Department of Water and Sanitation

NATIONAL WATER RESOURCE INFRASTRUCTURE (NWRI)

Resource Management Plan

KWENA DAM

REPORT – Volume 4 of 5 | **December 2016**

WATER IS LIFE - SANITATION IS DIGNITY

water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

2030 NDP

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- Badfontein Land Owners Association (BLOA);
- Badfontein South African Police Service (SAPS);
- Department of Environmental Affairs: Working for water;
- Department of Rural Development and Land Reform;
- Department of Water and Sanitation;
- Klipspruit Combined School;
- Klipspuit Community;
- Koporasie Community;
- Masofeng Community;
- Thaba Chweu Local Economic Development Agency (THALEDA);
- Thaba Chweu Local Municipality; and
- Ward Committee Members.

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	2018[1]	2019	2020	2021	2022
Five (5) Yearly Review of RMP	December	2022				

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

AMENDMENTS PAGE

Revision No	Description	Date
1	Draft RMP for DWS Review	08/10/2015
2	Final Draft RMP for DWS Review	11/04/2016
3	Final RMP for DWS Approval	15/08/2016
4	Final RMP for DWS Approval	14/12/2016

LIST OF ACRONYMS

AtoN	Aid(s) to Navigation
BID	Background Information Document
BP	Business Plan
CATHSSETA	Culture, Arts, Tourism, Hospitality, Sports Sector, Education and Training Authority
CD: IO MANCO	Chief Director: Infrastructure Operations Management Committee
CIWSP	Cooperative Inland Waterways Safety Programme
CoGTA	Corporative Governance and Traditional Affairs
CPSI	Centre for Public Service Innovation
DAFF	Department of Agriculture and Forestry
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
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
ECC	Effective Carrying Capacity
EDM	Ehlanzeni District Municipality
EMF	Environmental Management Framework
FSL	Full Supply Level
GIAMA	Government Immovable Asset Management Act
GP	Guideline-Programs
GPS	Global Positioning System
GWWs	Government 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
KPAs	Key Performance Areas
LAAP	Local Accountable AtoN Parties
LED	Local Economic Development
NDT	National Department of Tourism
NEMA	National Environmental Management Act
NPSC	National Project Steering Committee
NT	National Treasury
NWA	National Water Act
NWRI	National Water Resource Infrastructure
NWRS	National Water Resource Strategy
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, Weakness, Opportunities and Threats
TCLM	Thaba Chweu Local Municipality
TDA	Tourism Development Area
THALEDA	Thaba Chweu Local Economic Development Agency
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 Kwena 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 Kwena Dam.

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

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

Location of the Dam: Kwena Dam is a combined gravity and arch type dam which impounds the Crocodile River. It falls under Ward 4 within the jurisdiction of Thaba Chweu Local Municipality (TCLM) which forms part of the Ehlanzeni District Municipality (EDM) in Mpumalanga Province, South Africa. Its Global Positioning System (GPS) coordinates are **25°21'37.71''S 30°22'34.81''E**.

Purpose of the Dam: The primary purpose of Kwena 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: Kwena Dam is owned and operated by DWS for primary purpose. The dam has one authorised and one informal access points along R36 Road.

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

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

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

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

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

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

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

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

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

The identified key common objectives are:

- To have Kwena Dam basin free of Alien Invasive Plants in order to support the proposed recreational activities and to maintain the native ecological aspect of the area;
- To maintain a good water quality and protect the aquatic resource for recreational use as well as to ensure a healthy environment;
- To unlock the socio-economic potential of the dam for commercial opportunities such as fisheries, chalets, braai area;
- To establish access control which have lower tariffs to accommodate the rural communities around the dam;
- To stabilize the security system in order to be able to reduce poaching of fish using nets for commercial purposes by the local communities;
- To promote sustainable harvesting of fish;
- To uplift the Local Economy and increase Benefit Flows to the surrounding communities through community empowerment and job creation; and

A vision for the dam was formulated by Stakeholders to be as follows:

"To ensure the effective management of Kwena Dam and empowerment of local communities to benefit economically from the recreational uses 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 Kwena Dam that could enhance tourist attraction:

- The development of day visitor area which includes camping area, swimming pools, picnic;
- To host fishing World Championship; and
- Revamp the facilities such as slipway, ablution facilities, etc. which were developed by the boating club previously to accommodate current and potential recreational activities.

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CHAPTER 1: INTRODUCTION

1.1 BACKGROUND OF KWENA DAM

Kwena Dam (previously known as Braam Raubenheimer Dam) is located in the Crocodile River Catchment within Inkomati-Usuthu Catchment Management Area (CMA), approximately 33km towards Mashishing, formerly known as Lydenburg Town. The dam is situated under the jurisdiction of Thaba Chweu Local Municipality (TCLM) within Ehlanzeni District Municipality (EDM) in Mpumalanga Province.

Kwena Basin is the name given to the area between Chomse se Hoogte Pass and Witklip Pass on the R36 between Machadodorp and Lydenburg in Mpumalanga. The Kwena Dam is the focal point of this area, which extends right up to the surrounding mountains that form a natural and majestic boundary. Kwena is the Sotho name for crocodile and derives from the Crocodile River, which flows into the Dam.

Kwena Dam was previously managed by boating clubs which developed basic recreational facilities which are now vandalised such as ablution blocks and boat slip way. Several unauthorised recreational activities such as boating, fishing and camping still exists to date.

The dam is ideal for fishing and a variety of water sports. The pictures below were taken during the site visit which shows the continued recreational activities on the dam and its surrounding environment. **Figure 1** and **2** depicts visitors to Kwena Dam for recreational activities.

Figure 1: Day Visitors Activities

Figure 2: Illegal Camping

Kwena Dam is the largest impoundment along the Crocodile River system where the Crocodile, Lunsklip, Alex-se-Loop, Wilgekraalspruit, Elanspruit and Badfontein loop rivers converge. It is situated at Ward 4, at Global Positioning System (GPS) coordinates **25°21'37.71''S 30°22'34.81''E**. It is further located adjacent to Masofeng, Koporasie and Klipspruit communities along R36 on the North-western side of the dam between Machadodorp and Mashishing. **Figure 3** depicts the locality of Kwena Dam. The dam was established in 1984 for downstream primary purposes of irrigation and domestic uses. It provides water to the town of Nelspruit and has a capacity of approximately

167 million cubic metres (m^3). The dam profile is summarised in **Table 1**.

Table 1: Kwena Dam Profile

Kwena Dam Profile	
Location	South Africa
Province	Mpumalanga
District Municipality	Ehlanzeni District Municipality
Local Municipality	Thaba Chweu Local Municipality
Nearest Town	Mashishing (Lydenburg)
Completion Year	1984
Coordinates	25°21’37.71’’S; 30°22’34.81’’E
Purpose	Domestic and Irrigation
Owner	Department of Water and Sanitation
Water Management Area	Inkomati-Usuthu Catchment Management Area
Quaternary Catchment	X21C
Catchment Area (km^2)	954
River	Crocodile, Badfontein, Elandspruit and Alexandraspruit
Capacity (m^3)	167 000 000
Surface Area (ha)	12 504
Wall type	Arch Gravity dam
Wall Height (m)	50
Length (m)	1 783

Source: Department of Water Affairs (List of registered dams; March 2013)

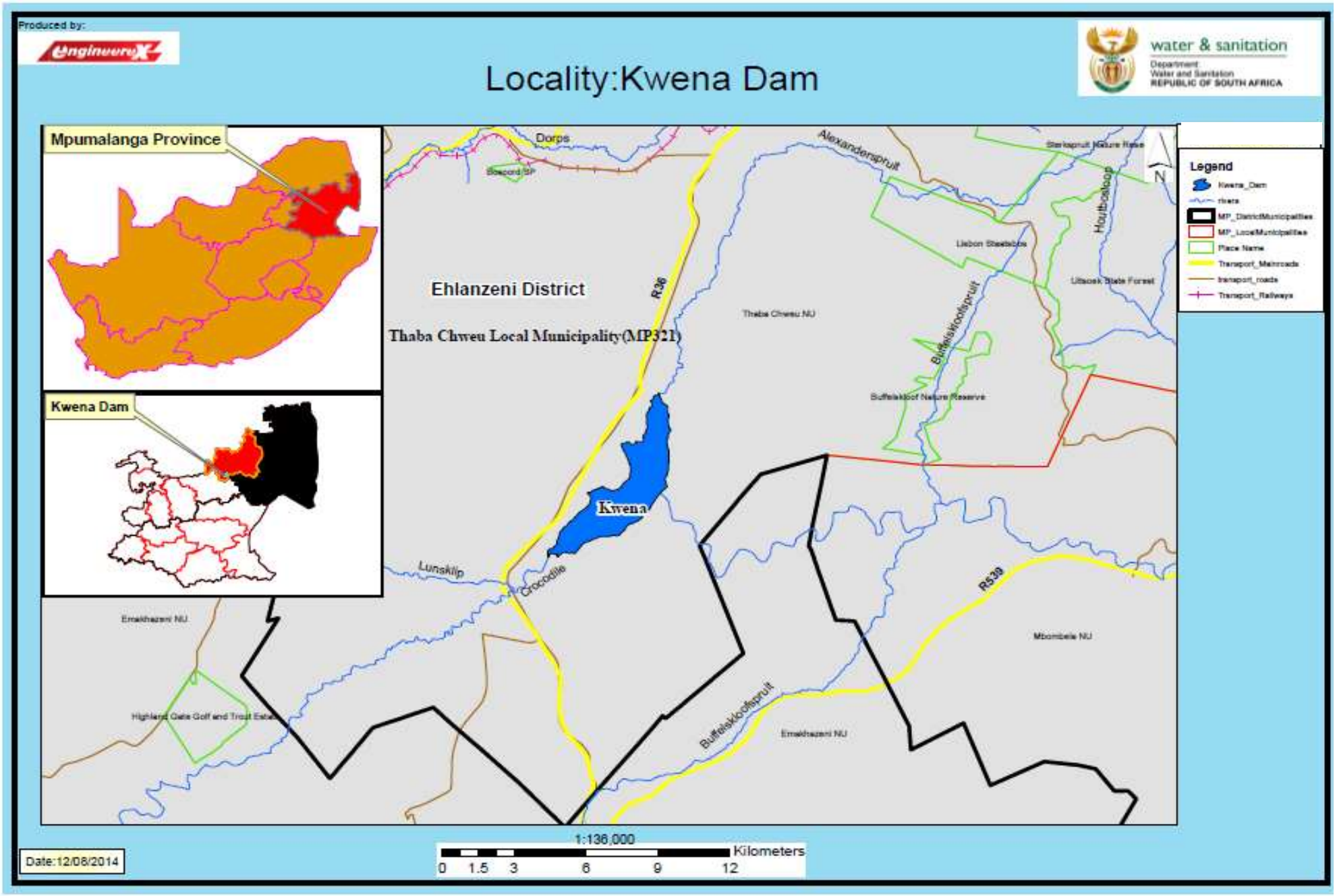

Figure 3: Locality Map for Kwena Dam

1.2 BIOPHYSICAL ENVIRONMENT

1.2.1 Climate

Kwena Dam falls within the summer rainfall region. The area normally receives about 625 mm of rain per year, with most rainfall occurring during summer.

The climate is warm and temperate in Lydenburg. In winter, there is much less rainfall in Lydenburg than in summer. According to Köppen and Geiger, this climate is classified as temperate highland tropical climate with dry winters. The temperature here averages 16.3°C. The average annual rainfall is 758 mm as shown in **Figure 4**.

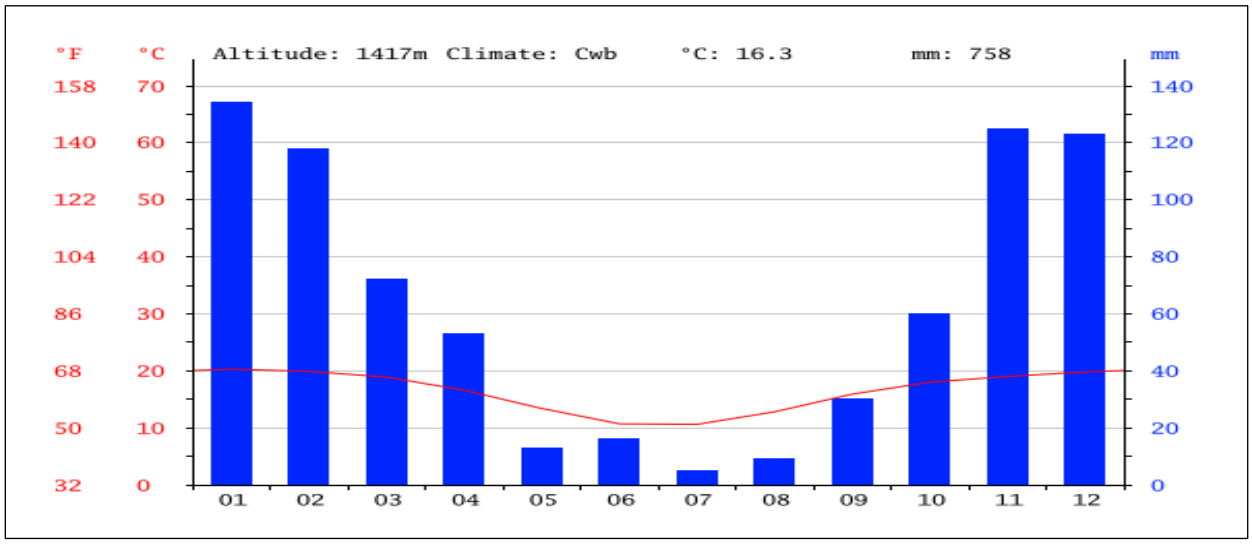

Figure 4: Temperature and Rainfall Patterns

The warmest month of the year is January, with an average temperature of 20.3°C. July has the lowest average temperature of the year, around 10.6 °C.

The climate is temperate lending itself to a variety of outdoor recreational activities to suit all age groups. The Kwena Dam is ideal for fishing and a variety of water sports

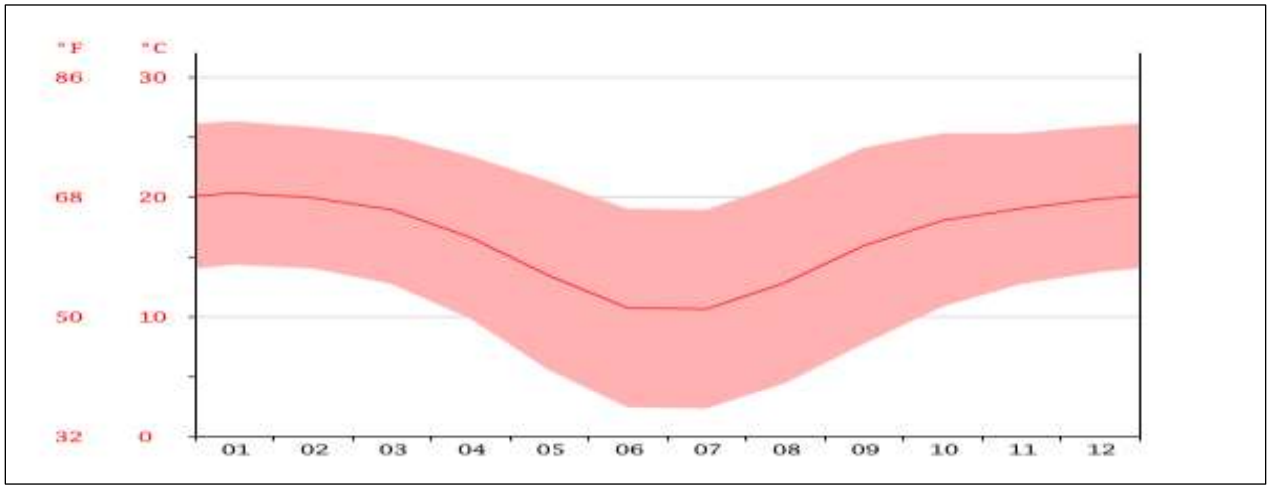

Figure 5: Temperature variation

1.2.2 Flora

Kwena Dam occurs at the Lydenburg Thornveld vegetation. This vegetation occurs at lower levels at the foot of the mountains and on undulating plains. This is open, frost-hardy woodland. Structurally it comprises closed grasslands which is almost always wooded, sometimes densely so in rocky areas and less so in frost-ridden valleys.

