Department of Water and Sanitation

NATIONAL WATER RESOURCE INFRASTRUCTURE (NWRI)

Resource Management Plan

BRONKHORSTSPRUIT DAM

REPORT – Volume 4 of 5

December 2016

WATER IS LIFE - SANITATION IS DIGNITY

water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

2030 NDP

Prepared by:

ENGINEEREX (PTY) LTD
Boardwalk Office Park,
107 Haymeadow Street
Faerie Glen
Pretoria
0043

Tel: 012 664 1180
Fax: 012 664 1165
Website: **www.engineerex.co.za**

Prepared for:

DEPARTMENT OF WATER AND SANITATION
Private Bag X313
Pretoria
0001

Tel: 012 336 8582
Fax: 012 324 6692
Website: **www.dws.gov.za**

ACKNOWLEDGEMENTS

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- Centre for Public Service Innovation (CPSI);
- City of Tshwane Metropolitan Municipality;
- Department of Environmental Affairs;
- Department of Public Works;
- Department of Water and Sanitation;
- Recreational clubs at the dam;
- The adjacent landowners; and
- The community members of ward 102.

Acknowledgement is also extended to other Stakeholders, not listed above, who attended and participated in the Stakeholder engagements.

TITLE AND APPROVAL PAGE

Recommended:

Name	Title	Signature	Date
Lucky Mzanywa	Project Manager: National Water Resource Infrastructure: Integrated Environmental Engineering (NWRI: IEE)		
Thanduxolo Dlamini	Director: Northern Operations, NWRI		
Leonardo Manus	Chief Director: Infrastructure Operations, NWRI		

Approved:

Name	Title	Signature	Date
Zandile Mathe	Deputy Director General: NWRI		

Review:

Review Period	Month	Year				
Annual Review of Business Plan	December	2018[1]	2019	2020	2021	2022
Five (5) Yearly Review of RMP	December	2022				

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

AMENDMENTS PAGE

Revision No	Description	Date
1	Draft RMP for DWS Review	19/09/2015
2	Draft RMP for DWS Review	28/11/2015
3	Draft RMP for Public Review	17/12/2015
4	Draft RMP for DWS Review	15/03/2016
5	Final RMP for DWS Review	30/11/2016
6	Final RMP for DWS Approval	14/12/2016

LIST OF ACRONYMS

ADU	Animal Demography Unit
AGIS	Agriculture Geo-Referenced Information System
AtoN	Aid(s) to Navigation
BDNR	Bronkhorstspruit Dam Nature Reserve
BGIS	Bio-diversity GIS
BID	Background Information Document
BP	Business Plan
CATHSSETA	Culture, Arts, Tourism, Hospitality, Sports Sector, Education and Training Authority
CD: IO MANCO	Chief Director: Infrastructure Operations Management Committee
CIWSP	Cooperate Inland Waterways Safety Programme
CoT	City of Tshwane Metropolitan Municipality
CPSI	Centre for Public Service Innovation
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DHS	Department of Human Settlement
DMC	Dam Management Committee
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
DWS	Department of Water and Sanitation
ECC	Effective Carrying Capacity
ECHOS	Environmental Characteristics Opportunity Spectrum
EMF	Environmental Management Framework
FP	Financial Plan
FSL	Full Supply Level
GDARD	Gauteng Department of Agriculture and Rural Development
GDP	Gross Domestic Product
GIAMA	Government Immovable Asset Management Act
GN	Government Notice
GP	Guidelines-Program
GPS	Global Positioning System
GVA	Gross Value Added
GWWs	Government Waterworks
I&APs	Interested and Affected Parties
IA	Implementing Agency
IALA	International Association of Marine Aids to Navigation and lighthouse Authority
IDP	Integrated Development Plan
IEE	Integrated Environmental Engineering
IRMP	Integrated Resource Management Plan
KPA	Key Performance Area
LED	Local Economic Development
MAP	Mean Annual Precipitation
MAT	Mean Annual Temperature

MOA	Memorandum of Agreement
NDT	National Department of Tourism
NEMA	National Environmental Management Act
NEMBA	National Environmental Management: Biodiversity Act
NEMPAA	National Environmental Management Protected Areas Act
NPSC	National Project Steering Committee
NT	National Treasury
NWA	National Water Act
NWRI	National Water Resource Infrastructure
OMC	Operations Management Committee
PCC	Physical Carrying Capacity
PP	Public Participation process
PPP	Public Private Partnership
RIDP	Regional Integrated Development Plan
QDS	Quarter Degree Square
RCC	Real Carrying Capacity
RMP	Resource Management Plan
RWU	Recreational Water Use
NPSC	Project Steering Committee
PSP	Professional Service Provider
SAMSA	South African Maritime Safety Authority
SAPS	South African Police Service
SASCOC	South African Sports Confederation and Olympic Committee
SDF	Spatial Development Framework
SWOT	Strengths, Weaknesses, Opportunities and Threats
TAL	Total Alkalinity
ToR	Term of Reference
WfW	Working for Water
WMA	Water Management Area
WWTW	Wastewater 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 Bronkhorstspruit 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 Bronkhorstspruit Dam.

Purpose of 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 socio-economic 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: Bronkhorstspruit Dam is an Concrete Arch type of dam which impounds Olifants River Catchment Area (Upper Olifants). It falls under Ward 102 in Region 7 of City of Tshwane Metropolitan Municipality (CoT), in Gauteng Province, South Africa. Its GPS coordinates are: **25°54'2.37"S 28°41'36.81".E**

Purpose of the Dam: The primary purpose of Bronkhorstspruit Dam include domestic water supply and industrial use.

The dam also currently offers recreational activities such as recreational resorts and private estate. It is a magnet for boating and water sports such as sailing, jet skiing, fishing and parasailing.

Dam ownership and management: Bronkhorstspruit Dam is owned and operated by DWS. There is currently no institutional structure to manage recreational use of the dam and as part of the RMP process, such structure has been proposed. The recreational institutional structure will assist to effectively manage the Bronkhorstspruit 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 was formulated by the stakeholders.

The identified key common objectives are:

- To improve and maintain a high water quality standard for the dam;
- To minimize the Alien Invasive Species at the dam;
- To maintain the biodiversity of the area, as recently there have been fish mortality as the dam is classified as hypertrophic and exhibits regular eutrophication problems;
- To maintain the adequate public access for broader public use of the dam;
- To promote sustainable fishing as a renewable resource;
- To establish capacity building and training within the local communities; and
- To ensure that a suitable and efficient Institutional Structure with appropriate powers and delegations is in place.

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

"A commitment to protect, manage, control and utilize the resource in a sustainable, equitable and effective manner in order to maximise the recreation potential of the dam and also to ensure that the use of the dam is beneficial to both the local communities and the water users".

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 Bronkhorstspruit Dam that could enhance tourist attraction:

- Introducing large sporting events.

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CHAPTER 1: INTRODUCTION

1.1 BACKGROUND OF BRONKHORSTSPRUIT DAM

Bronkhorstspruit Dam is situated within Ward 102 within Region 7 of City of Tshwane Metropolitan Municipality (CoT). Communities adjacent to the dam includes Viljoenskop and Kungwini Country Estate (See Figure 1 for the Locality Map). The dam is located 10 km north eastern side of the Bronkhorstspruit Town. The dam can be accessed through the R42 and R25 roads. The dam falls within the Quaternary Drainage Area B20C of Olifants River Catchment Area (Upper Olifants).

Bronkhorstspruit dam was established in 1950 at the confluence of the Bronkhorstspruit and Os Spruit. The Global Positioning System (GPS) co-ordinates of the dam are **25°54'2.37"S 28°41'36.81"E**. Part of the dam is situated within the Bronkhorstspruit Dam Nature Reserve (BDNR).

The primary purposes of the dam include domestic water supply and industrial use. The shoreline of the dam is a home to numerous recreational resorts and private estate. It is a magnet for boating and water sports such as sailing, jet skiing, fishing and parasailing. Table 1 provides the dam profile.

According to (Mucina & Rutherford, 2006), the study area is located within the Gauteng Highveld where the climate is typically mild, or cool to moderate, with warm and wet summers and cool dry winters. The average minimum and maximum temperatures recorded for the region are 3^0C and 27^0C respectively, with the summer maximum averaging at 26^0C, the winter maximum averaging at 9.8^0C. The winter months (June to August) are characterised by intermittent cold spells, especially during July and August and occasionally during September.

The rainy season occurs roughly from October to March with an average rainfall of 700mm being recorded, although this varies from 559mm to 960mm. The vast majority of the rainfall occurs in the form of short-duration, high-intensity thunderstorms with extreme weather conditions (hail, fog and snow) rarely occurring. The average relative humidity throughout the year can range from 38-69%.

The winter air is typically dry, with the long clear nights and the absence of wind resulting in the occurrence of frost on average 30 days per year.

Table 1: Bronkhorstspruit Dam Profile

Dam Profile for Bronkhorstspruit	
Location	South Africa
Province	Gauteng
Metropolitan Municipality	City of Tshwane Metropolitan Municipality
Nearest Town	Bronkhorstspruit Town
Completion Year	1950
Co-Ordinates	25°54'2.37"S 28°41'36.81"E
Purpose	Domestic water supply and Industrial use
Owner	DWS
WMA	Olifants Catchment Management Agency
Quaternary Catchment	B20C
Catchment Area (km^2)	1 263.0
River	Bronkhorst Spruit and Os Spruit
Capacity (m^3)	57 913
Surface Area (ha)	860.9
Wall Height (m)	35.2
Length (m)	152.4

Source: Department of Water Affairs (List of registered dams; April 2014).

