Department of Water and Sanitation

NATIONAL WATER RESOURCE INFRASTRUCTURE (NWRI)

Resource Management Plan

KLASERIE DAM

REPORT – Volume 4 of 5 | **August 2017**

WATER IS LIFE - SANITATION IS DIGNITY

water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

2030 NDP

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- AM Lodge;
- Nelspruit Department of Environmental Affairs: Working for water;
- Department of Water and Sanitation;
- Kamperusrus Community;
- Klaserie Caravan Park;
- Klaserie Dam Caretaker;
- Klaserie Irrigation Board;
- Maruleng Local Municipality;
- Morula Lodge;
- The community members of Scotia; and
- The councillors for Ward 1 and 2.

Acknowledgement is also extended to all other Stakeholders who attended and participated in the Stakeholder engagements.

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Review Period	Month	Year				
Annual Review of Business Plan	December	2019[1]	2020	2021	2022	2023
Five (5) Yearly Review of RMP	December	2023				

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

AMENDMENTS PAGE

Revision No	Description	Date
1	Draft RMP Report for DWS Review	14/12/2016
2	Final Draft RMP Report for DWS Review	15/05/2017
3	Final RMP Report for DWS Approval	20/07/2017
4	Final RMP Report for DWS Sign-off	16/08/2017

LIST OF ACRONYMS

AtoN	Aids to Navigation
BID	Background Information Document
BP	Business Plan
CATHSSETA	Culture, Arts, Tourism, Hospitality, Sports Sector, Education and Training Authority
CBA	Critical Biodiversity Areas
CD: IO MANCO	Chief Director: Infrastructure Operations Management Committee
CIWSP	Cooperative Inland Waterways Safety Programme
CMA	Catchment Management Area
COGTA	Corporative Governance and Traditional Affairs
CPA	Communal Property Association
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
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
EMF	Environmental Management Framework
EMP	Environmental Management Plan
ESA	Ecological Support Area
FSL	Full Supply Level
GIAMA	Government Immovable Asset Management Act
GP	Guideline Programs
GPS	Global Positioning System
GWWs	Governmental Waterworks
I&APs	Interested and Affected Parties
IA	Implementing Agency
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IDP	Integrated Development Plan
IEE	Integrated Environmental Engineering
IRMP	Integrated Resource Management Plan
KIB	Klaserie Irrigation Board
KNP	Kruger National Park
KPAs	Key Performance Areas
KPNR	Klaserie Private Nature Reserve
LAAP	Local Accountable AtoN Parties
LED	Local Economic Development
MAP	Mean Annual Precipitation
MLM	Maruleng Local Municipality
MOA	Memorandum of Agreement
NEMA	National Environmental Management 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
PPP	Public Private Partnership
PSP	Professional Service Provider
RCC	Real Carrying Capacity
RMP	Resource Management Plan
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
WfW	Working for Water
WMA	Water Management Area

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 Klaserie 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 Klaserie 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 in the RMP.

Location of the Dam: Klaserie Dam is an earth-fill type dam which impounds the Klaserie River. It falls under Ward 1 within the jurisdiction of Maruleng Local Municipality (MLM) which forms part of Mopani District Municipality (MDM) in Limpopo Province, South Africa. Its Global Positioning System (GPS) coordinates **24°31'46.06"S 31°03'50.70"E.**

Purpose of the dam: The primary purpose of Klaserie Dam is to provide raw water for irrigation and domestic use.

The dam also currently offers recreational activities such as boating, fishing and camping.

Dam ownership and management: Klaserie Dam is owned by DWS and operated by Klaserie Irrigation Board (KIB) for primary use. The dam is accessible via R40 Road (Klaserie Rd) from Hoedspruit to Acornhoek and has internal access gravel road.

The KIB appointed a private caretaker (Mr JH Potgieter) to manage the dam for secondary use for recreational purposes. This RMP proposes an improvement on the current institutional structure to include other relevant role players to assist in effectively managing the dam.

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 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.

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 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.

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

- 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, 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 maintain the water storage capacity of Klaserie dam;
- To establish and formalise recreational facilities around the dam;
- To promote sustainable harvesting of fish within the dam;
- To improve the current recreational institutional structure to manage the dam; and
- To ensure beneficiation of local communities from the dam economically and through equitable access.

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

"To promote the recreational activities without compromising the aesthetic character of the dam".

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 Klaserie Dam that could enhance tourist attraction:

- Improving security and maintenance of the camping area and facilities.
- Working closely with the surrounding game farms and Private Nature Reserve's in-order to ensure equitable access to the dam.
- Improving safety and security by enforcing compliance to management rules.

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CHAPTER 1: INTRODUCTION

1.1 BACKGROUND OF KLASERIE DAM

Klaserie Dam (previously known as Jan Wassenaar Dam) is an earthfill type dam which impounds the Klaserie River. It is located in Klaserie, under Ward 1 within the Maruleng Local Municipality (MLM) which forms part of the Mopani District Municipality (MDM) in Limpopo Province, South Africa.

The dam is surrounded by Private Nature Reserves, Game Farms and Lodges and it is on Global Positioning System (GPS) coordinates **24°31'46.06"S 31°03'50.70"E**.

Klaserie Dam is located approximately 30km from Hoedspruit and is accessible via R40 Road (Klaserie Road) from Hoedspruit and has internal access gravel road.

Figure 1 - 2 depicts the common recreational activities at the dam, pictures were taken during the Resource Management Plan (RMP) site inspection.

Figure 1: Camping

Figure 2: Day Visitor Fishing

The dam was built in 1960 for the purposes of irrigation and municipal use and has a storage capacity of 5 608 000 cubic metres (m^3). However, the said capacity has been greatly reduced by siltation.

The dam is owned by Department of Water (DWS) and is managed and operated by the Klaserie Irrigation Board (KIB) for the primary use (Irrigation). The secondary use of the dam has been leased to a private caretaker. The dam serves as a destination of choice for camping, boating and fishing activities.

A detailed description of the Klaserie Dam is outlined in **Table 1,** while **Figure 3** shows the location of dam.

Table 1: Klaserie Dam Profile

Klaserie Dam Profile	
Location	South Africa
Province	Limpopo Province
District Municipality	Mopani District Municipality
Local Municipality	Maruleng Local Municipality
Nearest Town	Hoedspruit
Completion Year	1960
GPS Coordinates	24°31'46.06"S 31°03'50.70"E
Purpose	Irrigation & Municipal Use
Owner	Department of Water and Sanitation
Water Management Area	Olifants River Proto CMA
Quaternary Drainage Area	B73A
Catchment area (km^2)	165
River	Klaserie River
Capacity (m^3)	5 608 000
Surface Area (ha)	118
Wall type	Earthfill
Wall Height (m)	20
Length (m)	20

Source: Department of Water and Sanitation (List of registered dams, February 2016)

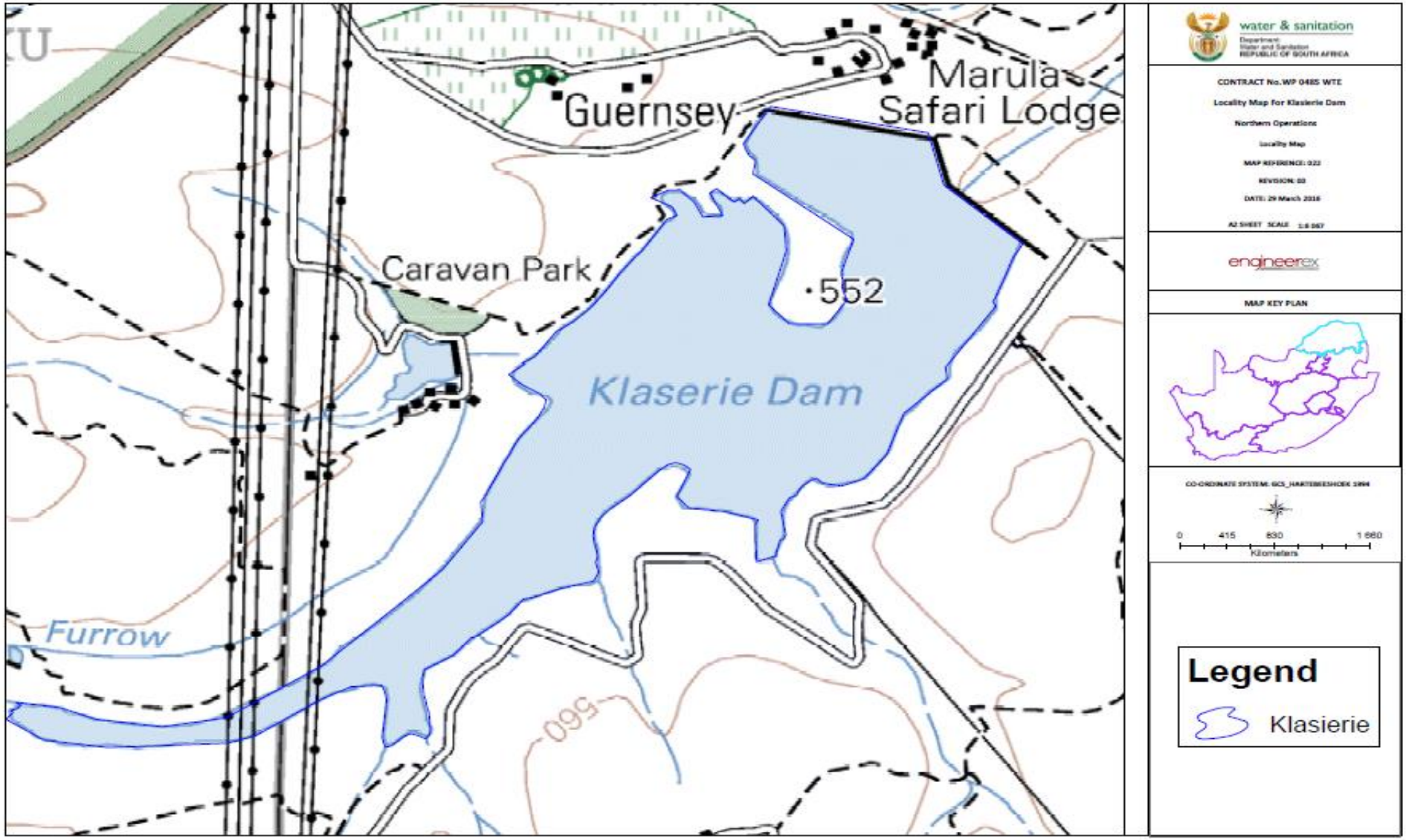

Figure 3: Locality Map for Klaserie Dam

1.2 BIO-PHYSICAL ENVIRONMENT

1.2.1 Climate

Hoedspruit climate is considered to be a local steppe climate. There is little rainfall throughout the year and is considered to be BSh according to the Köppen-Geiger climate classification. The average annual temperature is 21.5 °C in Hoedspruit. In a year, the average rainfall is 566 mm *(www.climate-data.org)*.

There is a difference of 112 mm of precipitation between the driest and wettest months. The variation in temperatures throughout the year is 8.9 °C.

January is the warmest month of the year. The temperature in January averages 25.3 °C. The lowest average temperatures in the year occur in July, when it is around 16.4 °C.

Figure 4 depicts the average temperature and rainfall of Hoedspruit over a year.

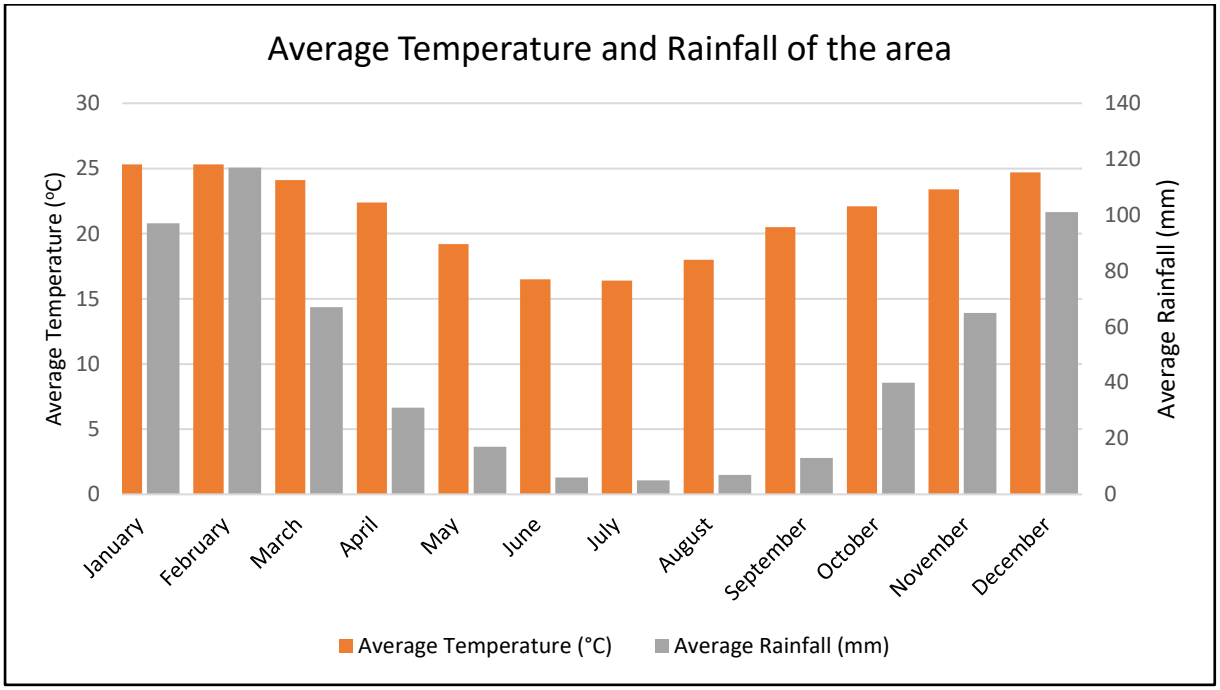

Figure 4: Average Temperature and Rainfall of the area (2016)

1.2.2 Flora

The vegetation of Klaserie is comprised of the Granite Lowveld, with moderately open savanna dominated by Sclerocarya birrea, Combretum apiculatum and C. zeyheri of Skukuza, Kruger National Park (KNP) (*mucina et al, 2006*).

The conservation status of this vegetation is vulnerable. Seventeen percent (17%) of this vegetation is statutorily conserved in the KNP and approximately the same amount conserved in private reserves mainly Selati, Klaserie, Timbavati, Mala-mala, Sabi Sand and Manyeleti Reserves. More than 20% of the vegetation has been transformed by cultivation and settlement development (*mucina et al, 2006*).

Figure 5 depicts the vegetation type around Klaserie Dam.

Figure 5: Vegetation Type around the dam.

The Vegetation Map of the area has been shown in **Figure 6**.

