.g. communal sanitation and non-farming activities).

Department of Sports and Recreation (DSR):

The Department is mandated to promote and develop sport and recreation activities and also in co-ordination of the relationships between the Sports Commission, national and recreation federations and other agencies.

Department of Tourism (NDT):

The Department is mandated to create conditions for the sustainable growth and development of tourism in South Africa. The Tourism Act makes provision for the promotion of tourism to and in the Republic and for regulation and rationalisation of the tourism sector, including measures aimed at the enhancement and maintenance of the standards of facilities and services utilised by tourists; and the co-ordination and rationalisation of the activities of those who are active in the tourism sector.

Department of Transport (DoT):

Responsible for legislation, policy and regulations for all transportation in South Africa, including shipping and other transport by water or sea, including small vessels and inland waterways.

Department of Water and Sanitation (DWS):

DWS through the National Water Act, 1998 (Act No. 36 of 1998) is mandated to protect aquatic and associated ecosystems and their biological diversity as well as to reduce degradation of the water resources. As part of its mandate, DWS initiated the development of RMPs together with the supporting BPs with the aim of ensuring sustainable and equitable development, utilisation and management of GWWs.

National Treasury (NT):

The Department is mandated to support the optimal allocation and utilisation of financial resources in all spheres of government. As part of the RMP, The National Treasury Public Private Partnership (PPP) Toolkit for Tourism (2005), will assist the process of tourism-based businesses development on State-owned Land. The Toolkit make it easier for Institutions and the Private

Sector to enter into tourism related partnerships on State Property managed by National, Provincial and Local Government Institutions.

South African Maritime Safety Authority (SAMSA):

Administers and executes maritime related legislation and regulations, including the National Small Vessel Safety Regulations and ensures standardisation, harmonisation and compliance of all AtoN in South African waters.

South African Police Service (SAPS):

The South African Police Service have been entrusted with the responsibility of creating a safe and secure environment for all people in South Africa as well as to prevent anything that may threaten the safety or security of any community.

South African Sports Confederation and Olympic Committee (SASCOC):

SASCOC is mandated to promote and develop high performance of sports as well as to act as a controlling body for sports in South Africa. It can also assist to coordinate organise events at the dam.

4.2 ZONING PLAN

According to DWAF (2006), a site-specific master planning and zoning which describes a framework for the allocation of zones needs to be undertaken based on the results of the Encumbrance Survey and basic Research regarding the Bio-physical, Social and Cultural environment as well as the objectives set by the Stakeholders (refer to section **3.6**).

The proposed Zoning Plan will integrate conservation, recreation and development whilst not retarding the primary functions of the dam.

4.2.1 Water Surface Zoning

The water surface zoning provides guidance on permissible and non-permissible recreational activities on the water surface taking into account the biophysical factors of the dam. The Water Surface is zoned as follows:

Safety and Security Zone:

It covers a minimum of 100m area from the wall and outlet works indicated by demarcation markers and AtoN. This area is reserved for DWS management purposes.

Management of this zone is aimed at protecting the dam wall and outlet works, as well as to ensure the safety of the public. This is a no-go zone to the public unless authorised.

Conservation Zones:

The aim of this zone is to conserve and protect sensitive aquatic habitation at the inlet(s) of the dam. According to Section 12 and 26 of NWA, the existence of these zones is thus not negotiable as it is imperative to protect the water resource for the purposes relating to basic human needs, environmental sustainability and water quality requirements. Access to these areas is generally not allowed due to the following:

- The areas intercept sediments and nutrients/pollutants which pose safety risks to the public due to muddy clay, and
- They are used by aquatic birds and fish species as habitat, refuge and breeding areas.

Low Impact Activity Zone:

This zone act as a buffer between High Impact Activity Zones and Conservation Zones. Low Impact Activity Zone allows for low intensity activities, i.e. activities associated with little or no wake such as wind surfing, kayaking, swimming, rowing, sailing, paddle boating, float tubes, canoeing, angling, yachting, aquaculture and small scale fisheries.

High Impact Activity Zone:

This zone has the largest water surface area and is located where the reservoir is at its deepest. It caters for high impact activities associated with high speed, wake and noise activities such as motorised boating, house boating, water skiing, and para-sailing.