According to Muccina *et* al, 2006; the Lydenburg Thornveld vegetation is distributed in most parts of Mpumalanga Province. It is situated in a broad band between the high-lying mountains from just north of Ohrigstad, tapering southwards through Mashishing to as far as south as the area in the vicinity of the Kwena Dam.

Most parts around the dam are covered by grass, it appear as a disturbed area from recreational activities and grazing of cattle. There are no red listed or protected plant species within the vicinity of the dam.

1.2.2.1 **Alien Invasive Plants Species**

Alien invasive plant species are non-indigenous plants introduced from other countries. Once they were introduced, they tend to spread beyond the area where they are desired. Alien plant species also outcompete the indigenous species wherever they germinate.

Alien invasive species have been categorized in the following categories: NEMBA 2004 (Act No. 10 of 2004): AIP Species Regulations, 2014:

- **Category 1a:** Invader plants species which must be combatted or eradicated.
- **Category 1b:** Invader plants species which must be controlled.
- **Category 2:** Invader plants species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit, as the case may be.
- **Category 3:** Invader plants species which are subject to exemptions in terms of section 71(3) and prohibitions in terms of section 71A of Act.

DEA: WfW programme should be engaged to identify and remove alien invasive species rivers which feeds Kwena Dam to reduce the widespread of the species.

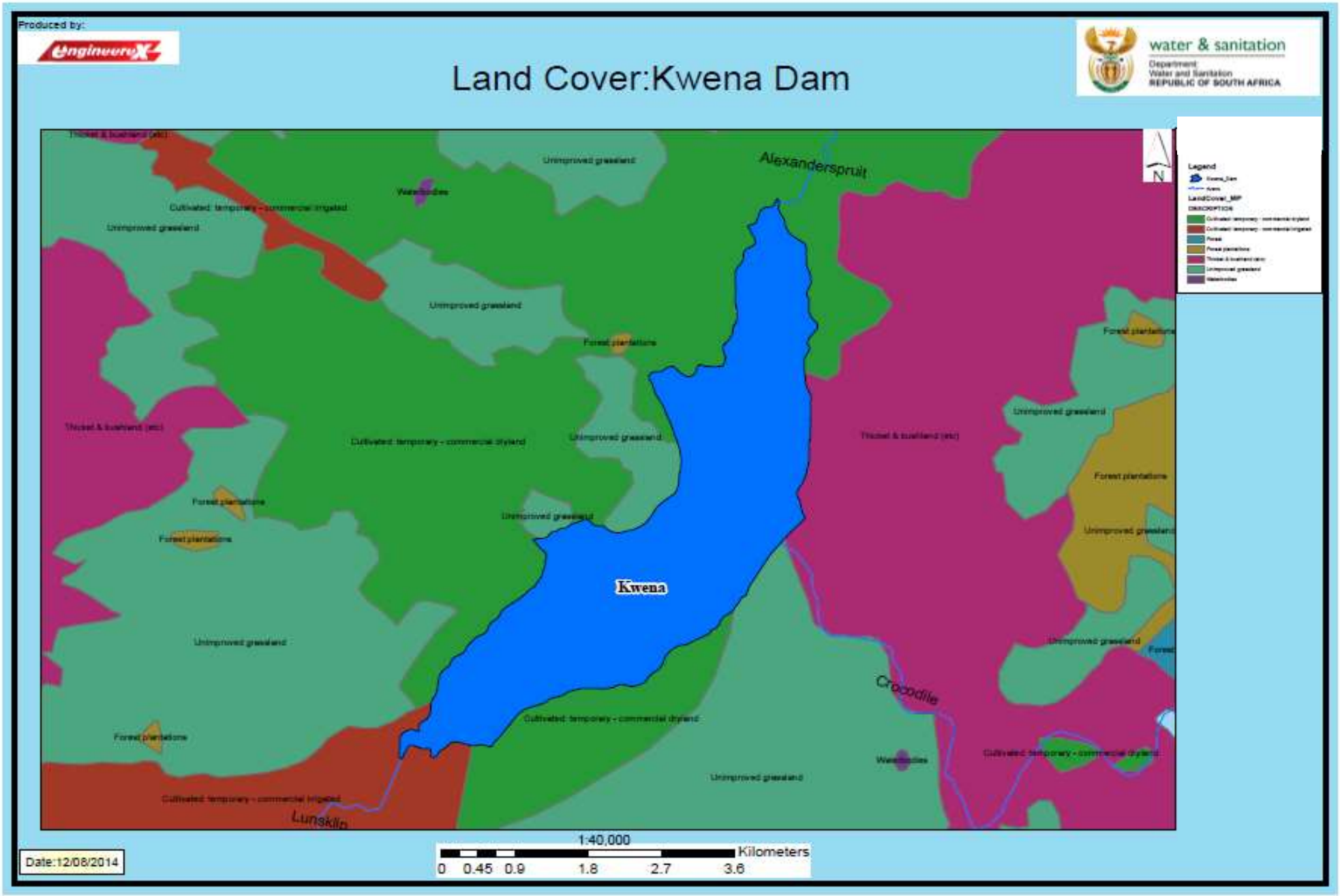

Figure 6: Land Cover Map for Kwena Dam

1.2.3 Fauna

The Water Resource Manager indicated that the dam is frequented by the Crocodiles (Crocodylinae) and Hippos (Hippopotamus amphibius) which access the dam via the Crocodile River. These are very dangerous species that survives both terrestrially and aquatically.

The dam is also a home of different fish species such as Bass, Cat Fish, etc.

1.2.4 Topography

Kwena Dam is in a low lying area surrounded by mountains, these mountains are about five hundred meters (500m) to the east, one thousand five hundred meters (1 500m) to the west, one thousand meters (1000m) to the north and nine hundred meters (900m) to the south of the dam.

The topography surrounding the dam is gentle and does not constitute a constraint to potential development associated with recreational activities such as lodges. The flat topography facilitates easy access to the water surface and presents opportunity for various activities such as camping, boating and angling. Refer to **Figure 7 Topographical Map**.

1.2.5 Geology and Soils

According to Mucina *et* al (2006), the study area is characterized by reddish, yellowish and greyish soils with low to medium base status mostly derived from the shales of the Pretoria Group (Including the Silverton and the Time Hill Formations). Shales occasionally intersected with the bands of the quartzite or andesite.

According to **Figure 8 Geological Map** below, the dam is situated on the sedimentary rock formation.

1.2.6 Cultural Environment

It is alleged by a local community member that the graves of her family are under water, flooded by the dam. During the drought season when the dam level drops, they become visible to some extent.

Access of the affected families should be granted to perform cultural ceremonies / rituals.

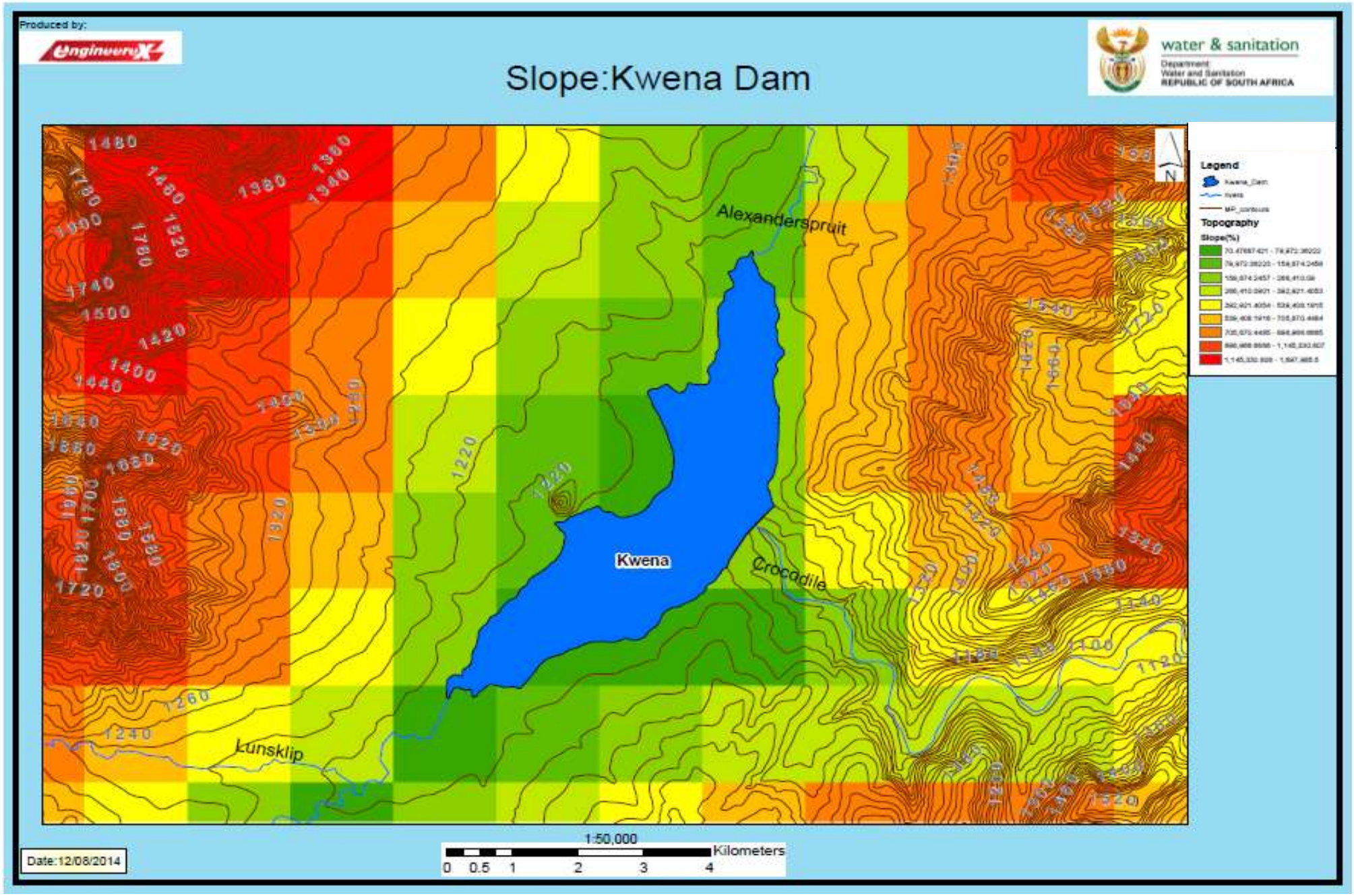

Figure 7: Topographical Map for Kwena Dam

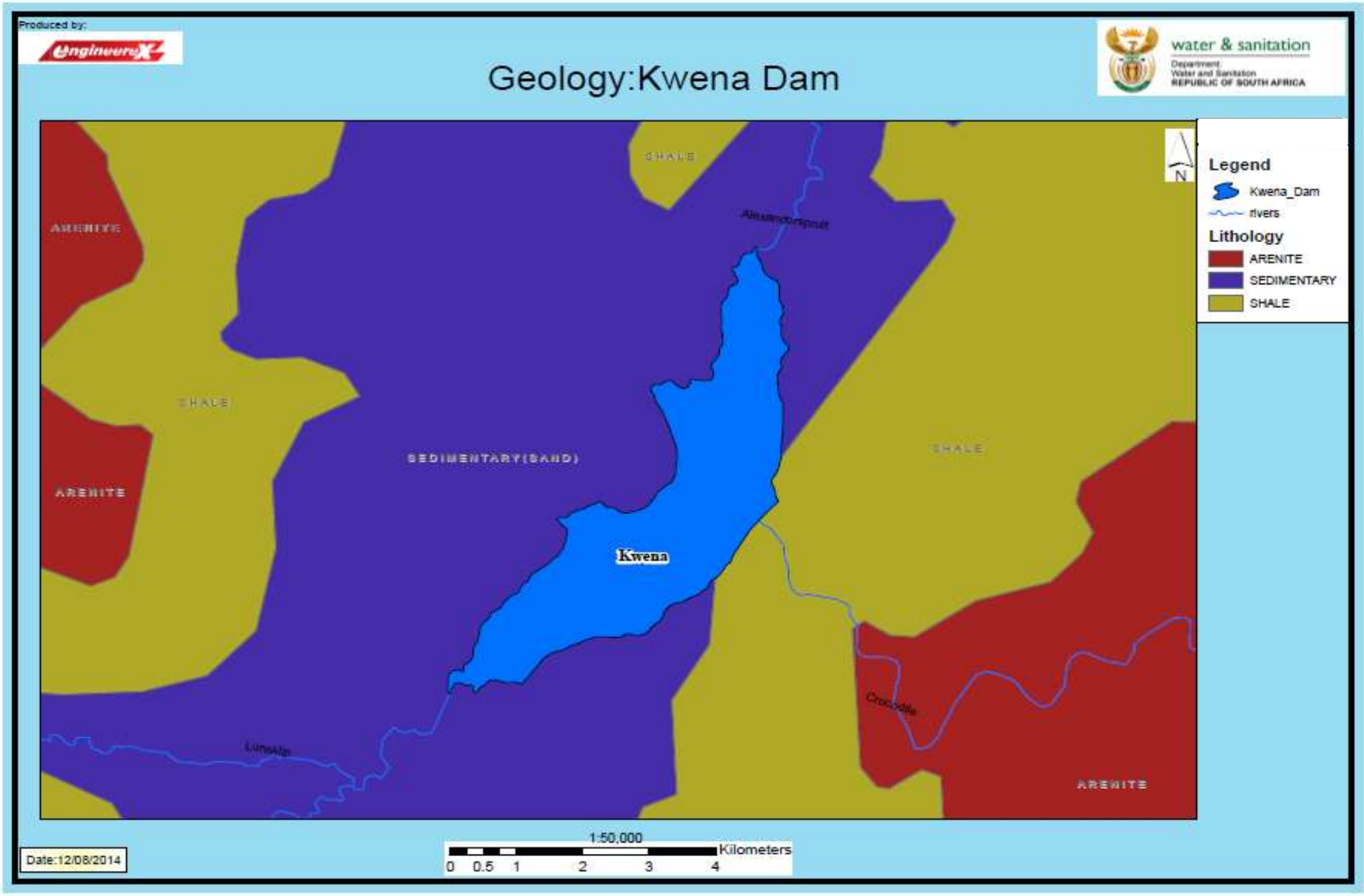

Figure 8: Geological Map for Kwena Dam

1.2.7 Hydrology

1.2.7.1 Surface Water

Kwena Dam is situated in Crocodile River Catchment within the Inkomati-Usuthu CMA and is located at catchment number X21C as shown in **Figure 10**. The dam impounds twelve (12) rivers in total in which four (4) are perennial and eight (8) non-perennial. Major tributaries to the dam include Crocodile River, Alexandraspruit, as well as Lunsklip River.