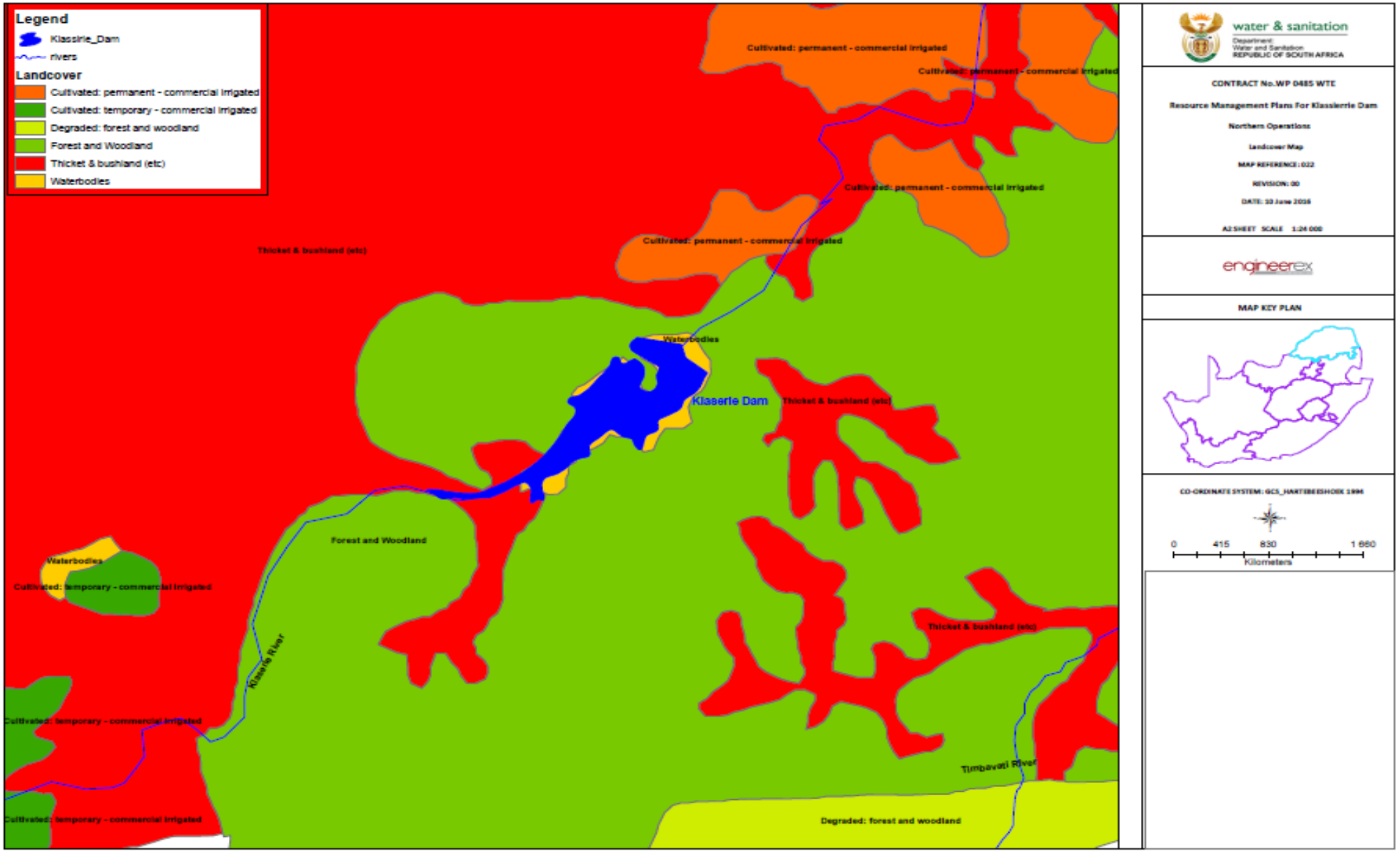

Figure 6: Land Cover Map for Klaserie Dam

1.2.3 Fauna

The dam is known for carp fishing. The Caravan Park adjacent to the dam has international guest who visit the dam for Carp fishing activities. Carp fish is a strictly catch and release due to its protected status. Klaserie Dam is also surrounded by game farms and a cattle kraal downstream the dam.

Figure 7 shows a notice for carp fishing and management at the dam.

Figure 7: Public Notice for Carp Fishing

1.2.4 Geology and Soil

Klaserie Dam is situated on the Swazian Goudplaats Gneiss, Makhutswi Gneiss and Nelspruit Suite (granite gneiss and migmatite), and further south still, the younger Mpuluzu Granite (Randian) from the major basement geology of the area. Archaean granite and gneiss weather into sandy soils in the uplands and clayey soils with high sodium content in the lowlands. Erosion is very low to moderate, refer to **Figure 8: Geological Map.**

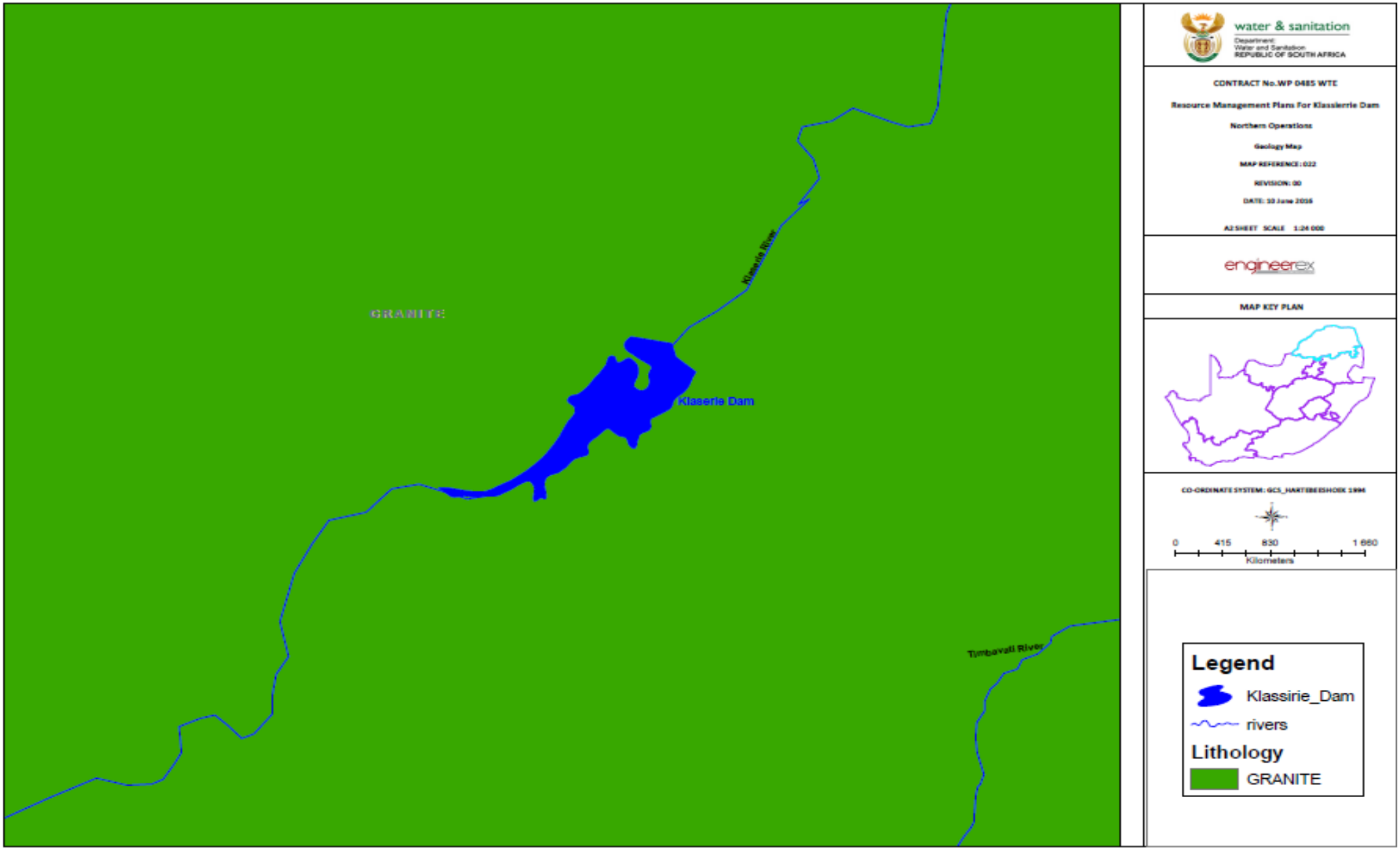

Figure 8: Geological Map for Klaserie Dam

1.2.5 Hydrology

1.2.5.1 Surface Water

The dam impounds the Klaserie River and is located within the Olifants Catchment. It is located at Quaternary drainage B73A area.

The surface area of the dam is approximately 118 hectares with a capacity of 5.7 million m^3. **Figure 9** depicts the overview of the dam.

Figure 9: Overview of Klaserie Dam

DWS measures and records the water levels / fluctuations of dams nationally on a weekly basis. The state of dams released by DWS indicated that Klaserie dam was 49.8 % full on **13 June 2016** as shown on **Figure 10.**

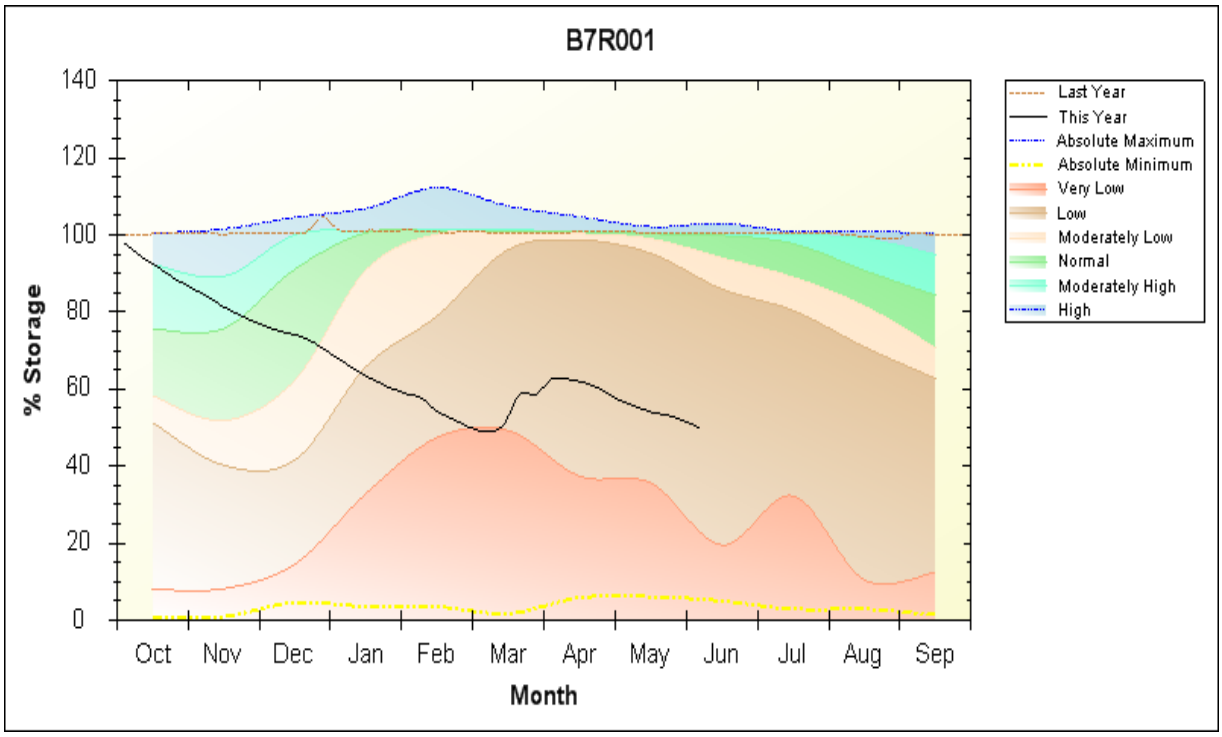

Figure 10: Fluctuations of the dam's water level over a year (DWS, 2016)

1.2.5.2 **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.

The development of algae has been evident around the edges and banks of the dam. This may be attributed to the dung of cattle grazing around the dam area and drinking water from the dam.

Water quality can be measured by a range of variables which concentrations might affect water use for its intended water use purposes.

Human health is affected directly by the proximity, availability and quality of water resources. **Table 2** shows the water quality variables within the dam.

Table 2: Klaserie Dam Water Quality Variables (DWS, RQS, 2016)

Characteristic	Tests Results	Target Water Quality Range (Recreational Purposes)	Description
Turbidity (Secchi disc, m)	-	3.0	• Most users will perceive water as suitable for swimming. This allows water depth to be judged and possible hazards will be visible. Risk of disease transmission by organisms associated with particulate matter is minimal but cannot be excluded on the basis of clarity or turbidity measures alone • No adverse effects on aesthetic appreciation
pH (pH units)	-	6.5 - 8.5	• Minimal eye irritation occurs. The pH of water is well within the buffering capacity of the lachrymal fluid of the human eye. • Skin, ear and mucous membrane irritation absent
Algae (Chlorophyll-a method, µg/chl-a)	-	0 - 15	• Nuisance conditions negligible for lower end of range, but at a mean concentration of 15 Fg/R, severe nuisance. • 0 - 15 conditions encountered for < 12 % of a year. No health effects
Phosphate (measured as Inorganic Phosphorus mg/l)	-	<5	• Oligotrophic conditions; usually moderate levels of species diversity; usually low productivity systems with rapid nutrient cycling. • No nuisance growth of aquatic plants or blue-green algae.

NB: During the period of this study the water quality variable results were not available from the DWS water quality management system.

Algae:

The concentration for algae measured as chlorophyll-a will not have any health impact for non-contact recreation.

pH:

The pH for the dam is within the TWQR for recreational use and also suitable for Aquatic ecosystem.

Turbidity:

The turbidity is low and does not limit the use of dam for water contact sports activities such as swimming.

Phosphate:

The phosphate concentration in the dam is low and this results to no nuisance growth of aquatic plants or blue-green algae in the dam. Based on the water quality results for the dam, the water will not cause effects on the current recreational activities and the dam's aesthetic quality.

Figure 11 shows the Hydrological Map of the area.