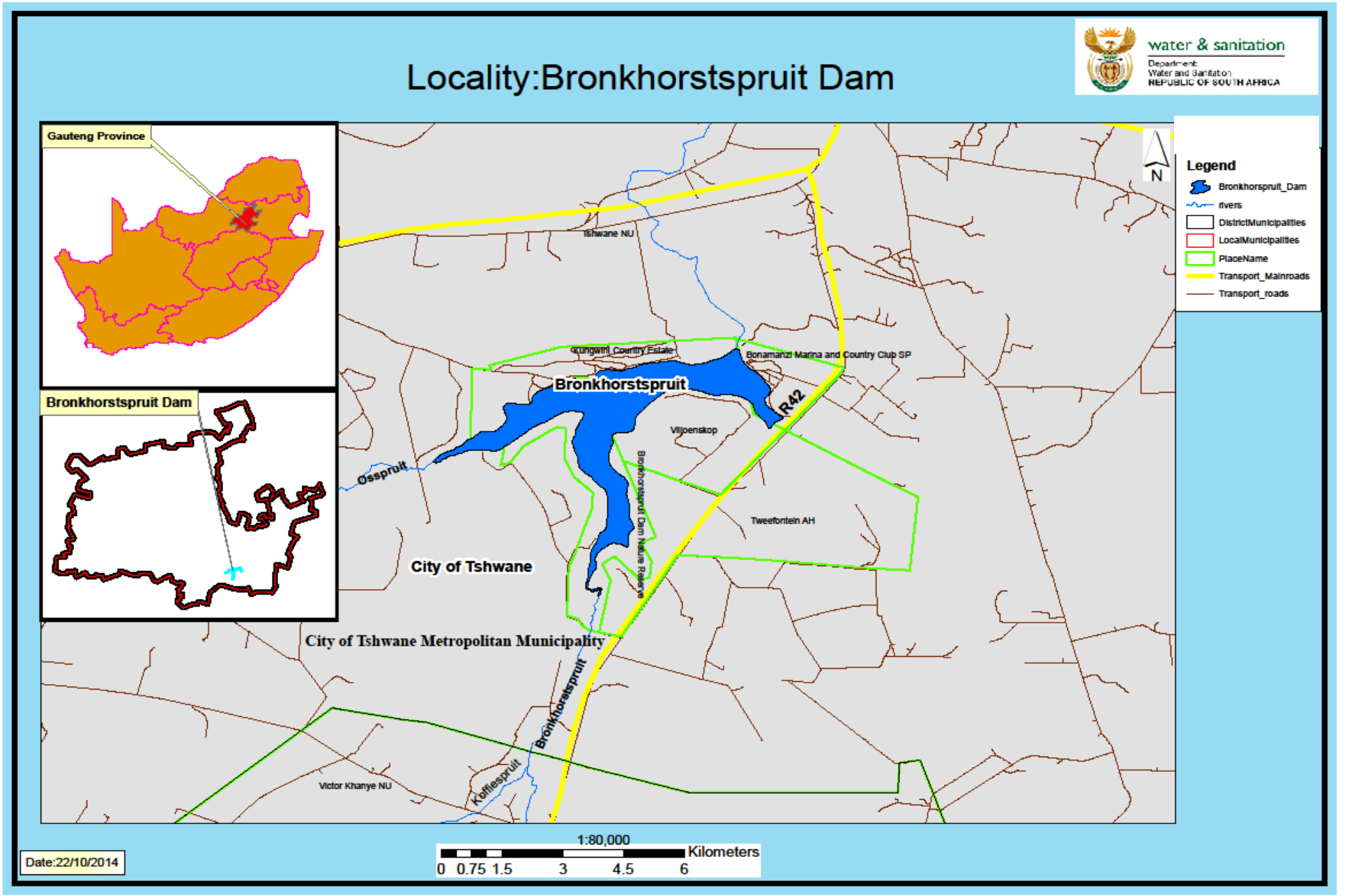

Figure 1: Locality Map for Bronkhorstspruit Dam

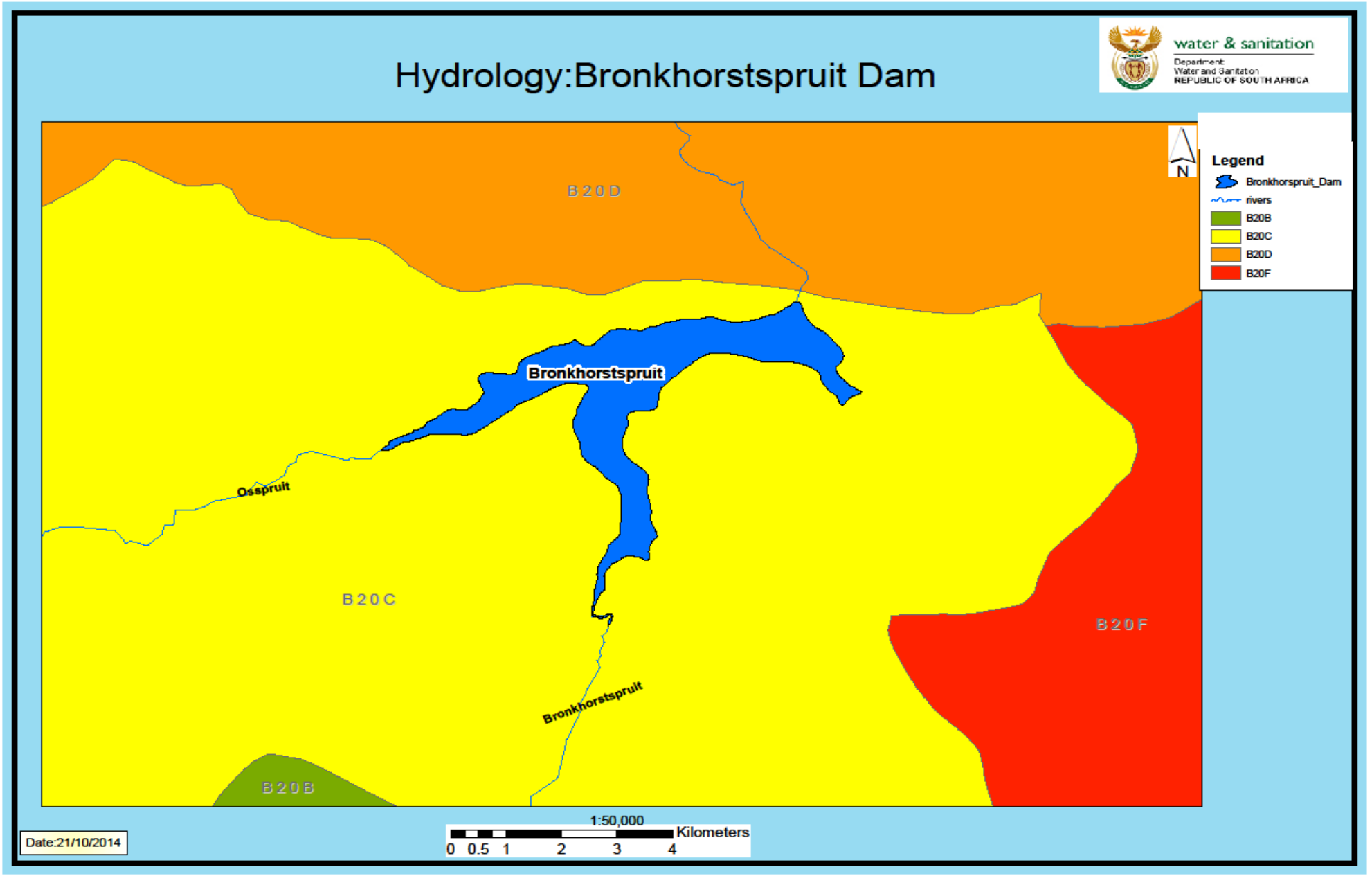

Figure 2: Hydrological Map for Bronkhorstspruit Dam

Overview of Olifants River Catchment Area

The dam falls within the Quaternary Drainage Area B20C of Olifants River Catchment Area (Upper Olifants). Currently, there is a proposal to establish a Catchment Management Agency (Government Notice, No. 37675). The reasons for the establishment of the CMA were: **1.** to achieve equitable access to the water, **2.** to achieve sustainable use of water and **3.** to achieve efficient use of water.

The Olifants Water Management Area covers an area of approximately 54 570 km^2 in extent. The WMA includes parts of Gauteng, Limpopo and Mpumalanga Provinces, and includes eight District Municipalities and 25 Local Municipalities. There are three distinct zones, with the Upper Olifants draining the Mpumalanga and Gauteng Highveld and effectively ending with the Loskop Dam.

The Middle Olifants is from Loskop Dam to the Escarpment and includes the Flag Boshielo and De Hoop dams, while the Lower Olifants extends from the escarpment, through Sekhukhuneland and a number of conservation areas, the Kruger National Park and on into Mozambique.

According to River Health Programme (2011), the WMA is characterised by the following economic activities:

- The main economic sectors in the catchment are mining and associated industries on the Highveld and more recently in the platinum belt, along what is known as the Eastern Limb, agriculture, and tourism. Coal mining is the predominant activity, with platinum and other precious metals (gold, copper, etc.) of growing economic importance.
- Whilst agriculture uses the bulk of the available water (60% - excluding power generation), it makes a relatively small contribution to the Gross Domestic Product (GDP), although critical to livelihoods and employment.
- Tourism is recognized as one of the growing sectors in the WMA. The contribution of the Kruger National Park, in drawing international visitors, is not only to the WMA and the region, but to the country as a whole.

Table 2: Catchment Characteristics

Catchment Characteristics	
Olifants River Catchment	54 570 km^2
Mean annual precipitation (MAP)	325 mm/a to 750 mm/a
Mean annual evaporation	1300mm to 1700mm
Mean annual runoff (MAR)	2400 million cubic metres

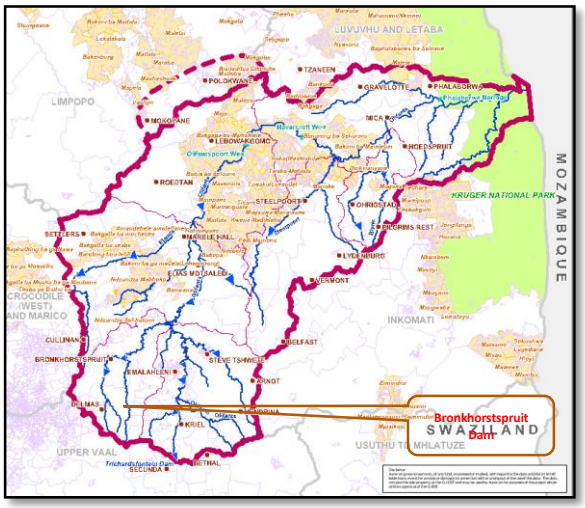

Figure 3: Overview of Olifants River Catchment Area (Source: DWS, 2015)

1.2 BIOPHYSICAL ENVIRONMENT

1.2.1 Climate

According to (Mucina & Rutherford, 2006), the study area is located within the Gauteng Highveld where the climate is typically mild, or cool to moderate, with warm and wet summers and cool dry winters. The average minimum and maximum temperatures recorded for the region are 3^{0}C and 27^{0}C respectively, with the summer maximum averaging at 26^{0}C and the winter maximum averaging at 9.8^{0}C. The winter months (June to August) are characterised by intermittent cold spells, especially during July and August and occasionally during September.

The rainy season occurs roughly from October to March with an average rainfall of 700mm being recorded, although this varies from 559mm to 960mm. The vast majority of the rainfall occurs in the form of short-duration, high-intensity thunderstorms with extreme weather conditions (hail, fog and snow) rarely occurring. The average relative humidity throughout the year can range from 38-69%.

The winter air is typically dry, with the long clear nights and the absence of wind resulting in the occurrence of frost on average 30 days per year. The prevailing wind directions and velocities throughout the year are indicated in the **Table 3**.

Table 3: Prevailing wind direction and speed around the dam.

Month	Prevailing Direction	Average Wind Speed m/sec
January	Northwest	3.52
April	Northwest	3.01
July	North West	3.27
October	Northwest and Southeast	4.21

1.2.2 Flora

According to (Mucina & Rutherford, 2006), *(*using Acocks veld type classification system), the dam is located within False Grassveld Types, which is further classified as Rand Highveld Grassland by Bgis. This Grassland is critically endangered and poorly conserved. Approximately half of this grassland has been transformed mostly by cultivation, plantations, urbanization or dam-building.

It is home to vast different plant species such as Graminoids: *Ctenium concinnum, Cynodon dactylon, Digitaria monodactyla, Setaria sphacelata*.
Herbs: *Acanthospermum austral, Justicia anagalloides, Xerophyta retinervis*.

The dam's shoreline is heavily infested by the waterweeds and invasive plants species such as willows, grey poplar, pompom weeds, etc.

The site inspection conducted on **04 February 2015,** there were lot of grass and floating plants observed within the dam, refer to **Figure 4**.

Figure 4: Floating plants *(Potamogeton Schweinfurthili)* and grass observed within the dam

1.2.3 Fauna

1.2.3.1 Amphibians Species

According to the Frogmap Atlas, fourteen (14) species were found in the 2528DC Quarter Degree Square (QDS) (Avian Demography Unit 2015) including the near Threatened Giant Bull Frog.

Table 4: Frog Species occurring in 2329DD QDS (ADU 2015)

Genus	Species	Common name	Red list category
Amietophhrynus	*gutturalis*	Guttural Toad	Least Concern
Amietophhrynus	*rangeri*	Raucous Toad	Least Concern
Schismaderma	*carens*	Red Toad	Least Concern
Kassina	*senegalesis*	Bubbling Kassina	Least Concern
Xenopus	*laevis*	Common Platana	Least Concern
Ptychadena	*anchietae*	Plain Grass Frog	Least Concern

Genus	Species	Common name	Red list category
Phrynobatrachus	*natalensis*	Snoring Puddle Frog	Least Concern
Ptychadena	*porosissima*	Striped Grass Frog	Least Concern
Amietia	*quecketti*	Drakensberg River Frog	Least Concern
Cacosternum	*boettgeri*	Common Caco	Least Concern
Pyxicephalus	*adspersus*	Giant Bull Frog	Near Threatened
Strongylopus	*fasciatus*	Striped Stream Frog	Least Concern
Tomopterna	*cryptotis*	Tremelo Sand Frog	Least Concern
Tomopterna	*natalensis*	Natal Sand Frog	Least Concern

- Largemouth Bass *(Micropterus salmoides);*
- Carp *(Cyprinus carpio);*
- Catfish *(Clarias gariepinus); and*
- Canary Tilapias *(Chetia flaviventris).*

1.2.3.3 **Reptiles**

Ninety four (94) reptile species were recorded within 2528DC QDS (ADU, 2015), most of these species are listed as least concern. Species such as *Homoroselaps dorsalis* (Striped Harlequin Snake) *and Chamaesaura aenea* (Coppery Grass Lizard) are listed as near threatened species whereas *Crocodylus Niloticus* (Nile crocodile) is listed as vulnerable species.

1.2.3.4 **Mammals**

Sixteen (16) mammal species were recorded within 2528DC QDS (ADU, 2015). The mammal species are tabulated in **Table 5**.

1.2.3.2 **Fish Species**

According to the Technical Report – Assessment of Bronkhorstspruit Dam and related ecosystem by Kruger (n.d) on behalf of Tshwane Nature Conservation, approximately eight (8) fish species both indigenous and invasive are found within the dam.

The report further suggested that the following fish species be removed from the dam:

Table 5: Mammal Species occurring in 2528DC QDS (ADU 2015)

Genus	Species	Common name	Red List Category [2]
Aepyceros	*melampus*	Impala	Least Concern
Alcelaphus	*buselaphus*	Hartebeest	Not Listed
Damaliscus	*pygargus*	Blesbok	Least Concern
Taphozous	*mauritianus*	Mauritian Tomb Bat	Least Concern
Elephantulus	*myurus*	Eastern Rock Elephant Shrew	Least Concern
Aethomys	*namaquensis*	Namaqua Rock Mouse	Least Concern
Mus	*minutoides*	Southern African Pygmy Mouse	Least Concern

[2] Friedmann, Y. & Daly, B. 2004. Red data book of Mammals of South Africa

Genus	Species	Common name	Red List Category [2]
Otomys	*auratus*	Southern African Vlei Rat	Not Listed
Rhabdomys	*pumilio*	Xeric Four-striped Grass Rat	Least Concern
Tatera	*brantsii*	Highveld Gerbil	Least Concern
	leugogaster	Bushveld Gerbil	Data Deficient
Crocidura	*maquassiensis*	Makwassie Musk Shrews	Vulnerable
Suncus	*infitesimus*	Least Dwarf Shrew	Data Deficient
Myotis	*welwitschii*	Welwitsch's Myotis	Near Treatened
Neoromicia	*capensis*	Cape Serotine	Least Concern
Scotophilus	*dinganii*	Yellow-bellied House Bat	Least Concern

Figure 5: Mammals observed within BDNR

1.2.4 Topography

The area slopes are gentle around the dam except at the northern shore of the dam, where it is steep and highly developed as illustrated by **Figure 6** and **Figure 7** showing the Slope Map. The elevation changes from 1 435 m at the lowest point to 1 462 m above mean sea level. The general slope angles ranges from 2% to 5% around the dam except the northern shoreline slope which ranges from 9% to 20%.

Figure 6: Steep slope near the dam wall

1.2.5 Geology and Soils

According to available Geological Map, the dam is located within Quartzite ridge of the Witwatersrand Supergroup and the Pretoria Group as well as the Selons River Formation of the Rooiberg Group, see **Figure 8** and supporting soils of various quality (shallow Glenrosa and Mispah forms especially on rocky ridges) typical of Ab, Ba and Ib land types.

