INFRASTRUCTURE BUILD, OPERATE AND MAINTENANCE (IBOM)

Resource Management Plan
HLUHLUWE DAM

REPORT – Volume 4 of 5

March 2020

WATER IS LIFE - SANITATION IS DIGNITY

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water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

2030 NDP

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ACKNOWLEDGEMENTS

Engineerex (Pty) Ltd would like to express its gratitude to the following stakeholders that contributed to the development of this Resource Management Plan for Hluhluwe Dam:

- Department of Water and Sanitation;
- Department of Cooperative Governance and Traditional Affairs;
- Department of Environmental, Forestry and Fisheries;
- Ezemvelo KwaZulu-Natal Wildlife (Hluhluwe - Imfolozi Park);
- KwaZulu-Natal Department of Agriculture and Rural Development;
- KwaZulu-Natal Economic Development Tourism and Environmental Affairs;
- Big Five Hlabisa Local Municipality;
- UMkhanyakude District Municipality;
- Traditional Authorities;
- Ward Councillor of Ward 08 of Big Five Hlabisa Local Municipality; and
- Community members of Mpukunyoni, Mvutshini, Hluhluwe, and EMdletsheni.

Acknowledgement is also extended to all other stakeholders who attended and participated in the various stakeholder engagements during the development of this plan.

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Review Period	Month	Year				
Annual Review of Business Plan (BP)	December	2021[1]	2022	2023	2024	2025
Five (5) Yearly Review of Resource Management Plan (RMP)	December	2025				

[1]The implementation of the RMP and BP requires one financial year planning ahead.

AMENDMENTS PAGE

Revision No	Description	Date
0	Draft RMP for DWS Review	21/01/2020
1	Draft RMP for Public Review	04/01/2020
2	Final Draft RMP for DWS Approval	23/03/2020
3	Final RMP for DWS Sign Off	26/03/2020

EXECUTIVE SUMMARY

Purpose of the Resource Management Plan: A Resource Management Plan (RMP) provides the principles and guidance within which the Dams must be used for recreational purposes. The principles and guidelines seek to promote community participation and beneficiation, environmental conservation as well as unlocking socio-economic opportunities associated with the recreational use of the Dam. This RMP is for Hluhluwe Dam, herein after referred to as the Dam, which is part of the Infrastructure Build, Operate and Maintenance (IBOM) Eastern Operations.

This RMP was developed in accordance with the Guideline on Integrated Resource Management Planning for the Use of Water for Recreational Purposes (DWAF, 2004) and in accordance with the requirements in Section 2, 26 and 113 of the National Water Act, 1998 (Act No. 36 of 1998) [NWA].

Mandate of Department of Water and Sanitation: The Department of Water and Sanitation (DWS), through the National Water Act, 1998 (Act No. 36 of 1998) [NWA], mandates the minister as the custodian of the nation's water resources. Part of the duties that the minister has are to ensure that the government waterworks (GWWs), including Hluhluwe Dam, are protected, used, developed, managed and controlled in a sustainable manner, to the benefit of present and future generation, as contemplated in Section 2 of the NWA. In fulfilling this mandate, the DWS initiated and commissioned the development of the RMP for the Dam.

A number of factors have prompted the need to compile a Resource Management Plan (RMP) for GWWs which amongst others, include the following:

Resource Management:

- The location of the Dam being in a protected area and thus also governed by legislation relating to its protected status;
- Presence and management of Invasive Alien Species; and
- Water quality issues.

Recreational Industry Involvement:

- Conflict amongst users due to the absence of a management tool;
- Public safety with regards to the use of inland vessels; and
- Uncontrolled developments within the Dam basin.

Community Participation and Beneficiation:

- Challenges of communities regarding physical access as well as access to the water-based economy of the resource;
- Participation and beneficiation of surrounding communities remains a challenge;
- Unlocking the economic potential of the Dam through the establishment of effective Public Private Partnerships (PPPs); and
- Equitable and sustainable benefit flow into the community through the creation of appropriate institutional arrangements.

Public Policy:

- The water resource should be identified as a local development objective in terms of an Integrated Development Plan (IDP) or Strategic Development Framework (SDF) for the relevant local and/or district municipalities. The zoning plan for the water resource must either be developed or updated.

In fulfilling this mandate Minister, the DWS initiated and commissioned the development of the RMP for the Dam.

Description and Location of the Dam: The Dam is an arch and earth-fill type of dam which impounds the Hluhluwe River. The water surface area is approximately 364 hectares with a full capacity of approximately 259 million cubic meters.