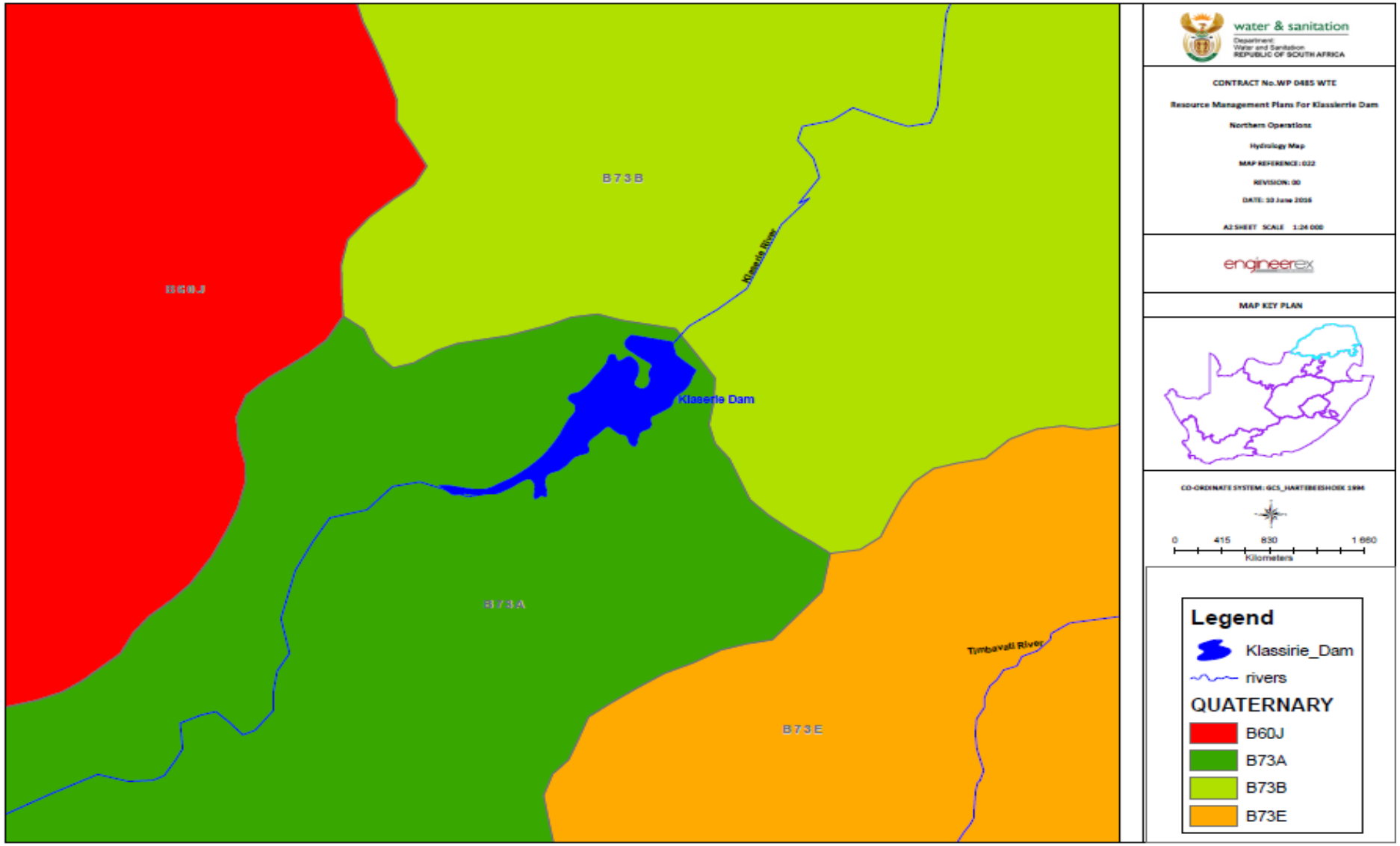

Figure 11: Hydrological Map for Klaserie Dam

1.4 BUILT ENVIRONMENT

1.4.1 Infrastructure

There are several infrastructures which have been developed over the years for the use of the dam. Infrastructures developed includes Access Gate, ablution facilities on the island and day visitors area, fire place , meeting area, Carp House as well as information signage around the dam. All these infrastructures are under the control and maintenance of the caretaker.

The ablution facilities have underground sewage tanks and are emptied from time to time by the use of honey-sucker to service the ablution facilities. **Figure 12 – 16** shows the existing facilities at Klaserie Dam.

Figure 12: Camping Site Ablution Blocks

Figure 13: Day Visitor's Ablution Block

The Carp House is mainly used by onsite maintenance personnel. This is where the tools are kept by the caretaker.

Figure 14: Carp House

There are two (2) boat launching areas that have been developed around the dam, one on the day visitor's side and the other at the camping side. The facilities lack wash-bays to ensure that the alien invasive plants seeds from other dams are not transferred to Klaserie Dam and also to comply with the South African Maritime Standards (SAMSA) and the Department of Transport (DoT), Inland waterways programme.

Figure 15: Boat Launching Area

Figure 16: Boat Launching Areas Layout

1.4.2 Transportation Network and Access

The dam is situated approximately 30km from Hoedspruit on the Guernsey Road and it is accessible through R40 Road from Hoedspruit, when turning left onto the Guernsey Road which has an access control. The dam has internal gravel access road. It is located approximately 40km from the Kruger National Park (KNP) and a mere 10 minutes' drive to some of the most well-known big five lodges. The dam is further by 7km to Acornhoek, 5km to Orpen Gate, 40km to Phalaborwa and 100km to Nelspruit.

1.5 USES AND USERS OF THE DAM

1.5.1 Primary Function of the dam

1.5.1.1 Irrigation

DWS has an agreement with the Klaserie Irrigation Board (KIB) for the primary use of the dam. KIB is responsible to release bulk water for irrigation purposes on the farms around the dam.

1.5.1.2 Municipal Use

The purpose of the dam is for irrigation and municipal use. The MLM has not tapped intends to use the dam for future developments around Klaserie.

1.5.2 Secondary Function of the Dam

The secondary and commercial activities that currently exists at the dam includes Camping and fishing activities. Day Visitor pays R40.00 for fishing and R150.00 per car for camping per day.

The secondary use activities are managed by the Caretaker (Mr JH Potgieter).

1.6 RECREATIONAL INSTITUTIONAL STRUCTURE

The management of recreational use of the dam has been leased to a private caretaker by the KIB and as part of the RMP process the recreational institutional structure will be reviewed.

1.6.1 Management of Water Surface

DWS has an agreement with the KIB to operate the dam for irrigation purposes to downstream farms.

In addition to the KIB and 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.

1.6.2 Access

The dam has an existing access gate and internal access gravel road. However, the access gate is not fully controlled and attention has to be given to optimise access control to the dam.

Figure 17 depicts the access gate to Klaserie Dam.

Figure 17: Access Gate

1.7 LAND OWNERSHIP

The RMP focuses on the DWS purchased boundary which is the state land expropriated for the construction and management of Klaserie Dam. Moreover, the RMP also takes cognisance of the activities adjacent to the DWS purchased boundary that may negatively affect the dam.

1.7.1 Land Claims

There is no current registered land claims on Klaserie Dam Purchase Boundary. However, it was highlighted during a Public Meeting that the Moletele Communal Property Association (CPA) has lodged a land claim for Klaserie Dam.

1.8 SAFETY

1.8.1 Safety of Navigation

There is currently no adequate, standardised and harmonised fixed and floating Aids to Navigation and Demarcation Markers in place. The AtoN Markers at the dam-wall have been flooded and misplaced.

1.8.2 Incident Management

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

As part of developing a RMP for the dam, an area has been proposed to be used as Incident Response Point, refer to the **Zoning Map** (Section 4.2)

1.9 SOCIO ECONOMIC ENVIRONMENT

1.9.1 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 a MLM as shown in **Figure 18**. An understanding of socio-economic conditions of Ward 1 can be used at a later stage to determine the impact of a RMP in the area in terms of changed socio-economic conditions.

A social Audit which focused on the population composition of the ward, Education level, and employment status was undertaken and is presented in section 1.9.1.1 to 1.9.1.3, respectively.

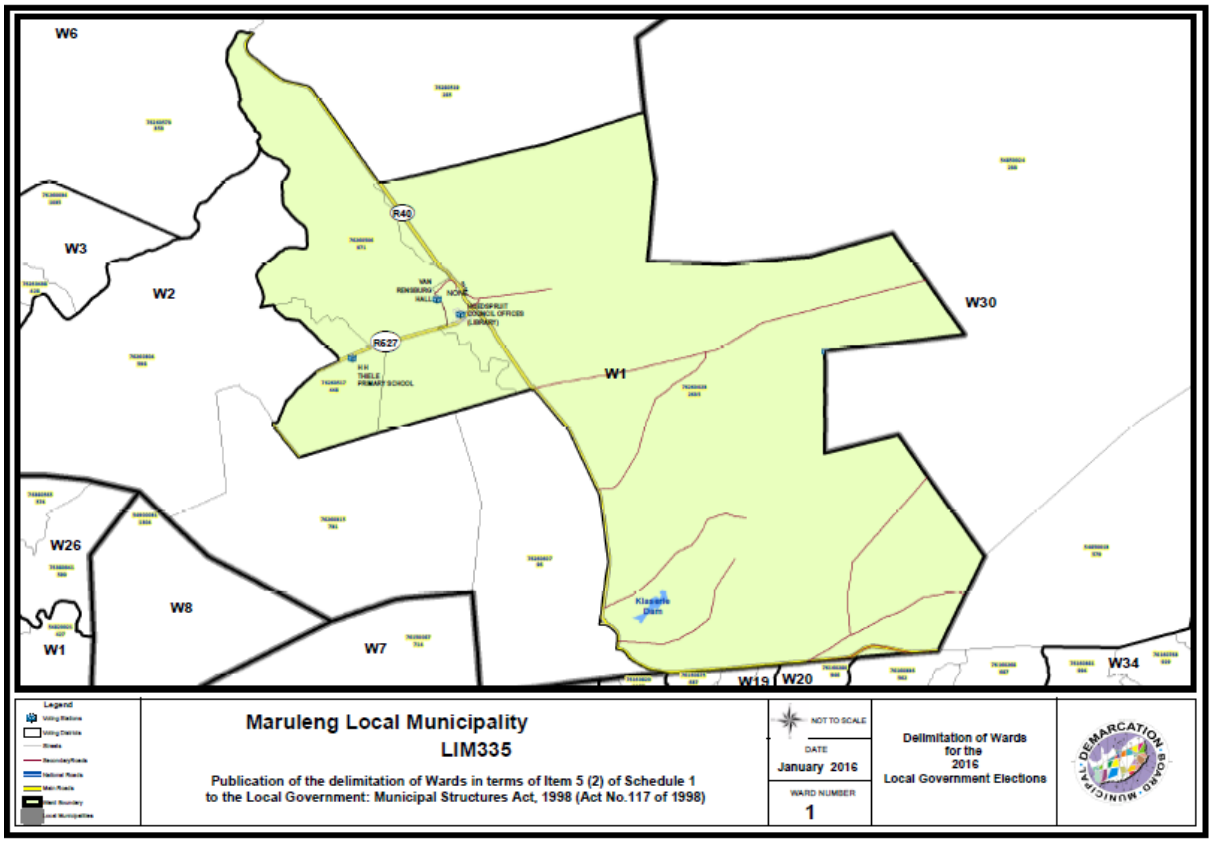

Figure 18: MLM Ward 1 Demarcation (Demarcation Board, 2016)

1.9.1.1 **Population Dynamics**

According to (MLM IDP, 2015), the municipality's population is dominated by youth, with Sepedi being the main language. Ward 1 has a total population of 5 622 as shown in **Table 3**.

Table 3: Ward 1 Population by Gender

Item	Description
Male	2 986
Female	2 636
Total	**5 622**

1.9.1.2 **Education Level**

Table 4 and Figure 19 shows that 20.90% of the population has no schooling while 18.50% has grade 12 and only 7% has higher education. The LED strategy should identify the level of the skills that the community has and identify gaps so that more effort is made to address the skills shortage in the municipal area.

Table 4: MLM Education Level

Item	Description
No schooling	11 011
Grade 7 (Std 5)	4 279
Grade 12 (Std 10)	9 811
Diploma with Grade 12	805
Bachelor's Degree	405
Honors Degree	211
Masters and PhD Degrees	132

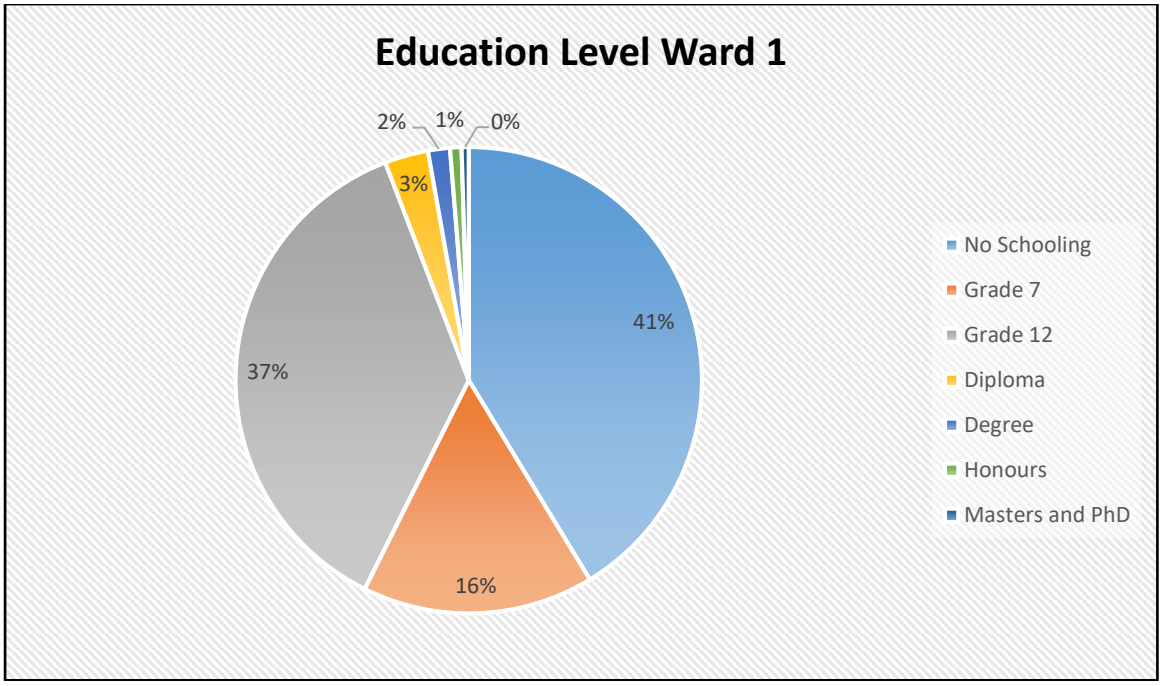

Figure 19: MLM Education Level

1.9.1.3 **Employment Status**

Table 5 and **Figure 20** shows that there are 26 798 economically active people in MLM, with 13 142 employed, 8 994 unemployed and 1667 discouraged work seekers. This indicates the need for the strategies to identify some of the development thrusts that are linked to job creation and economic growth.