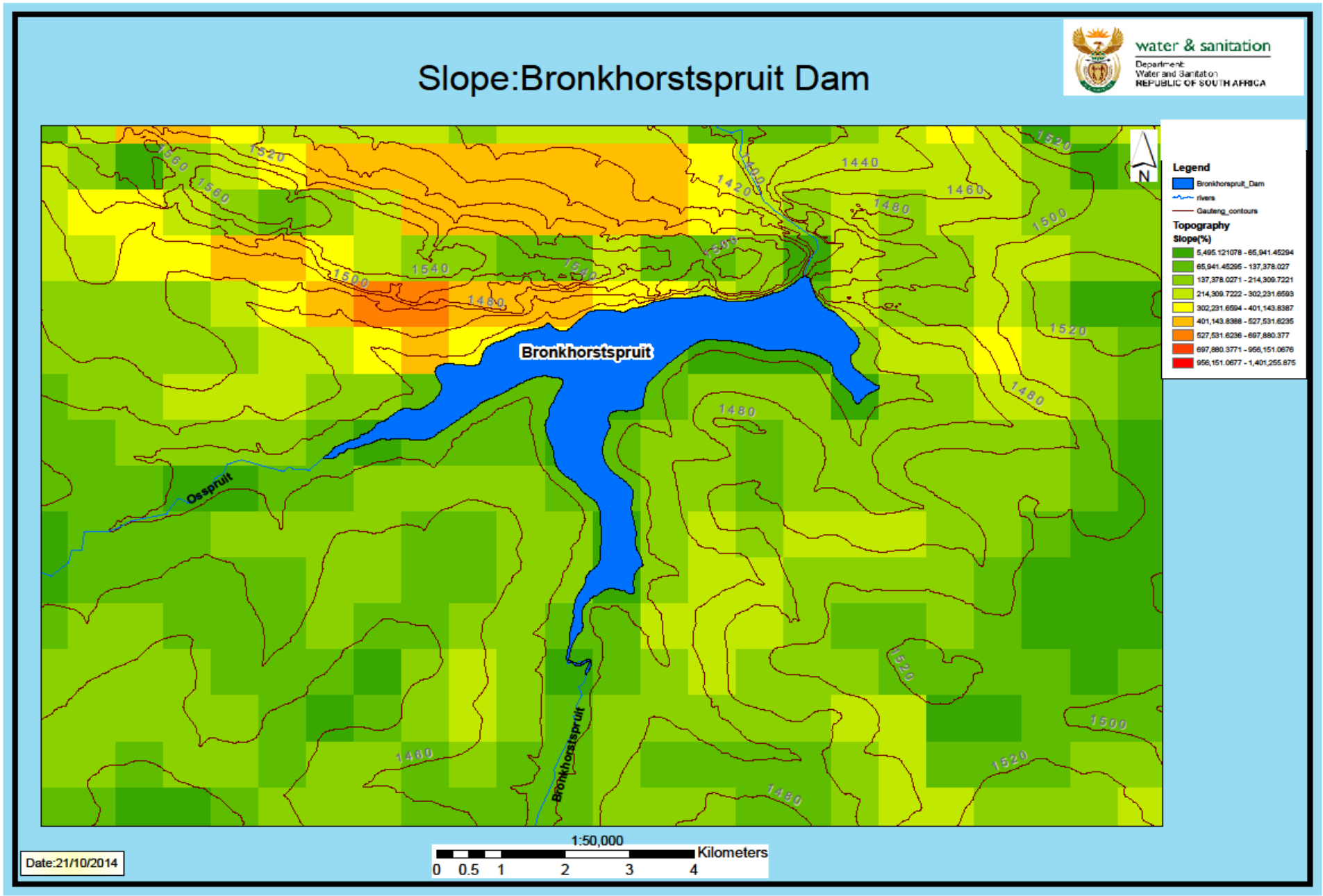

Figure 7: Slope Map for Bronkhorstspruit Dam

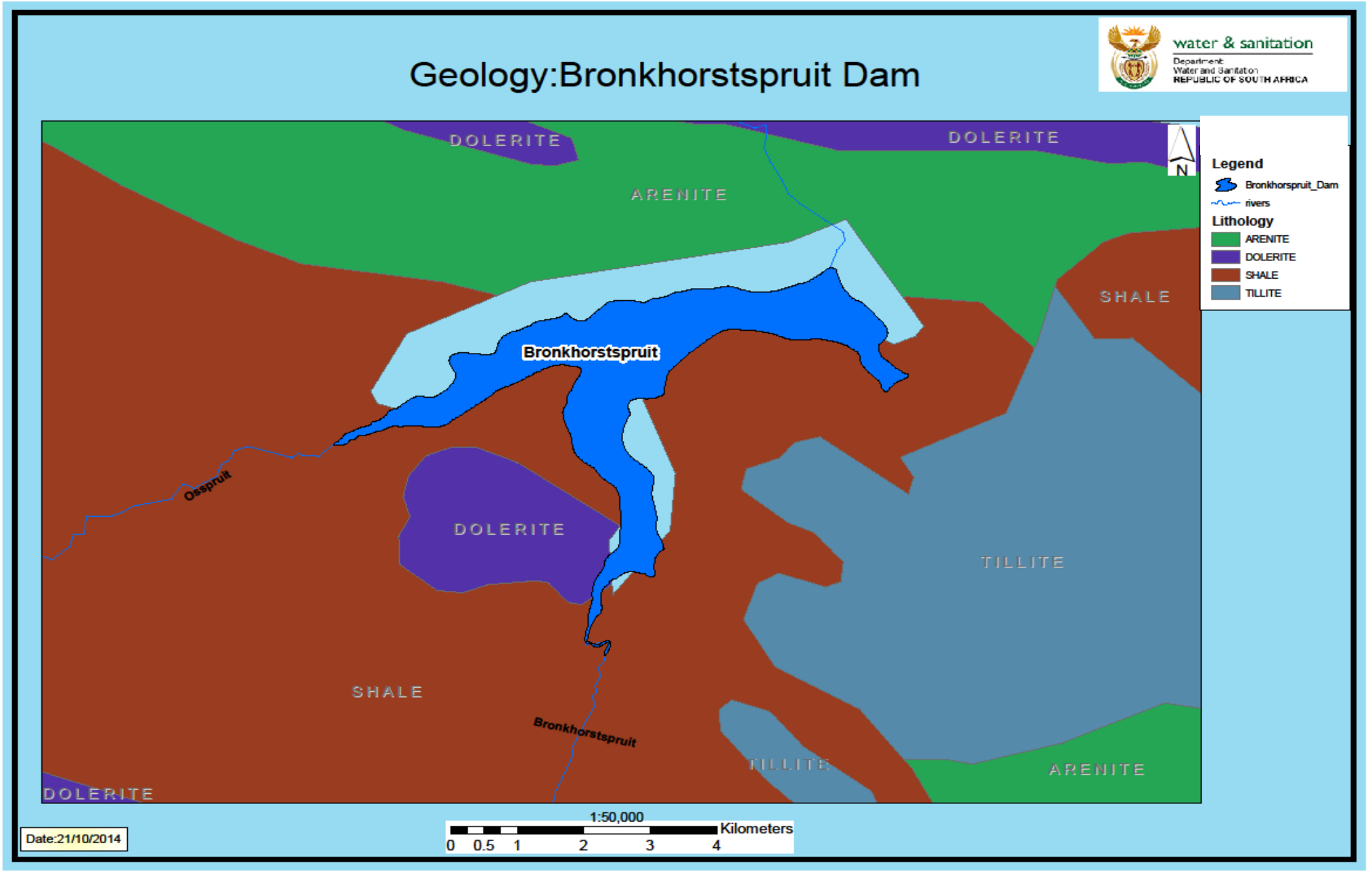

Figure 8: Geology Map for Bronkhorstspruit Dam

1.2.6 Conservation

Part of the dam is located within the BDNR which is protected in terms of the National Environmental Management: Protected Area Act, 2003 (Act No.57 of 2003). This will affect other recreational activities which can be accommodated within the dam basin. Zones within the nature reserve will be limited to conservation zones and low impact activities, such as fishing. The BDNR is home to over 200 birds' species; include the spike-heeled and red-capped larks, cisticolas, pipits and orange-throated longclaws, and many others. The availability of birds is largely dependent on the season. It is also a home to wild animals such as Blesbok.

1.2.7 Hydrology

1.2.7.1 Surface Water

The dam lies within the Olifants River Catchment area in Quaternary Drainage Area B20C, refer to the **Figure 2** for the Hydrological Map and it impounds the Bronkhorst Spruit and Os Spruit.

1.2.7.2 Water Quality

The term water quality is used to describe the physical, chemical and biological 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 affected directly by the proximity, availability and quality of water resources.

Water quality of the dam was one of the main concerns raised at both Stakeholder Meetings. Specific concerns were raised regarding the sewage management on the adjacent estates and Delmas Sewage Treatment Plant.

According to the (DWA, 2011), the water quality within the dam is a concern as it is currently in a hypertrophic[3] state. The adjacent residents have indicated that in recent months they have observed large quantities of algae, and other substances as well as dead fish within the dam. The pollution of the dam is thought to be from the sewage systems of the adjacent landowners. The site inspection conducted on the **04 February 2015,** there was plenty of grass and floating plants observed within the dam, refer to **Figure 9**. **Table 6** shows some of the water quality variables within the dam.

Table 6: Water Quality variables at Bronkhorstspruit Dam (10/2014 to 05/2015)

Characteristic	Tests Results	Water Quality Target Range (Recreational Purposes)	Effects
Clarity (Secchi disc, m)	1.5	3.0	Most users will perceive water as suitable for swimming. Risk of disease transmission by organisms associated with particulate matter is very low but cannot be excluded on the basis of clarity or turbidity measures alone. No adverse effects on aesthetic appreciation expected
pH (pH units)	8.4	6.5 - 8.5	Minimal eye irritation occurs. The pH of water is well within Quality Range and the buffering capacity of the lachrymal fluid of the human eye. Skin, ear and mucous membrane irritation absent.

[3] Usually very low levels of species diversity; very highly productive systems; nuisance growth of aquatic plants and blooms of blue-green algae, often including species which are toxic to man, livestock and wildlife.

Characteristic	Tests Results	Water Quality Target Range (Recreational Purposes)	Effects
Algae (Chlorophyll-a method, µg/chl-A)	46.0	0 - 15	Severe nuisance conditions may be encountered. Aesthetically unacceptable surface algal scums evident for much of the time. (The composition and health of the fish population may be affected)
Ammonia (mg/L)	0.04	0 – 1.0	No health and or Aesthetic effects can occur.
Magnesium (mg/L)	16.0	0 - 30	No health effects
Potassium (mg/L)	6.0	0 - 50	No aesthetic or health effects
Sulphate (mg/l)	15.0	0 - 200	No health or aesthetic effects are experienced
Electrical Conductivity (mS/m)	30.0	0 - 70	No health effects associated with electrical conductivity of water are expected < 45 mS/m
Calcium (mg/L)	20.4	0-30	No health effects. No scaling evident. Possible corrosive effects < 16 mg/L

Source: (DWS RQS, 2015)

The Maucha Diagram shows that the Calcium (Ca^{2+}), Total Alkalinity (TAL) and Magnesium (Mg^{2+}) level in the water is relatively high.

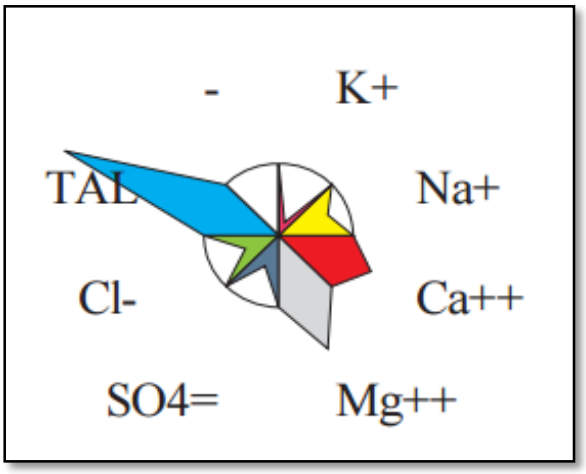

Figure 9: Maucha Diagram (DWA RQS, 2010)

1.3 BUILT ENVIRONMENT

1.3.1 Transportation Networks

As shown in **Figure 10**, provincial roads (R42 and R25) pass by the dam. Both these roads can be used to access the dam.

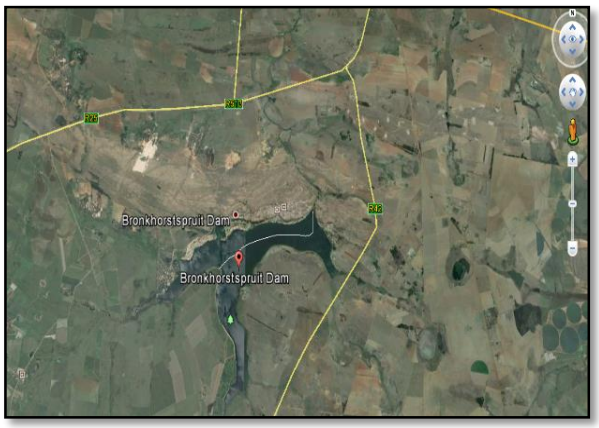

Figure 10: Road Network around the dam (source: Google Earth: Imaginary Date 17/06/2015)

1.4 USERS AND USE OF THE DAM

1.4.1 Primary Functions

1.4.1.1 Domestic Use

The primary purpose of the dam is to provide domestic water to Bronkhorstspruit area, Southern Western Highveld and nearby villages. According to DWA (2010), approximately 16.678 Mm^3/a of water have been abstractions from the dam and it was also noted that it is unclear whether the 16.678 Mm^3/a water abstracted from Bronkhorstspruit Dam is meant strictly for domestic use only.

1.4.1.2 **Industrial and Irrigation Use**

The dam also provides some water for irrigation to farmers downstream and also provide water to industrial areas around Bronkhorstspruit. According to DWA (2010), the industrial and irrigation allocation from this dam could not be quantified.

1.4.2 Secondary Functions

1.4.2.1 **Recreational Use**

The recreational clubs and estates that make use of the dam includes, Summer Place, Catamaran Club, Bonamanzi Country Club, Baja Dam, Clover Hill, Kaia Manzi Resort, Bonamanzi Marina and also the individuals access the dam via the BDNR for this purpose.

The following recreational activities take place at the dam:

- Angling (both from shore and boats);
- Bird Watching;
- Swimming Event (Roode1000 Swimming Competition), but swimming is not allowed within the dam; and
- Boating.

A number of events are held at the dam including various angling competition (Bass) as well swimming.

1.5 RECREATIONAL INSTITUTIONAL STRUCTURE

The institutional structure refers to an effective structure that can manage the use of the water resources in an acceptable manner and it must be representative of all relevant stakeholders. The successful implementation of a RMP depends highly on various institutions adopting and putting into practice this integrated management tool. This section provides an overview of the institutions which play a significant role in the management of Bronkhorstspruit Dam.

Officially, Bronkhorstspruit Dam is managed by DWS, who functions as the custodian of all surface water in the Republic of South Africa. Currently, there is no institutional structure managing the recreational use, but there is a proposal to establish a Catchment Management Agency which will work on the catchment level.

1.5.1 Management of Water Surface

The management of the surface water in terms of operation of the Dam is done by DWS.

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.

1.5.2 Access

The dam is a very popular destination within the Gauteng Province water enthusiasts, however public access is limited to the BDNR, Kaia Manzi Resort, Bonamanzi Marina, Transvaal Sailing Club and Baja Dam as most of the shoreline is privately owned. There are more than twenty (20) private slipways into the water surface. The access fees are general reasonable, refer below:

Example:

BDNR charges entrance fees as follows:

Entrance:

Per adult	: R20.00
Per child	: R10.00
Per pre-school child	: R5.00

Camping Fees:

- R70 with electricity
- R40 without electricity

Vessel launching is forbidden within this area.