The water surface zoning colour coding means the following:

Colour	Zone Description
Red	Safety and Security Zone
Green	Conservation Zone
Sky Blue	Low Impact Activity Zone
Dark Blue	High Impact Activity Zone

 Table 12: Proposed Water Surface Zoning Description

Zone Name	Permissible Activities	Non Permissible Activities	Recommendations
 Safety and Security Zone 	 Alien invasive species clearing Management of dam infrastructure Management and maintenance activities by DWS and authorised personnel. 	 Public access 	 Area should be demarcated by dermacation makers and AtoN.
Conservation Zones	• None	 Public activities (to prevent aquatic habitats disturbance). 	 Area should be demarcated by demarcation makers and AtoN. Strict management and control of these areas, especially with regards to illegal fishing and dumping.
Low Impact Activity Zone	AnglingBass Boats	 Power boats: Jet skis Water skis 	 Area should be demarcated by demarcation makers and AtoN. Anglers on boats must move at slow speed and only during daytime due to the underneath and floating objects. The dam is infested with crocodiles, as such cautions must be taken when using angling boats.



Figure 24: The Proposed Water Surface Zoning Map

4.2.2 Shoreline Zoning⁵

In addition to the water surface zoning, an integral part of the RMP is also shoreline zoning, which provides guidance on what recreational activities (if any) are permissible and not permissible on the land adjacent to the dam (DWS purchased boundary). The management zones includes:

<u>Safety and Security Zone (dam wall and</u> <u>associated DWS infrastructure):</u>

It is applicable to the area surrounding the dam wall and the outlet works. The extent of this zone is determined by DWS and shall not be less than 100m from the dam wall and downstream. This area is reserved for DWS management purposes.

Management of this zone is aimed at protecting the dam wall and outlet works, as well as to ensure the safety of the public and surrounding areas. This is a no-go zone to the public unless authorised.

Conservation / Low Density Activity Zone:

This zone consists of ecologically sensitive areas and areas with high biodiversity. It also includes the area around the inlets of the dam. Access to this area is limited to low impact activities such as hiking, bird watching, etc. This area is reserved to prevent ecological damage due to development activities hence high impact development not permitted.

Medium Density Activity Zone:

This area is reserved for small scale activities such as day visitors, picnic areas, shoreline fishing, camping (tent and caravan), braai facilities, swimming pools, ablution facilities and infrastructure for services.

High Density Activity Zone:

This area is reserved for large scale activities including chalets, recreational club houses, infrastructure for services, and Land Based Aquaculture.

Community Resource Zone:

This zone is for the sole beneficiation of the local communities in ensuring that their livelihood is maintained and improved. Activities include subsistence fishing, livestock watering points, small scale community gardens, etc.

The shoreline zoning colour coding means the following:

Colour	Zone Description
Red	Safety and Security Zone
Green	Conservation/ Low Density Activity Zone
Yellow	Medium Density Activity Zone
Orange	High Density Activity Zone
Brown	Community Resource Zone

⁵Permanent structures within the purchase line are not allowed. All developments should be outside 1:100 year floodline.

Table 13: Proposed Shoreline Zoning Description

Zone Name	Permissible Activities	Non-permissible Activities	Recommendations
 Safety and Security Zone 	 Fire management Alien invasive species clearing Management of dam infrastructure Management and maintenance activities by DWS and authorised personnel 	 Unauthorised public access 	 A minimum area of 100m wide downstream the dam wall should be demarcated preventing public access and use.
 Conservation/ low density activity zone 	 Conservation management activities: Bird watching Academic Research 	• Development	 Permissible activities may only be permitted provided that they are approved by relevant Authorities and they are conduct as per the relevant Legislations. These zone should control access to ecological sensitive areas.
Medium Density Activity Zone	Shoreline fishing	 Accommodation facilities such as Chalets Recreational club houses Permanent Structures 	 The management of this area should follow PPP process in terms of the National Treasury. Requirements of NWA and NEMA must be taken into account in all recreational activities. All developments must be approved by DWS. No private slipways to be built without approval from DWS.
• High Density Activity Zone	 Recreational club house Infrastructure for Services 	Permanent Structures	 The management of this area should follow PPP process in terms of the National Treasury. Requirements of NWA and NEMA must be taken into account in all recreational activities. Noise level to be kept at a minimum. All developments must be approved by DWS. No private slipways to be built without approval from DWS.