The Dam is located on the demarcation boundary of Ward 08 of Big Five Hlabisa Local Municipality (BFHLM). The BFHLM falls under the jurisdiction of UMkhanyakude District Municipality (UKDM) in the KwaZulu-Natal Province of South Africa. The GPS coordinates are 32°10'46"S 28°7'19"E.

Purpose of the Dam: The primary purpose of the Dam is to provide bulk raw water for irrigation and domestic use. The Dam currently offers no recreational activities, however, subsistence fishing has been reported.

Dam Ownership and Management: DWS owns and operates the Dam for its primary purpose. Currently there is no institutional structure managing the Dam for secondary (recreational) use. Through the process of developing the RMP, an appropriate Dam Management Committee (DMC) proposed, shall be appointed by DWS to facilitate the implementation of the objectives and identified projects in line with the requirements of the Hluhluwe Dam RMP on behalf of DWS.

Stakeholder Engagement: The success of the development and implementation of the RMP depends on the cooperation of all stakeholders both the Authorities and Interested and Affected Parties (I&APs). Authority and public meetings were conducted to obtain input (challenges and objectives) relating specifically to the Dam. These meetings were conducted in accordance with the DWAF Guidelines for Public Participation (2001) that outlines three broad phases for public participation namely the Planning, Participation and Exit phase.

Identified Objectives and Vision: During the authority and public meetings, issues and concerns were raised from which the following objectives were identified:

- To ensure the provision of potable drinking water for domestic use to downstream and surrounding communities;
- To investigate fencing the entire Dam in order to control access to the Dam and ensure safety of the people and livestock;
- To construct a wash bay to prevent the introduction and spread of alien invasive species in and around the Dam;
- To construct a swimming pool since swimming is prohibited due to the presence of hippos and crocodiles in the Dam;
- To ensure public safety by improving security around the Dam;
- To investigate the removal of silt from the Dam;
- To promote sustainable subsistence fishing at the Dam;
- To revive the picnic area and tourism in general at the Dam;
- To conduct awareness programs to educate local communities about the importance of protecting and conserving water resources;
- To establish more compatible tourism development at the Dam (facilities and recreational activities);
- To construct water ponds near the Dam to supply water for irrigation and promote farming and livestock watering;
- To establish an effective and functional institutional structure inclusive of the community representatives to manage the use of water for recreational activities; and
- To uplift the local economy and increase benefit flow to the surrounding communities through meaningful community empowerment.

Vison: A 20-year vision for the Dam, formulated from the objectives identified by stakeholders, is as follows:

"To enhance public participation, beneficiation and empowerment with an aim to create a safe and secure environment in and around the Dam as well as to uplift the local economy by identifying and supporting potential tourism development".

Tourism Potential The potential recreational developments identified to enhance tourist attraction includes:

- Refurbishment of the day visitor's area;
- To revive tourism in general at the Dam;
- Construction of a swimming pool;
- Refurbishment of the existing picnic area;
- Address network issues around the Hluhluwe area; and
- Re-introduction of a boat cruise activity.

The key challenges identified include:

- The Dam is fenced around the Dam wall and associated infrastructure only, hence access control is a challenge;
- Lack of control of local community livestock that is grazing and drinking at the Dam;
- There is no management structure to oversee access and the potential recreational activities;
- High silt loads in the Hluhluwe system from poor catchment management;
- Communities next to the Dam have co-existed with dangerous and damage causing animals such as crocodiles and hippopotami (hippos). This results to human-wildlife conflicts;
- Hippos often graze and destroy the nearby croplands;
- Livestock drink water from the Dam and risk being attacked by crocodiles and hippos or drowning whilst reaching for water in deeper areas;
- Community members practice subsistence fishing regardless of the presence of hippos and crocodiles, this too is a safety risk but over and above that the fishing is not controlled;
- The area where Hluhluwe River (river feeding into the Dam) exits the Hluhluwe Imfolozi Park (HiP) is identified as high risk for animal escape from the park. In the past a herd of elephants have escaped from this point; and
- Approximately 20 years ago a sun set boat cruise was operated at the Dam by Ezemvelo KwaZulu-Natal Wildlife (EKZNW), however, due to drought conditions and low water levels in the Dam, the activity was not viable.

Recommendations:

This RMP recommends the following immediate actions:

- Establishment of a Dam Management Committee (DMC) to oversee access and potential recreational use of the Dam;
- To avoid conflict amongst users, avoid uncontrolled development and to protect the water resource, the permissible and non-permissible activities on the water- and shoreline surface are delineated in the Zoning Plan and covered under Section 4.2; and
- To ensure public safety with regards to the use of inland vessels, the maximum level of recreational use the water resource can accommodate is covered under Carrying Capacity in section 4.2.3.