Baja Dam charges entrance fees as follows:

Entrance:

Per adult	: R40.00
Per child (12-17 yrs)	: R30.00
Per child (6-11 yrs)	: R20.00
Per car	: R20.00
Per motorboat/jet ski	: R60.00

Overnight (Camping fees):

Per adult	: R50.00
Per child (12-17 yrs)	: R30.00
Per child (6-11 yrs)	: R20.00
Per car	: R20.00
Electricity per night	: R20.00

Both anglers and motorboat enthusiasts are welcome within Baja Dam.

1.6 LAND OWNERSHIP

According to information received from the DWS, the Department owns approximately 30% of the land where the dam is located [4] and the remaining land is privately owned over which the Department has a servitude of storage. Information outstanding from DWS at the time of the compilation of this report is the maps or documentation to show the land or farms in question.

1.6.1 Land Claims

There are several land claims on some of the properties where the dam is located. The land claims have been lodged with Department of Rural Development and Land Reform (DRDLR)'s Land Claims Commission in terms of the Retribution of Land Right Act, 1994 (Act No. 22 of 1994). The following is the list of properties extracted from the Notice 923 and 608 of 2014 published in the Government Gazette No. 38128[5] and 37889[6] respectively.

Table 7: List of Land Claims

Claimant	Property	Current Land Owner	Deed of Transfer
Nyambunaye Mgidi & Johanne Mgeti	Portion 4 (Remaining Extent) of Tweefontein 541 JR	CJ Viljoen & Seuns Pty Ltd	T36856/1975
Salmon Shoba & Adam Shoba	Portion 18 of Oude Zwaans Kraal 542 JR	Geldenhuys Susara Jacomina	T77255/1995
Salmon Shoba & Adam Shoba	Portion 0 (Remaining Extent) of Oudou Boerdery 626 JR	G H Braak Pty Ltd	T15878/1989

Further investigations are being undertaken before the commissioner can approve or disapprove the claims.

1.7 SAFETY

There is no overall safety system in place at the dam. However the Bronkhorstspruit Dam Resorts Managements have compiled a vessels rules, however the rules are not enforced.

The dam was selected as one of the dams to pilot the Cooperate Inland Waterways Safety Programme (CIWSP) by Centre for Public Service Innovation (CPSI) in collaboration with relevant departments (e.g. DWS, SAMSA and DoT).

The CIWSP is a partnership between government entities and between the community and government. The aim is to enhance the development of a best practise model to ensure a safe and structured inland maritime environment and culture whilst protecting the water resources.

This will be done through a phased roll-out of the best practice model to dams & rivers and communities in South Africa (CIWSP, 2012). The project has three (3) key elements, namely vessel safety and incident management, environmental and resource integrity, and local

[4] RMP workshop 21082014

[5] Published on 31 October 2014

[6] Published on 8 August 2014

development (transport as catalyst for rural tourism, safety systems, etc.).

The project was born from a concern related to the inability to implement and enforce a number of government regulations regarding vessel safety (as compiled by SAMSA and DWS) to prevent un-safe vessels and skippers from operating on South African inland waters. It soon became clear that regulations from and responsibilities of other Departments, such as managing invasive aquatic species (DEA), water resource management (DWS), policing and events management (Sports and Recreation) are equally important.

These regulations are worthless unless it's enforced and monitored in an integrated manner. A suite or toolbox of integrated policy implementation solutions is thus needed. In essence, what is needed are ground-level actions that are simple, implementable and sustainable. CIWSP combines pro-active and preventive measures with integrated reactive solutions should there be an incident. Given its unique integrative nature, the model further aims to create a single point of inland maritime information for the public, thus promoting transparent user-friendly accessibility and empowerment. Water users, including recreational and commercial use will further receive additional value through the integrated incident management and response system, navigational aids and improved environmental quality.

The project was first introduced to Stakeholders at Clover Hill Estate, but since then the implementation has slowed down.

1.7.1 Safety of Navigation

There is currently no adequate, standardised and harmonised fixed and floating Aids to Navigation[7] (AtoN) and Demarcation Markers in place.

1.7.2 Incident Management

There is no specific incident management system in place to ensure that incidents are responded to in a coordinated manner.

1.8 SOCIO-ECONOMIC ENVIRONMENT

1.8.1 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 Region 7 of CoT. An understanding of socio-economic conditions of Region 7 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, population, education level, individual monthly income and employment status was undertaken and is presented in section 1.8.1.1 to 1.8.1.4, respectively.

1.8.1.1 Population Dynamics

According to the 2011 Census data, the CoT is home to approximately 2, 9 million people. Tshwane's population is more dominated by black Africans representing 2, 2 million people, followed by a White population of approximately 600 000 people, 59 166 Coloured individuals and 51 547 Asian individuals. About 37% of the population is classified as youth, making Tshwane one of the youngest cities in South Africa.

Region 7 of CoT had a total population of 83 922 people in 2011 (Stats SA Census 2011). The overall number of men and women in the region is equivalent; however, men have more job

[7] A marine Aid to Navigation (AtoN) is defined by the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) as "A device or system external to vessels that is designed and operated to enhance the safe and efficient navigation of vessels and/or vessel traffic".

opportunities than women. Region 7 is home to different languages such as Afrikaans, English, Sepedi, Tsonga, Ndebele and Tswana. A detailed breakdown of population per age group and gender of Region 7 is shown in **Figure 11**.

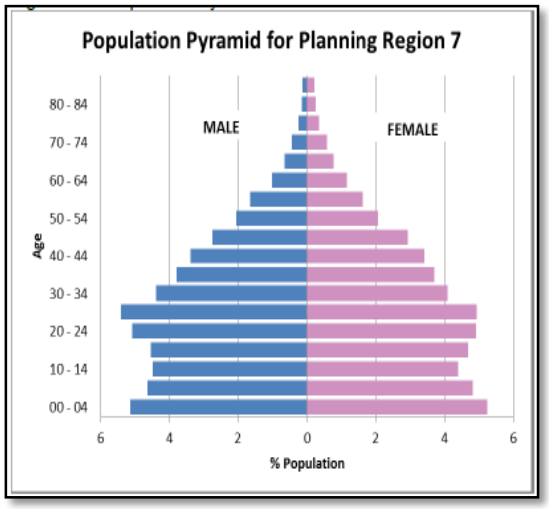

Figure 11: Population Pyramid (RIDP, 2014)

1.8.1.2 Educational Level

In summary Region 7 have 7.40% of adults whom have no schooling and 18.79% of adults attend school up to grade 12. The region has fairly low education levels, with few people having a tertiary qualification. A more detailed breakdown of the education levels are shown in the **Table 8**. The large number of people who did not complete secondary education is a course for concern within the region and the municipality.

Table 8: Region 7 educational level

Group	Percentages
No Schooling	7.40%
Some Primary	21.57%
Completed Primary	4.86%
Some Secondary	26.71%
Completed Secondary	18.79%
Technical Education	1.09%
Higher Education	7.05%
Other	0.27%
Not Applicable	12.25%

Source: Stats SA, Census 2010

1.8.1.3 Individual Monthly Income Levels

The table 8 show that 32 272 individuals, who makes 38.45% of the total population in the region do not have any source of income. While the rest of the individuals have sources of income. Of those with monthly income, approximately fourteen percent (14%) of them earn an income below poverty line, which is R 620 per month as defined by Statistics South Africa. It is also worth noting that only 1.36% of individuals earn above R25, 600 per month within the region. See **Table 8**.

Table 9: Region 7 Income level

Individual monthly income level	Percentage
No Income	38.45%
R 1 - R 400	13.82%
R 401 - R 800	3.56%
R 801 – R 1,600	11.39%
R 1,601 – R 3,200	8.03%
R 3,201 – R 6,400	4.82%
R 6,401 – R 12,800	3.69%
R 12 801 – R 25,600	2.68%
R 25,601 - R 51,200	0.90%
R 51,201 – R 102,400	0.24%
R 102,401- R 204 800	0.15%
R 204,801 or More	0.07%
Unspecified	10.12%
Not Applicable	2.06%

Source: Stats SA, Census 2010

1.8.1.4 Employment

In terms of employment levels within the region, approximately 32.10% of residents are employed and only 11.18% of residents are unemployed. Of greater concerned is that 21.29% of the residents are not economically active whereas 3.36% of them are discouraged work-seekers suggesting that they no longer seek to become employed (Census, 2011).

Table 10: Employment statues of the region

Indicators	Percentages
Employment	32.10%
Unemployment	11.18%
Discouraged Work-Seeker	3.36%
Other not Economically Active	21.29%
No Applicable	32.07%

Source: Stats SA, Census 2010

1.8.2 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 municipality into primary sector, which is extractive, secondary sector made of manufacturing and tertiary sectors, which comprises of services. The **Figure 12** shows CoT's GVA per sector for 2013.

Primary Sector:

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

Secondary Sector:

- Manufacturing;
- Electricity, gas and water; and
- Construction.

Tertiary Sector:

- Wholesale and retail, catering and accommodation;
- Transport, storage and communication;
- Finance, insurance, real estates and business services;
- Community, social and personal services; and
- General Government.

Figure 12 shows that the greatest contribution is from General Government (30.39%) and Finance, Insurance, Real Estate and Business Service (23.59%).

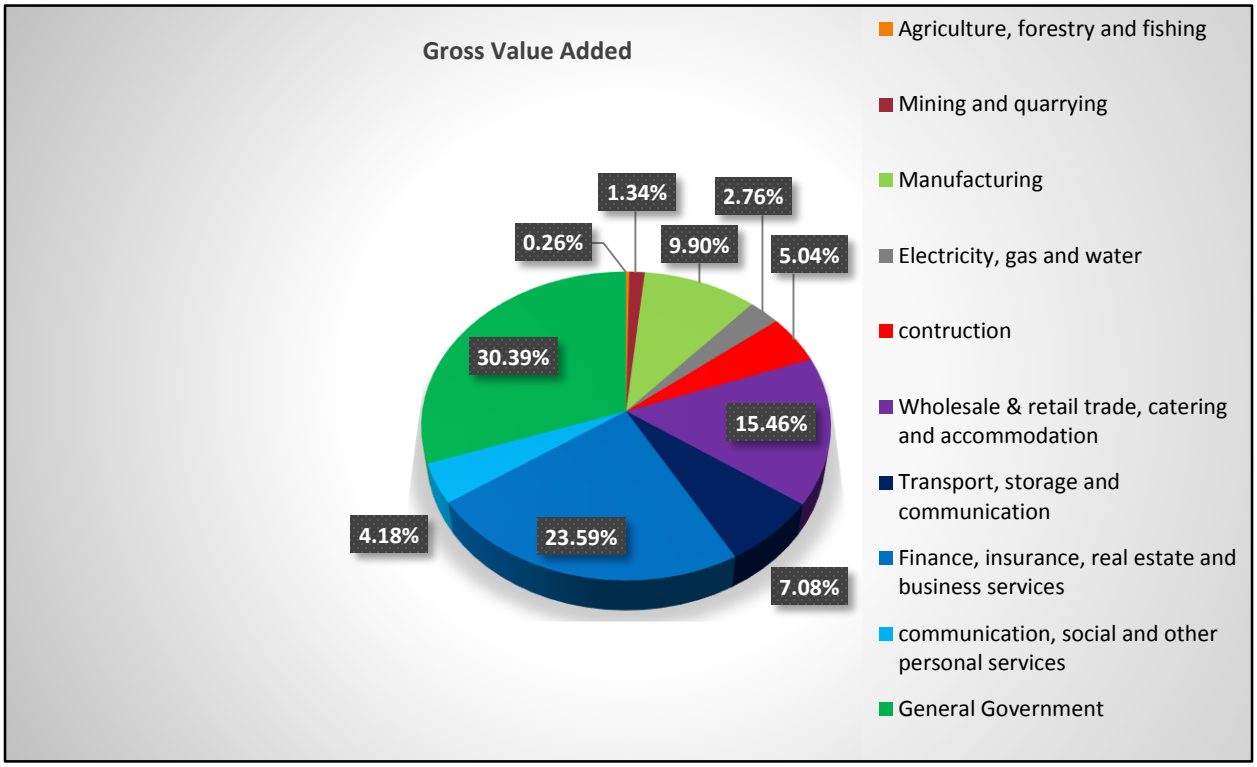

Figure 12: GVA for CoT in R million at 2013 constant prices

The use of the dam for recreation purposes can contribute significantly to the following sectors, fishing, catering and accommodations as well as transportation. This sectors are currently contributing less to the GVA of the municipality.

1.8.3 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 water-based 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; and
- 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 Bronkhorstspruit Dam. It is informed by relevant policy, legislation and planning documents administered by other government departments. Similarly, these government departments are required to use the RMP to inform the development of future policy, legislation and planning documents.

I. **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 benefit-sharing 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 are protected, used, developed, 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 made available for 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 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:

- City of Tshwane Metropolitan Spatial Development Framework (2012).
- Communal Land Rights Act, 2004 (Act No.11 of 2004).
- Development Facilitation Act, 1995 (Act No. 67 of 1995).
- Disaster Management Act, 2002 (Act No. 57 of 2002).
- Environmental Conservation Act, 1989 (Act No, 73 of 1989).
- Gauteng C-Plan V3.3.
- Gauteng Department of Agriculture and Rural Development Strategic Plan 2010 – 2014.
- Gauteng Environmental Management Framework (Draft 2014).
- Gauteng Spatial Development Framework (Feb 2011).
- Intergovernmental Relations Framework Act, 2005 (Act No.13 of 2005).
- Land Administration Act, 1995 (Act No.2 of 1995).
- Local Government: Municipal Systems Act, 2000 (Act No. 32 of 2000).
- National Protected Area Expansion Strategy for South Africa 2008.
- National Sport and Recreation Act, 1998 (Act No. 110 of 1998 as amended).
- National Veld and Forest Fire Act, 1998 (Act No.101 of 1998).
- Occupational Health and Safety Act, 1993 (Act No.85 of 1993).
- Public Finance Management Act, 1999 (Act No.1 of 1999).
- Region 7: Regional Integrated Development Plan (2014-2015).

- Restitution of Land Rights Act, 1994 (Act No. 22 of 1994).
- State Land Disposal Act, 1961 (Act No. 48 of 1961).
- Tourism Act, 1993 (Act No.72 of 1993).
- **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 RMP

A Resource Management Plan (RMP) is a plan which aims to regulate access and the recreational utilization 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 environmental impacts and to ensure communities have access to water based economy.

3.2 PURPOSE OF THE RMP

The main aim of RMPs is to attain the objectives underlying sustainability and to compile functional, workable sustainable access and utilization plans for water resources.