The surface area of the dam is approximately 12 504 hectare (ha) in size. It has a capacity of approximately 167 x 10^6 m^3.The operation of the Crocodile River catchment focuses mainly on the needs of the irrigation sector, which is to be expected since irrigation is by far the largest water use sector in the catchment.

It is important to note that the Kwena Dam only supplements the supply to water users abstracting from the Crocodile River. The operating rule is that irrigators will first make use of run-of-river flows before releases are made from the Kwena Dam. The day-to-day management of releases from the Kwena Dam, and abstractions from the Crocodile River are currently determined by the Crocodile Main Irrigation Board (DWAF, 2009).

The dam has been previously managed by boating clubs for recreational activities and still provides an excellent location for boating, camping and fishing. It is also well known for hosting Kwena Basin Fly-fishing Challenge.

DWS measures and records the water levels of dams nationally on a weekly basis. **Figure 9** illustrates the fluctuation of the water levels over a year. The readings are recorded on a weekly basis in most of the government waterworks (GWWs) by DWS.

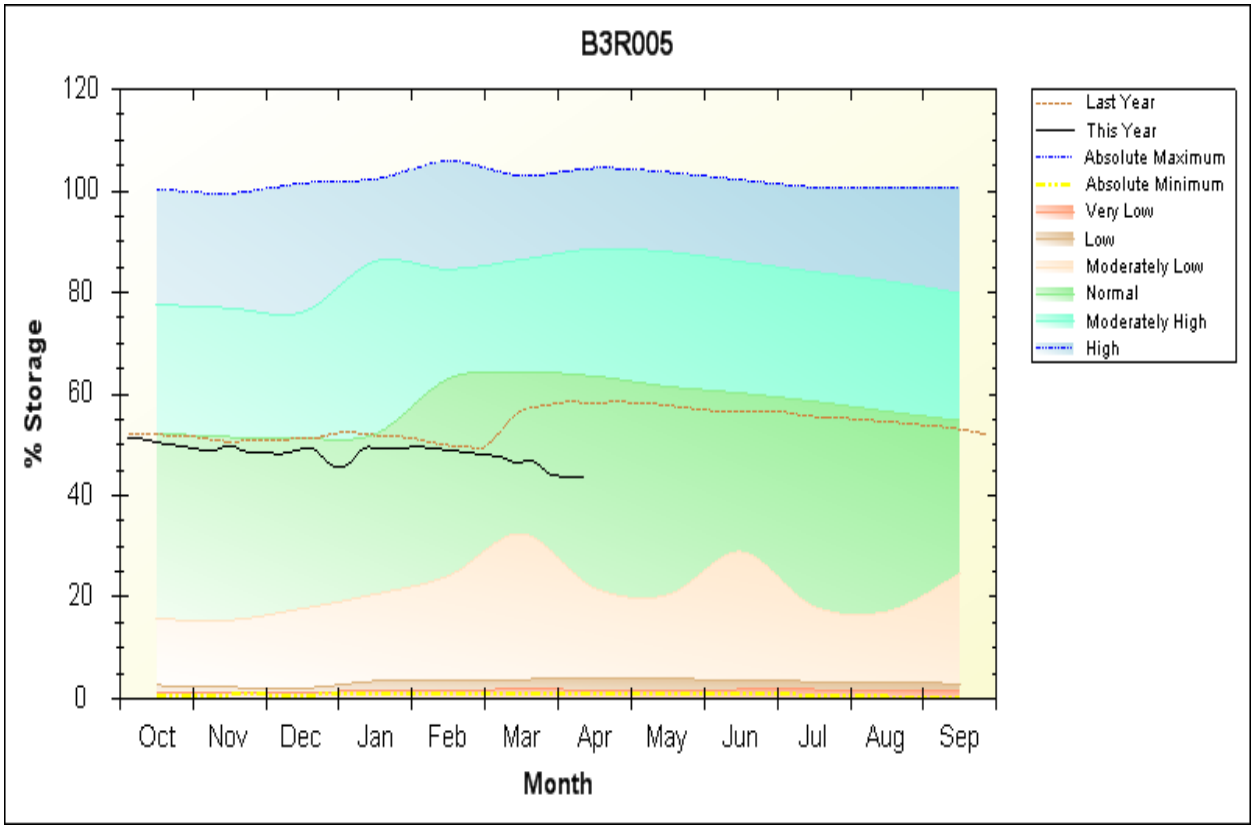

Figure 9: Fluctuations of the dam's water level over a year (DWS, 2015).

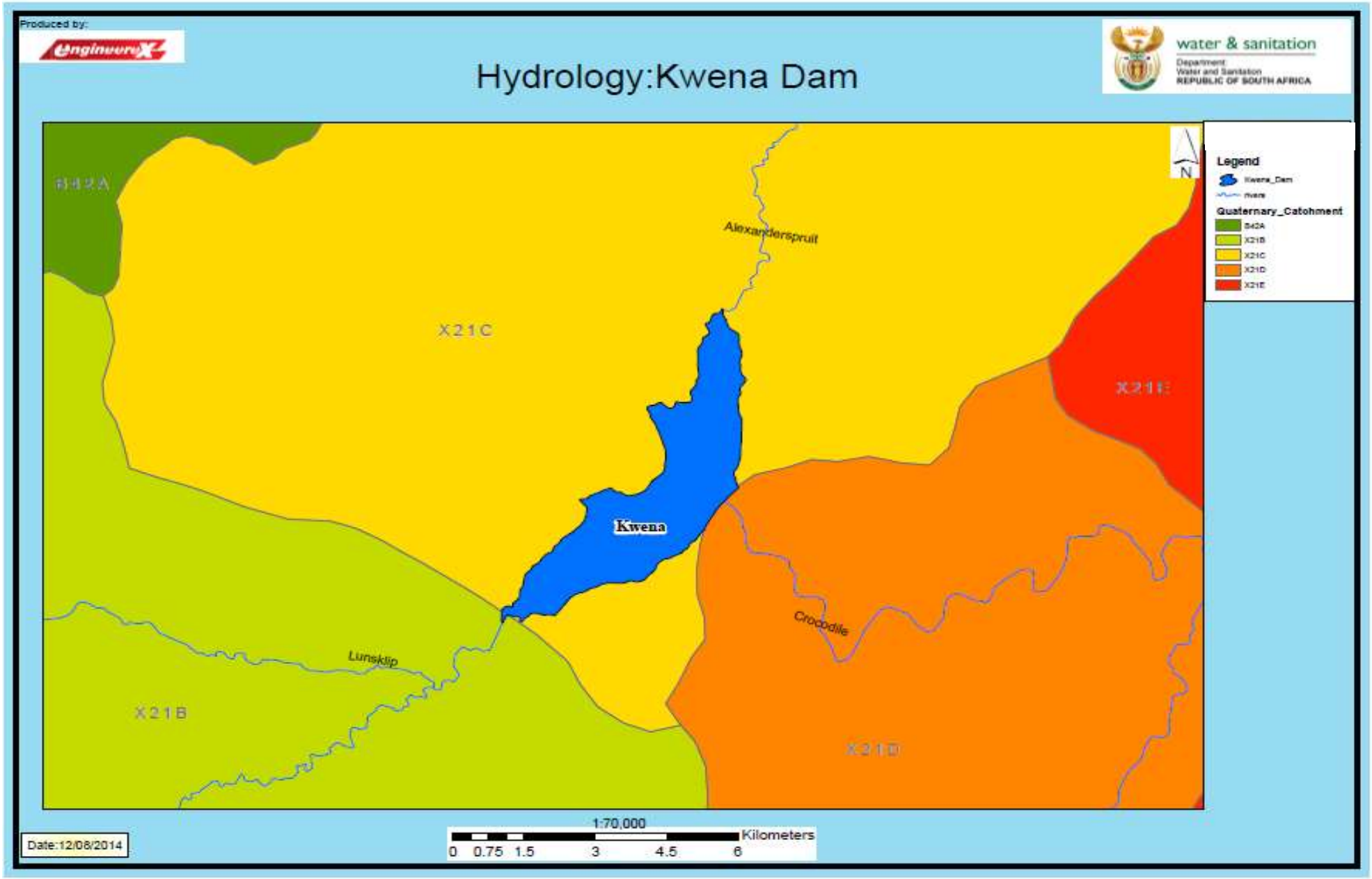

Figure 10: Hydrology Map for Kwena Dam

1.2.7.2 **Aquatic Alien Invasive**

Invasive aquatic plants are introduced plants that have adapted to living in, on, or next to water, and that can grow either submerged or partially submerged in water. Their presence may harm native ecosystems or commercial, agricultural, or recreational activities dependent on these ecosystems. They may even harm human health.

These species can be spread in many ways including ships, boats, aquaculture, aquatic recreation, water gardening, connected waterways and many other pathways. Through these and other means, aquatic invasive species have been introduced into South Africa (Muse Web Design and Development- http://www.invasives.org.za/plants/, 11/04/2016).

The Department of Environmental Affairs, through the working for Water project should be engaged to identify and remove aquatic alien invasive species rivers which feeds Kwena Dam to reduce the widespread of the species.

1.2.7.3 **Water Quality**

The term water quality is used to describe the physical, chemical, biological and aesthetic properties of water, all of which determine its fitness for use and its ability to maintain the health of aquatic organisms (DWAF, 1996). Water quality therefore expresses the suitability of water to sustain various uses or processes. Any particular use will have certain requirements for the physical, chemical or biological characteristics of water. Consequently, water quality can be defined by a range of variables which limit water use. Human health is directly affected by the proximity, availability and quality of water resources.

The water quality tests results received from the sub-directorate Resource Quality Monitoring of the directorate Resource Quality Services of the DWS were compared with the minimum standards of the South African Water Quality Guideline Volume 2 for Recreational Use. The dam is ranked in category one (1) which means that it has low hazardous potential and good water quality for recreational activities.

Table 2: Water Quality Variables for Kwena Dam (DWS Water Quality Management System, 2014)

Parameter	Analytical Results	Target Water Quality Range (Recreational Purposes)	Effects
Algae (g/chl-a)	N/A	0 - 15	Nuisance conditions negligible for lower end of range, but at a mean concentration of 15, severe nuisance 0 - 15 conditions encountered for < 12 % of a year. No health effects
pH (pH units)	N/A	6.5 -8.5	Minimal eye irritation occurs. The pH of water is well within Quality Range the buffering capacity of the lachrymal fluid of the human 6.5 - 8.5 eye. Skin, ear and mucous membrane irritation absent.
Turbidity (NTU)	N/A	3	Unsuitable for swimming. However, if lack of clarity (or turbidity) is the only consideration preventing the use of a water body for swimming, then it may be allowed, provided all subsurface, potential hazards are removed and signs indicating water depth are clearly posted. Risk of disease transmission by organisms associated with particulate matter increases but this cannot solely be determined on the basis of clarity measurements. May be some depreciation in aesthetic quality and enjoyment of the water body

Parameter	Analytical Results	Target Water Quality Range (Recreational Purposes)	Effects
Phosphate (measured as Inorganic Phosphorus mg/l)	N/A	<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.

Source: Department of Water and Sanitation, Recreational Use: Volume 2, 1996

The water quality results available were for chemical elements such as Magnesium, Calcium, and Fluoride etc. which do not have any limitations for recreational use. However analytical results for the physical parameters listed in **Table 2** were not available during the time of research.

The most important water quality problem in surface water in South Africa is most likely to be faecal pollution together with the associated disease causing organisms (WRC 1998).

1.3 BUILT ENVIRONMENT

1.3.1 Infrastructure

As indicated above that the dam is owned and operated by DWS, the Department has developed infrastructures which are used in managing the dam. Infrastructures developed include offices with boardroom, as well as workers residents. During the tenure of the boat clubs for recreational activities, ablution block, slipway, and boathouse.

Figure 11: DWS Offices and Employees Squatters

Figure 12: Vessel Slipway

1.3.2 Transportation Network

The dam is situated adjacent to R36 Road between Machadodorp and Mashishing. The condition of the road is very poor, with potholes making the use of small cars difficult. However, the road is currently being upgraded. The dam is easily access on this road either from Machadodorp or Mashishing.

1.4 USES AND USERS OF THE DAM

1.4.1 Primary Use (Irrigation)

According to Eco-status of Crocodile River (2013), Kwena Dam was constructed in 1984 for irrigation purposes. Land-use includes mainly exotic trout farms, a few commercial pine plantations, small-scale live-stock farming and irrigated crops in the portion of the reach close to the Kwena Dam.

1.4.2 Secondary Use (Recreational)

The dam is a tourist attraction and is well known for hosting Kwena Dam Fly-Fishing Challenge, fishing and camping on holidays. It is located 25km northeast of Buffelskloof Private Nature Reserve, 30 km from Makobulaan Nature Reserve and 38km west of Lydenburg. The proximity of the dam to the town, the nature reserves means the tourists will have the opportunity to enjoy both the recreational activities and the wildlife. The dam is the largest water body in TCLM and is at an excellent location for recreational activities.

The recreational activities that take place on the water surface and DWS purchased land are camping, fishing and boating. The dam is the superb location for boating, camping, fishing and is also well known for hosting Kwena Basin Fly-fishing Challenge.

Figure 13 - 14 are pictures that depict Kwena Dam and the surrounding environment as was observed during the site inspection.

Figure 13: Fishing

Figure 14: Camping

1.5 LAND OWNERSHIP

The RMP is focusing on the Government Waterworks (GWWs). GWWs refers to the dam surface area and surrounding purchase boundary of DWS. However, the RMP also takes cognisance of the activities adjacent to the GWWs.

The dam located around private properties. The owners has formed “Badfontein Land Owners Association” (BLOA) which deals with challenges affecting the Badfontein communities.

1.5.1 Land Claims

There are land claims which has been unresolved for years around the dam. The land claimants are sceptical on the objective on the RMP as the claims are still under review. However, the land which is under water cannot be claimed through the restitution process but compensation with monetary value or alternative land is an alternative to fix this challenge.

1.6 RECREATIONAL INSTITUTIONAL ARRANGEMENTS

There is currently no institutional structure to manage recreational use of the dam and as part of the RMP process a recreational institutional structure will be established.

The non-existence of the management structure has led to unauthorised activities such as access, slipways and fishing to persist at the dam. It is very critical to establish and implement an institutional structure to monitor and inspect activities around the dam to ensure the protection of the water resource.

1.6.1 Management of Water Surface

DWS operates the dam for primary purposes and bulk water supply to TCLM, a water service provider.

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

1.6.2 Access

Kwena Dam is accessed through R36 Road between Machadodorp and Mashishing. There is one (1) authorised access gate to the dam and DWS offices. Other informal access point has been established along Badfontein SAPS side.