Figure 25: The proposed Shoreline Zoning Map

Figure 25 below illustrate the proposed overall Zoning Map for Roodekopjes Dam.



Figure 26: The Proposed Overall Zoning Map

4.2.4 Carrying Capacity

The carrying capacity of a water resource represents the maximum level of users and related infrastructure that the water surface of the dam can accommodate, without diminishing user satisfaction, the economy and culture of the area.

The Carrying Capacity of Roodekopjes Dam was not calculated since angling is the only water sport allowed on the dam. This is because the dam is shallow with huge rocks, dry tree trunks, buildings, old fences and poles underneath the water. Many dangerous objects such as trees, drums and bottles also float on the water, and this can pose a threat to boaters.

4.3 STRATEGIC PLAN

The Strategic Plan is informed by the objectives identified by stakeholders and through research on potential opportunities at the dam.

Objectives of this plan are broken down into management fields:

- Objective (What do we want?)
- Motivation (Why do we want to achieve this?)
- Action Projects (How do we achieve this?)
- Management Support (Who will be involved?)

In **Tables 14 - 16**, the Strategic Plan on how to achieve the identified objectives identified regarding the dam is outlined.

Table 14: Strategic Plan for KPA 1: Resource Management

KPA 1: Resource Management			
Objective (What do we want)	Motivation (Why do we want to achieve this)	Action Projects (How do we achieve this)	Management Support (Who will be involved)
Alien Invasive Plants Control • To have Roodekopjes Dam free of alien invasive vegetation in order to support the proposed recreational activities and to maintain the native ecological aspect of the area.	 Roodekopjes Dam is infested with aquatic alien invasive plant species (Water Hyacinth) and the terrestrial alien invasive plant species (Giant Reed Grass). The further spreading of these species can have a detrimental effect on the ecology of the dam and the natural aesthetic of the area in general. They can also lower the diversity of aquatic animal species within the dam as well as hindering other proposed recreational activities such as boating. 	 Remove all alien invasive vegetation within the purchased boundary and the surrounding adjacent area. Manual removal is more environmental friendly and can also create jobs for people. Some of the resort owners are taking out hyacinth on a continuous basis. A cable to catch the hyacinths at the inflow can help to prevent the spreading of the plant into the dam. Rehabilitate areas infested with invasive alien vegetation with suitable species that are indigenous to the area. Proper supervision must be provided to the alien plants removal projects at the dam. This is to ensure that the work is completed within a specified period. Develop an inspection and cleaning mechanism (wash bay) to ensure that vessels entering the dam do not contaminate it with alien vegetation. 	 Department of Environmental Affairs (DEA): Working for Water (WFW) Department of Agriculture, Forestry and Fishery (DAFF): Land use and Soil Management section North West Expanded Public Works Programme (NEPWP) South African Biodiversity Institute (SANBI) DMC
 Water Quality To improve and maintain water quality standard of the dam. 	 The water quality is a key issue that needs to be addressed to ensure sustainable use of the dam by all. The water quality of the dam is deteriorating at an alarming rate. There is presence of excessive algae, debris and poorly treated sewage effluent). 	 Enforcement of all relevant environmental legislations (e.g. NWA and NEMA) at the dam can assist to improve the dam's water quality. The components of CIWSP should be implemented at the dam to achieve this objective. DWS should step in and assist the municipality upon evidence of their failure to abide by the minimum standards or requirements that have been defined by the green drop certification 	 DWS (Water Quality and River Health section) DMC Other Government Departments such as Environmental Affairs and NGOs that concern themselves with water quality and environmental health