Table 5: MLM Employment Status

Item	Description
Economically Active	26 798
Employed	13 142
Unemployed	8 994
Discouraged work seekers	1 667

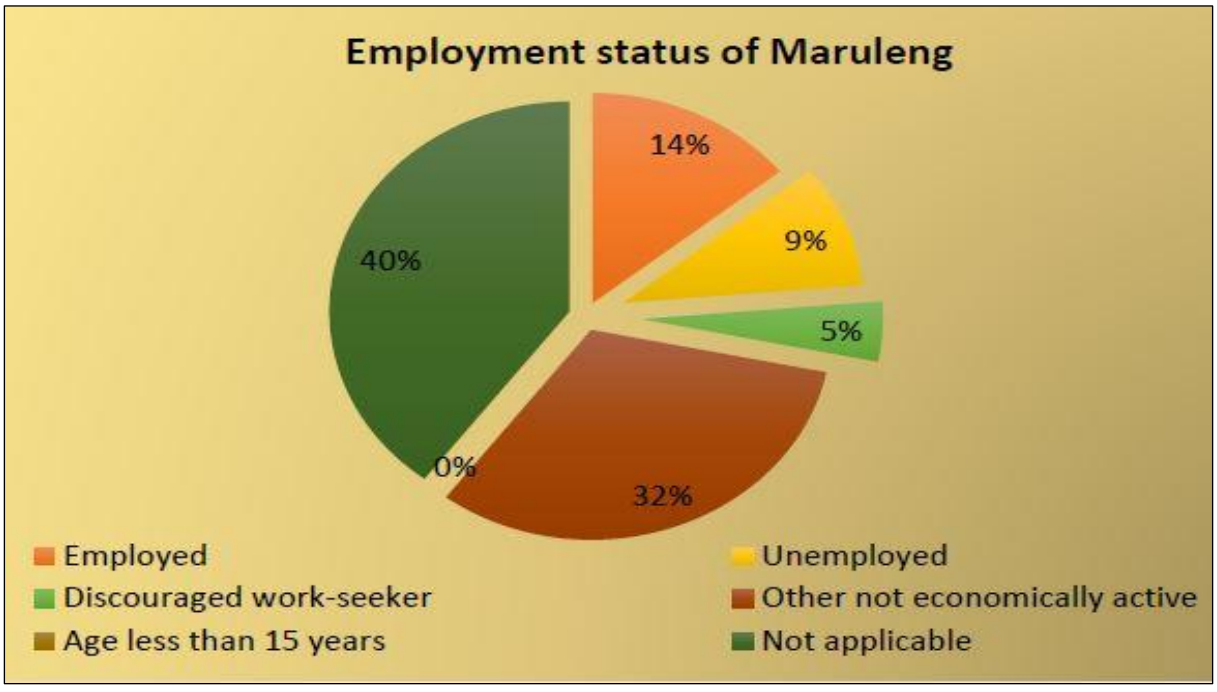

Figure 20: MLM Employment Status

1.9.1.4 **Household Income**

About 3891 households in the municipality fall within the category earning below R1500.00 per month and about 32 871 people live on grants as shown in **Figure 21**.

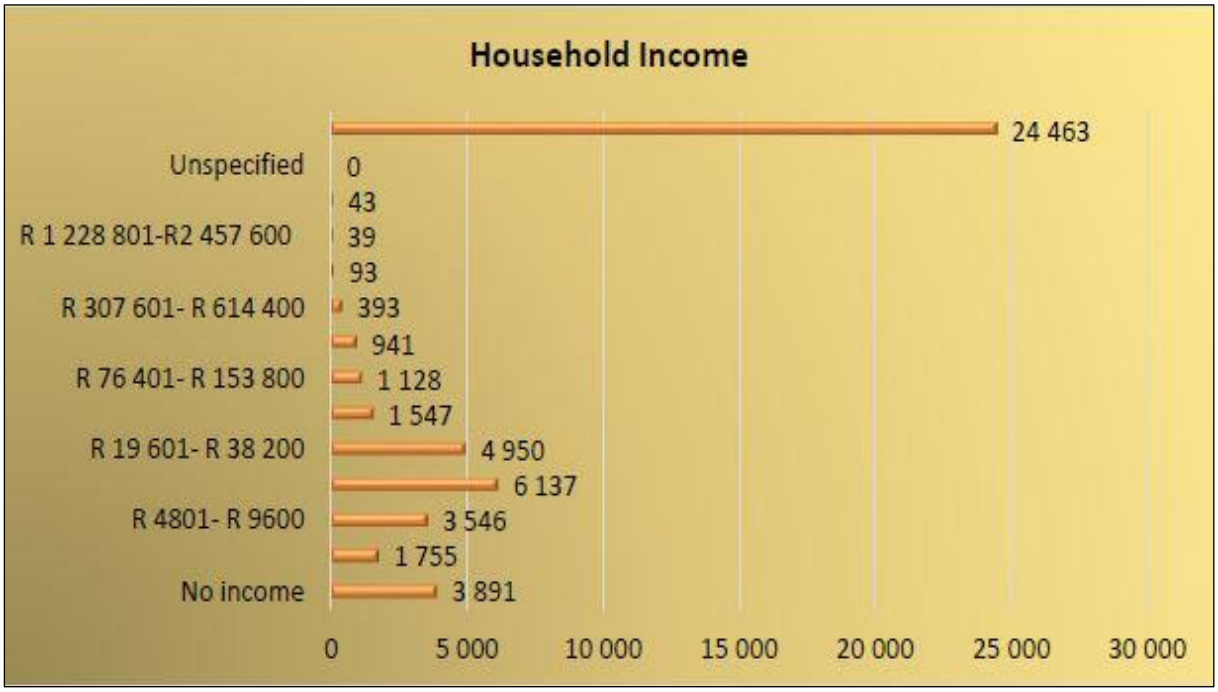

Figure 21: MLM Household Income

1.9.2 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 Klaserie Dam. It is informed by relevant policy, legislation and planning documents administered by other government departments, most of which are herein under discussed similarly, these government departments are required to use the RMP to inform the development of future policy, legislation and planning documents.

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:** This paper outline 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:** Public participation refers to ongoing interaction between role players and all stakeholders that is aimed at improving decision making during planning, design, implementation and evaluation of all project 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:** 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 PPP Toolkit for Tourism:** This toolkit assists the process of development of tourism-based businesses on state-owned land. The Toolkit should make it easier for institutions and the private sector to enter into tourism related partnerships on state property managed by national and provincial government institutions.

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 Document on using water for recreational purposes (DWAF, 2004):** This policy is the main guideline in support of the RMP process with regards to the basic principles, policies, strategies and actions for regulating the use of water for recreational purposes.

XVI. **Public Finance Management Act (PFMA) (Act No. 29 of 1999**): Section 76 of the Act secures transparency, accountability and sound management of the revenue, expenditure, assets and liabilities of government departments. The Act promotes the objective of good financial management in order to maximise service delivery. The Act allows DWS to enter into PPP agreements with the private sector for the commercial use of state assets.

XVII. **Safety at Sport and Recreational Events Act, 2010 (Act No. 2 of 2010):** Events management is addressed by Safety at Sport and Recreational Events Act (Act No. 2 of 2010). This act deals with ensuring responsibility for safety and security at events. The act deals with among other things,

- Responsibility for safety and security at the events;
- Risk categorization of events; and
- Safety certificates.

XVIII. **South African Maritime Safety Authority Act, 1998 (Act No. 5 of 1998):** One of SAMSA's three legislative mandates is "to ensure safety of life and property at sea". The Act enables SAMSA to administer and execute the relevant maritime legislation.

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

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

- Broad-based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003).
- Communal Land Rights Act, 2004 (Act No.11 of 2004).
- Development Facilitation Act, 1995 (Act No. 67 of 1995).
- 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).
- Limpopo Environmental Management Act, 2003 (Act No. 7 of 2003).
- National Heritage Resources Act, 1999 (No. 25 of 1999)
- Occupation Health and Safety Act, 1993 (Act No. 85 of 1993).
- Restitution of Land Rights Act, 1994 (Act No. 22 of 1994).
- State Land Disposal Act, 1961 (Act No. 48 of 1961).
- Sustainable Development Goals (2015)

- **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.

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 complete and other legislation could be applicable.

CHAPTER 3: WHAT IS RESOURCE MANAGEMENT PLAN

3.1 DEFINITION OF A RMP

A Resource Management Plan (RMP) is a plan which aims to regulate access and the recreational utilisation of a water resource and the surrounding state land in ways which promote community participation and beneficiation, environmental conservation and to 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 water consumption, it is still a major water use and needs to be managed correctly to ensure increased community participation and beneficiation with minimal disturbances and environmental impacts.

3.2 PURPOSE OF RMP

The main aim of RMPs is to attain 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

Trigger 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, as illustrated in **Table 6.**

Table 6: Trigger Factors for the Development of Klaserie Dam RMP

Trigger Factors	Description
Resource Management	**Resource Management** • The current caretaker is illegally mining the sand from the dam for commercial purposes. He does not have authorisation from relevant institutions. • Maintenance of storage capacity by desilting the dam from time to time. **Access Control** • Proper access control and security around the dam to curb the illegal fishing and trespassing. • Discrimination and/or Imbalances of camping visitor's preferences.
Community Participation and Beneficiation	**Community Participation** • Lack of communication between the surrounding landowners. • Lack of water provision to the surrounding landowners. • Privatization of the dam by the caretaker.

Trigger Factors	Description
Recreational Industry	**Caretaker Agreements** • The Klaserie Irrigation Board (KIB) has a caretaker agreement for recreational activities with a private party. The agreement is reviewed every three (3) years. • The caretaker agreement is not transparent and does not give other institutions or people to bid.
Public Policy	**Local Planning Initiatives** • To ensure that the RMP incorporates the planning documents from Local or District Municipality in cases where the dam is identified as local development objective in terms of the Integrated Development Plan (IDP), Spatial Development Framework (SDF) or Tourism Master Plans for the relevant Local or District municipality.

3.4 RMP DEVELOPMENT PROCESS

The RMP is developed in accordance to the RMP Guideline Procedure (DWAF, 2006) as illustrated in **Figure 22.**

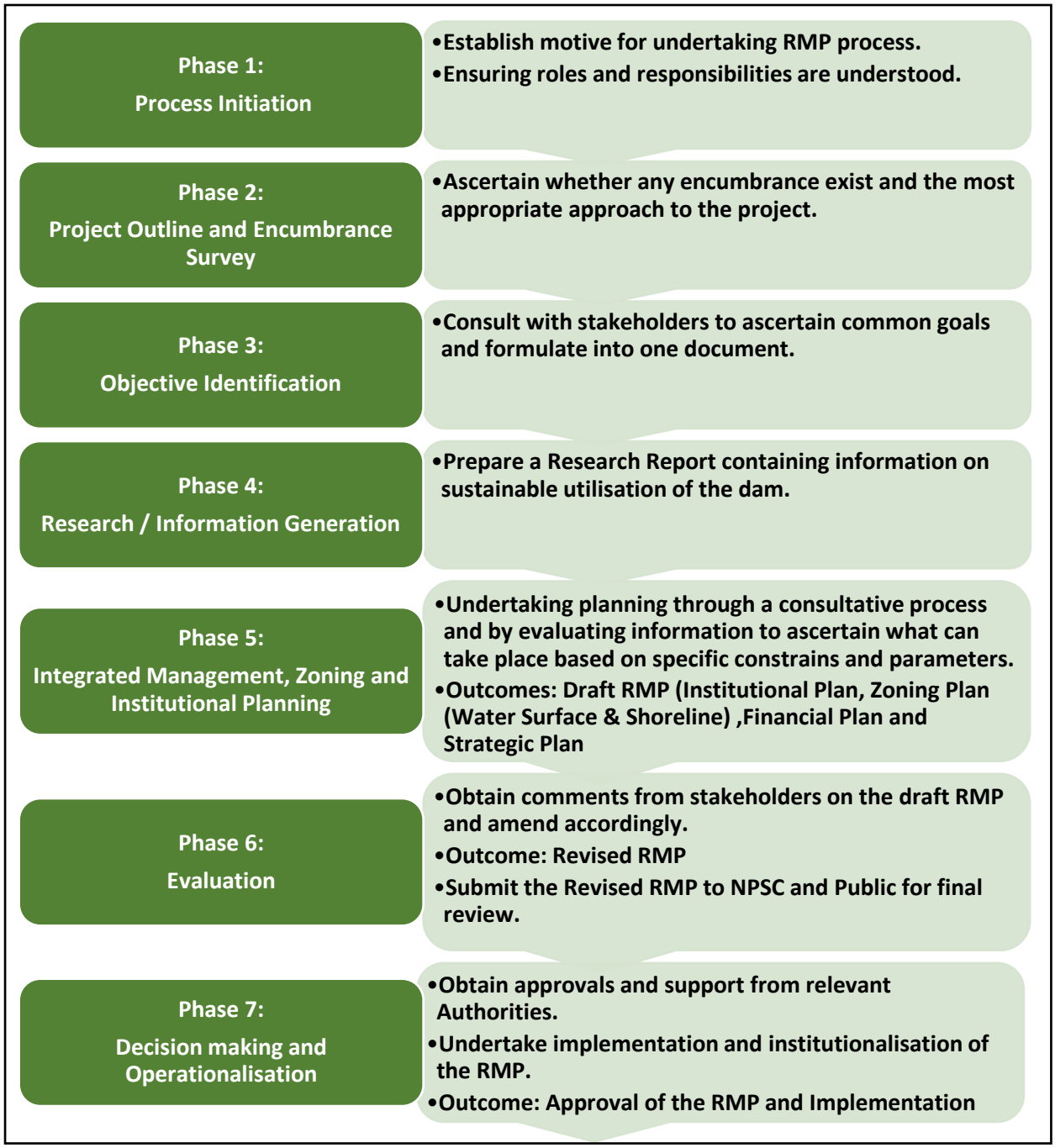

Figure 22: RMP Procedure

3.5 RMP PLANNING STAGES

3.5.1 Desktop Study

The desktop study was conducted in order to collect the baseline information about the dam as well as the surrounding environment. This study provided information such as the location of the dam, user groups, current activities and previous studies conducted for the dam.

3.5.2 Site Inspection

There were two (2) site visits conducted for the dam. The first site inspection was conducted on **25 November 2015** to gather the baseline information about the dam using a checklist questionnaires. The site inspection was undertaken with the DWS officials, KIB and the caretaker of recreational activities of the dam.

During the site visit, the dam level was approximately 70% full. It was also noted that the dam is silted. Island were also evident on the water surface due to drought. Visitors were also evident at the dam for camping and fishing as depicted on **Figure 23 - 24**.

Figure 23: Visitor Camping

Figure 24: Community Member Fishing

The second site inspection was conducted with MLM Officials on **12 April 2016**. Additional background information was collated from consultation with adjacent landowners, Local Municipality and the Klaserie Irrigation Board (KIB).

3.5.3 Public Participation

Public Participation process (PP) is a process in which potential Interested and Affected Parties (I&APs) are afforded 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 (Information Gathering and Research)** 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 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), their relationship towards each other and planning procedure are imperative in the successful development of the RMP. It is also important that proper consultation with the public is conducted 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 Planning Phase entails three (3) important aspects namely:

- 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 and follow-up emails.

3.5.3.3 **Exit Phase**

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

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

During this Phase, a draft RMP will be presented to the Stakeholders so that they can comment and give inputs.

3.5.3.3 **Advertising Process**

3.5.3.3.1 Background Information Document (BID)

The purpose of this document was to provide stakeholders (Authorities and I&APs) with the background information about the proposed RMP project and to introduce the processes to be followed in the development of the plan. It also aimed to inform authorities and I&APs on how to fully participate in the process and to encourage active attendance in stakeholder

engagement meetings. The BID was compiled from the information collated through the desktop study and site inspection (See attached **Appendix B).**

3.5.3.3.2 Newspaper Advert

A Newspaper advert regarding the RMP project was placed in the **Hoedspruit Herald Newspaper on 22 April 2016.** The advert invited the public to attend the Public Participation Meeting. Furthermore, an advert for the Draft RMP was advertised in **Kruger 2 Canyon Newspaper on 10 March 2017**. (See attached **Appendix C**).