The informal access point needs to be formalised and improved / developed to be used during the implementation of the RMP.

1.7 SAFETY

1.7.1 Safety of Navigation

There is currently no adequate, standardised and harmonised fixed and floating Aids to Navigation (AtoN[2]) and demarcation Markers in place.

1.7.2 Incident Management

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

As part of the RMP process an area has been proposed to be used as Incident Response Point, refer to the **Zoning Plan**.

1.8 SOCIO-ECONOMIC ENVIRONMENT

1.8.1 Social Audit

The main purpose of social audit is to examine the general status of the study area and to determine issues that need to be addressed when developing the RMP in order to overcome potential difficulties in an area. The study area falls within Ward 4 of TCLM as shown in **Figure 15**. An understanding of socio-economic conditions of the ward 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 and Education level, employment status was undertaken and is

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

presented in section 1.8.1.1 to 1.8.1.3, respectively.

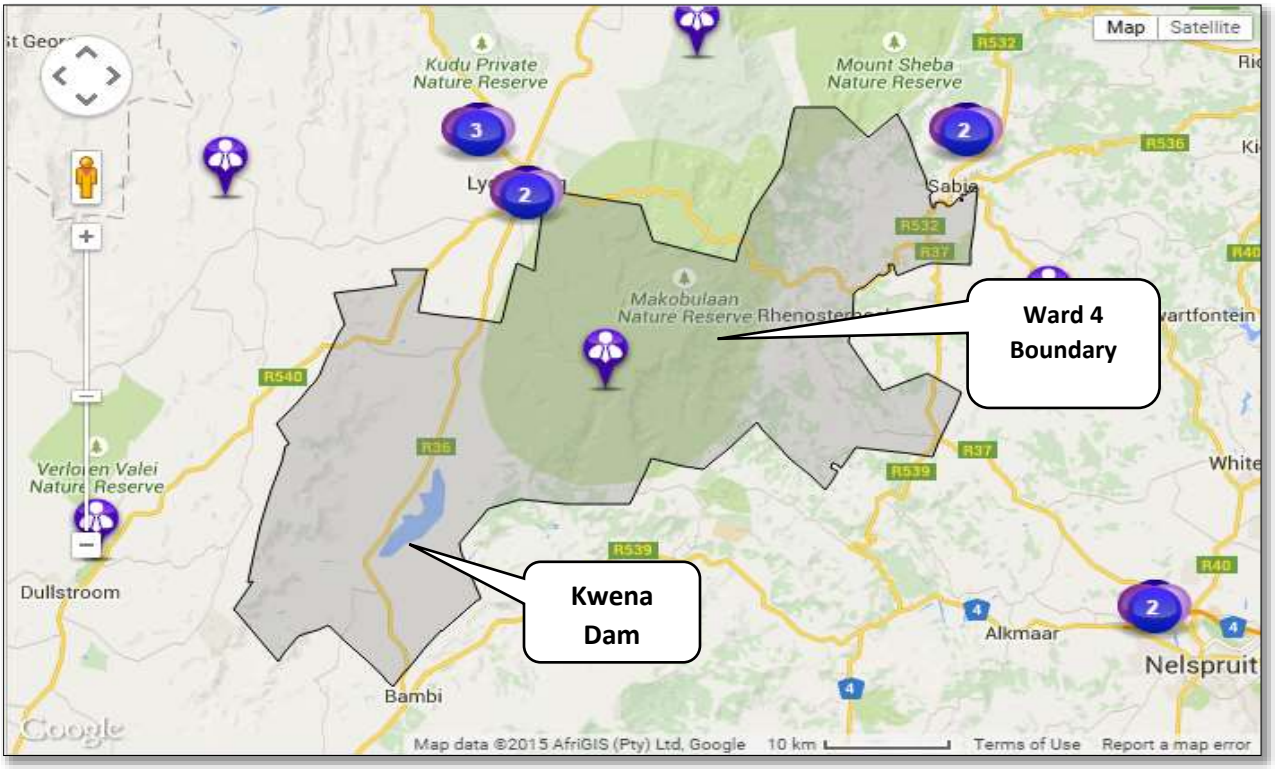

Figure 15: Thaba Chweu Local Municipality Ward 4 (Mobilitate, 2014)

1.8.1.1 **Population Dynamics**

According to Census (2011), TCLM has a total population size of 98 387. The population is dominated by Black Africans 80 285 and followed by Whites at 14 299. Ward 4 has a total population estimated at 7 820, of the population, 83% are black African, 16% are white, and 1% are colored, with Indian or Asian groups. Refer to **Table 3** and **Figure 16.**

Table 3: Population Group

Population Group	
Item	**Description**
Black African	6 452
Coloured	77
Indian or Asian	13
White	1 255
Other	23

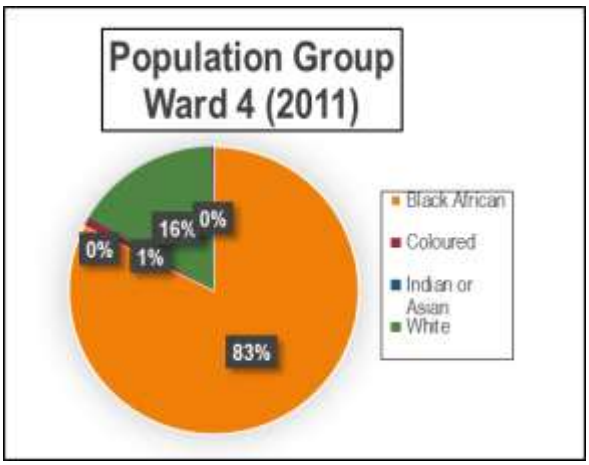

Figure 16: Population Group

1.8.1.2 Educational Level

The total population in ward 4, 37% have primary school, 55% have some secondary education, and 7% have some certificates for higher education. Refer to the **Table 4** and **Figure 17** and **below.**

Table 4: Education Level

Education Group	
Item	**Description**
Primary	2184
Secondary	3184
Certificates	71
Tertiary Qualifications	396
No Schooling	1031
Not Applicable	955

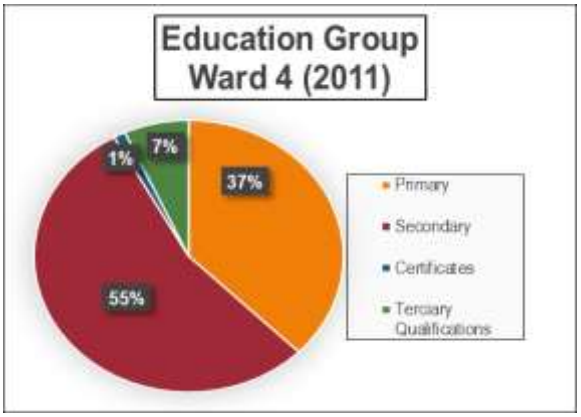

Figure 17: Education Group

1.8.1.3 Employment Status

According to census 2011, there are 3 381 employed persons and 1 686 persons are classified as not economically active. The total unemployment rate is estimated at 7%. Refer to **Table 5 and Figure 18**.

Table 5: Employment Status

Employment Status	
Description	**Description**
Employment	3381
Unemployment	432
Economically Inactive	1686
Not applicable	332

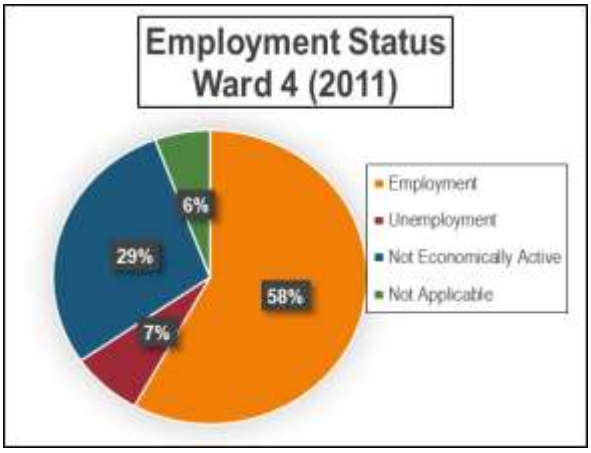

Figure 18: Employment Status

1.8.2 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 Kwena Dam. It is informed by relevant policy, legislation and planning documents administered by other government departments. Similarly, these government departments are required to use the RMP to inform the development of future policy, legislation and planning documents.

I. **The Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996), Section 24:** Provides that, everyone has a right to an environment that is not harmful to their health or well-being.

II. **Conservation of Agricultural Resource Act, 1983 (Act No. 43 of 1983):** Provides for control over the utilization of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith. Regulation 7 and 8 within the same Act deals with the protection of wetlands and water courses, while regulations 15 and 16 deals with Alien Invasive Plant Species and bush encroachment**.**

III. **Consideration on Institutional Arrangement for Managing Use of Water for Recreational Purposes (DWAF, 2003):** It outlines some of the institutional issues at a local level and makes recommendations about the conditions under which different Institution Management arrangements may be considered.

IV. **General Public Participation Guidelines (DWAF, 2001):** Public Participation refers to the ongoing interaction between Role Players and all stakeholders that is aimed at improving decision making during planning, design, implementation and evaluation of all projects within the state, this includes the proposed development of the RMP.

V. **Government Immovable Asset Management Act, 2007 (Act No. 19 of 2007):** To provide for a uniform framework for the management of an immovable asset that is held or used by a national or provincial department; to ensure the coordination of the use of an immovable asset with the service delivery objectives of a national or provincial department; to provide for issuing of guidelines and minimum standards in respect of immovable asset management by a national or provincial department; and to provide for matters incidental thereto.

VI. **Government Notice R654 dated 1 May 1964, in terms of the Water Act, 1956 (Act No. 54 of 1956):** Regulates access and use of government waterworks for recreational purposes.

VII. **Guidelines for Compilation of Resource Management Plans (DWAF, 2006):** Directs and guides the development of RMPs by providing insight into the purpose and objectives of these plans, the procedure for its compilation and structure of such documents.

VIII. **Merchant Shipping (National Small Vessel Safety) Regulations (2007):** These Regulations provide *inter alia* for:

- Requirements for vessel safety;
- Crewing requirements and responsibilities;
- Controlled events such as competitions and regattas; and
- Responsibilities of authorised agencies (governing boards/ clubs/ organisations and regulating authorities).

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

IX. **Methodology for Carrying Capacity Assessment for the Use of Water for Recreational Purposes (DWAF, 2003):** The carrying capacity of a water resource represents the maximum level of visitor/recreational use and related infrastructure that the water resource and surrounding area can accommodate, without diminishing user satisfaction or adverse impacts upon the local or host community, the economy and culture of the area.

X. **National Environmental Management Act, 1998 (Act No. 107 of 1998):** NEMA serves as South Africa's Environmental Framework Legislation. It was designed to provide for co-operative and Integrated Environmental Governance by establishing a general framework for decision-making on matters affecting the environment.

XI. **National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) and Related Regulations:** This Act aims to provide the framework, norms and standards for the conservation, sustainable use and equitable benefit-sharing of South Africa's biological resources.

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

XII. **National Environmental Management: Protected Area Act, 2003 (Act No. 57 of 2003):** The aim of this Act is to provide for the protection and conservation of ecologically viable areas, which are representative of South Africa's Biodiversity, as well as natural landscapes and seascapes.

XIII. **National Treasury Public Private Partnership (PPP) Toolkit for Tourism, 2005:** This toolkit assist the process of development of tourism-based businesses on State-owned Land. The Toolkit make it easier for Institutions and the Private Sector to enter into tourism related partnerships on State Property managed by National and Provincial Government Institutions.

XIV. **National Water Act, 1998 (Act No. 36 of 1998):** The purpose of the Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in a sustainable and appropriate manner, for the benefit of all. Furthermore Section 113 of the Act states that the water of a government waterworks and surrounding state owned land may be made available for recreational purposes, subject to controls determined by the Minister and regulations made by the Minister.

Using water for recreational purposes is a water use under Section 21K and can be exercised as permissible use of water under Schedule 1 of the Act. However, this provision does not cater for commercial use hence the RMP should be implemented in line with General Strategic Plan for commercialisation of Tourism Public Private Partnerships at Government Waterworks, 2009 and PFMA Treasury Regulation 16.

Once the RMP has been approved, the RMP will regulate access and use of the

dam. It is important to note that users will need to comply with other relevant legislation.

XV. **Operational Policy: Using Water for Recreational Purposes (DWAF, 2004):** This policy is the main guideline in support of the RMP process with regards to the basic principles, policies, strategies and actions for regulating the use of water for recreational purposes.

XVI. **Public Finance Management Act (PFMA) (Act No. 29 of 1999**): Section 76 of the Act secures transparency, accountability and sound management of the revenue, expenditure, assets and liabilities of government departments. The Act promotes the objective of good financial management in order to maximize 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).
- Environmental Conservation Act, 1989 (Act No. 73 of 1989).
- Integrated Development Plan of Thaba Chweu Local Municipality (2014/15)
- Intergovernmental Relations Framework Act, 2005 (Act No.13 of 2005).
- Land Administration Act, 1995 (Act No. 2 of 1995).
- Local Government: Municipal Systems Act, 2000 (Act No. 32 of 2000).
- National Heritage Resources Act, 1999 (Act No. 25 of 1999)
- Occupation Health and Safety Act, 1993 (Act No. 85 of 1993).
- State Land Disposal Act, 1961 (Act No. 48 of 1961).

➢ **Safety of Navigation:** In addition to its common-law responsibility, DWS is, in terms of the requirements described in the National Water Act, Act No 36 of 1998, amongst others, responsible for the safety of GWWs. DWS, its delegated public sector partner, or a delegated water management institution, has therefore the responsibility to provide the required fixed and/or floating AtoN for general navigation.

In addition to the DWS, Local Accountable AtoN Parties (LAAP) and other Bodies providing access to Government waterways and watercourses have a responsibility to ensure that the required fixed and/or floating AtoN are provided after obtaining the necessary support from DWS and thereafter the permission by SAMSA. In order to demarcate specific zones/areas, standardised demarcation markers are to be used in conjunction with the relevant AtoN.

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

The aim is to enhance the development of a best practice model to ensure a safe and structured inland maritime environment and culture, whilst protecting the country's precious water resources. Not only do these Acts, Regulations and Frameworks guide specific decisions and actions, they also provide the framework for monitoring performance and compliance, and provide guidelines regarding contravention, offences and penalties. This list is not extensive, other legislation could be applicable.

CHAPTER 3: WHAT IS A RESOURCE MANAGEMENT PLAN

3.1 DEFINITION OF RMP

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

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

3.2 PURPOSE OF THE RMP

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

Without approved management plans relating to water resources utilized for recreational purposes, it is difficult for informed decisions to be made necessitating a precautionary approach to access, utilisation and development proposals.

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

3.3 PROCESS TRIGGERS

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

A number of generic factors have been identified by DWS for the development of RMPs, however, the Process Facilitator identified site specific trigger factors for Kwena Dam, as illustrated in **Table 6**.

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

Trigger Factors	Description
Resource Management	**Resource Management** • The non-existence of the management structure has led to the development of graves close to the dam. The dam has no facilitator to monitor and inspect activities around the dam. The graves close to the dam will alter the development of recreational activities within the purchased line **Alien Invasive Species** • Alien invasive species such as Black Wattles are a threat to the indigenous biodiversity and that they consume large quantities of water which will impact on the water level and also the habitat of the indigenous species. **Safety and Security** • Incidents of drowning that occurred in the past. • Inadequate safety measures at the dam.