Without approved management plans related to the utilization of the water resource in place, it makes it difficult for informed decisions to be made, necessitating a precautionary approach to access, utilization and development of the water resource.

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

Triggers 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 Bronkhorstspruit Dam, as illustrated by **Table 11.**

Table 11: Trigger Factors for the Development of Bronkhorstspruit Dam RMP

Trigger Factors	Description
Resource Management	**Water Quality Issues** • To promote the protection of the dam and its surrounding environment as well as to reduce or prevent water pollution and degradation from the surrounding users (e.g. water pollution from nearby residential estates and upstream sewage treatment plants). **Alien Plant Species** • The dam's surroundings is infested with Alien Invasive Plants Species such as Pompom weeds *and Cortaderia selloana* (pampas grass). These can have detrimental impact on the dam as they consume large quantity of water. **Protected Areas** • The portion of the dam is located within a Nature Reserve and as such, the utilization of the dam should be guided by clear guidelines (RMP) in order to protect and preserve this sensitive environment.
Community Participation and Beneficiation	**Community Beneficiation** • The previously disadvantaged local communities are experiencing problems with regards to physical access as well as commercial access to water-based recreational activities.
Public Policy	**Local Development Initiatives** • The dam should be integrated into local planning initiatives and decision support tools such as the City of Tshwane Metropolitan Municipality (CoT) IDP and SDF to ensure that enough resources are allocated to the water resource in order to protect the dam.

3.4 THE DEVELOPMENT PROCESS

The RMP is developed in accordance with the RMP guideline procedure (DWAF, 2006) as illustrated in **Figure 13**.

Figure 13: 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 Bronkhorstspruit 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

The site inspection was conducted on **18 July 2014** to gather baseline information using a checklist questionnaire. The site inspection was undertaken with the DWS Officials (IEE and the Dam Manager). Photos of the study area were also taken during site inspection. Second site inspections was undertaken on **04 February 2015.**

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 co-operative 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. As such, the success of the RMP is dependent on the level of involvement of the various stakeholders. Various stakeholders were identified and invited to participate in an open and consultative process. (See attached **Appendix A)**. The stakeholder list is updated on a continuous basis throughout the RMP process.

3.5.3.2 **The Participation Phase**

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

- Informing and identifying 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 (See attached **Appendix D-E**) and follow up emails.

3.5.3.3 **The Exit Phase**

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

- Ensuring that all goals, challenges, concerns, objectives and the vision of 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 will 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 Compilation and Distribution of Background Information Document (BID)

The purpose of this document was to provide stakeholders 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 encouraged active attendance to stakeholder's 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 the **Streeknuus Newspaper**. The advert invited the public to attend the Public Participation Meeting. The advert was published in English on **13 August 2014.** Furthermore, an advert for the draft RMP was advertised **18 December 2015**. (See attached **Appendix C**).

3.5.3.4.3 Flyer 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 the relevant contact details. The flyers were compiled in English and were distributed on **08 August 2014.** Moreover, the flyers for the draft RMP were distributed on and **17 December 2015** (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 **08 August 2014.**

Moreover, the meeting invites for the draft RMP were sent out on the **17 December 2015** (See attached **Appendix E**)

3.5.3.5.2 Authority Meeting

The initial authority meeting was held on **21 August 2014** at **Die Draai Resort, Bronkhorstspruit Town.**

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 report was presented to the Authorities on the **28 January 2016**.

3.5.3.5.3 Public Meeting

The initial public meeting was held on **21 August 2014** at **Die Draai Resort, Bronkhorstspruit Town.** 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 Bronkhorstspruit Dam.

The draft RMP was presented to the Public on **17 March 2016**.

3.5.3.5.4 Comments and Responses Register

A copy of draft report was circulated on the **07 December 2015** for commenting .The commenting period was to lapse on 18 January 2017.See **Appendix E** for the Comment and Response Register

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 by **Table 12**.

Table 12: Planning Partners and their Respective Mandates

Department/ Agency	Mandate
City of Tshwane Metropolitan Municipality	The dam is within the jurisdiction of the municipality
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 Reform (DRDLR)	The department will assist in terms of the Land Claims As part of the RMP process the Department will assist in terms of Land Claims/Ownership issues.

Department/ Agency	Mandate
Department of Environmental Affairs (DEA)	Responsible for Biodiversity Management within the dam including Invasive Alien Species.
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 Africa 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).

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, Legal, Social and Existing Plans.**

Tables 13 - 16 outline the summary of limitations that might affect the development or implementation of the RMP for the dam.

Table 13: Summary Biophysical Encumbrances

Item	Description
Vegetation	• Presence of the Aquatic Alien Species at the dam. • Portions of the dam is regarded as having high ecological value as such should be protected.
Water Level	• Fluctuations in the dam level due to drought or water abstraction may impact on the recreational use of the dam.
Water Quality	• Poor water quality of the dam. • Possible pollution of the dam from poor sewage management of the surrounding residential areas and sewage treatment plan upstream.

Table 14: Summary Legal Encumbrances

Item	Description
Purchased Boundary	• The adjacent landowners have built permanent structures within the 1:100 year flood line of the dam. • Lack of information regarding the DWS's servitude line.
Access	• Access to the water surface of the dam is not regulated.
Agreements	• Lack of formal agreement in relation to overall management of the recreational activities at the dam. • The majority of the shoreline is privately owned.

Table 15: Summary of Social Encumbrances

Item	Description
Recreational Activities	• Very limited space is available for public recreational use. This is due to the fact that the State Land within the servitude/ purchased line is very small or non-existing. • Poor relations between the DWS and adjacent land owners.

Table 16: Summary of Existing Plans Encumbrances

Item	Description
Institutional Plan	• There is no institutional structure to manage the recreational utilization of the dam. • There is no Zoning Plan in place to manage/regulate the recreational use of the dam.

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 17.**

Table 17: SWOT Analysis for Bronkhorstspruit Dam

Strengths	Weaknesses
• The dam is conveniently situated and attract visitors from the major towns and cities within a radius of approximately 100 km. • Most of the shoreline is privately owned and therefore most costs of maintenance etc, is for owner's accounts leaving the DWS to maintain the limited area with the funds that would normally be needed to maintain a full shoreline. • The dam is seen as a major tourist attraction as it is part of Bronkhorstspruit Nature Reserve. • The dam is free of dangerous animals such as crocodiles and hippopotamus. • The dam is currently used for various water based competitions such as Roode 1000 Swim Competition. • Low crime rates around the dam.	• Most of the dam shoreline is privately owned and this makes it difficult for the DWS to manage activities within the dam. • Too many Departments are responsible for different aspects of the quality of the water and impact of alien vegetation. E.g. Alien vegetation is under Department of Environmental Affairs (DEA) and water pollution is under DWS • Lack of marketing for the dam. • Portion of the dam is located within Bronkhorstspruit Nature Reserve. This will limit some of the proposed recreational activities. • The dam banks have a lot of water-reeds. • Limited shoreline available for general public use as most is privately owned and public not permitted entry. • Limited shoreline available for general public use as most is privately owned and public not permitted entry. • History of lack of input and support from DWS in sorting out problems, both water and other infrastructure, creating mistrust from landowners and residents. • Safety on the water is not enforced. • Centre for Public Service Innovation (CPSI) is slow in introducing the Cooperative Inland Waterways Safety Programme even though the dam was selected as one of the dam to pilot the project.
Opportunities	**Threats**
• The dam has long shoreline which makes it suitable for fishing. • Opportunities for construction of tourism facilities around the dam. • There is an opportunity for small scale fisheries at the dam. • Opportunity to introduce large sporting events. • There is an opportunity for increased marketing. • There is an opportunity for the dam to provide water with high quality to the adjacent communities.	• Uncontrolled developments around the dam without proper sanitation systems. • Poor water quality due to farms, mining and sewage plants upstream feeding into the dam. • Most of the dam shoreline is privately owned and as a results they used the surface water as they please. • Water pollution from the surrounding estates as a result of sewage discharges. • Poaching of wild animals within the Bronkhorstspruit Dam Nature Reserve. • Security and access control, as the dam access is privately owned and controlled. • The dam is invaded by alien invasive species such as bass fish and also pompoms. • Lack of capacity to effectively monitor and ensure compliance to the policies in regards to use, access and develop the water resource

	• . Water reeds and hyacinth growth is increasing daily because of contamination or the poor quality of the water. • Vessels coming into the dam during the day are not being treated to ensure that they do not bring in any form of contamination (e.g. algae and hyacinths) from other dams. • The fact that there are too many departments with different mandates and each department has their own priority as a results makes it difficult to work towards common goal.

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 Bronkhorstspruit Dam and have been categorized into three (3) Key Performance Areas (KPAs) as illustrated below:

KPA 1: Resource Management

- To maintain and improve water quality of the dam so that recreational activities such as swimming can take place;
- To promote conservation of all endangered and protected flora and faunal species during developments at areas where these species exist; and
- To promote and maintain sustainable utilization of the dam and its surrounding environment.

KPA 2: Resource Utilisation

- To have an alternative access point to the dam from surrounding communities;
- To improve safety of navigation through the implementation of standardised and harmonised AtoN and demarcation markers as directed by SAMSA;
- To have formalized recreational clubs such as boating clubs;
- To encourage the youth to participate in fishing as this will eliminate issues of crime and poverty within the community; and
- To see future developments such as Bed and Breakfasts, holiday resorts, family parks, restaurants, hotels, parking bays, resource centers, gym facilities and casinos where local communities will benefit through job opportunities.

KPA 3: Benefit Flow Management

- To uplift the local economy and increase benefit flows to the surrounding communities through employment empowerment, skills transfer through environmental education programmes;
- To see the dam recreationally marketed as it is known to most community members for its primary function of water provision; and
- To have an effective and suitable organizational structure that will effectively manage the recreational utilization of the dam and its surrounding land.

Action projects required to achieve these objectives are provided in detail in **Section 4.3** (**The Strategic Plan**).

A vision for the dam for a period of 20 years was formulated from the key common objectives identified by the stakeholders and stands as follows:

"A commitment to protect, manage, control and utilize the resource in a sustainable, equitable and effective manner in order to maximise the recreation potential of the dam and also to ensure that the use of the dam is beneficial to both the local communities and the water users"

After setting both the dam's specific objectives, a research was conducted in order to provide relevant information to decision makers regarding the sustainable utilisation of the water resource and where applicable the State Land.

3.6.3 Research/ Information Generation (**Phase 4**)

The aim of undertaking the research process 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 data as illustrated in **Figure 14**.

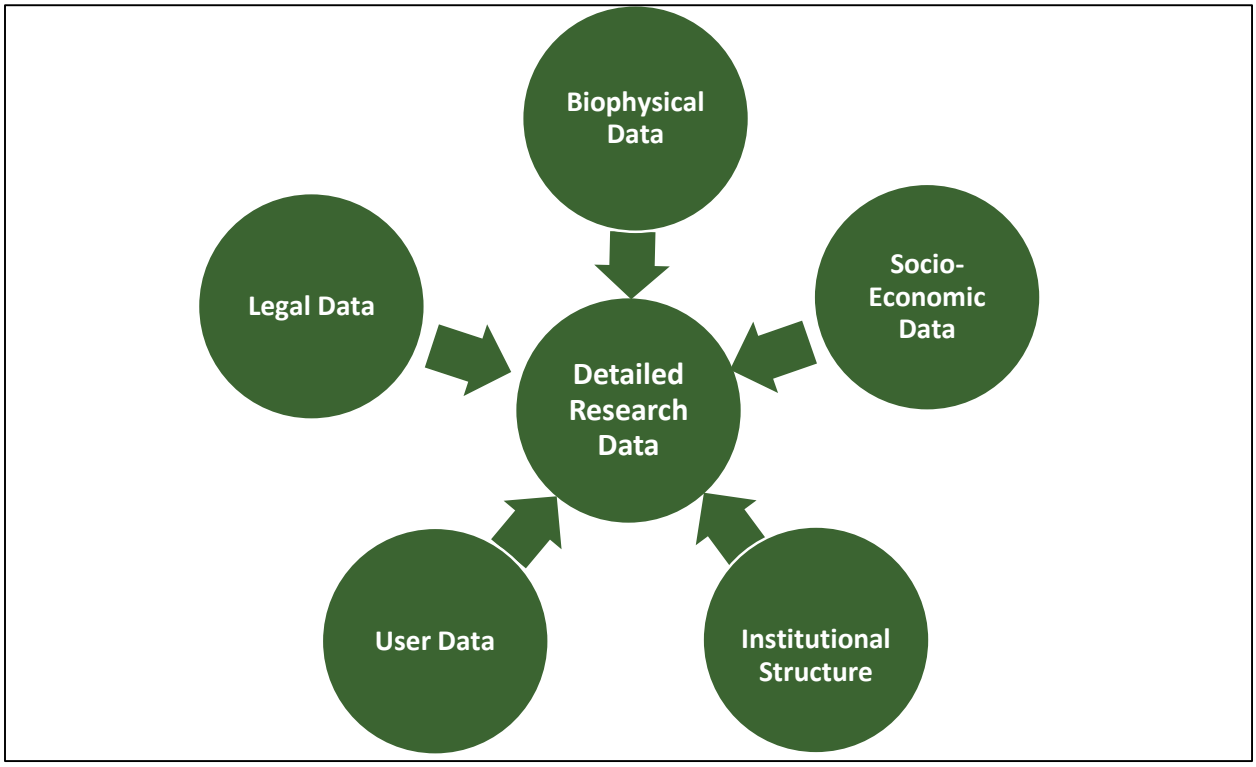

Figure 14: Research Data

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

3.6.3.1 **Tourism Development Potential**

The area has tourism development potential that will assist in terms of unlocking the socio-economic potential of the dam.

3.6.3.1 **Feasibility of Identified Potential Objectives**

According to DWAF (2006), the feasibility of the proposed objectives needs to be determined in light of the local environmental conditions.

Table 18 shows the practicability of all proposed recreational objectives.