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LIST OF ACRONYMS

AtoN	Aids to Navigation
B&B	Bed and Breakfast
BBBEE	Broad Based Black Economic Empowerment
BFFBLM	Big Five False Bay Local Municipality
BFHLM	Big Five Hlabisa Local Municipality
BID	Background Information Document
BP	Business Plan
CATHSSETA	Culture, Arts, Tourism, Hospitality, Sports Sector, Education and Training Authority
CD: IO MANCO	Chief Directorate: Infrastructure Operations Management Committee
CIWSP	Cooperative Inland Watercourse Safety Programme
CoGTA	Cooperative Governance and Traditional Affairs
DEA	Department of Environmental Affairs
DEFF	Department of Environment, Forestry and Fisheries
DHS	Department of Human Settlement
DMC	Dam Management Committee
DoT	Department of Transport
DPW	Department of Public Works
DSR	Department of Sports and Recreation
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
ECC	Effective Carrying Capacity
EIA	Environmental Impact Assessment
EKZNW	Ezemvelo KwaZulu-Natal Wildlife
FP	Financial Plan
FSL	Full Supply Level
GIAMA	Government Immovable Asset Management Act, 2007 (Act No.19 of 2007)
GP	Guideline Programme
GPS	Global Positioning System
GWWs	Government Waterworks
HIP	Hluhluwe-Imfolozi Park
HLM	Hlabisa Local Municipality
I&APs	Interested and Affected Parties
IA	Implementing Agency
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IBOM	Infrastructure Build, Operate and Maintenance
IDP	Integrated Development Plan
IEE	Integrated Environmental Engineering
IRMP	Integrated Resource Management Planning
KPAs	Key Performance Areas
KZNDARD	KwaZulu-Natal Department of Agriculture and Rural Development
LAAP	Local Accountable Aton Parties
MOA	Memorandum of Agreement
NDT	National Department of Tourism
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMBA	National Environmental Management Biodiversity Act, 2004 (Act No.10 of 2004)

NEMPAA	National Environmental Management Protected Areas Act, 2003 (Act No.56 of 2003)
NPSC	National Project Steering Committee
NT	National Treasury
NWA	National Water Act, 1998 (Act No. 36 of 1998)
OMC	Operations Management Committee
PCC	Physical Carrying Capacity
PFMA	Public Finance Management Act, 1999 (Act No.29 of 1999)
PP	Public Participation
PPP	Public Private Partnership
RCC	Real Carrying Capacity
RMP	Resource Management Plan
RMP	Resource Management Plan
SAMSA	South African Maritime Safety Authority
SAPS	South African Police Service
SASCOC	South African Sports Confederations and Olympic Committee
SDF	Spatial Development Framework
SWOT	Strengths, Weaknesses, Opportunities and Threats
ToR	Terms of Reference
UKDM	UMkhanyakude District Municipality
WMA	Water Management Area

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

The Department of Water and Sanitation (DWS), through the National Water Act, 1998 (Act No. 36 of 1998) [NWA], mandates the Minister as the custodian of the nation's water resources. Part of the duties that the minister has are to ensure that the government waterworks (GWWs), including the Hluhluwe Dam, are protected, used, developed, managed and controlled in a sustainable manner and to the benefit of both the present and future generation as contemplated in Section 2 of the NWA.

A number of factors have prompted the need to compile Resource Management Plans (RMPs) for GWWs, which *inter alia* include the following:

Resource Management:

- Whether the water resource is situated within a protected area or not, and if yes would be subjected to protection by relevant legislation;
- The presence and management of Invasive Alien Species; and
- Water quality issues.

Recreational Industry Involvement:

- Conflict amongst users due to the absence of a management tool;
- Public safety with regards to the access and use of inland vessels; and
- Uncontrolled developments within Dam basin.

Community Participation and Beneficiation:

- Challenges of communities regarding physical access as well as access to the water-based economy of the resource;
- Participation and beneficiation of surrounding communities remains a challenge;
- Unlocking the economic potential of the Dam through the establishment of effective Public Private Partnerships (PPPs); and
- Equitable and sustainable benefit flow into the community through the creation of appropriate institutional arrangements.

Public Policy:

- The water resource should be identified as a local development objective in terms of an Integrated Development Plan (IDP) or Strategic Development Framework (SDF) for the relevant local and/or district municipalities. The zoning plan for the water resource must either be developed or updated.