Trigger Factors	Description
Community Participation and Beneficiation	**Community Participation** • To enable local communities to be part and parcel of the dam and raise awareness of the activities at the dam as currently, only white people uses the dam for recreational purpose. **Access Control** • The access control is currently not controlled and as a result, people gain access from all the sites and damage available facilities such as toilets, vessel house and fence.
Public Policy	**Local Planning Initiatives** • Kwena Dam should be integrated in other local planning initiatives and decision support tools such as Thaba Chweu Local Municipality (TCLM) Integrated Development Plan (IDP), Environmental Management Framework (EMF), Spatial Development Framework (SDF), etc.

3.4 RMP DEVELOPMENT PROCESS

The RMP is developed in accordance to the RMP Guideline Procedure (DWAF, 2006) as illustrated in **Figure 19**:

Figure 19: RMP Procedure

3.5 RMP PLANNING STAGES

3.5.1 Desktop Study

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

3.5.2 Site Inspection

A site inspection was conducted at Kwena Dam on **02 June 2014** to gather baseline information using a checklist questionnaire. The site inspection was undertaken with the officials from DWS (Integrated Environmental Engineering (IEE). Photos of the study area were also taken during site inspection as illustrated in **Figure 20.**

Figure 20: Site Visit Pictures

Additional background information was collated from consultation with different Stakeholders. Other Interested and Affected Parties (I&APs) were identified during site inspection through liaison with representative of the DWS Officials and Thaba Chweu Local Municipality.

3.5.3 Public Participation

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

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

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

The public participation process for this project was formulated to include the following objectives:

- The identification of role players;
- The introduction the RMP project to role players and inform them about their roles and responsibilities;
- The engaging of the Stakeholders (Authority 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**

Planning phase entails three (3) important aspects namely:

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

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

3.5.3.1.1 The Role Players

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

3.5.3.2 **Participation Phase**

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

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

3.5.3.3 **Exit Phase**

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

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

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

3.5.3.4 **The Advertising Process**

3.5.3.4.1 Compilation and Distribution of Background Information Document (BID)

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

3.5.3.4.2 Newspaper Advert

A Newspaper advert regarding the RMP project was placed in the **Steelburger Newspaper**. The advert invited the public to attend the Public Participation Meeting. The advert was published in English on **11 July 2014**. Furthermore, an advert for the draft RMP was advertised on **22 January 2016**. (See attached **Appendix C**).

3.5.3.4.3 Flyer Compilation and Distribution

Flyers were also used as a form of notification, they aimed at informing the I&APs about the public consultative meetings. The flyer detailed a brief description of the RMP, meeting date, time, venue and relevant contact details. The flyers were compiled in English and were distributed on **09 July 2014**. Moreover, the flyers for the draft RMP were distributed on **22 January 2016** (See attached **Appendix D).**

3.5.3.5 **Direct Communications**

3.5.3.5.1 E-mails

Meeting invitations were sent out to authorities and I&APs notifying them about the scheduled consultative meetings. The invitation entailed the BID, meeting venue and time. The email notification was sent out on **07 July 2014**. Moreover, the meeting invitations for the draft RMP were sent out on **25 January 2016** (See attached **Appendix E)**.

3.5.3.5.2 Authority Meeting

The initial authority meeting was held on **16 July 2014** at the **Kwena Dam DWS offices.**

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 **03 February 2016** at **Thaba Chweu Local Municipality Offices**.

3.5.3.5.3 Public Meeting

The initial public meeting was held on **16 July 2014** at **Klipspruit combined School**. A platform was also given to identify encumbrances/ challenges that might hinder the progress of the RMP as well as to identify objectives and vision for the dam. The attendance of the meeting was good despite the disruption by land claimants and community members.

A follow up meeting was held on **03 June 2014** at **Thaba Chweu Local Municipality Offices**.

The draft RMP was presented to the public on **03 and 04 February 2016.**

3.5.3.5.4 Comments and Responses Register

A copy of the draft report was circulated on **15 January 2016** for commenting. The commenting period was to elapse on **01 February 2016.** (See attached **Appendix F**).

3.5.4 Planning Partners

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

The RMP provides for coordination between different governments and agencies to ensure that not only the objectives of DWS are attained, but also the objectives of other relevant Government Departments are attained. Such Departments includes among others as outlined in **Table 7**.

Table 7: Planning Partners and their Respective Mandates

Department/ Agency	Mandate
Thaba Chweu Local Municipality (TCLM)	The dam is within the jurisdiction of the municipality.
Thaba Chweu Local Economic Development Agency (THALEDA	To build up the economic capacity of the Thaba Chweu Municipality local area to improve its economic future and the quality of life for all
Department of Agriculture, Forestry and Fisheries (DAFF)	The purpose of DAFF includes sustainable development and management of resources to maximizing the economic potential of the fisheries sector while protecting the integrity and quality of the country's aquatic ecosystems. Operation Phakisa expansion to inland dams is one of DAFF initiative aimed at unlocking economic potential of fisheries sector within the inland water. The latter programme will be used as benchmark for implementation of conservation policies while implementing job creation within fishery and fish processing market.
Department of Rural Development and Land Reform (DRDLR)	The department will assist in terms of Land Claims/Ownership issues.
Department of Environmental Affairs (DEA)	Responsible for Biodiversity Management within the dam including Invasive Alien Species.
Department of Public Works (DPW)	Has the power to regulate and control the use of state land outside the GWWs. In this regard, lease agreements or permits will be required from the department as some of the recreational activities will overlap into the state land.
Department of Transport (DoT)	Responsible for legislation, policy and regulations for all transportation in South Africa, including shipping and other transport by water or sea also inland waterways.
National Treasury (NT)	The use of State assets is governed by National Treasury Regulations, requiring DWS to plan concessions in compliance or association with National Treasury, guided by the Tourism Public Private Partnership (PPP) Toolkit of 2005.
South 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

Department/ Agency	Mandate
	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 8 - **11** outline the summary of limitations that might affect the development or implementation of the RMP for the dam.

Table 8: Summary of Biophysical Encumbrances

Item	Description
Water Quality	• The ablution facilities have been vandalized. Provision of waste management services and renovation of ablution to prevent water pollution.
Flora	• Availability of Alien invasive species such as Black Wattles is a threat to the indigenous biodiversity.
Fauna	• The presence of species such as hippos in the dam will endanger the lives of people.

Table 9: Summary of Legal Encumbrances

Item	Description
Land claims	• The land claimants are sceptical on the objective on the RMP as the claims are still under review. However, the land which is under water cannot be claimed through the restitution process but compensation with monetary value or alternative land is an alternative to fix this challenge. • The DWS purchase boundary has been demarcated by a fence around the dam. However, there are potential land claims within the purchase boundary.
Settlements	• The expansion of settlement towards the dam. Local communities are building houses towards the dam boundary.

Table 10: Summary of Social Encumbrances

Item	Description
Mobility	• Lack of access control. The dam is currently accessed and used in an illegal manner.
Safety	• There are incidents of housebreaking which are reported from time to time around the dam.
Cultural	• It is alleged that there are graves under water.
Employment	• The implementation of projects at the dam which excludes the employment of local communities.

Table 11: Summary of Existing Plans

Item	Description
Zoning Plan	• The current zoning plan was developed as a result of past operation of the dam by boating clubs. This was closed down due to the exclusive use and inequitable access to the dam.

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

3.6.2 SWOT Analysis and Objective Identification

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

3.6.2.1 SWOT Analysis Approach

There were issues of concerns that were raised in the stakeholder engagement meetings prior to conducting the SWOT Analysis. Other challenges or encumbrances that may hinder the progress of the dam's RMP process were identified by the stakeholders following the SWOT analysis approach as illustrated in **Table 12**.

Table 12: SWOT Analysis for Kwena Dam

Strengths	Weaknesses

• The water quality is of good quality and no pollution is experienced in the dam.
• Constant water level of the dam.
• Large water surface body to utilize.
• Good climatic conditions, moderate temperatures.
• The dam is in a good location and is a tourist attraction.
• The development around the dam will strengthen the recreational potential of the dam and combat the illegal activities.
• Cohesive and well integrated community which work together to solve community issues.
• The dam offers potential for camping, conference centre, swimming pools, diving, chalets, etc.
• The SA-National Champions for fishing are hosted at the dam and it has a potential to host the Fishing World Championship.
	• The R36 Road adjacent to the dam is in a bad condition. Some lodges around the dam have been closed down as a result of potholes on the road. The access road needs to be fixed.
	• Poor management around the dam including:
	  ○ Illegal activities such as drug dealing happens around the dam.
	  ○ The use of boats by visitors which do not comply with SAMSA standards.
	  ○ Poaching of fishes using nets for commercial purposes by local communities.
	  ○ The dam is not secure, illegal access is gained to the dam through the communities.
	  ○ Vandalism of facilities around the dam, e.g. Ablution Facilities, boat house.
	  ○ Lack of security and access control has led to a lot of unauthorised entrances.
	  ○ The livestock's which graze around the dam are not secured, they move freely and go on the road which could lead to accidents.

Opportunities	**Threats**
• Proper access control, safety and security around the dam needs to be developed. • To have an entity such as community trust, private company, etc. to manage the dam while the RMP process is still underway. • Eco-tourism and safe environment for recreational activities. • Social developments around the area such as formal houses, schools, recreational Facilities.	• Mining prospecting around the area may impact on the water quality and species only found near Kwena Dam. • Nets used for poaching fishes are left in the dam and in turn damages the engine boats. • Unsolved land claims for local communities. • The waste left around the dam is washed into the dam by rain and wind which impact on aquatic species and the water quality. • Political influence overriding the needs of local communities. • Uncontrolled expansion of informal settlements.

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

KPA 1: Resource Management

- To have Kwena Dam basin free of Alien Invasive Plants in order to support the proposed recreational activities and to maintain the native ecological aspect of the area;
- To maintain a good water quality and protect the aquatic resource for recreational use as well as to ensure a healthy environment; and
- To compile a Zoning Plan which will integrate conservation, recreation and development whilst not compromising the primary functions of the dam.

KPA 2: Resource Utilization

- To unlock the socio-economic potential of the dam for commercial opportunities such as fisheries, chalets, braai area;
- To establish access control which have lower tariffs to accommodate the rural communities around the dam;
- To ensure safety in all aspects during boating; and
- To promote sustainable harvesting of fish.

KPA 3: Benefit Flow Management

- Uplift the Local Economy and increase Benefit Flows to the surrounding communities through community empowerment and job creation; 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 ensure the effective management of Kwena Dam and empowerment of local communities to benefit economically from the recreational uses 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 following data as illustrated in **Figure 21.**

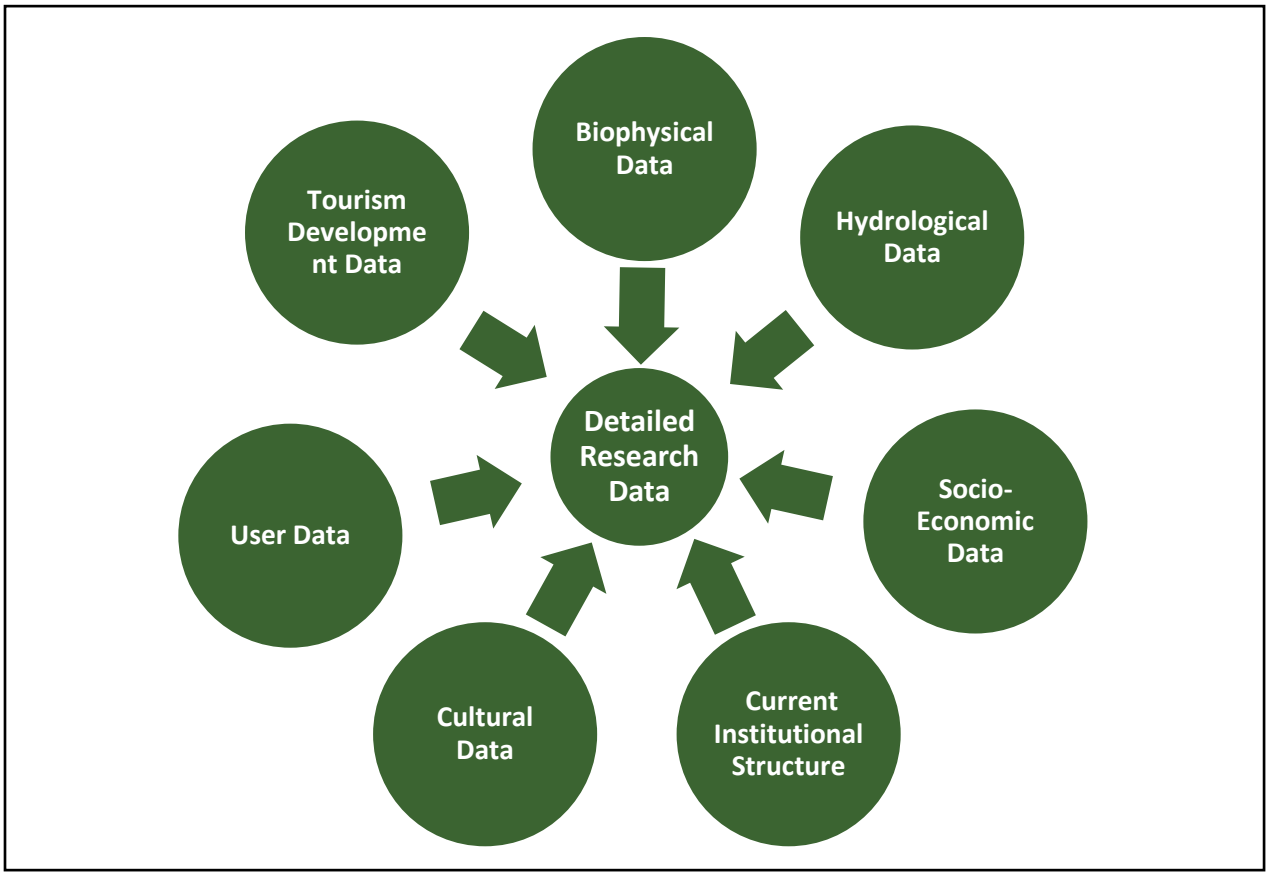

Figure 21: Research Data

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

3.6.3.1 **Tourism Development Potential**

The dam is a tourist attraction and is well known for hosting Kwena Dam Fly-Fishing Challenge, fishing and camping on holidays. It is located 25km northeast of Buffelskloof Private Nature Reserve, 30km from Makobulaan Nature Reserve and 38km west of Mashishing. The proximity of the dam to the town, the nature reserves means the tourists will have the opportunity to enjoy both the recreational activities and the wildlife. The dam is the largest water body in TCLM and is at an excellent location for recreational activities.