Table 18: Feasibility of Potential Recreation Objectives

KPA 1: Resource Management		
Objectives	**Status Quo**	**Practicability**
• To minimize the Alien Invasive Species at the dam.	• The dam and its surrounding is home to Alien Invasive Fish species (such as Carps and Bass fish which are declared invasive species) and also Alien Invasive Plants species such as Pom-pom weed (Campuloclinium macrocephalum). The dam has lot of reeds (both common and Giant Reeds), which makes it difficult to utilize some portions of the dam. The further spreading of the giant reeds can have a detrimental effect on the ecology of the dam and affects the natural aesthetic of the area in general. • Alien invasive species have a detrimental effect on the natural ecology of the dam and its surrounding. These species result in a decrease in indigenous biodiversity and usually result in the overall degradation of the ecological integrity of the dam.	• The objective can be achieved taking in account the current legislation in place. Alien invasive control falls within DEA as well as Land Use Management Department with Department of Agriculture, Forestry and Fisheries (DAFF). • The use of wash bays can assist to prevent the spread of Aquatic Alien Invasive species, however this should be established in accordance to the SAMSA Regulations. Private ownership of the land where the dam is located as well as the poor relationship between DWS and the adjacent land owners might be a challenge in attaining this objective.
• To improve and maintain a high water quality standard for the dam.	• Currently the dam is classified as hypertrophic and exhibits regular eutrophication problems. In addition, there is insufficient information regarding the pollution source impacting on the dam. Due to the dam's function as a source of drinking water, it is important to understand where pollution is emanating from in order management plans can be put in place to improve the water quality. • The water quality is a key issue that needs to be addressed to ensure the sustainable use of the dam by all users. The dam is situated near urban areas and is subject to various sources of pollution within the catchment. •	• Water quality management lies within multiple institutions as well as on the dam users themselves, as such cooperation between all stakeholders will ensure the possibility of improving and maintaining the high water quality standard of the dam. • Insufficient information with regards to the pollution sources might pose a challenge and this will be detail further in the BP. • The Aquatic Ecological Study need to be undertaken to determine the impacts on the biodiversity within the dam due to pollution.
• To compile a Zoning Plan.	• Currently, there is no zoning plan in place to regulate recreational activities taking place in the dam. • According to information received from the DWS, the Department owns approximately 30% of the land where	• The aim of the Zoning Plan is ultimately to integrate conservation, recreation and development whilst making sure that the developments do not retard the primary function of the dam. Once the Zoning Plan is in place, it

	the dam is located8 and the remaining land is privately owned over which the Department has a servitude of storage. Information outstanding from DWS is the maps or documentation to show the land or farms in question.	will guide in terms of identifying area suitable to developments. • The Zoning Plan will be compiled as part of the RMP process in terms of DWAF's Guidelines for Compilation of Zoning Plans for GWWs. • Insufficient information regarding the purchased or servitude line for the dam might be a challenge in attaining this objective especially when zoning the shoreline.
• To maintain the biodiversity of the area, as recently there have been fish mortality as the dam is classified as hypertrophic and exhibits regular eutrophication problems.	• The tourism development potential of the area is highly dependent on the biodiversity of the area. Part of the dam is located within Bronkhorstspruit Dam Nature Reserve which is protected in terms of the National Environmental Management: Protected Area Act, 2003 (Act No. 57 of 2003). • Taking in account the sensitivity of the surrounding environment, maintaining the biodiversity of the area is essential to the sustainability of the resource.	• The responsibility/ mandate of biodiversity management lies within the DEA, DAFF and GDARD, as such cooperation between these departments is crucial in achieving the objective. • The aim of the Zoning Plan is ultimately to integrate conservation, recreation and development whilst making sure that the developments do not retard the primary function of the dam. • Insufficient information with regards to the pollution sources might pose a challenge and this will be detail further in the BP.
KPA 2: Resource Utilisation		
Objectives	**Status Quo**	**Practicability**
• To maintain adequate public access for broader public use of the water resource and its associated state land through controlled authorized access and	• The dam is a very popular destination within the Gauteng Province water enthusiasts. However, public access is limited to the Nature Reserve and some of the Resorts adjacent to the dam.	• There should be an engagement between DWS and adjacent landowners whom provided public access to the dam to ensure that the practice continues. • The Business Plan will detail on how equitable and affordable access can be provided to all users. It will further stipulate how the previously disadvantaged

[8] RMP workshop 21082014

associated infrastructure development.	• Currently the dam is mostly used by the adjacent estates owners. This group access the dam via private entrances at their estates. • The DWS purchased boundary is unknown hence such developments and possible access points for the Local Communities to the dam will be a challenge.	communities will economically benefit from recreational opportunities.
• To provide recreational users with clear rules and to be delegated with the authority to enforce them. • To ensure safety regarding the utilization of the dam	• Bronkhorstspruit Dam is small and popular to water enthusiasts. This could result in incidents and accidents if no rules are in place and enforced. General visitor behaviour, especially relating to noise at the public area can be a disturbance to other users and to residents around the dam. Rules have been developed and implemented by the adjacent land owners for a number of years.	• Currently, there are existing dam rules which was developed in terms of the Water Act, 1956 and Regulation 654. These rules need to be updated and endorsed by DWS.
• To allow a space for organized sporting events to take place in a manner that is safe and meets the participant's expectations.	• The dam is used by various user groups, including swimming and boating groups	• The events need to follow a proper event management system.
• To promote sustainable fishing practices.	• Subsistence fishing by the Local Community remains an active use of the dam, however this must be regulated by relevant policy to avoid exploitation. • Fishing practices can also be used to manage Alien Invasive fish species such as Carp and Bass fish which are abundant within the dam.	• One of the function of the proposed Institutional Structure should be to oversee the fishing practices at the dam. • Permit system should also be established in order to manage fishing within the protected/conservation areas.
KPA 3: Benefit Flow Management		
Objectives	**Status Quo**	**Practicability**
• To ensure that local communities participate and benefit in local development initiatives happening in and around the dam.	• The surrounding community consists of residents on estates, farms and smallholdings on the banks of the dam as well as people that reside in the settlements further towards the north of the dam. Numerous jobs have already been created due to the direct	• Establishment of functional Institutional Structure which is inclusive of all the relevant stakeholders with sufficient power to manage the recreational use of the dam as well as encourage local economic initiatives and participation regarding the use of the dam.

• To establish capacity building and training within the local communities.	recreational use of the dam and also due to the surrounding development activity. Furthermore, the dam continues to be used for subsistence fishing. • The dam and Bronkhorstspruit Dam Nature Reserve, are regarded as natural resources which can be utilized to promote and enhance the tourism potential in Region 7 of CoT. The accessibility of the dam, and the long shorelines of the dam makes this dam ideal destination for various recreational use. Potential exists for various sports and leisure activities including boating, swimming, fishing, picnicking and camping.	• The implementation of the RMP will guide the training of the locals to equip themselves and become actively participates in the tourism sector. • Most of these potentials are limited to State Land which is very limited in this regards. • The Business Plan will discuss in details on how equitable and affordable access can be provided to all users. It will further discuss how the previously disadvantaged communities will economically benefit from recreational opportunities.
• Improved institutional arrangements and management.	• Officially, Bronkhorstspruit Dam is managed by DWS, who functions as the custodian of all surface water in the Republic of South Africa. Currently, there is no institutional structure in place to manage the recreational use of the dam, but there is a proposal to establish a Catchment Management Agency. The Catchment Management Agency cover vast area as a result there is a need to establish an institutional structure which will be focusing on the recreation use of the dam.	• CoT to be appointed as an Implementing Agency. • Roles and Responsibilities to be clear.

CHAPTER 4: INTERGRATED MANAGEMENT, ZONING AND INSTITUTIONAL PLANNNING (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) takes 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 in **Figure 15**.

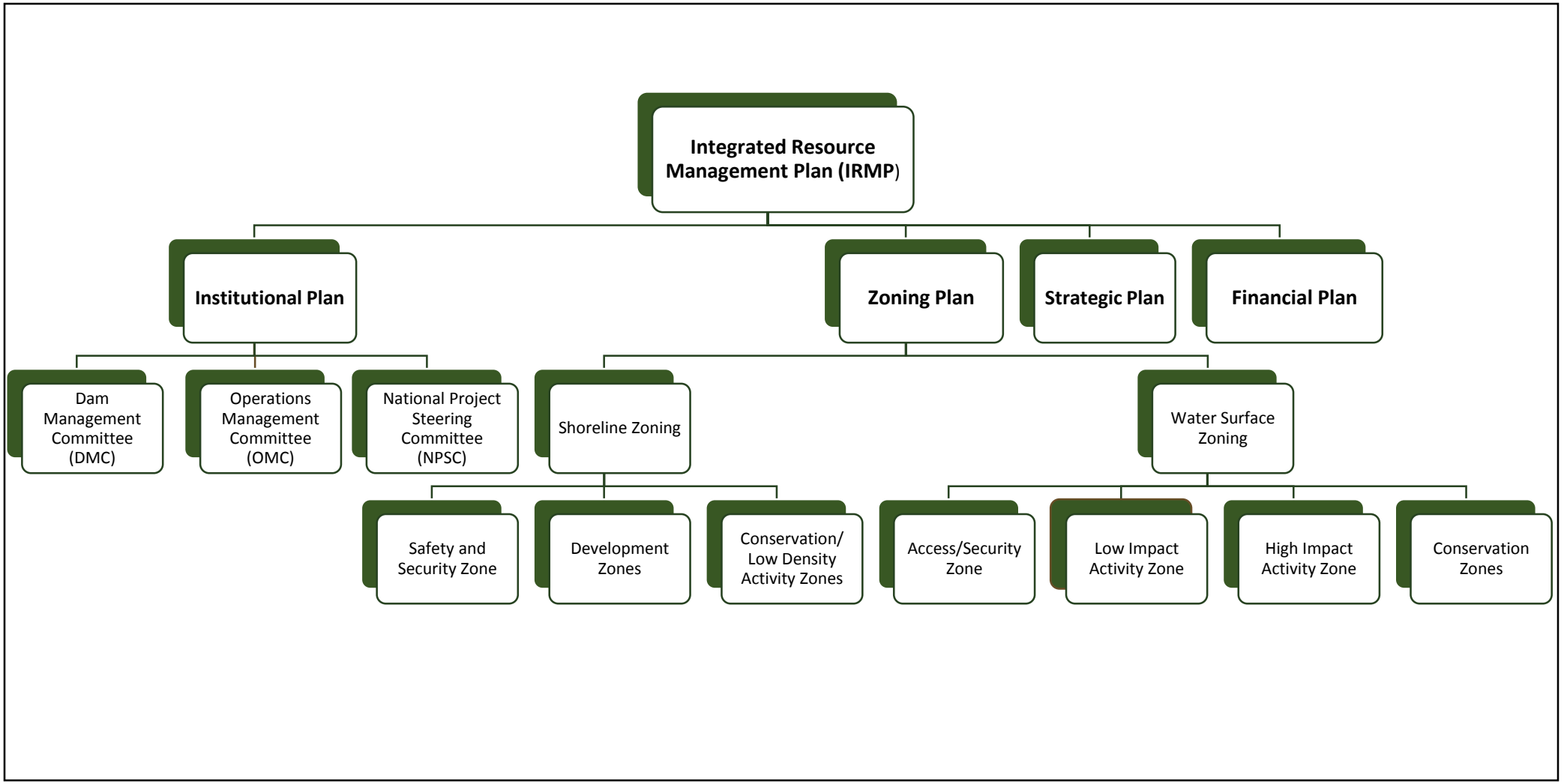

Figure 15: Integrated Resource Management Plan

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 Implementing Agency (IA) 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 wash bays.

Figure 16 illustrates the proposed user groups that will form part of the DMC

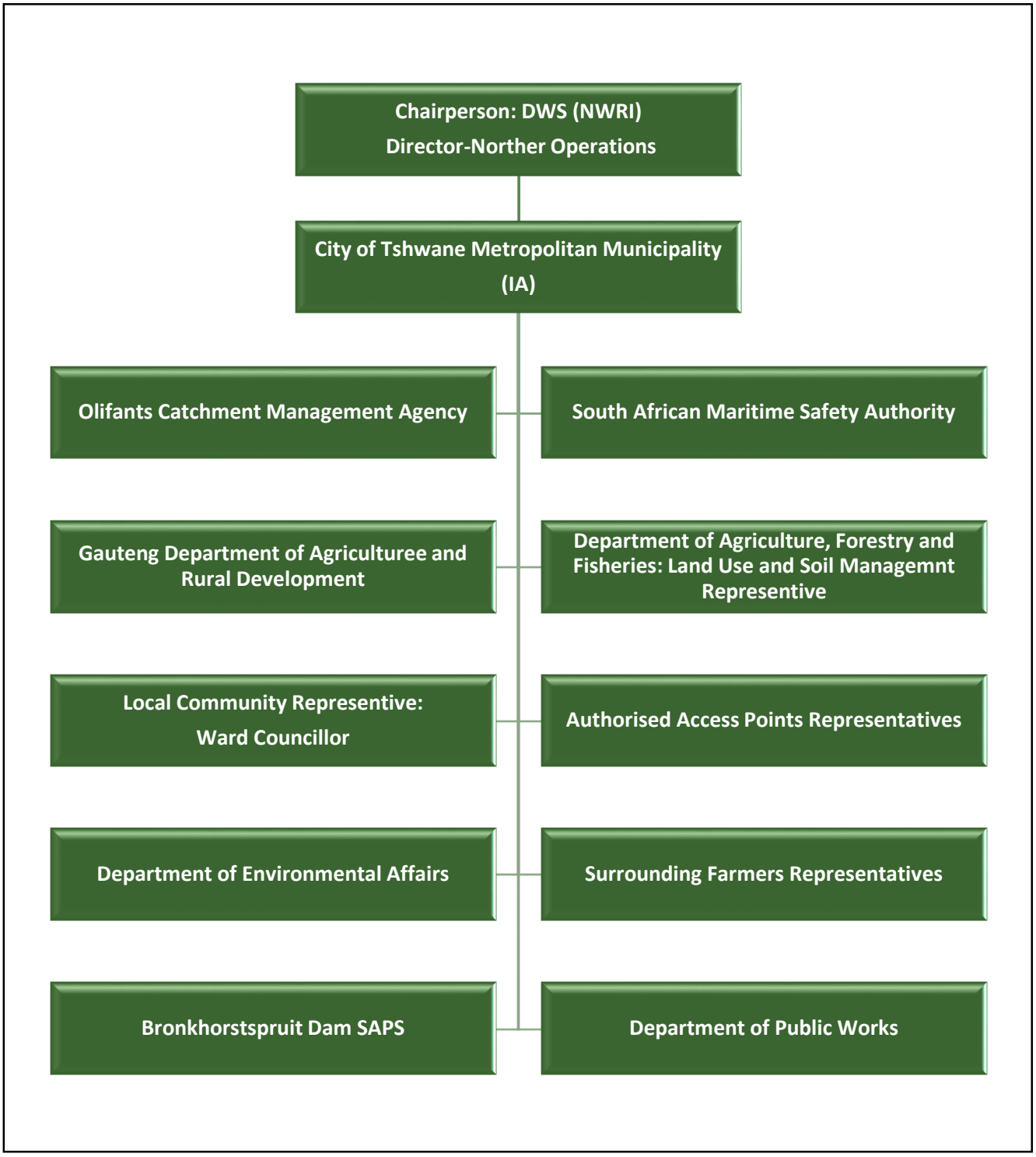

Figure 16: Proposed DMC

The DMC will have a number of management tools which will enable proper management of the dam in line with legislative 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** as this are existing reporting structures. The ToR provide guidance on the following management aspects:

- Roles and responsibility of chairperson;
- Roles and responsibilities of an IA;
- 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.