KPA 1: Resource Management			
Objective (What do we want)	Motivation (Why do we want to achieve this)	Action Projects (How do we achieve this)	Management Support (Who will be involved)
	• Currently the dam is classified as hypertrophic and exhibits regular eutrophication problems. Poor water quality of the dam affects both the biodiversity and the recreational use of the dam.	 programme for Wastewater Treatment Quality Management Regulations. DAFF can assist local famers to rely more on organic fertilizers in order to reduce water pollution from agricultural effluents. All recreational activities must be monitored and evaluated to ascertain if there is any pollution threat to the dam. Frequent monitoring of water quality. 	
 <u>Mitigation of Crocodiles</u> <u>Attacks</u> To promote safety against crocodile attacks in the dam. 	 Roodekopjes Dam lies on the Crocodile River and it is infested with crocodiles which are widely considered as the dangerous animals. It was indicated during the Stakeholder meetings that many people have been attacked by crocodiles while fishing and boating at the dam. Although crocodiles are important part of the biodiversity, they pose danger to the tourists and patrons who access the dam. 	 Communication signage alerting people of areas populated with crocodiles and also alerting people on how to act when they come across crocodiles. Tourists/ patrons visiting the dam should take note of the safety boards with the information of prohibited activities in and around the dam. Dam Management Committee (DMC) to develop the animal control protocol. 	 DWS Department of Rural, Environment and Agricultural Development (READS) DAFF DMC
Biodiversity • To maintain and enhance the ecosystem's composition, functioning, integrity and character over time and space. Also to utilize the dam in a sustainable and appropriate manner to	 According to DEA (2005), Roodekopjes Dam has some surrounding wetland habitat which attracts water birds (approximately 257 different red data bird species were attracted to the dam due to its diverse biodiversity). For these reasons it is desirable to maintain and improve the ecological state 	 Develop an integrated Environmental Management System (EMS) for the dam. Undertake a biodiversity assessment and prepare a biodiversity management plan. Install buoys at the Conservation Zones. Sustainability of the high recreational value of the dam will be measured by the increase in number of tourists per year, economic growth and development of human capital. 	 READS DMC Local conservation initiatives Bird Watchers, Eco Care Trust, Dendrological, etc

KPA 1: Resource Management			
Objective (What do we want)	Motivation (Why do we want to achieve this)	Action Projects (How do we achieve this)	Management Support (Who will be involved)
support current and future generation needs.	and also to minimize, remediate and mitigate any adverse effects.	 Enforcement of all relevant environmental Legislations. 	
 To update the existing Zoning Plan which will integrate conservation, recreation and development whilst not retarding the primary functions of the dam. 	 The Zoning Plan for Roodekopjes Dam was developed in 1999. However, the plan did not consider economic and social issues, and lacked guidelines regarding institutionalisation, capacitation and empowerment for the implementation of the plan. The existing zoning map will be updated in accordance to the DWS zoning plan guidelines and it will take into account the current recreational activities and facilities as well as the identified objectives. 	 The Zoning Plan should accommodate all feasible recreational activities within the purchased boundary. Implementation of standardised and harmonised AtoN and demarcation markers. Implement all other aspects of the CIWSP best practice model. Establish density controls for activities and facilities that requires carrying capacity assessments (i.e. number of vessels per hectare). 	• DWS • DMC
 <u>Safety</u> Improved safety of navigation 	 There is no standardised and harmonised AtoN and demarcation markers available at the dam. 	 To improve safety of navigation through the implementation of standardised and harmonised AtoN and demarcation markers as directed by SAMSA. 	 DWS to facilitate the process Agreements between SAMSA, DWS, LAAPs and other relevant parties to be concluded

Table 15: Strategic Plan for KPA 2: Resource Utilisation

	KPA 2: Resource Utilisation			
Objective (What do we want)	Motivation (Why do we want to achieve this)	Action Projects (How do we achieve this)	Management Support (Who will be involved)	
 Improve Access Control To provide equitable, compactable and adequate access control at the dam. 	 Roodekopjes Dam is being utilised by various people and as a result there is a need for adequate access control to prevent vandalism of the dam's fence and gates as well as to ensure users safety. 	 Access to the dam must be accessible, equitable and safe to all users. Establishment of dam rules in terms of DWAF Regulation R654 relating to access to the dam, fees payable for access, safety measures, speed limit applicable on the ring roads around the dam and the time in which the dam will be open to the public. Educate the Local Communities about the importance of safety measures around the dam basin in order to curb vandalism of the dam's properties. Access fee to the dam should be prescribed in terms of the S113 and S56 of NWA. The fees can be utilised to maintain the dam as well as to create job opportunities such as cleaners, security, etc. The entry fee need to be reasonable to ensure that the dam remains an affordable destination for all. 	• DWS • DMC	
 Access Roads To upgrade the existing gravel roads at the dam 	• There is currently gravel roads (to the dam and internal), and during the rainy reasons, it becomes difficult for users to access the dam.	• Upgrading of the gravel roads to tar, for ease access to the dam.	 MLM DWS DMC 	
 Public Safety To ensure public safety regarding the recreational use of the dam. To meet the user needs and satisfy government 	 The crime rate at the dam is a deterrent factor which prevent tourism to grow at Roodekopjes Dam. Currently there is no overarching safety system at the dam which is 	 Establishment of Community Police Forum (CPF). Establishment of fence all around the dam to prevent access of criminals to the dam. Appoint safety officers to monitor dam access points and to ensure that the dam safety rules are adhered to at all times. 	 South African Police Service (SAPS) South African Martine Authority (SAMSA) DWS DEA 	