In fulfilling this mandate the Minister, the DWS initiated and commissioned the development of the RMP and its Business Plan (BP) for Hluhluwe Dam, hereafter referred to as the Dam.

1.2 PURPOSE OF THIS RMP

A Resource Management Plan (RMP) provides the principles and guidelines within which the Dam must be used for recreational purposes[2]. The principles and guidelines seek to promote community participation and beneficiation, environmental conservation and unlocking socio-economic opportunities associated with the recreational use of the Dam. This RMP is for Hluhluwe Dam, herein after referred to as the Dam, which is part of the Infrastructure Build, Operate and Maintenance (IBOM) Eastern Operations.

This RMP is developed in accordance with the Guideline on Integrated Resource Management Planning for the Use of Water for Recreational Purposes (DWAF, 2004) for the Hluhluwe Dam, and to attain the objectives underlying sustainability in Section 2 of the NWA, with particular relevance to Section 26 and 113 relating to the use of water and access and use of government waterworks for recreational purposes.

[2] NWA Section 21 (k) Water Use - Using water for recreational purposes.

1.3 DESCRIPTION AND LOCATION OF THE DAM

The Dam is an arch and earth-fill type of dam which impounds the Hluhluwe River. The water surface area is approximately 364 hectares with a full capacity of approximately 259 million cubic meters. **Table 1** shows the Dam profile.

The Dam is located on the demarcation boundary of Ward 08 of Big Five Hlabisa Local Municipality (BFHLM). The BFHLM falls under the jurisdiction of UMkhanyakude District Municipality (UKDM) in the KwaZulu-Natal Province of South Africa as shown in **Figure 1**. The GPS coordinates are 32°10'46"S 28°7'19"E.

1.4 PURPOSE OF THE DAM

DWS owns and operates Hluhluwe Dam for primary purpose. The primary purpose of the Dam is to provide bulk raw water for irrigation and domestic use. The Dam currently offers no recreational activities, however, subsistence fishing has been reported and there is no recreational institutional structure to manage the Dam.

1.5 DAM OWNERSHIP AND MANAGEMENT

DWS owns and operates the Dam for its primary use. Currently there is no institutional structure managing the Dam for recreational purposes. Through the process of developing the RMP, an appropriate Dam Management Committee (DMC) proposed, shall be appointed by DWS to facilitate the implementation of the objectives and identified projects in line with the requirements of the Hluhluwe Dam RMP on behalf of DWS.

Table 1: Hluhluwe Dam Profile

Hluhluwe Dam Profile	
Location	South Africa
Province	KwaZulu-Natal
District Municipality	UMkhanyakude
Local Municipality	Big Five Hlabisa
Completion Year	1965
Coordinates	32°10"46'S 28°7"19'E
Purpose	Irrigation and domestic use
Owner	DWS
Quaternary Catchment	W32F
Water Management Area	Pongola-Mzimkhulu
River	Hluhluwe
Capacity (Mm^3)	259
Surface area (ha)	364
Wall type	Arch and Earth-fill
Wall Height (m)	33
Crest Length (m)	511

Source: Adapted from Department of Water and Sanitation (2016)