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.

Agreements between DWS and Implementing Agency (IA)

CoT will be appointed as an IA for the RMP of Bronkhorstspruit Dam. CoT and DWS will sign a MOA, which is a legal binding document which will outline the roles and responsibilities and conditions to be followed by both parties in terms of managing the water resource for recreational use.

CoT is currently undertaking the management of portion of the dam located within their Nature reserve for recreational purposes. Another option would be PPP with private entity.

The minimum requirements of an IA include the following:

- An Implementing Agency can be a government entity or public-sector body identified by DWS;
- Must have the best interest of a water resource and the community at large; and
- Must be willing to work with the Department and other users of the water resource.

The IA is appointed to manage commercial and recreational use of the dam. This would include the following:

- Management of public access area;
- Management of incident management system;
- Management of community skills and training programmes;
- Management of commercial activities (in line with Treasury Requirements); and
- Management of AtoN and demarcation markers.

Regardless, all agreements should be in line with the RMP requirements and relevant Legislations and Regulations.

Recreational Use Agreements

Recreational clubs must enter into an agreement with the IA who will be responsible for the surface water management of the dam. All recreational use at the dam must be through an appropriate legal framework. However all agreements must be approved in writing by DWS and the DMC. Recreational Use Agreements must be developed in line with the conditions stipulated in the agreement between DWS and the IA (if appointed). All agreements must be finalised within 12 months of the RMP being approved.

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 No. 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 AtoN[9] for general navigation.

Access Agreements

All surface water 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.

All adjacent landowners and clubs must be made aware that access to the surface water should only be through authorised access points. Accessing the surface water through unauthorised access points is an illegal activity unless they enter into a formal agreement with DWS. Further, a formal agreement with DWS will be required for all adjacent landowners and recreational clubs that have direct access to the water surface of the dam through constructed slipways, natural slipways or jetties for angling and/or launching of vessels.

The wash bay must be built on State Property as part of the CIWSP. A formal agreement is necessary between the IA and DEA on the management and maintenance of the facility.

Event Applications

The dam is used for a number of competitive angling events as well as swimming. All events must be managed through an event application process. The events application will be submitted to an IA for approval and DWS for commenting. 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).
- 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 SASCOC affiliated organisation. The development targets set by the National Organisations must be met.

4.1.2 Operations Management Committee (OMC)

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 17**.

The committee should meet quarterly discussing matters relating to operations and maintenance of all GWWs. A 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.

[9] AtoN refers to any sort of marker which aids the traveler in navigation; the term is most commonly used to refer to nautical or aviation travel, common types of such aids include lighthouses, buoys, fog signals and day beacons.

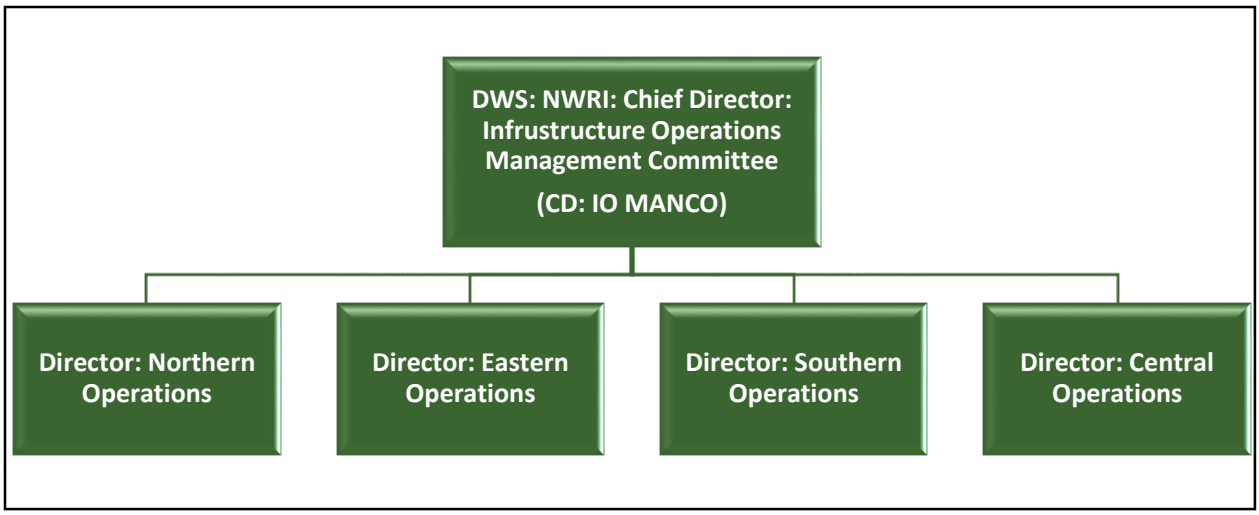

Figure 17: Existing CD: IO MANCO

4.1.3 National Project Steering Committee (NPSC)

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 18** illustrates a typical example of Governmental Departments that will form part of the NPSC:

Figure 18: Proposed NPSC

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.

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 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 19: Proposed Water Surface Zoning Description

Zone Name	Permissible Activities	Non Permissible Activities	Recommendation
• 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 are necessary.
• Low Impact Activity Zone.	• Activities associated with no or little water wakes, such as: ○ Swimming ○ Canoeing ○ Rowing	• Motorized boating • Water Skiing • Jet skis	• Area should be demarcated by demarcation makers and AtoN.
• High Impact Activity Zone.	• Water-Skiing • Motorized boating	• Swimming • Canoeing • Rowing	• Area should be demarcated by demarcation makers and AtoN. • All activities within the high impact zone shall take place beyond 70 m from the shoreline. • Activities within this zone must be evaluated to determine their impact on the water resources and other dam users before they are allowed into the dam.

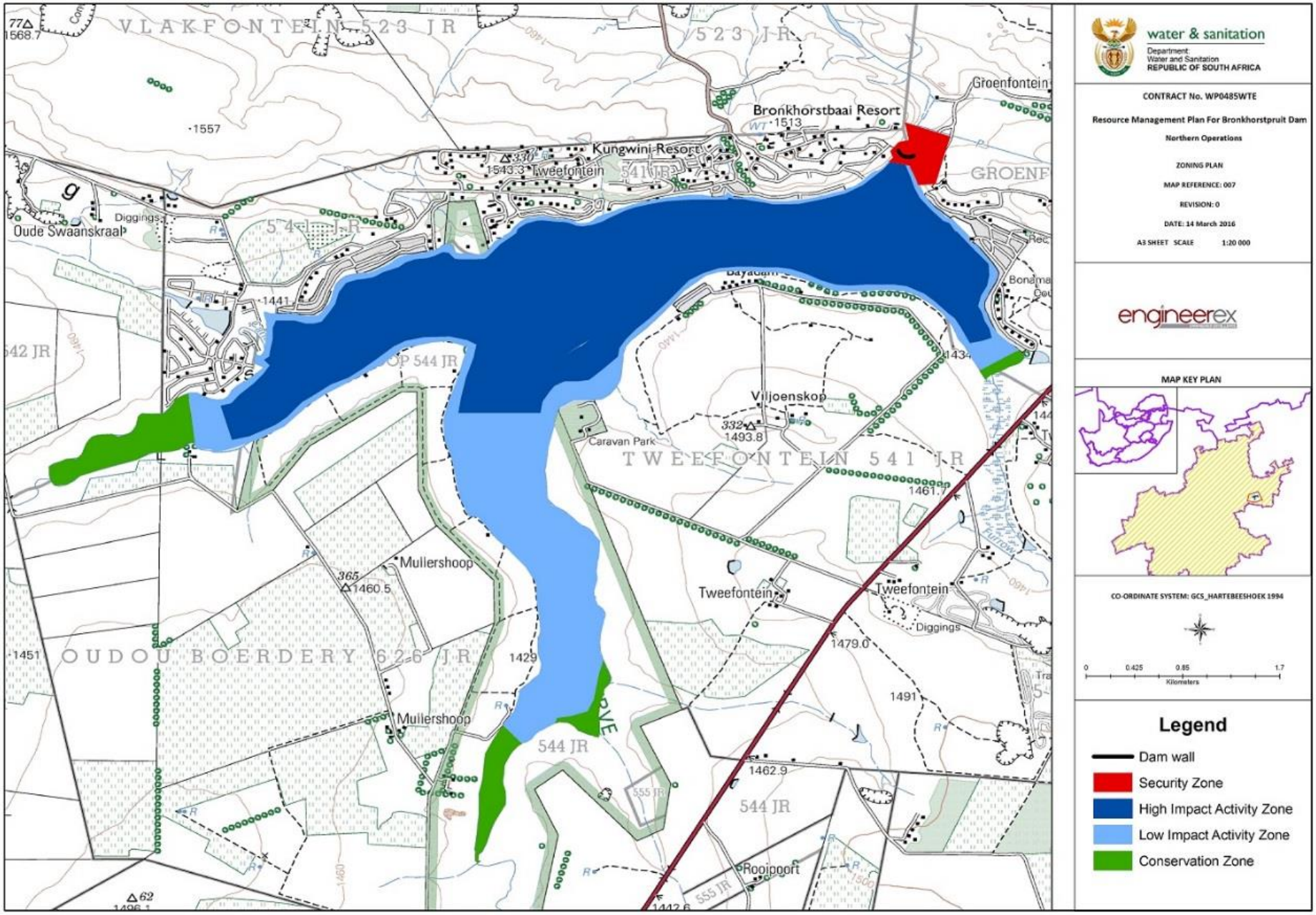

Figure 19: Proposed Overall Zoning Plan

4.2.2 Carrying Capacity

The carrying capacity of a water resource represents the maximum level of visitor use and related infrastructure that the water resource and surrounding area can accommodate, without diminishing user satisfaction or adverse impacts upon the Local Communities, the economy and culture of the area.

In order to determine the degree of recreational use possible on the water surface, the Methodology for Carrying Capacity Assessment: Recreational Water Use (DWAF, 2006) was used as a guideline to determine the level of activity that would be sustainable at Bronkhorstspruit Dam.

Determining the carrying capacity ensures that recreational use of the dam is safe and that users do not feel crowded and enjoy their use of the dam. There are three kinds of carrying capacity, namely:

- **Physical Carrying Capacity** (PCC) – this is the maximum number of users that can physically fit onto the water surface at any given time;
- **Real Carrying Capacity** (RCC) – this is the maximum number of users that can use the resource once corrective factors that are unique to the dam are taken into account; and
- **Effective** (or permissible) **Carrying Capacity** (ECC) – this is the number of visitors that can use the resource, given the management capacity.

Each level constitutes a corrected capacity level of the preceding level. The PCC is always greater than the RCC, and the RCC is greater than the ECC, thus: **PCC > RCC and RCC ≥ ECC.**

The process of establishing the carrying capacity is normally determined through the following tasks:

- Analysis of recreation and water resource management policies;
- Analysis of objectives of the water resource;
- Analysis of current recreational water use;
- Definition, strengthening or modification of policies regarding recreational water use management;
- Identification of factors influencing recreational water use; and
- Determination of the recreational water use carrying capacity.

Physical Carrying Capacity

PCC is calculated using the formula: PCC = A x U/a x Rf

- Where: A = Area of the water surface available for recreational use
- The U/a = area required for each user.
- Rf = Rotation factor (the number of visits per day) and is assumed to be 1.

A is calculated as the area of the water surface: 860.9 ha.

U/A = There is a range of literature regarding the area required for different recreational users. The U/A used for that assessment are as follows:

Craft	U/A (ha/craft)
Rowing	0.5
Canoe	0.3
Fishing	3.0
Powerboats	6.0
Sailing	5.0
Average	**3.0**

Based on the table above the average hectare per user is 3.0 ha (30 000 m2), the value of 5.0 ha (50 000 m2) can be acceptable area per user. This has been chosen in order to ensure that the dam is not overcrowded, as such impacting on the sense of the area.

Therefore: PCC = A x U/a x Rf
= 860.9 ha x (1 craft/5 ha) x 1
= 172 Crafts

Real Carrying Capacity

Formula: RCC = PCC x (100 – Cf_1)% x (100 – Cf_2)% x … (100 – Cf_n)%

- Where: Cf = a corrective factor expressed as a percentage.

Real capacity is the PCC, taking into account factors that limit recreation. In this case limiting factors include:

- Biophysical, such inlets and sensitive environments.
- Safety No Go Zones.

Calculating the area of the surface of the dam, adding a buffer-zone at the dam wall and the restricting factors outlined above, allowed us to determine the real carrying capacity of the water surface with approximately 788.96 ha (860.9ha-71.95ha) of the water surface remaining available for recreation.

These factors accounts for 71.95ha, which is 8.36%

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

= 172 x (100 – 8.36) %/100

= 158 Craft

Effective Carrying Capacity

Effective Carrying Capacity is the maximum number of visitors that a site can sustain, given the management capacity available. Given that Bronkhorstspruit Dam has no institutional structure in place, the effective carrying capacity is thus estimated to be 0. Once a management system and details for infrastructure capacity is in place, the ECC can be recalculated.

What must be emphasised is that the carrying capacity of 158 Crafts on the dam is too much and thus the management budget and staff must be clarified and formalised before large scale recreational endeavours are promoted. As discussed in the section above, formalised institutional arrangements must be in place before there is a planned increase in tourism and recreational use.

The ECC will be calculated once the management structure is in place.

4.3 STRATEGIC PLANNING

The Key Performance Areas were further divided into sub-fields and aimed at effectively addressing the following questions:

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

In **Tables 20 – 22**, the Strategic Plan on how to achieve the identified objectives identified regarding the dam is outlined.