3.6.3.2 **Feasibility of Identified Potential Objectives**

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

Table 13: Feasibility of Potential Recreational Objectives

KPA 1: Resource Management		
Objectives	**Status Quo**	**Practicability**
• To have Kwena Dam free of Alien Invasive Plants in order to support the proposed recreational activities and to maintain the native ecological aspect of the area.	• Several alien invasive plants have been identified downstream the dam wall, i.e. Bluegum, seringa tree.	• The objective can be achieved taking into account the current legislature in place. Alien Invasive control falls within the Working for Water Programme of DEA as well as Land Use Management within the Department of Agriculture, Forestry and Fisheries (DAFF). • The use of wash bays can assist to prevent the spread of Aquatic Alien Species, this has to be established with accordance to the South African Maritime Safety Authority (SAMSA) Regulations.
• To maintain the high standard of water quality within the dam.	• The quality of the water in the dam is very good, as such it should be maintain. The dam was constructed for the primary purpose of agricultural and domestic use.	• Water quality management lies within multiple institutions as well as on the dam users themselves, as such cooperation between all Stakeholders will ensure the possibility of maintaining the high water quality standard of the dam. • Enforcements of all relevant Legislation (e.g. NWA and NEMA) at the dam can always keep the dam's water quality in good conditions. • The use of wash bays can assist to prevent the spread of Aquatic Alien Invasive species. However, this should be established in accordance with the CIWSP best practice model.
KPA 2: Resource Utilisation		
Objectives	**Status Quo**	**Practicability**
• To safeguard the provision of water to local communities i.e. Masofeng, Klipspruit and Koporasie.	• Masofeng, Koporasie and Klipspruit Communities stay adjacent and depend on the dam for water and subsistence fishing. It is alleged that these communities depend on the system feeding the dam, they do not have access to clean water.	• Thaba Chweu Local Municipality should facilitate and address service delivery issues. The provision of either boreholes that will feed the communities or the construction of water treatment plant that will purify the water to the end users, i.e. local communities.
• To unlock the socio-economic potential of the dam for commercial	• The socio-economic potential of the dam is hampered by illegal camping and fishing is evident at the dam.	• The dam rules relating to the dam access, fees payable for access, safety measures, speed limit applicable to the dam and the time in which the dam

opportunities such as fisheries, chalets, braai area, etc.	• Currently there are no formalized nor established recreational facilities which can yield economic benefits to the local communities and visitors. • Illegal camping and fishing are evident at the dam.	will be open to the public should be established in terms of DWAF Regulation R654. • The appointment of safety and enforcement personnel is imperative to ensure compliance with the dam rules and other relevant legislations. • The Business Plan will incorporate the objective and will include a cost structure that is market related and will be affordable to local visitors and tourists.
• To establish access control which have lower tariffs to accommodate the rural communities around the dam. • To ensure safety in all aspects during the use of the dam.	• The dam is not secure, a lot of illegal access points have been opened around the dam. • The dam is experiencing a high poaching level of fish due to certain portions of the reserve not being fenced.	• The dam rules relating to the dam access, fees payable for access, safety measures, speed limit applicable to the dam and the time in which the dam will be open to the public should be established in terms of DWAF Regulation R654. • The Business Plan will incorporate the objective and will include a cost structure that is market related and will be affordable to local visitors and tourists.
• To promote sustainable harvesting of fish.	• The sustainable fishing is affected by illegal and poaching of fish by local communities using nets for commercial purposes. • Subsistence fishing by the Local Communities remain an active use on the dam, however this must be regulated by relevant policy to avoid overfishing within the dam.	• The BP will detail the funding mechanism that will provide local fishermen with equitable and affordable access to the dam for fish harvesting. • The management structure should ensure that the fishery industry is in line with regulation such as the Marine Living Resources Act, 1998 which will assist in regulating fishing at the dam.
KPA 3: Benefit Flow Management		
Objectives	**Status Quo**	**Practicability**
• Uplift the Local Economy and increase Benefit Flows to the surrounding communities through community empowerment and job creation.	• Currently there are no existing socio-economic activities that have been implemented around the dam.	• Establishment of functional and effective Institutional Structure that should have enough power to ensure that the Local Communities are getting benefits emanated from the dam use. • The BP will detail how the previously disadvantaged communities will economically benefit from recreational opportunities.
• To establish an effective institutional structure that can manage the use of water for recreational purpose in an acceptable manner, which is also representative of all the Stakeholders.	• No institutional structure exist for Kwena Dam.	• TCLM to be appointed as the IA. • Roles and Responsibilities of an AI to be clearly defined.

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 22.**

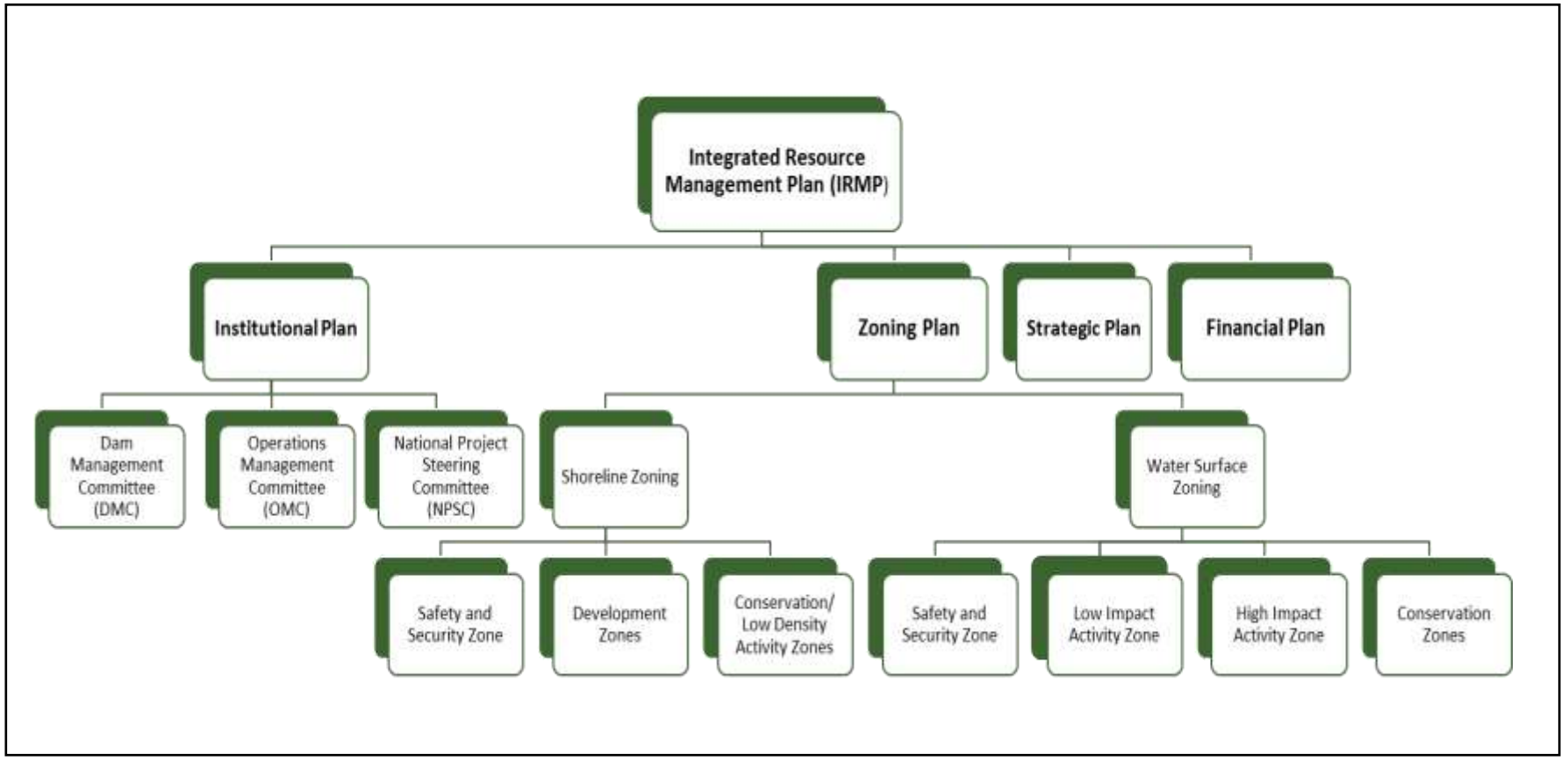

Figure 22: Integrated Resource Management Plan

4.1 INSTITUTIONAL PLAN

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

4.1.1 Dam Management Committee (DMC)

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

One of the main functions of the DMC is to give support to 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 23 illustrates the proposed user groups that will form part of the DMC

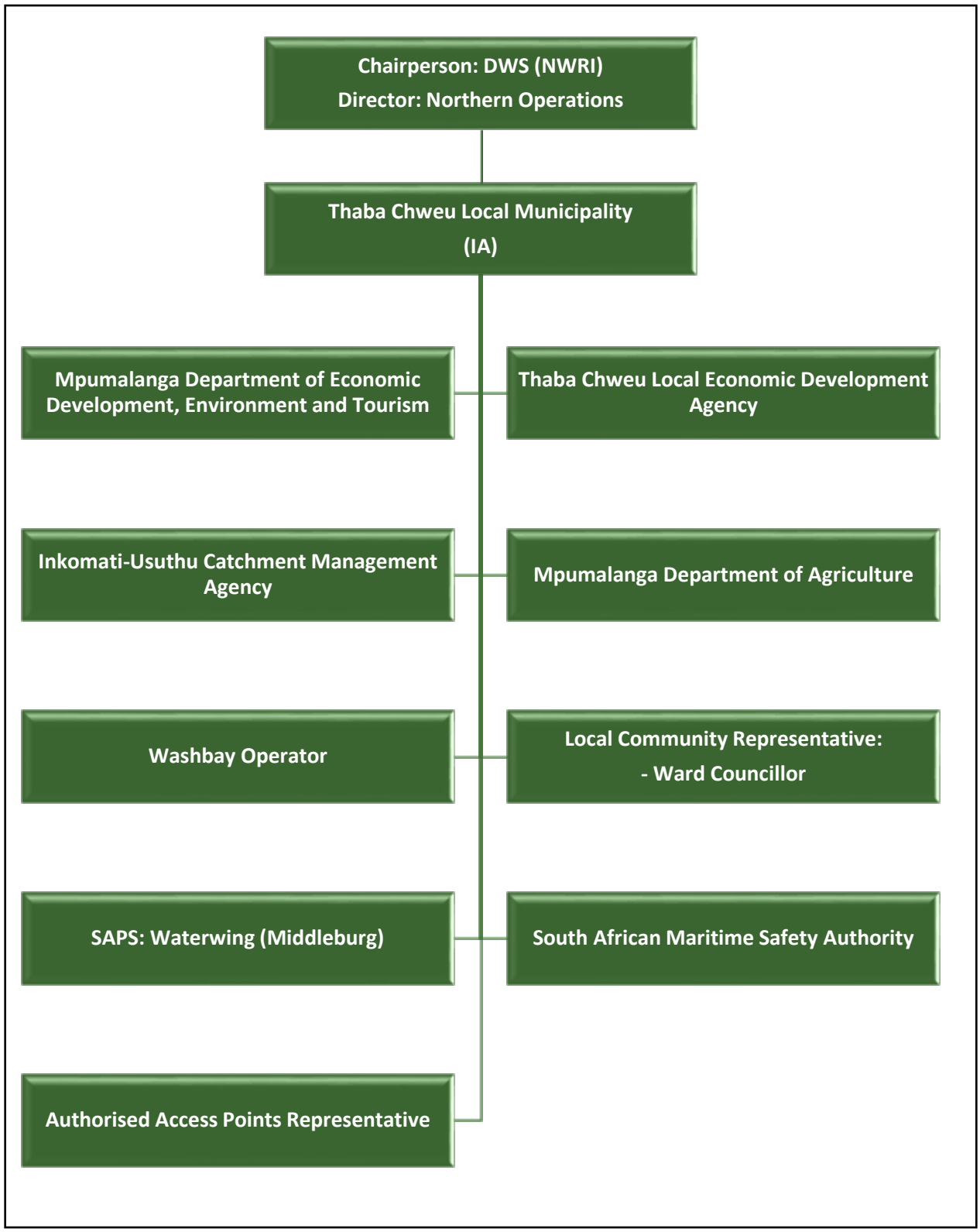

Figure 23: Proposed DMC

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 Responsibility of chairperson;
- Roles and Responsibilities of members;
- Roles and Responsibilities of an IA;
- 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.

All the existing agreements 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.

Agreements between DWS and Implementing Agency

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

TCLM has an economic development agency, THALEDA which is developed to build up the economic capacity of the Thaba Chweu Municipality Local area to improve its economic future and the quality of life for all. It gives an opportunity by which public, business and nongovernmental sector partners work collectively to create better conditions for economic growth and employment generation.

The minimum requirements of an IA include the following:

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

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

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

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

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 Aids to Navigation (AtoN)[3] for general navigation.

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

- Exhibit the relevant AtoN; 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 and 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.

Event Applications

Different events that involves recreational activities such as fishing competition, boating, etc. All events must be managed through an event application process.

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 24.**

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.