KPA 2: Resource Utilisation			
Objective (What do we want)	Motivation (Why do we want to achieve this)	Action Projects (How do we achieve this)	Management Support (Who will be involved)
requirements regarding the standard of activities and facilities, appropriateness of land use, compliance with applicable legislation and rights of use as well as access to the dam.	also preventing some of the angling competition to take place.	 DMC in conjunction with SAPS to develop and establish safety plan in the area. Implementation of DWS Incident Management System. Develop information material (i.e. signage and pamphlets, etc.) to convey safety rules at the dam. 	• DMC
 Bird Watching To establish bird watching and environmental education. 	 According to DEA (2005), Roodekopjes Dam has some surrounding wetland habitat which attracts water birds. The dam has attracted approximately 257 different red data bird species due to its diverse biodiversity. Bird watching is a fascinating, ever changing activity that increases awareness and appreciation of natural wildlife. Bird watching and environmental education trips can be linked to skills development and job creation initiative e.g. tourist guides. 	 Construction of bird tower height. Sufficient skilled guides to undertake the guiding of bird watching. Development of bird conservation plan. 	 Bird Watchers Eco Care Trust Bird Life South Africa to train the guides more about the bird's species and bird conservation and also how to make the bird watching an exciting experience for the tourists
 Sustainable Fishing To promote sustainable subsistence fishing at the dam. To promote sustainable angling as a sport. 	 Roodekopjes Dam is rich in fish diversity which plays a major role in the ecological balance of the aquatic ecosystem and also serve as a food source for local subsistence fishermen. However, the dam used to contain sixteen (16) fish species and only five (5) 	 Preserve the core habitats for nesting, resting, feeding and breeding of fish within the inlets. Management authority or DWS must develop a communication signage in order to effectively inform different angling groups about the dam fishing rules. Appoint safety officers that will monitor compliance of the dam fishing rules. 	 South African Sports Angling and Casting Confederation (SASACC) South African Sports Confederation and Olympic Committee (SASCOC)

KPA 2: Resource Utilisation			
Objective (What do we want)	Motivation (Why do we want to achieve this)	Action Projects (How do we achieve this)	Management Support (Who will be involved)
	 fish species are currently left due to extensive illegal gill netting. Subsistence fishing by the local community remains an active use of the dam, however, this must be regulated by relevant policy to avoid overfishing within the dam. The dam is very popular for angling competitions, which target carp and catfish. It is currently a fixture on the Gauteng leg of the SA Bass Cast for Cash tournament trail. Angling is most probably the paramount contributor towards socio –economic development at Roodekopjes Dam. 	 Trainings should be provided to local subsistence fishers, to support subsistence fishing. Harvesting should be adapted to the capacity of the fish stock to renew themselves. If the decline of stocks is unavoidable, the dam can be stocked with fish naturally occurring in the dam. Generate the necessary infrastructure, such as banks to fish from in order to support the growth of angling tourism at the dam. 	 DWS READ DAFF Other relevant conservation NGOs within the Brits Area must be involved
Aquaculture: Introduction of Aquaculture a the dam.	 There is a potential for Aquaculture due to diversity of fish species in the dam. Small-scale fisheries will make an important contribution to nutrition, food security, sustainable livelihoods and poverty alleviation to the local community. 	 Conduct a feasibility study to determine the viability of introducing aquaculture at the dam. Provide training to workers. Appoint Safety Officer that will monitor compliance of the fishing rules. 	 DAFF READS MLM DWS DMC
 Dam Rules and Enforcement To provide recreational users with clear rules and to be delegated with the authority to enforce them. 	 There are lot of illegal activities undertaken at the dam such as gill netting, unauthorised developments, crime, etc. Furthermore, noise pollution coming from the informal 	 Enforcement officers will be required to effectively implement the rules. Develop information material (signage, pamphlets, etc.), to convey the dam rules. Implementation of CIWSP to promote safety at the dam. 	 DWS DMC Enforcement Officers may require support and expertise from other security agencies,