Table 20: 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)**
Water Quality: • To improve and maintain a high water quality standard for the dam.	• Currently the dam is classified as hypertrophic and exhibits regular eutrophication problems. In addition, there is insufficient information regarding the pollution source impacting on the dam. Due to the dam's function as a source of drinking water, it is important to understand where pollution is emanating from in order for a management plans can be put in place to improve the water quality.	• Establishment of the current aquatic resource and associated ecosystem and then develop a set of baseline data for future monitoring purposes. • A management plan should be developed to address the management of waste within the dam and upstream. The use of fertilizers, herbicides and pesticides should be discouraged. • The current water quality issues should be investigated to identify source and point of pollution. • Discussions between DWS, CoT as well as adjacent estates owners regarding the management of sewage around the dam should be undertaken. • Monitoring protocol to be set up to ensure improvement of current water quality. • DMC must develop a programme for monitoring and reporting of the water quality. • Water quality monitoring to be linked with UPN system to allow quick response. • DWS in conjunction with the CoT should consider establishing a proper sewage system to service the areas around the dam.	• DWS • 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 programme for wastewater treatment quality management regulation.
Alien Invasive Species: • To minimize the alien invasive species at the dam.	• The dam and its surrounding is home to Alien Invasive Fish species (such as Carps and Bass which are declared	• Remove all invasive alien vegetation (pom-pom weeds, weeping willow and poplar) at the dam.	• DEA • DAFF (Land Use and Soil 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)**
	invasive species) and also Alien Invasive Plants species such as Pom-pom weed (*Campuloclinium macrocephalum*). The dam has lot of reeds (both common and Giant Reeds), which makes it difficult to utilize some portions of the dam. The further spreading of the giant reeds can have a detrimental effect on the ecology of the dam and affects the natural aesthetic of the area in general. • Alien invasive species have a detrimental effect on the natural ecology of the dam and its surrounding. These species result in a decrease in indigenous biodiversity and usually result in the overall degradation of the ecological integrity of the dam.	• A Containment Plan for Invasive Fish Species such as Carp and Bass should be developed and implemented taking in account the requirements of the NEMBA. • Construction of wash-bays to prevent the introductions as per the CIWSP best practice model to avoid the spread of Aquatic Alien Species from another dams. • Education programmes regarding the impacts of alien invasive species on the land and water resource to be instituted.	• GDARD • Adjacent Land Owners • CoT
Biodiversity: • To maintain biodiversity of the area.	• The natural resource base provide the foundation for tourism development in the area. The tourism development potential of the area is highly dependent of the biodiversity of the area. Part of the dam is located within the Bronkhorstspruit Dam Nature Reserve (protected in terms of the National Environmental Management: Protected Area Act, 2003 (Act No. 57 of 2003)) which is home to more than 200 bird species including endemic bird species.	• All developments around the dam needs to be properly planned, based on a detailed ecological survey, in order to avoid the unnecessary removal of plants. • The strategic important habitats (inlets and shorelines) need to be protected and properly managed to ensure their ecological functioning. • Identify areas where vegetation has deteriorated and rehabilitate accordingly. • Species management for Alien Fish Species	• DEA • DAFF (Land Use and Soil Management) • GDARD • CoT

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)**
Zoning Plan: • To compile a Zoning Plan.	• Currently, there is no zoning plan in place to regulate recreational activities taking place in the dam. The challenge is that dam users launch vessels in places they dim fit in the water resource, thereby compromising the carrying capacity of the dam and limiting other recreational users.	• The Zoning Plan should accommodate all feasible recreational activities within the dam. • The Land Matters (Purchased line vs servitude line) should be resolved. The discussions with the surrounding land owners should be undertaken to ensure proper management of the dam.	• DWS

Table 21: 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)**
Users and Safety: • To provide recreational users with clear rules and to be delegated with the authority to enforce them. • To ensure safety regarding the utilization of the dam .	• Bronkhorstspruit Dam is small and popular to water enthusiasts. This could result in incidents and accidents if no rules are in place and enforced. General visitor behaviour, especially relating to noise at the public area can be a disturbance to other users and to residents around the dam. • Rules have been developed and implemented by the adjacent land owners for a number of years. This rules were not endorsed by the relevant departments.	• Update dam rules and approach DWS for endorsement. • Develop specific rules for activities or uses for which this may be required. • Implementation of Unique Position Number (UPN) System. • Develop information material (i.e. signage and pamphlets etc.) to convey safety rules at the dam. • Implementation of standardised and harmonised AtoN and Demarcation Markers • Implement all other aspects of the CIWSP best practice model. • The skipper should have a skipper's license and complete the SAMSA checklist for safety purposes prior to conducting the boat trips	• DWS • SAPS • DMC • SAMSA • DMC to check for the skipper's Certificate of Competence and the vessel's Certificate of Fitness.

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)**
		• Appoint safety officers to ensure that the safety rules are adhered to at all times. • Establish density controls for activities and facilities that requires carrying capacity assessments (i.e. number of vessels per hectare). • Spillway to be fenced off to present unauthorized access and ensuring community safety.	
Access: • To maintain adequate public access for broader public use of the water resource and its associated state land through controlled authorized access and associated infrastructure development.	• The dam is a very popular destination within the Gauteng Province water enthusiasts. However, public access is limited to the Nature Reserve as most of the shoreline is privately owned. As such the provision of public access is of outmost importance to the surrounding Local Communities. Currently the dam is mostly used by the adjacent estates owners. This group access the dam via private entrances at their estates. • The DWS purchased boundary is unknown hence such developments and possible access points for the Local Communities to the dam will be a challenge.	• There should be an engagement between DWS and adjacent landowners whom provide public access to ensure that the practice continues. • The entry fees need to be reasonable to ensure that the dam remains accessible and affordable to the local community. • Zonal plan to take into account different recreational activities undertaken within the dam, furthermore shoreline zonal plan should be developed once the extent of the purchased line and servitude of storage have been established.	• CoT • DMC • DWS • Adjacent Landowners
Sustainable Fishing: • To promote sustainable fishing practices.	• Subsistence fishing by the Local Community remains an active use of the dam, however this must be regulated by relevant policy to avoid exploitation.	• 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	• DWS • DAFF • DMC

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)**
	• Fishing practices can also be used to manage alien invasive fish species such as Carp and Bass fish which are abundant within the dam.	angling groups about the dam fishing rules. • Appoint safety officers that will monitor compliance of the dam fishing rules.	
<u>Organized Events:</u> • To allow a space for organized sporting events to take place in a manner that is safe and meets the participant's expectations.	• The dam is used by various user groups, including swimming and boating groups.	• Event organizers must provide training and environmental education to participants in order to minimize the impacts of the participants to the biodiversity of the area. • Only licensed participants should be allowed to take part in the organized events. • Event organizers in conjunction with DWS should develop a management plan which will identify environmental risks associated with recreational and competitive events and provide the appropriate control measures to minimize or avoid potential adverse impacts. The plan should also stipulate the role and responsibility of the participants and the event organizes. • Clear communication signage must be put in place in order to inform participants about the dam rules. • Sufficient sanitary facilities should also be provided along the routes during organised events in order to protect the environment as well as to promote human hygiene.	• Events permit must be acquired from the DWS and/ or DMC prior to the events. • Depending on the nature of the event, other organ of State or similar related services need to be involved (e.g. Municipal Disaster Management, Police, Emergency Ambulance, Local Fire Fighters, Water Policing Division of SAPS, etc.) to ensure that all events are well managed. • Relevant departments such as GDARD and the environmental section at CoT that are responsible for biodiversity (especially in running events) must be consulted in order to prevent or minimize biodiversity degradation around and within the dam basin.

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)**
		• Discussions with South African Sports Confederations and Olympic Committee (SASCOC) and other relevant associations regarding the potential for the dam to be used as a venue for provincial competitions. This would also include development of various water sports in the surrounding communities through partnerships with clubs based at the dam.	

Table 22: 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 Beneficiation:</u> • To ensure that local communities participate and benefit in local development initiatives happening in and around the dam. • To establish capacity building and training within the local communities.	• The surrounding community consists of residents on estates, farms and smallholdings on the banks of the dam as well as people that reside in the settlements further towards the north of the dam. Numerous jobs have already been created due to the direct recreational use of the dam and also due to the surrounding development activity. Furthermore, the dam continues to be used for subsistence fishing. • The dam and Bronkhorstspruit Dam Nature Reserve, are regarded as natural resources	• Develop a strategy on capacity building and training programmes at the dam and implement accordingly. • Awareness campaign to be developed by DMC. The campaign should focus on potential uses of the dam for recreational purposes, dam safety as well as danger associated with use of the dam. • Lifeguard skill training and first aid training to ensure safe public use of the dam. • DWS to partner with CoT in order to enable improved tourism at the dam including PPPs for accommodation, boat cruises, management of public access area.	• All the relevant Government Departments such as include DWS, GDARD, DAFF and CoT that concerns themselves with water quality, tourism, Local Economic Development (LED), the surrounding communities and natural resource management need to be involved. • DMC to facilitate.

	which can be utilized to promote and enhance the tourism potential in Region 7 of CoT. The accessibility of the dam, and the long shorelines of the dam makes this dam ideal destination for various recreational use. Potential exists for various sports and leisure activities including boating, swimming, fishing, picnicking and camping.		
Institutional Arrangement: • Improved institutional arrangements and management.	• Officially, Bronkhorstspruit Dam is managed by DWS, who functions as the custodian of all surface water in the Republic of South Africa. Currently, there is no institutional structure in place, but there is a proposal to establish a Catchment Management Agency. The Catchment Management Agency cover vast area as a result there is a need to establish an institutional structure which will be focusing on the recreation use of the dam.	• Appoint CoT as an IA. • The roles and responsibilities of the IA must be clearly defined.	• DWS • DMC to facilitate • Agreements between SAMSA, DWS, LAAPs and other relevant parties to be concluded.

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. People should not be denied access to the dam. All fees associated with the usage of the dam for recreation should take into account the socio-economic status of the users. The access fees should make a provision for equitable access.

The information acquired from the RMP will be used to produce the Business Plan 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 Bronkhorstspruit Dam RMP. It also describes the financial management and operational requirements to implement the Objectives of the RMP.

The BP will include a Financial Plan (FP) which will facilitate the implementation of the RMP by providing implementation program cost estimate for all possible economic recreational activities.

WAY FORWARD

Once the RMP and its BP are approved by the Minister of Water and Sanitation, it will be published in the Government Gazette as a regulation in terms of Section 26 of the NWA.

Review of RMP

According to DWAF (2006), the RMP is reviewed and updated every five (5) years to ensure that the management objectives remains relevant and management actions are continually improved. The BP is updated annually. **Figure 20** illustrates the RMP & BP review framework.

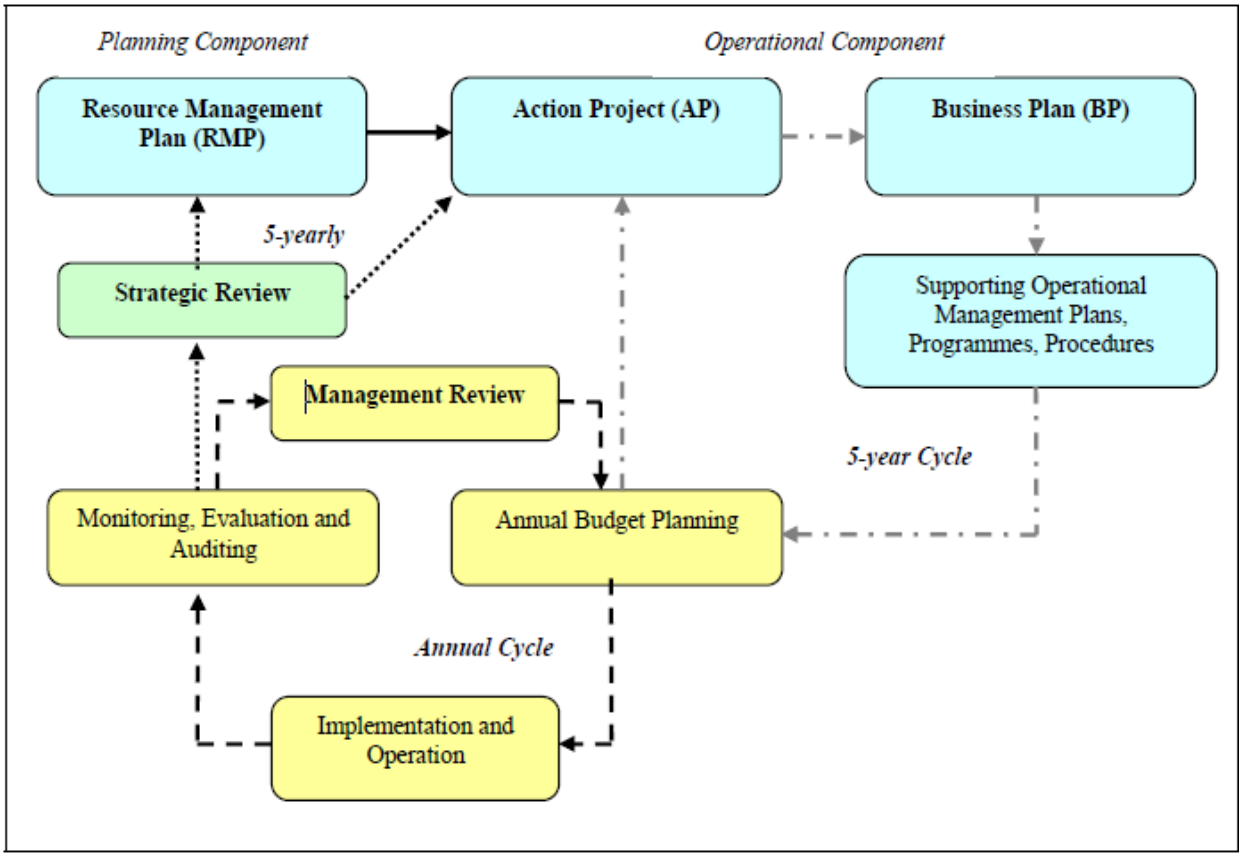

Figure 20: RMP and BP Review Framework

CONCLUSIONS

The RMP documents the challenges that exists within the Bronkhorstspruit Dam that can significantly impact on the utilisation and management of the dam and it's surrounding for recreational purposes. Such factors include legal, 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 an **Institutional Plan** for the effective management of dam. The focus on Institutional Plan is accompanied by a **Zonal Plan** which provides guidance on potential activities that are allowed on the dam, together with a **Strategic Plan**. In addition, a **Financial Plan** will provide guidance on funding requirements and funding options to implement the objectives of the RMP.

Furthermore 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 Bronkhorstspruit Dam, a BP has been developed to describe a manner in which the potential recreational activities are to be financially resourced. Furthermore, 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 the 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.

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APPENDICES