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

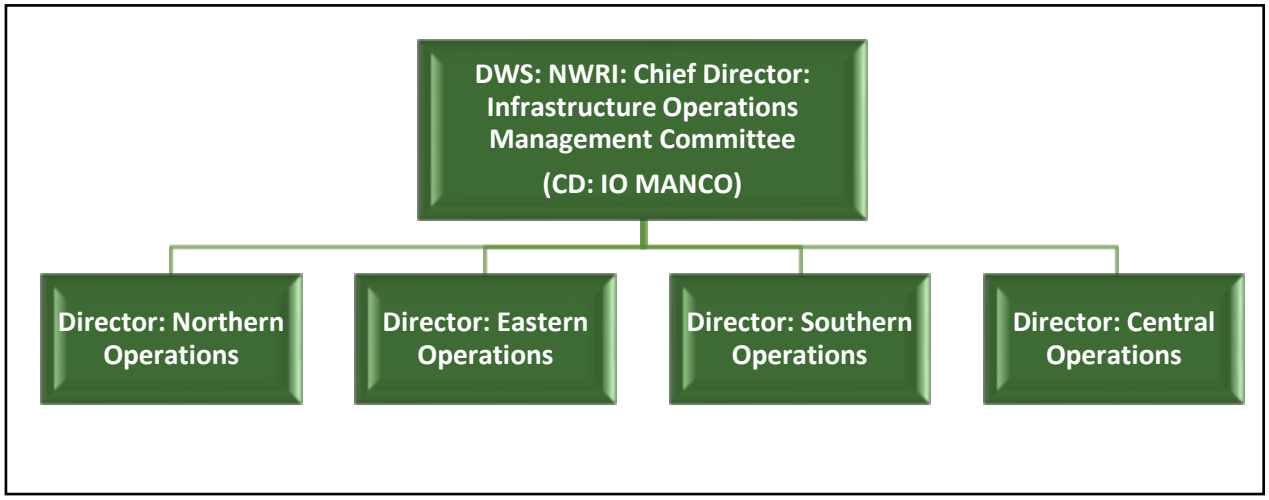

Figure 24: Existing CD: IO MANCO

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

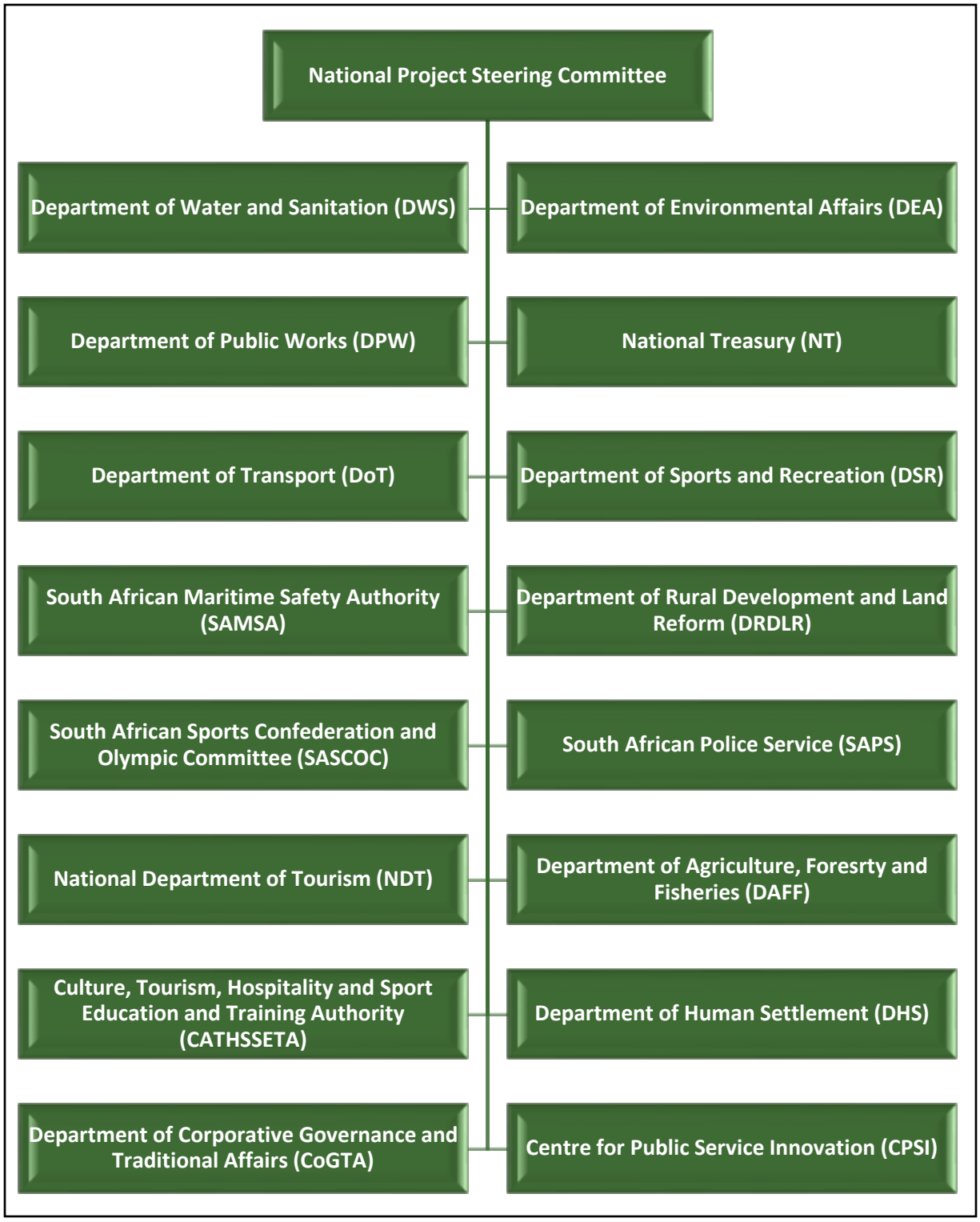

Figure 25: Proposed NSPC

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

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

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

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

Department of Agriculture, Forestry and Fisheries (DAFF):
The purpose of DAFF includes sustainable development and management of resources to maximizing the economic potential of the fisheries sector while protecting the integrity and quality of the country's aquatic ecosystems.

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

Department of Corporative Governance and Traditional Affairs (CoGTA):
Its function is to develop national policies and legislation with regard to Provinces and Local government, and to monitor their implementation. Other function of the Department is to support Provinces and Local Government in fulfilling their constitutional and legal obligations.

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

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

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

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

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

Department of Transport (DoT):
Responsible for legislation, policy and regulations for all transportation in South Africa, including shipping and other transport by water or sea, including small vessels and inland waterways.

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

National Treasury (NT):
The Department is mandated to support the optimal allocation and utilisation of financial resources in all spheres of government. As part of the RMP, The National Treasury Public Private Partnership (PPP) Toolkit for Tourism (2005), will assist the process of tourism-based businesses development on State-owned Land. The Toolkit make it easier for Institutions and the Private Sector to enter into tourism related partnerships on State Property managed by National, Provincial and Local Government Institutions.

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

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

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

4.2 ZONING PLAN

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

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

4.2.1 Water Surface Zoning

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

Safety and Security Zone

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

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

Conservation Zones:

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

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

Low Impact Activity Zone:

This zone act as a buffer between High Impact Activity Zones and Conservation Zones. Low Impact Activity Zone allows for low intensity activities, i.e. activities associated with little or no wake such as wind surfing, kayaking, swimming, rowing, sailing, paddle boating, float tubes, canoeing, angling, yatching, 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 motorized boating, house boating, para-sailing and water skiing.

The water surface zoning colour coding means the following:

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

Table 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 demarcation makers and AtoN.
• Conservation Zones.	• None	• No public activities are allowed 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
		• Motorized boating
		• Water Skiing
		• House boats
		• Para-sailing
		• Kite-surfing
		• Jet skiis
			• Area should be demarcated by demarcation makers and AtoN.

• High Impact Activity Zone.	• Motorized 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

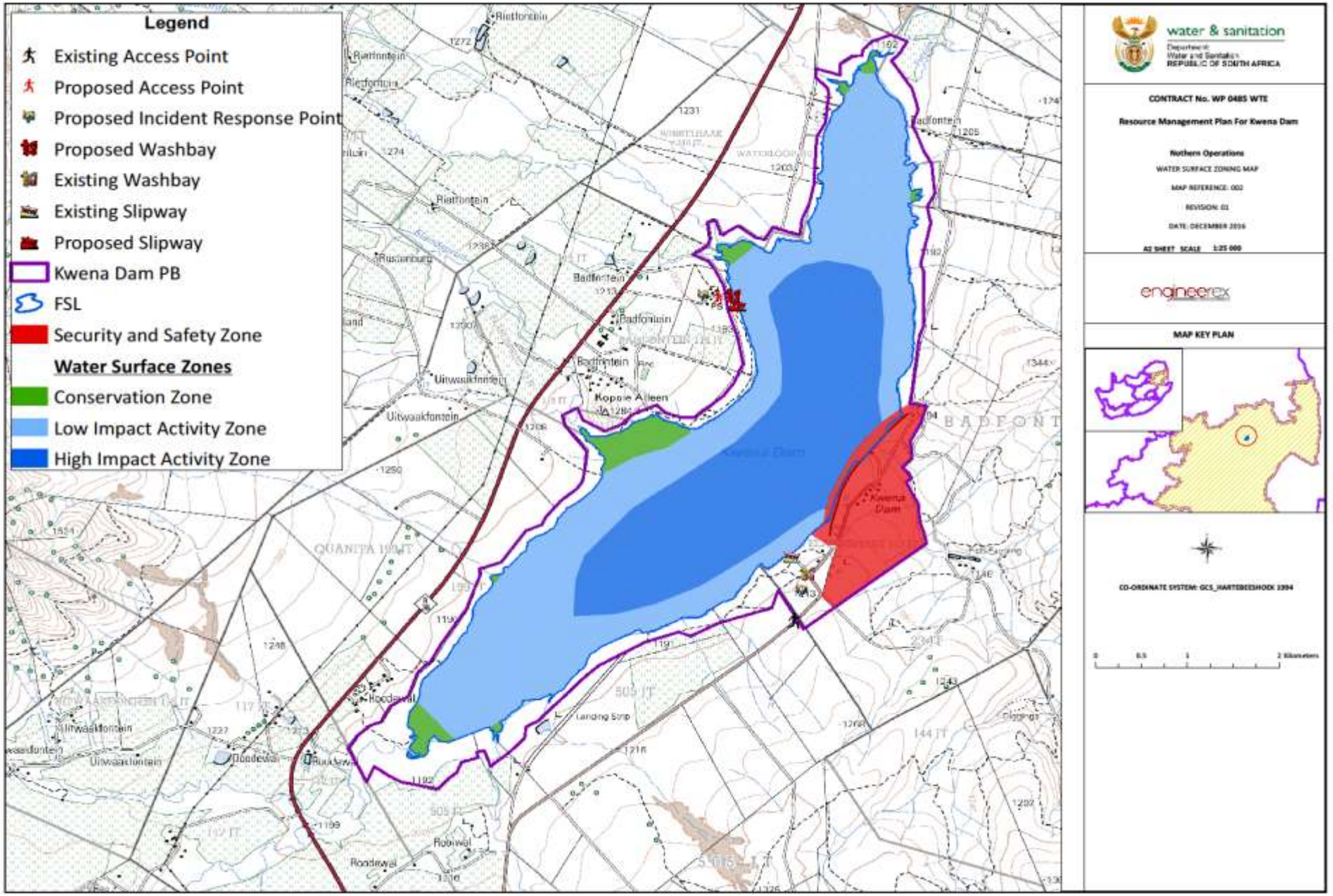

Figure 26: Proposed Water Surface Zoning Map

4.2.2 Shoreline Zoning[4]

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 includes:

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

[4] 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 • Swimming pools • Ablution facilities • Infrastructure for services • Chalets • Recreational club houses	• Permanent structures • Recreational club houses • Infrastructure for services • Accommodation facilities such as chalets, houses, etc.	• The management of this area should follow PPP process in terms of National Treasury. • All developments must be approved by IA. • 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.
• Community Resource Zone.	• Subsistence fishing • Livestock watering points • Small scale community gardens	• Chalets • Recreational club houses • Braai facilities • Camping	• Demarcation of the area by fence and provision of an access control. • The Community Resource Zone is for settlement along the dam for subsistence fishing, small gardening not for commercial.