3.5.3.3.3 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 relevant contact details. The flyers were compiled in English and were distributed on **12 April 2016.** The Onsite Notices were also erected on the area accessible to the Public around the dam. This includes entrance gate and fence of the dam as shown in **Figure 25**.

Moreover, the flyers for the draft RMP were distributed on **03 March 2017** (See attached **Appendix D**).

Fence of the dam

Entrance to the dam

Entrance to the dam

Main Entrance to Klaserie

Figure 25: Proof of Onsite Notice

3.5.3.4 **Direct Communication**

3.5.3.4.1 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 **19 April 2016**.

Moreover, the meeting invites for the draft RMP were sent out on **14 March 2017** (See attached **Appendix E**).

3.5.3.4.2 Authority Meeting

The initial authority meeting was held on **03 May 2016** at **Maruleng Local Municipality Hall.**

The purpose of the meeting was:

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

The draft RMP was presented to the authorities on **28 March 2017** at **Maruleng Local Municipality Hall.**

3.5.3.4.3 Public Meeting

There were three (3) Public Meetings held at different venues to accommodate all the Interested and Affected Parties (I&APs). The program for Public Meetings is shown in **Table 7.**

Table 7: Dates of Public Meeting

Initial Public Meeting			
Venue	**Audience**	**Date**	**Time**
Klaserie Dam	Surrounding Landowners	04May 2016	13H00 – 15H00
Scotia GaMongatane	Moletele Communal Property Association	16May 2016	15H00 – 17h00
Kampersrus	Community	1 May 2016	18H00 – 19H30
Draft RMP Public Meeting			
Klaserie Dam	Surrounding Landowners	29 March 2017	13H00 – 15H00
Scotia GaMongatane	Moletele Communal Property Association	29March 2017	15H00 – 17h00
Kampersrus	Kampersrus Community	28 March 2017	18H00 – 19H30

3.5.3.5 **Comments and Responses Register**
A copy of the draft report was circulated on **03 March 2017** for commenting. The commenting period was to elapse on **28 April 2017.** (See attached **Appendix F**).

3.5.4 Planning Partners

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

The RMP provides for coordination between different governments and agencies to ensure that not only the objectives of DWS are attained, but also the objectives of other relevant Government Departments are attained. The relevant Departments/agencies are listed in **Table 8**.

Table 8: Planning Partners and their Respective mandates

Department/ Agency	Mandate
Maruleng Local Municipality	The dam is within the jurisdiction of the municipality.
Klaserie Irrigation Board	KIB is responsible for the management and operation of Klaserie Dam for primary use (irrigation).
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 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 Rural Development and Land Reform (DRDLR).	The Department will assist in terms of Land Claims/Ownership issues.
Department of Transport (DoT)	Responsible for legislation, policy and regulations for all transportation in South Africa, including shipping and other transport by water or sea also inland waterways.
National Treasury (NT)	The use of State assets is governed by National Treasury Regulations, requiring DWS to plan concessions in compliance or association with National Treasury, guided by the Tourism Public Private Partnership (PPP) Toolkit of 2005.
South African Maritime Safety Authority (SAMSA)	One of SAMSA's three legislative mandates is "to ensure safety of life and property at sea". The Act enables SAMSA to administer and execute the relevant maritime legislation.

3.6 RMP DATA ANALYSIS

3.6.1 Encumbrance Survey (Phase 2)

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

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 9 - 11 outline the summary of limitations that might affect the development or implementation of the RMP for the dam.

Table 9: Summary of Biophysical Encumbrances

Item	Description
Siltation	• Siltation of the dam which reduce the storage capacity of the dam, affect use of boats in other areas as well as the release of water for irrigation.
Climatic Conditions	• The flooding of camping area during heavy rains have a potential to damage existing and potential infrastructure.
Vegetation	• The dam is located on a Critical Biodiversity Area (CBA) 1 and Ecological Support Area (ESA) 1 as identified on the Limpopo Conservation Plan and Kruger to Canyon (K2C) Buffer zone. Careful planning has to be adhered to during the implementation process.
Hydrology	• There is a small water surface area which cannot accommodate a lot of recreational activities. • The development/ presence of algae due to the eutrophication of cow dung/ manure. • It is alleged that the Caravan Park upstream has diverted the flow of the river into the dam. • Morula Lodge (surrounding landowner) allege that the caretaker has blocked the provision of water to their premises. • There is a drought which affects the primary and secondary use of the dam and operational levels.

Table 10: Summary of Legal Encumbrances

Item	Description
Agreements	• The current management structure excludes key role players such as SAMSA, DAFF, who have the mandate of using the dam for recreational activities. • The caretaker opportunity is not transparent. It is not advertised nor give other people an opportunity to bid.
Mining Permits	• The caretaker does not have necessary permits from DWS and Department of Mineral Resources (DMR) for mining of sand.
Land Claims	• Existence of land claims within Klaserie Dam boundary.

Table 11: Summary of Social Encumbrances

Item	Description
Access Control	• Access entrance needs to be secured to prohibit unauthorized access.
Access Fee	• To evaluate the access fee for day visitor in accordance to the socio-economic status of the surrounding communities.
Expectations	• The local communities are still experiencing the shortage of water for domestic uses.

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 (Phase 3)

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 12**.

Table 12: Klaserie Dam SWOT Analysis

Strengths	Weaknesses
• The surrounding areas are clean and free of waste. • The dam has good water quality. • Surrounded by game farms and Private Nature Reserves. • Good camping area. • The dam is well managed and has rules to control the day visitors. • It is located along the tourism route to and from Kruger National Park.	• Small surface area of 118 hectares. • It is far from the nearest local community. • The dam is not fully fenced, there are issues of trespassing. • Non-constant water levels. • Entrance is not fully secure. • Development of algae. • Siltation has reduced the storage capacity.
Opportunities	**Threats**
• Maintain the access gravel road. • Improve the management structure. • Sand mining for maintaining the storage capacity and business. • To provide local community with water for domestic use. • Awareness of fishing requirements and permitting system. • Job creation for maintaining the camping area and facilities and security.	• Siltation has reduced the storage capacity. • The alleged land claims by Moletele CPA. • Part of the dam has been rented out for commercial fishing to Caravan Park. • The island was flooded in 2012. • Net fishing during the night. • Possible presence of crocodile and hippos. • The dam can be over commercialized by DWS.

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

KPA 1: Resource Management

- To carefully plan and implement projects within critical biodiversity areas (CBA) 1 and ecological support areas (ESA);
- To ensure the conservation of species diversity around the dam basin;
- To have the Klaserie Dam free of Alien Invasive Plants and to maintain the ecological aspect of the area;
- To maintain a good water quality of the dam so as to meet the primary and secondary use requirements; and
- To maintain the storage capacity of the Klaserie Dam.

KPA 3: Resource Utilisation

- Provision of water for domestic use to the surrounding communities such as Scotia;
- To formalise and secure the dam all around;
- To secure the gate in-order to prohibit unauthorised access;
- To establish and formalise recreational facilities around the dam; and
- To promote sustainable harvesting of fish within the dam.

KPA 3: Benefit Flow Management

- To ensure the participation and beneficiation of all stakeholders in the use of the dam; and
- To establish an effective institutional structure that can manage the use of water for recreational purpose in an acceptable manner, which is also representative of all the stakeholders.

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:

"To promote the recreational activities without compromising the aesthetic character of the dam".

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 Phase was to collect the relevant data about the dam that 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 data as illustrated in **Figure 26**.

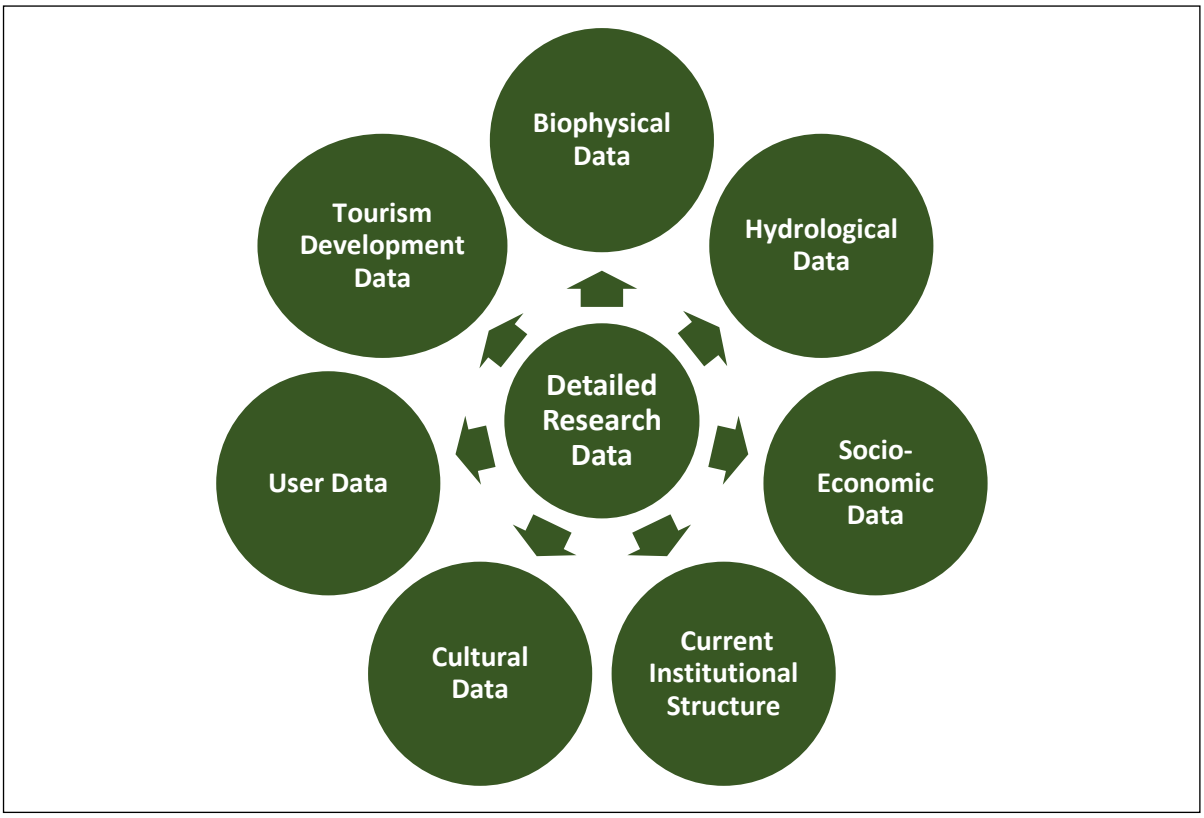

Figure 26: Research Data

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**

Few activities exists at Klaserie Dam, which is dominated by fishing and camping. The day-visitors are restricted to the first part of the dam just after the entrance gate for fishing whereas camping visitors are accommodated on the island. The island has the following structures which support the tourism activities at the dam:

- Ablution Facilities;
- Fire place;
- Meeting Place;
- Carp Fish House; and
- House for maintenance purposes

Figure 27 depicts the infrastructure overview of the dam.

Figure 27: Infrastructure Overview

3.6.3.2 **Adjacent Tourism Facilities**

3.6.3.2.1 AM Lodge - A Private Luxury Game Lodge

AM Lodge is a five-star Private Luxury Game Lodge in the Klaserie region. Water features throughout the public areas of the main lodge serve as a reminder of its proximity to the Klaserie River, a lifeblood for the fauna and flora of the Greater Kruger National Park (Source???).

AM Lodge is located on a Private Luxury Game Lodge in the Klaserie region at the border of the Limpopo and Mpumalanga provinces, approximately 5.5 hour's drive from Johannesburg, or 15 minutes from East-gate airport at Hoedspruit. The conservancy, home to a range of animals including buffalo, giraffe, zebra, wildebeest and several antelope species, is flanked by Big Five private game reserves that form part of the Greater Kruger National Park, an area that covers approximately 20-million hectares dedicated to the conservation of wildlife, (*www.amlodge.co.za*).

3.6.3.2.2 Klaserie Caravan Park

Klaserie Caravan Park offers an experience for the whole family with specimen angling and a swimming pool. Small boats and canoes are available for hire for those who would like to roam the waters of the dam.

There are options of staying in one of fully fitted tented camps or chalets. Camping or caravan sites along the banks of the dam are also a popular option. All camp sites are supplied with power outlets and own personal braai with borehole water at each site (*www.klaseriecaravanpark.co.za*).

3.6.3.2.3 Klaserie Private Nature Reserve

The Klaserie Private Nature Reserve (KPNR) is one of the largest privately owned nature reserves in South Africa covering 60 000 hectares and forms part of the greater Kruger National Park. It is an entirely non-government organization involved in the full spectrum of Nature Conservation.

The KPNR was established in 1969 and was officially proclaimed a nature reserve in 1972 with Jan de Necker as the founding chairman and Reenen Van Vuuren as the first warden. The reserve is run by an executive committee

comprising of members or landowners who are elected at the AGM and operate through the reserves warden Colin Rowles.

KPNR is also committed to the non-profit organization Eco Children (formerly known as Children's Eco Children) which is in an initiative of the Klaserie Private Nature Reserve. Eco Children has been very successful in interacting with the children of the local community from a hands-on conservation education perspective and through a 'whole school development' approach. Eco Children has a specific focus on the environment and on education, and the significance and importance of both to our lives and the future of our country.

KPNR is deeply involved in the full spectrum of nature conservation. Home to over 60,000 hectares of wilderness and a home to a number of wildlife initiates, they include the Ground Hornbill Project, Rhino Protection and The Elephant Project.

3.6.3.3 **Feasibility for Potential Objectives**

According to DWAF (2006), the feasibility of the proposed objectives needs to be determined in light of the local environmental conditions.**Tables 13** shows the practicability of all proposed recreational objectives.