KPA 2: Resource Utilisation			
Objective (What do we want)	Motivation (Why do we want to achieve this)	Action Projects (How do we achieve this)	Management Support (Who will be involved)
	settlements in the vicinity of the dam have been reported to be one of the huge nuisance factor as it cause disturbance to other users and as well as residents around the dam. In this regard, the dam rules should be established and enforced to control the use and management of the dam.		such as the SAPS to enforce the dam rules. This is because it has been reported that some of the illegal fishers are aggressive towards the dam management authorities

Table 16: Strategic Plan for KPA 3: Benefit Flow Management

KPA 3: Benefit Flow Management			
Objective (What do we want)	Motivation (Why do we want to achieve this)	Action Projects (How do we achieve this)	Management Support (Who will be involved)
<u>Community Participation and</u> <u>Beneficiation</u> • Uplift the Local Economy and increase Benefit Flows to the surrounding communities through community empowerment.	• Tourism sector have been identified as a vehicle for skills development, job creation, Broad- Based Black Economic Empowerment (BBBEE), etc. it is imperative that the local communities derive benefits from recreational activities conducted at the dam.	 Implement skills development programmes where opportunities exist. Implementation of environmental education to the local communities and ensure that they are always updated with environmental information. Educate the community on how to utilise the dam for other recreational activities besides fishing. This will assist in terms of uplifting the surrounding local community. 	 Relevant Municipal Departments such as Local Economic Development must be involved DMC
Institutional Arrangements	• According to the RMP guidelines,	• The institutional structure must be representative	• DWS
• To establish an effective	an effective institutional structure	of all Stakeholders.	
institutional structure that	must be established in terms of		
can manage the use of water	DWAF's considerations on the		
ROODEKOPJES DAM RESOURCE MANAGEMENT PLAN

KPA 3: Benefit Flow Management			
Objective (What do we want)	Motivation (Why do we want to achieve this)	Action Projects (How do we achieve this)	Management Support (Who will be involved)
for recreational purpose in an acceptable manner, which is also representative of all the Stakeholders.	 Institutional Arrangements for Managing Use of Water for Recreational Purposes guideline (2003). There is currently no recreational institutional structure to manage the dam. However, as part of the RMP process a recreational Institutional Plan for Roodekopjes Dam will be established. 	• The roles and responsibilities of the role players must be clearly defined and understood.	

4.4 FINANCIAL PLAN

The RMP provides guidance on cost recovery mechanisms to ensure the sustained and improved management of the dam. There are opportunities for PPPs which could further unlock the economic potential of the dam. PPPs allows for DWS to make State Assets such as GWWs available to private parties who wish to engage in tourism related commercial operations (DWAF, 2009). PPPs should be established as per Regulation 16 of the National Treasury.

The dam is a State asset and as such all profits generated from the recreational use, should also be used to further develop the dam. The public should not be denied access to the dam. All fees associated with the usage of the dam for recreation should take into account the socioeconomic status of the users. The access fees should make a provision for equitable access.

A more detailed Financial Plan (FP) is contained in the Business Plan (BP) (volume 5 of 5), which will facilitate the implementation of the RMP by providing implementation program cost estimate for all possible economic recreational activities. The information acquired from the RMP will be used to produce the BP based on the action projects for each objective as stipulated under the Strategic Plan. However, many of the identified objectives are not of commercial nature and as such these non-economic objectives will not feature in the BP.

The BP provides a good description of possible economic recreational activities and the methods that can be used or enhanced to achieve the ultimate vision and the key objectives of Roodekopjes Dam RMP. It also describes the financial management and operational requirements to implement the Objectives of the RMP.