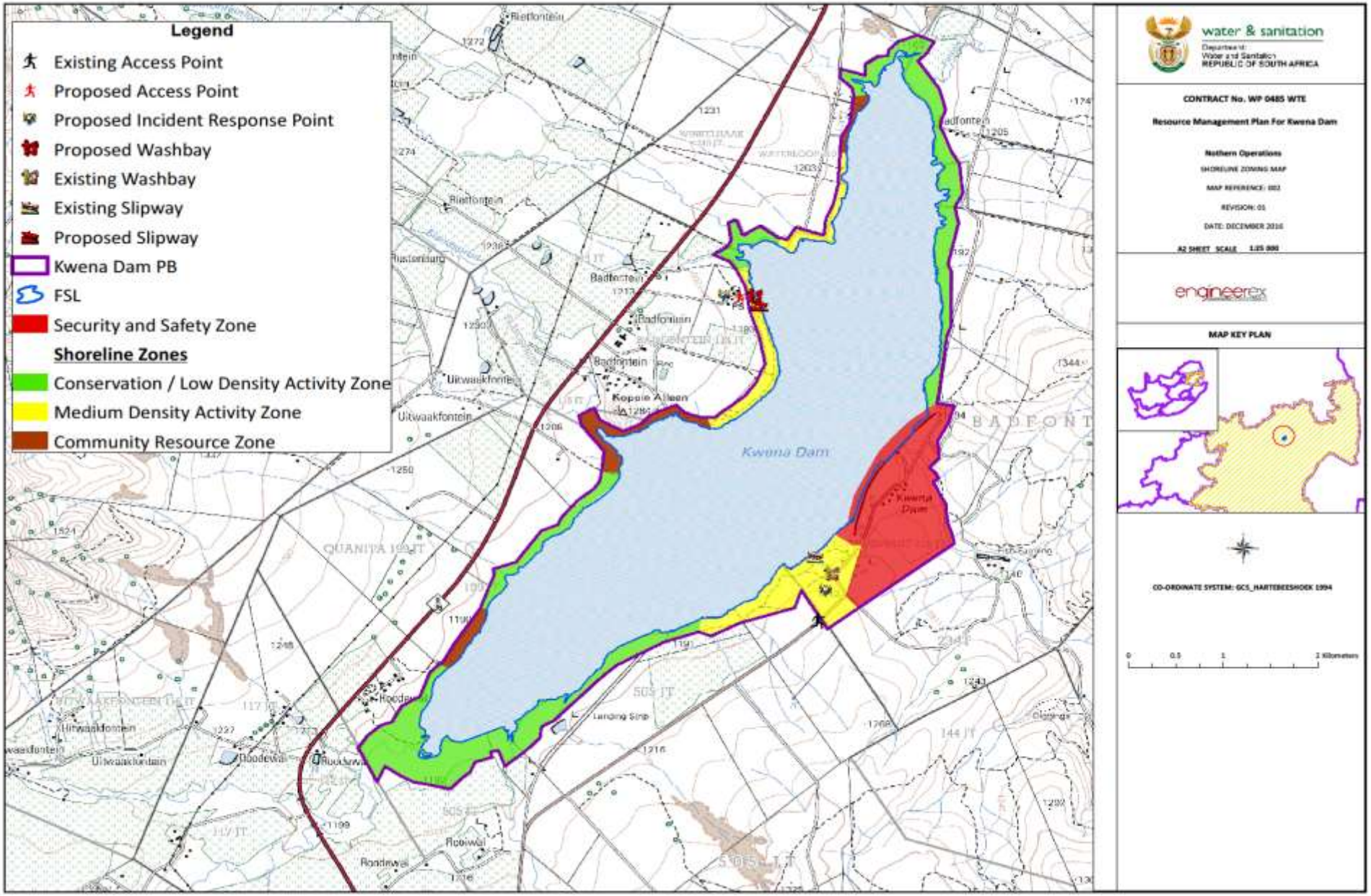

Figure 27: Proposed Shoreline Zoning Map

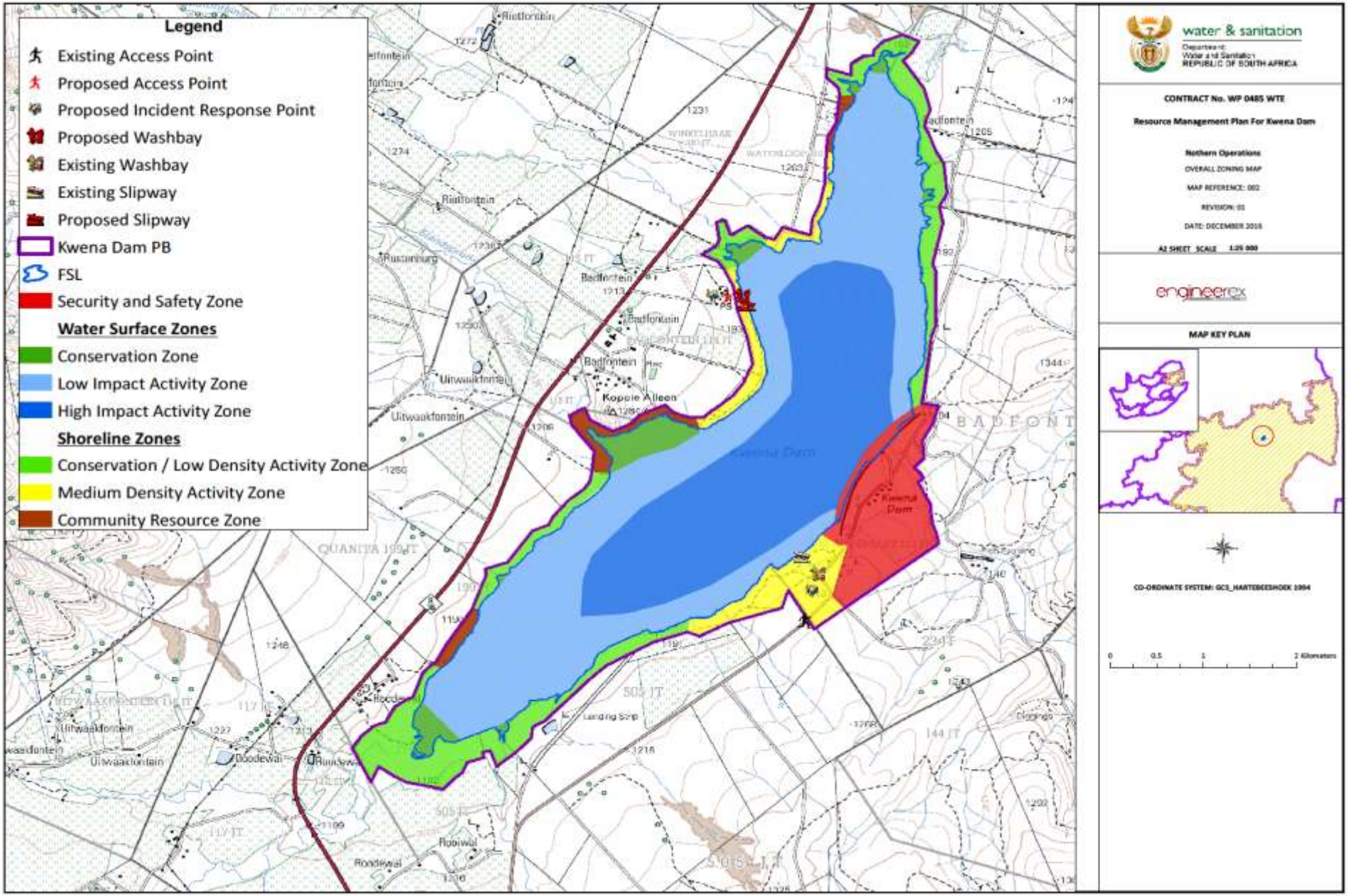

Figure 28: Proposed Overall Zoning Map

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 Kwena 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 ×U/a ×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: 12 504 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: **Craft**	**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 Kwena Dam can further be calculated as:

PCC **=** A × U/a × Rf
=12 504 × 1/5 × 1
= 6 252 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 (500 ha); and

- Conservation Area (700 ha).

The above factors results in 9.6% decrease in water surface available for recreation at the dam, therefore 90.4% of the surface area of the dam is still available for recreation.

RCC for Kwena Dam is therefore:

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

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

RCC = 6 252 × (100 – 9.6) %/100
= 5 651 vessels

Effective Carrying Capacity (ECC)

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

Currently there is no formal management structure in place, 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?)

Table 16 - 18 shows the Strategic Plan on how to achieve the identified objectives regarding the dam is outlined.

Table 16: Strategic Plan for KPA 1: Resource Management

KPA 1: Resource Management			
Objective (What do we want)	**Motivation (Why do we want to achieve this)**	**Action Projects (How do we achieve this)**	**Management Support (Who will be involved)**
Alien Invasive Plants Control: • To have Kwena Dam free of Alien Invasive Plants in order to support the proposed recreational activities and to maintain the native ecological aspect of the area.	• Several alien invasive plants have been identified in the vicinity of the dam.	• Remove all Invasive Alien Vegetation within the purchased line and the surrounding area. • Develop an inspection and cleaning mechanism to ensure that Boats using the dam does not contaminate the dam with Alien Seeds from other dams	• Working for Water (WFW) programmes within DEA and Land use and soil Management section within DAFF must be involved in order to eradicate and control Invasive Alien Plant Species within and around the dam. • South African Biodiversity Institute (SANBI) must be considered as well.
Safety and Security: • Improved safety of navigation	• There is no standardised and harmonised AtoN and demarcation markers available on the dam.	• To improve safety of navigation through the implementation of standardised and harmonised AtoN and demarcation markers as directed by SAMSA.	• DWS to facilitate the process • Agreements between SAMSA, DWS, LAAPs and other relevant parties to be concluded.
Water Quality: • To preserve and maintain the high standard of water quality of the dam.	• The water quality of the Kwena Dam is generally good and it is imperative to ensure that all proposed recreational activities are conducted in a sustainable manner with the aim of preserving water quality within the dam.	• All recreational activities must be monitored and evaluated to ascertain if there is any pollution threat to the dam.	• DWS Water Quality and River Health section must monitor water quality regularly to ensure its suitability for recreational activities. • Other Government Departments such as Environmental Affairs, Inkomati CMA and NGOs that concern themselves with water quality and environmental health must be involved.
Relocations: To advise local people and monitor the encroachment of settlements	• The settlement around the dam is moving closer to the dam.	• The incorporation of the settlements in planning tools such as IDP and render services	• TCLM and DWS should monitor the development around the dam to

KPA 1: Resource Management			
Objective (What do we want)	**Motivation (Why do we want to achieve this)**	**Action Projects (How do we achieve this)**	**Management Support (Who will be involved)**
towards the dam and DWS purchase boundary.		will limit the development towards the dam.	ensure that the encroachment towards the dam is managed.
Risk Plan • Development of risk plan of the dam.	• The need to respond to natural and man-made disasters such as drought, fire, pollution, floods, protests, etc. • The drought of 2015/16 period had a great impact on the levels of water in the dam.	• The IA need to develop risk plans which will respond to the issues that are potential to the dam, i.e. how will the dam be used during drought periods.	• DWS and Inkomati CMA can assist in determining the measures to respond when risks identified arises.
Cultural Aspects • It is alleged by a community member that there are graves underwater.	• Graves submerged under water of the local communities.	• Access of the affected communities to perform cultural ceremonies / rituals from time to time.	• DWS and Department of Arts and Culture can assist in cultural initiatives and grant access to cultural ceremonies to be performed from time to time.

Table 17: Strategic Plan for KPA 2: Resource Utilisation

KPA 2: Resource Utilisation			
Objective (What do we want)	**Motivation (Why do we want to achieve this)**	**Action Projects (How do we achieve this)**	**Management Support (Who will be involved)**
Carrying Capacity: • To promote, accommodate and manage a variety of activities and facilities within the dam basin in a manner that enhances the user's experience and minimizes the impact on the resource.	• Carrying Capacity is an effective management tool to control access, utilization of the water resource and development within the dam basin. Kwena Dam is popular for fishing sports and camping.	• Establish density controls for recreational activities and facilities that requires carrying capacity assessments (i.e. number of canoes per hectare) • Implement density controls as per approved accepted utilization level.	• The involvement of the relevant industry with regards to user experience and other aspects such as safety is imperative. • Environmental and other planning institutions including relevant government departments need to be consulted when establishing density controls.
Water Provision: • To ensure adequate water supply to the local communities.	• The community adjacent to the dam do not have access to clean water. They rely on the streams feeding the dam for domestic water use. • The municipality has provided water tanks but these are often without water.	• Include these areas as priority list in municipal plans for service delivery. • Drilling of boreholes in stead transporting water from town to fill the tanks. • Provide a water treatment plan for the adjacent local communities.	• The Local Municipality has a mandate as a water service provider (WSP) through the Water Services Act, 1997 (Act No. 108 of 1997) for the purification and provision of water to the end users such as local communities.
Access Control And Safety: • To provide equitable, compactable and adequate access control at the dam.	• The dam is not secure, a lot of illegal access points have been opened around the dam.	• Access to the dam must be equitable and safe to all users. • Establishment of dam rules in terms of DWAF Regulation R654 relating to access to the dam, fees payable for access, safety measures, speed limit applicable on the ring roads around the dam and the time in which the dam will be open to the public. • Access fee to the dam should be prescribed in terms of the S113 and 56 of	• DWS support is required to approve any kind of public access, use and development within the purchased land.

KPA 2: Resource Utilisation			
Objective (What do we want)	**Motivation (Why do we want to achieve this)**	**Action Projects (How do we achieve this)**	**Management Support (Who will be involved)**
		NWA. The fees can be utilised to maintain the dam as well as to create job opportunities such as cleaners, security, etc. • The entry fee need to be reasonable to ensure that the dam remains an affordable destination for all. • Educate the Local Communities about the importance of safety measures around the dam basin in order to curb vandalism of the dam's properties.	
Fishing: • To promote sustainable harvesting of fish.	• The sustainable fishing is affected by illegal and poaching of fish by local communities using nets for commercial purposes. • Subsistence fishing by the Local Communities remain an active use on the dam, however this must be regulated by relevant policy to avoid overfishing within the dam.	• Involve DAFF to issue fishing permits for subsistence and commercialisation. • Introduce fish farming project in terms of PPP to uplift surrounding communities.	• The management structure should ensure that the fishery industry is in line with regulation such as the Marine Living Resources Act, 1998 which will assist in regulating fishing at the dam.
Community Resource Zone: • Demarcate a community resource zone.	• Local community has livestock for subsistence livelihood.	• Provide three (3) areas around the dam where communities can use for livestock watering through canals and sustainable fishing.	• DWS and TCLM should engage DAFF in terms of the number of livestock for subsistence and access to water.

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

KPA 3: Benefit Flow Management			
Objective (What do we want)	**Motivation (Why do we want to achieve this)**	**Action Projects (How do we achieve this)**	**Management Support (Who will be involved)**
<u>Community Participation And Beneficiation:</u> • Uplift the Local Economy and increase Benefit Flows to the surrounding communities through community empowerment and job creation.	• Tourism sector have been identified as a vehicle for skills development, job creation, Broad-based Black Economic Empowerment, etc. it is imperative that the Local Communities derive benefits from recreational activities conducted at the dam.	• Implement Skills Development Programmes where opportunities exist. • Provision of suitable day visit areas within the dam as majority of communities enjoy visiting the dam during weekends. This will reduce littering at dam as there will be good waste management containers onsite.	• The Local Empowerment Organizations must be involved. • Relevant Departments such as THALEDA must be involved. • Involvement of the Ward Councillors, steering committee as well as other relevant government departments that deal with community social welfare, sport and education should be involved in making sure that the community is participating as well as benefiting from the dam through recreational activities.
<u>Institutional Arrangements:</u> • 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.	• According to the RMP guidelines, an effective institutional structure must be established in terms of DWAF's considerations on the Institutional Arrangements for Managing Use of Water for Recreational Purposes guideline (2003).	• TCLM to be appointed as the IA. • The roles and responsibilities of the role players must be clearly defined and understood.	• DWS Institutional Establishment section, Process Facilitator and other relevant Departments should be involved so that they can give their input in terms of their respective mandates.

4.4 FINANCIAL PLAN

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

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

The information acquired from the RMP will be used to produce the Business Plan based on the action projects for each objective as stipulated under the Strategic Plan. However, many of the identified objectives are not of commercial nature and as such these non-economic objectives will not feature in the BP.

The BP provides a good description of possible economic recreational activities and the methods that can be used or enhanced to achieve the ultimate vision and the key objectives of Kwena 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 29** shows the RMP and BP review framework.

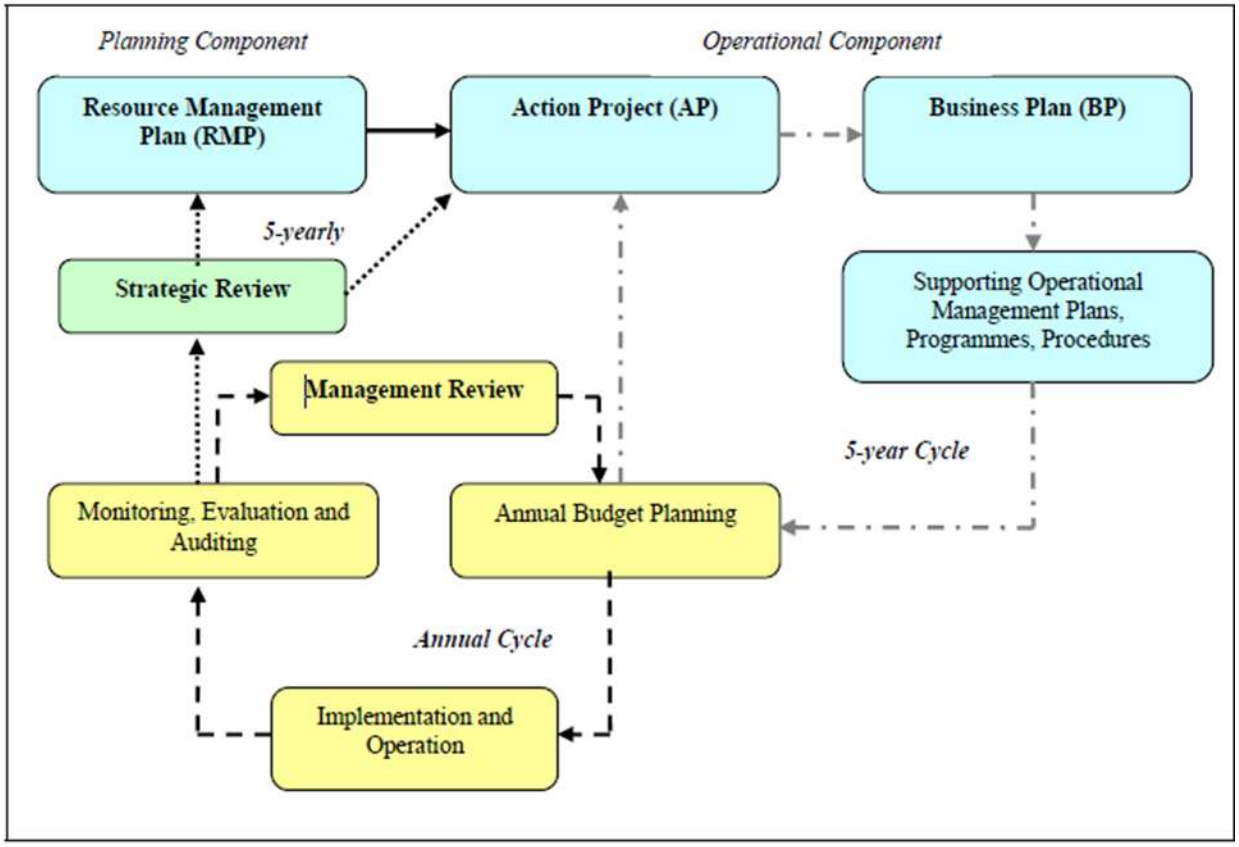

Figure 29: RMP and BP Review Framework

CONCLUSIONS

The RMP documents the challenges that exists within the Kwena 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.

Furthermore, the RMP promotes community participation and beneficiation, through Stakeholders engagement which were conducted to obtain common key objectives to be met by the RMP. The vision of the dam was formulated from the key common objectives identified by Stakeholders. Based on the strategic objectives identified for Kwena 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.

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APPENDICES