Table 13: Feasibility of Potential recreational Objectives

KPA1: Resource Management		
Objectives	**Status Quo**	**Practicability**
• To carefully plan and implement projects within critical biodiversity areas (CBA) 1 and ecological support areas (ESA). • To promote conservation of species diversity around the dam.	• The dam is situated within critical biodiversity areas (CBA) 1 and ecological support areas (ESA) 1 as identified in Limpopo Conservation Plan and Kruger to Canyon Biosphere.	• The protection of sensitive area may be achieved through understanding the carrying capacity to avoid over development of the dam. Due process are to be followed during planning to ensure that developments are carefully planned and implemented.
• To have Klaserie Dam free of Alien Invasive Plants and to maintain the ecological aspect of the area.	• DEA: Working for Water (WfW) programme has identified several Alien Invasive Plants (AIPs) around the dam.	• DEA WfW should incorporate the Klaserie Dam in their clearance and monitoring programme to ensure that the area is free of AIPs.
• To maintain a good water quality of the dam in order to meet the primary and secondary use requirements.	• There is a presence of algae resulting from the livestock dung that access the dam to drink water.	• An area for livestock watering has to be demarcated and zoned to avoid conflict of water uses and to ensure effective management of the water resource.
• To maintain the storage capacity of Klaserie Dam.	• Siltation has reduced the storage capacity of the dam and this has impacted on the use of boats in other areas of the dam also releasing water for irrigation to downstream farmers. • There is an illegal sand mining in the inlets and sensitive ecological areas of the dam for commercial purposes by the caretaker (Mr JH Potgieter).	• DWS and the KIB should follow the necessary processes to have the dam desilted in order to maintain the water storage capacity. If the issue is not addressed there might be no dam for future generation.
KPA 2: Resource Utilisation		
Objectives	**Status Quo**	**Practicability**
• To provide water for domestic purposes in Scotia.	• The primary purpose of the dam is for both municipal and irrigation use, however, the municipal use to provide water for domestic purposes has not been utilised at Klaserie Dam.	• Mopani District Municipality (MDM) as a Water Service Provider (WSP) has a mandate through the Water Services Act, 1997 (Act No. 108 of 1997) to purify and distribute water to end users. • Maruleng Local Municipality (MLM) should engage with MDM to ensure water provision at Scotia and surrounding community.
• To secure the gate in-order to prohibit unauthorised access.	• The dam is not fully fenced and there are issues of trespassing.	• KIB has a mandate to control and ensure that the water resource is secured in collaboration with DWS. This may be achieved

	• Entrance gate is not secure. The boom gate is no longer functional and the security room is vacant.	through security personnel to monitor and control access and fencing off the dam to prevent trespassing.
• To establish and formalise recreational facilities around the dam.	• The dam has basic camping facilities and also caters for day visitors for fishing. • The dam is surrounded by game farms and private Nature Reserves. It is located along tourism route to and from Kruger National Park.	• The proposed Implementing Agency (IA) of the RMP should conduct a feasibility study to ascertain feasible and sustainable recreational activities in accordance to the carrying capacity, zoning as well as relevant authorisation.
• To promote sustainable harvesting of fish within the dam.	• There is a catch and release activity for Carp fish as it a protected species. There are activities of net fishing taking place at night at the dam.	• The promotion of sustainable fishing can be through issuing of fishing water authorisation for subsistence fishing for local communities. Fishing permits/ license should be issued for commercial fishing. • There is an opportunity to teach communities which types of fish they should catch to minimize net fishing.
• Improve safety of navigation.	• The AtoN demarcation at the dam wall safety zone has been flooded and further demarcation is necessary to prevent conflict of water uses and recreational users.	• Standardized demarcation makers are to be used to determine specific zones/areas, i.e. no go areas, safety zones, etc.
• To promote equitable access and use of the dam by the public.	• There is an access fee for day and camping visitors. The fee must be reviewed in accordance to the socio-economic environment of Klaserie	• Local communities should be able to go to the dam and engage in recreational activities at a reasonable price.
KPA 3: Benefit Flow Management		
Objectives	**Status Quo**	**Practicability**
• To ensure the participation and beneficiation of all stakeholders in the use of the dam.	• The caretaker agreement opportunity has always been awarded to the same caretaker. • The caretaker opportunity is not transparent.	• The proposed IA with the support of the Dam Management Committee should strengthen community participation and beneficiation through Public-Private Partnership initiatives.
• To establish an effective institutional structure that can manage the use of water for recreational purpose.	• The current management structure is privatised and does not include other roles players.	• DWS should develop the institutional structure which is representative of all key stakeholders.

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

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

- Biophysical, cultural and socio-economic and User needs constraints;
- Development Potential and requirements;
- Site planning and Zonation;
- Programmes and Plans that will unlock the potential of the water resource; and
- Institution options and legal aspects required to create these programmes and plans.

The IRMP is broken down into four (4) main plans namely the **Institutional Plan**, **Zoning Plan**, **Strategic Plan** and **Financial Plan** as illustrated by **Figure 28**.

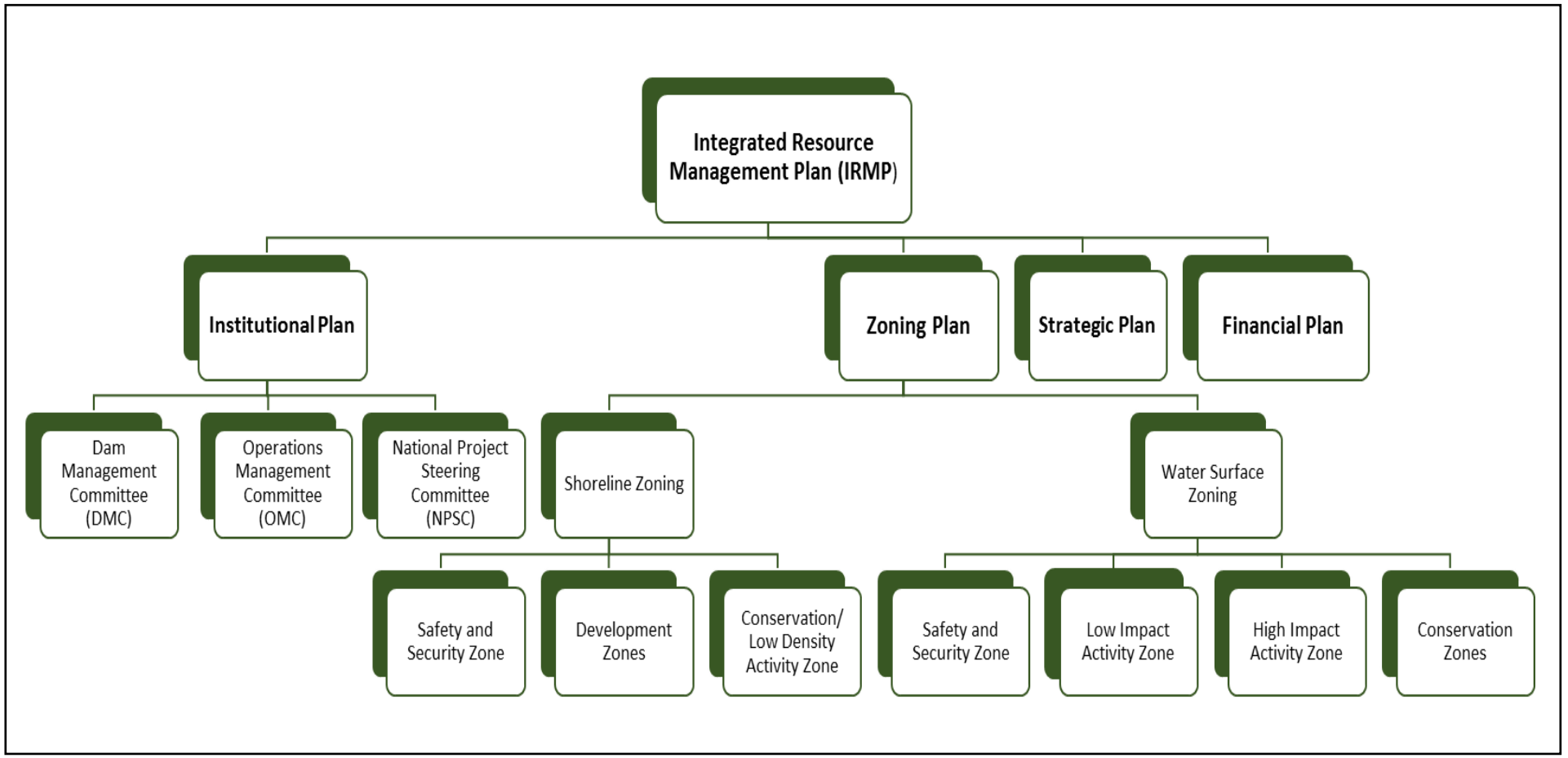

Figure 28: Integrated Resource Management Plan

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; a Dam Management Committee (DMC), Operations Management Committee (OMC) and National Project Steering Committee (NPSC). The appointed management authorities by DWS at the dams, will also form part of the institutional structure.

4.1.1 Dam Management Committee

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 the 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 29 illustrates the proposed user groups that will form part of the DMC.

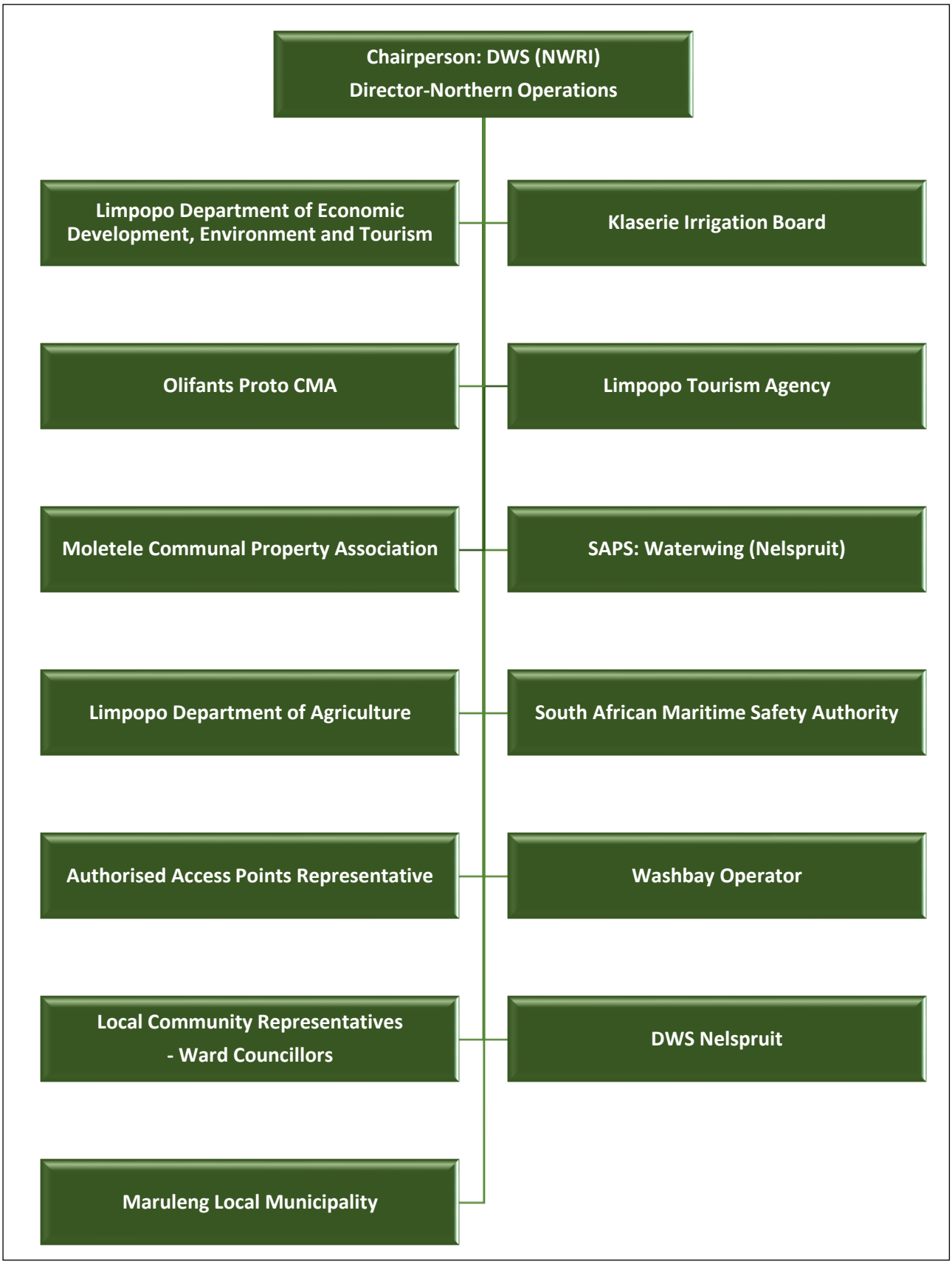

Figure 29: Proposed DMC

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 the **OMC** as the existing reporting structure. The ToR provide guidance on the following management aspects:

- Roles and responsibilities 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.

The caretaker agreement should be reviewed within the 12 months of the RMP being approved. This is to ensure that the agreements are aligned with the objectives of the RMP.

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[2] for general navigation.

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

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

Access Agreements

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

All adjacent landowners and clubs must be made aware that access to the surface water as well as shoreline 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 IA. Further, a formal agreement with IA 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.

[2] 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.

Event Applications

All events must be managed through an event application process. The applications will be submitted to the IA and to DWS will provide comments. 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); and
- 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 of Infrastructure Operational within NWRI as illustrated by **Figure 30.**

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

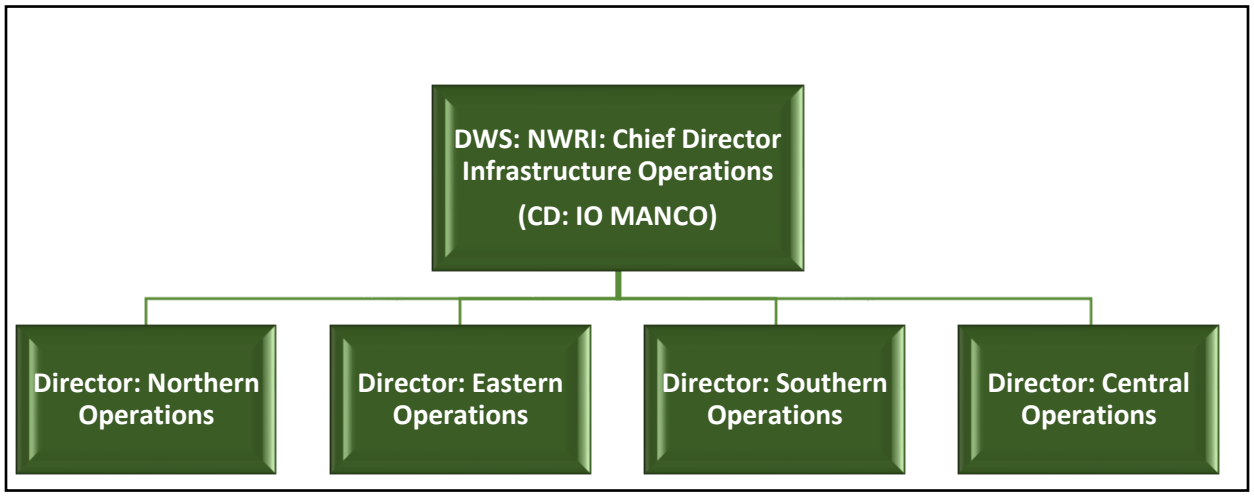

Figure 30: Existing CD: IO MANCO

4.1.3 National Project Steering Committee (NPSC)

NPSC is formed by DWS and is made up of representatives from National Government Departments 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. This committee should meet twice in a year. **Figure 31** illustrates a typical example of Governmental Departments that will form part of the NPSC:

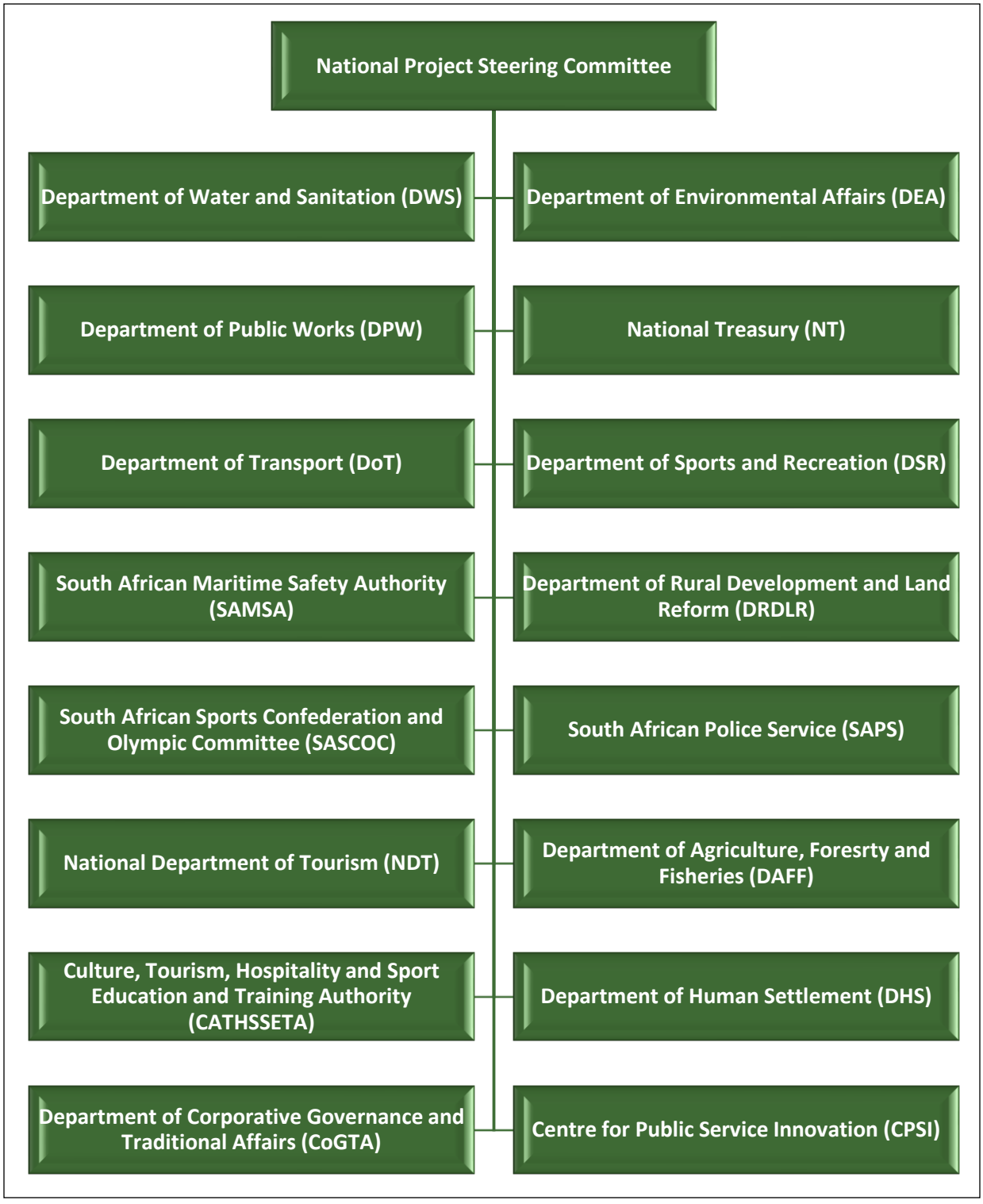

Figure 31: Proposed NPSC

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 organized 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 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 mean the following:

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

Table 14: 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 (in order prevent aquatic habitats disturbance)	• Area should be demarcated by demarcation makers and AtoN. • Strict management and control of these areas, especially with regards to illegal fishing and dumping.
• Low Impact Activity Zone.	• Activities associated with no or little wakes, such as ○ Angling ○ Canoeing ○ Swimming ○ Rowing ○ Paddle boating ○ Kayaks ○ Float tubes ○ Sailing	• Motorised boating • Water Skiing • House boats • Para-sailing • Kite-surfing • Jet skis	• Area should be demarcated by demarcation makers and AtoN.
• High Impact Activity Zone.	• Motorised boating • Water Skiing • House boats • Para-sailing • Kite-surfing • Jet skis	• Activities associated with no or little wakes, such as ○ Angling ○ Canoeing ○ Rowing ○ Paddle boating ○ Kayaks ○ Float tubes ○ Sailing	• Area should be demarcated by demarcation makers and AtoN. • All activities within the high impact zone shall take place beyond 70m 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

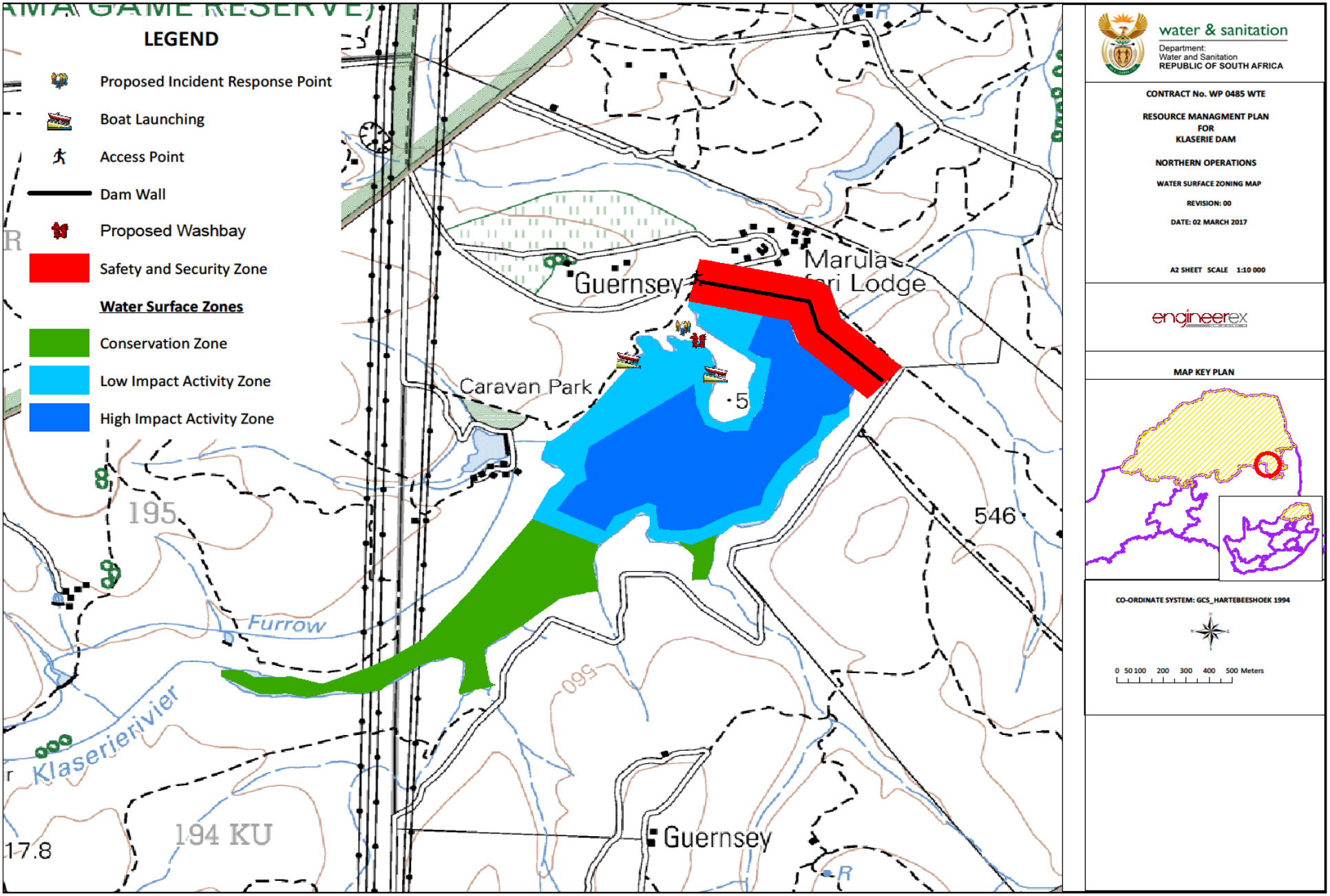

Figure 32: Proposed Water Surface Zoning

4.2.2 Shoreline Zoning[3]

In addition to water surface zoning, an integral part of the RMP is also shoreline zoning which provides guidance on what recreational activities (if any) are permissible and non-permissible on the land adjacent to the dam (DWS purchase boundary). The management zones include:

Safety and Security Zone (dam wall and associated DWS infrastructure):

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

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

Conservation / Low Density Activity Zone:

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

Medium Density Activity Zone:

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

High Density Activity Zone:

This area is reserved for large scale activities including chalets, recreational club houses, infrastructure for services and land based aquaculture.

Community Resource Zone:

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

The shoreline zoning colour coding means the following:

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

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

Table 15: Proposed Shoreline Zoning Description

Zone Name	Permissible activities	Non-Permissible Activities	Recommendation
• Safety and Security Zone.	• Fire management • Alien invasive species clearing • Management of dam infrastructure • Management and maintenance activities by DWS and authorised personnel	• Public access	• A minimum area of 100m wide downstream the dam wall should be demarcated preventing public access and use.

• Conservation/ Low Density Activity Zone.	• Conservation management activities:
	  ○ Bird watching
	  ○ Hiking
		• Development	• These zone should control access to ecological sensitive areas.

• Medium Density Activity Zone.	• Camping (tent and/or caravan)
	• Day visitors
	• Picnic
	• Shoreline fishing
	• Braai facilities
	• Ablution facilities
	• Infrastructure for services
		• Permanent structures
		• Accommodation facilities such as:
		  ○ Chalets
		  ○ Recreational club houses
			• The management of this area should follow PPP process in terms of National Treasury.
			• All developments must be approved by IA and DWS.
			• Requirements of NWA and NEMA must be taken into account in all developments.
			• All developments should have an approved Environmental Management Plan (EMP) to ensure construction does not impact on dam and must blend in with the natural environment.
			• Camping, birding, hiking, picnicking, bank angling and access to the water must be done in accordance to access agreements.
			• Camping and picnicking is allowed only in designated areas.
			• Noise levels to be kept at a minimum.
			• No littering at Camping and Picnic spots.