THE WAY FORWARD

5.1 REVIEW OF RMP

According to DWAF (2006), the RMP is reviewed and updated every five (5) years to ensure that

the management objectives remain relevant and management actions are continually improved. The BP is updated annually. The figure below show the RMP & BP review framework.



Figure 27: RMP Review Framework

CONCLUSIONS

The RMP documents the challenges that can significantly impact on the utilisation and management of the Roodekopjes Dam and it's surrounding for recreational purposes. Such factors include biophysical, socio-economic, hydrological as well as access to the resource. These factors will assist DWS with the most appropriate approach to ascertain that the issues are addressed before the implementation of the RMP.

The RMP will assist in effectively managing the dam and its surrounding environment. Furthermore its function is to implement recreational **Institutional Plan** for the effective management of dam. The focus on Institutional Plan is accompanied by a **Zoning Plan** which provides guidance on potential activities that are allowed on the dam, together with a **Strategic Plan**. Moreover, the RMP promotes community

participation and beneficiation, through Stakeholders engagement which were conducted to obtain common key objectives to be met by the RMP. The vision for the dam was formulated from the key common objectives identified by Stakeholders. Based on the strategic objectives identified for Roodekopjes Dam, a BP will be developed to describe a manner in which the potential recreational activities are to be financially resourced.

In addition, by including the RMP in the Local Initiatives such as IDPs, LED, etc. can ensure effective co-operative governance as well as to provide necessary support with regards to the use of dam for recreational purposes. Undertaken in this manner, it is believed that the potential of the water resource can be optimally unlocked in a sustainable and equitable manner.

REFERENCES

Census, (2011). Statistical Release – Statistics South Africa.

Data.ORG, C. (2016, 10 15). <u>http://en.climate-data.org/.</u> Retrieved from <u>http://en.climate-data.org/location/7152/.</u>

Department of Environmental Affairs, (March, 2005). State-of-Rivers Report: Monitoring and Managing the Ecological State of Rivers in the Crocodile (West) Marico Water Management Area.

Department of Water Affairs and Forestry, (1996). South African Water Quality Guidelines, Volume 2 - Recreational Water Use Manual Guideline.

Department of Water Affairs and Forestry, (1999). Roodekopjes Dam Zoning Plan.

Department of Water Affairs and Forestry, (2001). Generic Public Participation Guideline.

Department of Water Affairs and Forestry, (2003), Institutional Arrangements for Managing Use of Water for Recreational Purposes.

Department of Water Affairs and Forestry, (2006), Guidelines for the Compilation of Resource Management Plans, Guideline Program 2 - Recreational Water Use

Department of Water Affairs and Forestry, (2006). Recreational Water Use Manual Guideline.

Department of Water Affairs, (2008). Bulk Water Infrastructure.

Department of Water Affairs, (2016). Dam Water Levels

Department of Water Affairs, (September, 2015). List of registered dams.

Department of Water Affairs, .Republic of South Africa (RSA). Report on the Roodekopjes Dam Government Waterwork (Crocodile River, Western Transvaal). Pretoria: Doc. No. W.P. P-'74.

Department of Water and Sanitation (2013). National Water Resource Strategy (NWRS2)

Mogakabe, D.E. and Van Ginkel, C.E, (2008). The water quality of Roodekopjes Dam. Internal Report No. N/0000/00/DEQ/0108 for the Department of Water Affairs and Forestry, South Africa.

Mucinah, L and Rutherford, M.C, (2006). Vegetation of South Africa, Lesotho, and Swaziland. South African Biodiversity Institute, Pretoria, South Africa.

Quantec, (17/04/2015), Easy Data Report.

South African National Biodiversity Institution <u>Www.bgis.sanbi.org</u> (June 2016).

South African Weather Service. (2016, 10, 12). http://www.weathersa.co.za/. Retrieved from http://www.weathersa.co.za/nw.

Tapela, B. N, Britz, P. J and Rouhani, Q. A., (2015). Baseline and Scoping Study on the Development and Sustainable Utilisation of Storage Dams for Inland Fisheries and their Contribution to Rural Livelihoods. WRC Project No. K5/1957/4'.

Van der Walt, J.J., van der Walt C.J. and AD Ceronio, A.D, (2004). Playing catch-up with catchment water quality the Vaalkop water treatment plant upgrade case study.

APPENDICES