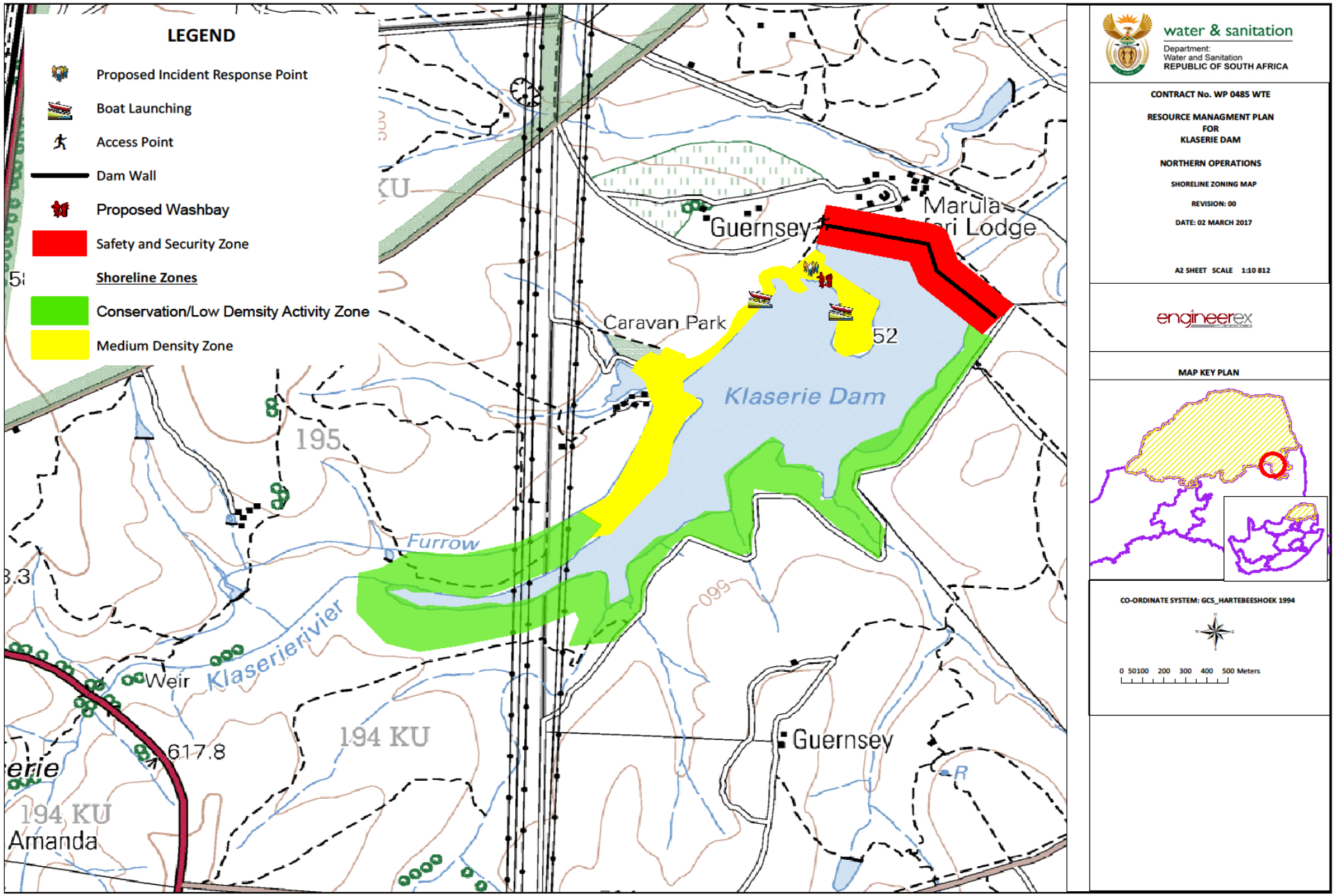

Figure 33: Proposed Shoreline Zoning Map

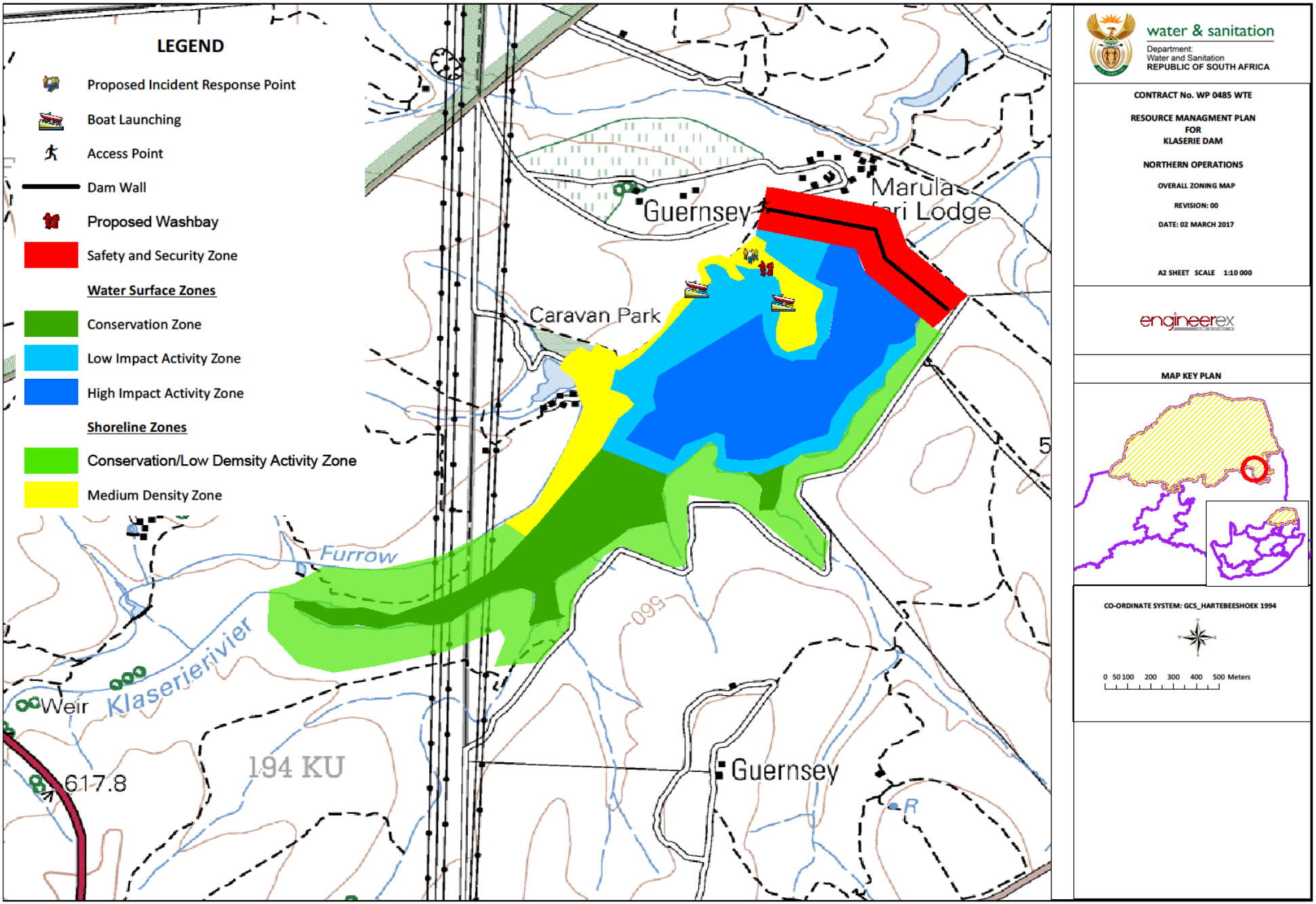

Figure 34: Proposed Overall Zoning Map

4.2.3 Carrying Capacity

In order to determine the degree or possible recreational use on the water surface, the Methodology for Carrying Capacity Assessment: Recreation Water Use (DWS 2003) was used as guideline to determine the level of activities that would be sustainable at Klaserie Dam

Carrying capacity for recreation provides a guideline to ensure that recreation at the dam is safe, that users do not feel crowded and that they enjoy the use of the dam for leisure activities.

There are three kinds of carrying capacity:

- **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)

PCC is calculated as PCC = A x U/a x Rf

- **Where A** = Area available for public use;
- **U/a** = area required for each user; and
- **Rf** = Rotation Factor (the number of visits per day)

A is calculated as the area of the water surface available for public use: 118 ha

The **U/A =** There is a range of literature regarding the area required for different recreational users.

The U/A used for the assessment is as follows:	U/A (ha/craft)
Powerboats	**4.0**
Angling	**3.0**
Canoeing	**1.0**
Average	**2.7**

Based on the fact that most activities do not require much space, the average hectare per user is 2.7 ha (27 000 m^2), the value of 5.0 ha (50 000 m^2) 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.

The PCC for Klaserie Dam can further be calculated as:

PCC = A × U/a × Rf
=118 × 1/5 × 1
= 23.6 vessels

Real Carrying Capacity (RCC)

It refers to the maximum permissible number of users to the water resource, once the corrective factors (Cf) derived from the particular characteristics of the site have been applied to the PCC. The RCC takes factors into account that limits recreation. The limiting factors include:

- Safety Areas/ No go Zones (10 ha); and
- Conservation Area (20 ha).

The above factors results in 25.4% decrease in water surface available for recreation at the dam, therefore 74.6% of the surface area of the dam is still available for recreation.

RCC for Klaserie Dam is therefore:

RCC = PCC × (100 – Cf1) % × (100 – Cf2) % × (100 – Cfn) %

Where **Cf** = a corrective factor expressed as a percentage.

RCC = 23.6 × (100 – 25.4) %/100

= **17.6 vessels**

Effective Carrying Capacity (ECC)

The maximum number of visitors that a site can sustain, given the management capacity (MC) available. Currently, the management structure is being reviewed, as such the ECC is 0. The ECC will be calculated after the proposed Institutional structure (as part of the RMP) have been implemented in order to manage the sustainable utilization of the dam for recreational purposes.

4.3 STRATEGIC PLAN

The Strategic Plan is informed by the objectives identified by relevant Stakeholders and through research on possible opportunities for the Dam.

The objectives were clearly defined and they effectively address 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 18 - 20**, the Strategic Plan on how to achieve the identified objectives identified regarding the dam is outlined.

Table 16: Strategic Plan for KPA 1: Resource Management

KPA 1: Resource Management			
Objectives (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)**
Conservation: • To carefully plan and implement projects within critical biodiversity areas (CBA) 1 and ecological support areas (ESA). • To promote the conservation of species diversity around the dam.	• The dam is situated within critical biodiversity areas (CBA) 1 and ecological support areas (ESA) 1 as identified in Limpopo Conservation Plan and Kruger to Canyon Biosphere.	• The protection of sensitive area may be achieved through understanding the carrying capacity of the dam so as to avoid over development within and around the dam.	• DEA as well as Limpopo Department of Economic Development, Environment and Tourism (DEDET) should provide support and guidance on the management of biodiversity around the dam.
Alien Invasive Plants: • To have Klaserie Dam free of Alien Invasive Plants and to maintain the ecological aspect of the area.	• DEA: Working for Water (WfW) programme has identified several Alien Invasive Plants (AIPs) around the dam.	• DEA: WfW should incorporate Klaserie Dam in their clearance and monitoring programme to ensure that the area is free of AIPs. • The construction of a wash bay to eliminate the spread of alien vegetation when launching the boat into the dam.	• DEA working for water programme
Water Quality: • To maintain a good water quality of the dam in order to meet the primary and secondary use requirements.	• The presence of algae due to the dung from livestock accessing the dam for drinking water.	• An area for livestock watering has to be demarcated and zoned to avoid conflict of water uses and effective managing of water resource.	• DAFF to monitor the increase and management of livestock around Klaserie.
Storage Capacity: • To maintain the storage capacity of Klaserie Dam.	• Siltation has reduced the storage capacity of the dam and impacted on the use of boats in other areas and water release for irrigation.	• The KIB should follow the necessary processes to have the dam desilted to maintain the water storage capacity.	• DWS should provide guidance to KIB in applying for necessary permits to desilt the dam.

KPA 1: Resource Management			
Objectives (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)**
	• There is an illegal sand mining for commercial purposes by the current caretaker.		

Table 17: Strategic Plan for KPA 2: Resource Utilisation

KPA 2: Resource Utilisation			
Objectives (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 Provision: • To provide water for domestic purposes in Scotia.	• The purpose of the dam is for both municipal and irrigation use. The municipal use to provide water for domestic purposes has not been utilized at Klaserie Dam.	• Maruleng Local Municipality should engage with MDM to ensure water provision at Scotia and surrounding community.	• Mopani District Municipality (MDM) as a Water Service Provider (WSP) has a mandate through the Water Services Act, 1997 (Act No. 108 of 1997) purify and distribute water to end users.
Security: • To formalise and secure the dam all around. • The gate needs to be secured to prohibit unauthorised access.	• The dam is not fully fenced, as there are issues of trespassing. • Entrance gate is not secured. The boom gate is no longer functional and the security room is vacant.	• This may be achieved through security personnel to monitor and control access. Also fencing off the dam to prevent trespassing.	• KIB with the support of DMC has a mandate to control and ensure that the water resource is secured in collaboration with DWS.
Recreational Facilities: • To establish and formalise recreational facilities around the dam.	• The dam has basic camping facilities and also caters for day visitors for fishing. • The dam is surrounded by game farms and private Nature Reserves. It is located along tourism route to and from Kruger National Park.	• (IA) of the RMP should conduct a feasibility study to ascertain feasible and sustainable recreational activities in accordance to the carrying capacity, zoning as well as relevant authorisation.	• The IA with the support of the DMC together with Limpopo Tourism to promote recreational activities around the dam.
Sustainable Harvesting Fish: • To promote sustainable	• There are catch and release activities of Carp fish since the fish is a protected species. There are activities of net fishing taking place at night at the dam.	• The promotion of sustainable fishing can be through issuing of permits for subsistence fishing for local communities and fishing license/ permits for	• DAFF and Limpopo Department of Agriculture to provide awareness and

KPA 2: Resource Utilisation			
Objectives (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)**
harvesting of fish within the dam.		commercial fishing. There is an opportunity to teach communities which types of fish they should catch to minimize net fishing.	possible training sustainable fishing.
Safety of Navigation: • Improve safety of navigation	• The AtoN demarcation the dam wall safety zone has been flooded and further demarcation is necessary to prevent conflict of water uses and users.	• Standardized demarcation makers are to be used to determine specific zones/areas, i.e. no go areas, safety zones, etc.	• DWS, DMC and SAMSA to ensure that the safety zones are demarcated by AtoN.
Access: • To promote equitable access and use of the dam by the public.	• There is an access fee for day and camping visitors. The fee must be reviewed in accordance to the socio-economic environment of Klaserie and surrounding areas.	• Local communities should be able to go to the dam and engage in recreational activities at a reasonable price. • Establishment and enforcement of dam rules.	• DWS with support of the DMC should implement RMP to regulate the access and use of the dam.

Table 18: Strategic Plan for KPA 3: Benefit Flow Management

KPA 3: Benefit Flow Management			
Objectives (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)**
Community Participation and Beneficiation: • To ensure the participation and beneficiation of all stakeholders in the use of the dam.	• The caretaker agreement opportunity has always been awarded to the same caretaker. • The caretaker opportunity is not transparent.	• The proposed IA and Dam Management Committee should strengthen community participation and beneficiation through Public-Private Partnership initiatives.	• IA to facilitate and monitor community participation as well as benefiting from the dam through recreational activities. • The BP will assist in identifying the marketing strategies and funding mechanisms that can assist the local communities to invest in the recreational industry at the dam

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 draft 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 Berg River 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 35** shows the RMP & BP review framework.

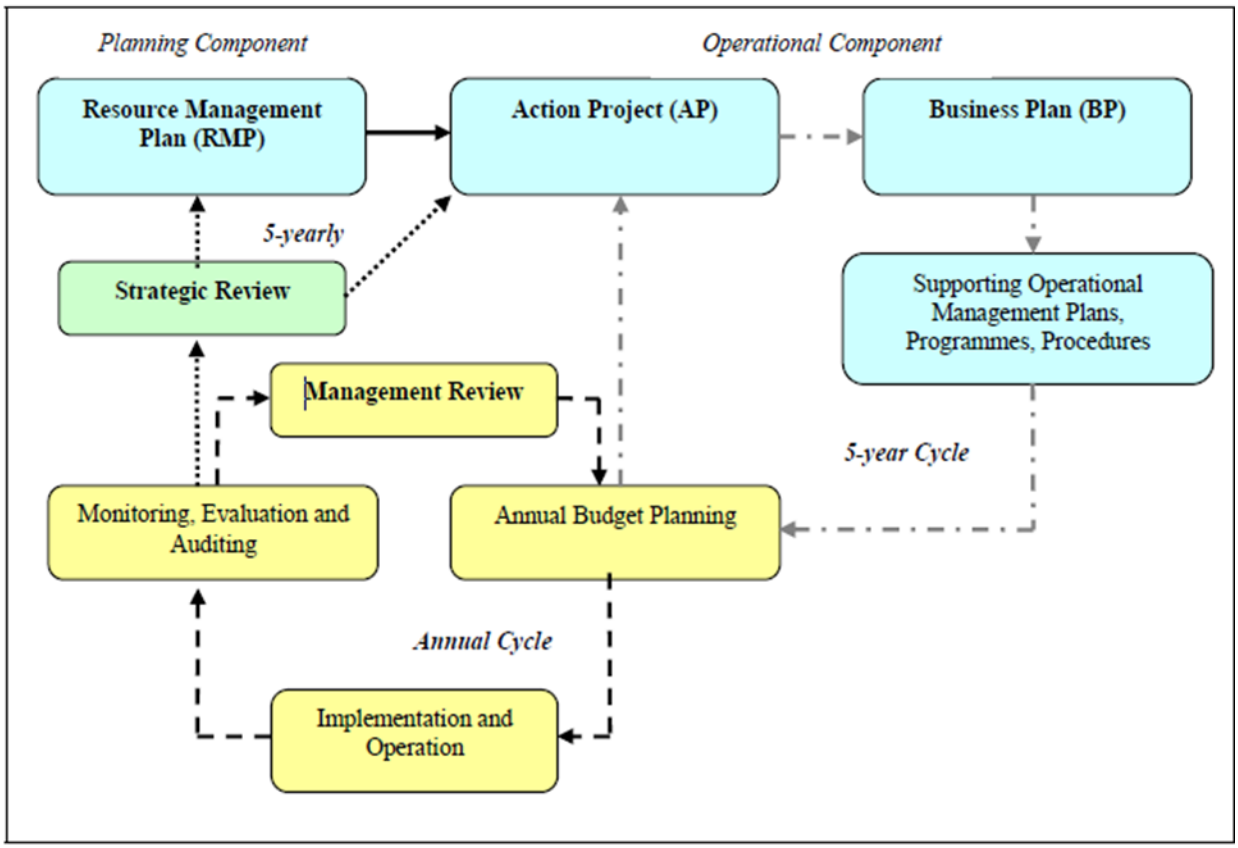

Figure 35: RMP and BP Review Framework

CONCLUSIONS

The RMP documents the challenges that exists within Klaserie Dam that can significantly impact on the utilisation and management of the dam and it's surrounding for recreational purposes. Such factors include biophysical, socio-economic, and 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**. The Strategic plan explains the action plans on how to achieve the identified objectives.

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

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

REFERENCES

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

Department of Water and Sanitation (2016), List of registered dams. February 2016

Maruleng Local Municipality (2015). Spatial Development Framework Review, Pages 28-29. February 2015

Maruleng Local Municipality (2016). Draft Land Use Scheme.

Mucina, L. & Rutherford, M.C, eds. (2006). The vegetation of South Africa, Lesotho and Swaziland. (1st ed).Pretoria: South African National Biodiversity Institute.

Municipal Demarcation Board (2016), Maruleng Local Municipality Ward Delimitation. Ward 1 2016

Triviron Environmental (2008). Proposed development of Zandspruit Estates on the Remainder of the Farm Happyland 241KT: Hoedspruit; Maruleng Local Municipality within Mopani District Municipality, Limpopo Province.

Data.ORG, C. (2017, 05 15). http://en.climate-data.org/. Retrieved from http://en.climate-data.org/location/27047/.

APPENDICES