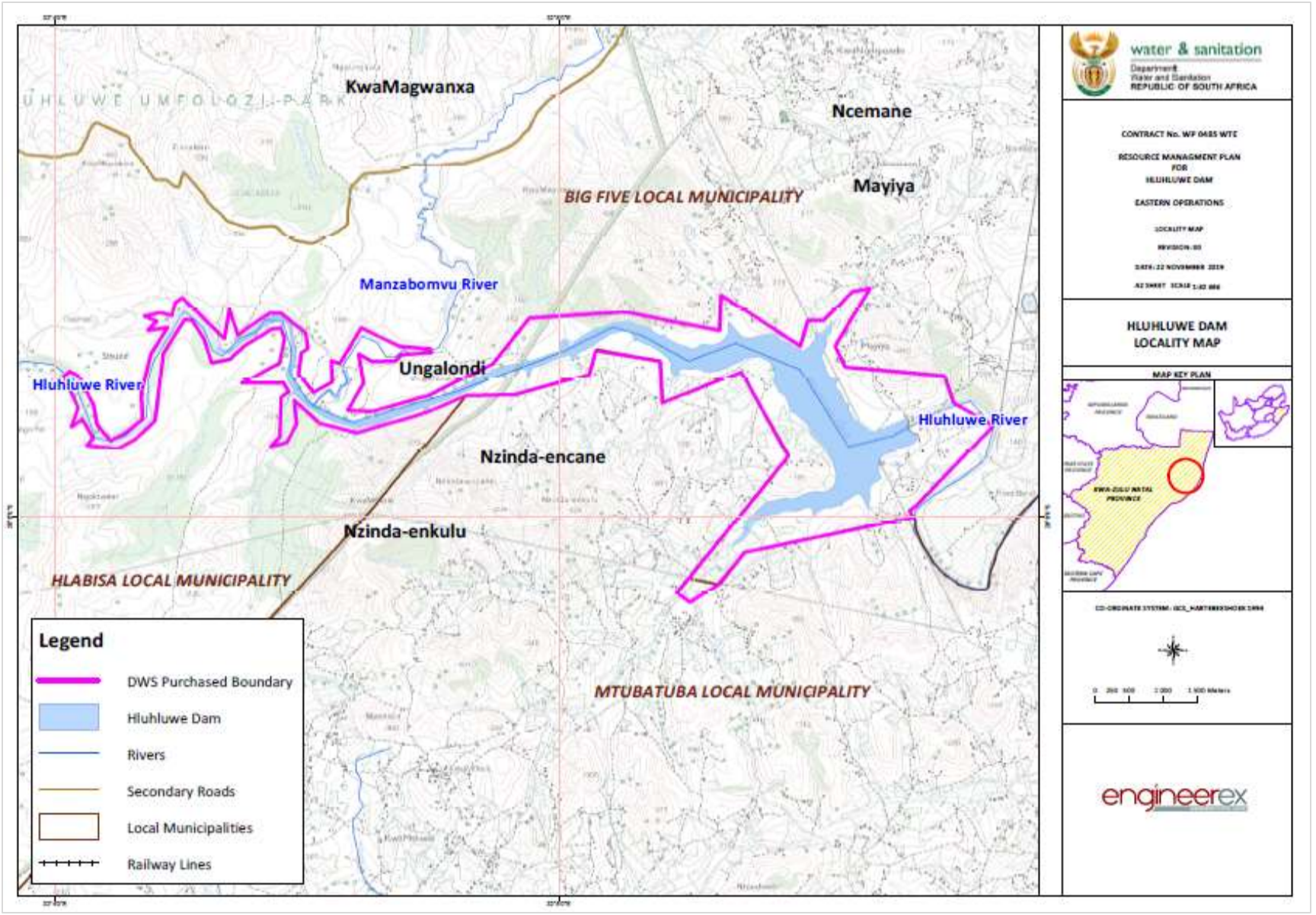

Figure 1: Locality Map for Hluhluwe Dam

1.6 LEGISLATIVE FRAMEWORK

Provided in the table below are the key data sources used to develop the RMP and the legislative framework applicable to the management and use of the Dam for recreational purposes.

Table 2: Key Data Sources Used to Develop the RMP:

Policy and Guidelines	Description
Consideration on Institutional Arrangement for Managing Use of Water for Recreational Purposes (DWAF, 2003)	"The guidelines illustrate various institutional options to institutionalise the management of recreational water use".
1st Draft National Inland Fisheries Policy Framework for South Africa. Department of Agriculture, Forestry and Fisheries, 2018	The Policy seeks to create an efficient regulatory regime for the inland fisheries sector in order to create an enabling environment to promote sustainable growth and transformation of the sector.
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.
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."
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.
Guidelines for Compilation of Zoning Plans for Government Waterworks (DWAF, 1999)	The guidelines provides direction on the compilation of zoning plans for government waterworks within DWS purchased boundary.
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.
National Treasury Public Private Partnership (PPP) Toolkit for Tourism, 2005	This toolkit assists 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.
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.

The legislative framework applicable to the management and use of the Dam for recreational purposes is summarized in the table below.

Table 3: Legislative Framework Applicable to the Management and Use of the Dam for Recreational Purposes

Legislation: Acts, ordinances, bylaws	Relevance: Description
Constitution	**Relevance:**
Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996), Environmental Rights (Section 24)	Section 24 – "Everyone has the right: 1. to an environment that is not harmful to their health or wellbeing, 2. to have an environment protected for the benefit of present and future generations, through reasonable legislative and other measures that- a. prevent pollution and ecological degradation, b. promote conservation and secure ecologically sustainable development and use natural resources while promoting justifiable economic and social development."
National Legislation	**Significance to the RMP:**
Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003)	"Aims to address inequalities resulting from the systematic exclusion of black people from meaningful participation in the economy."
Communal Land Rights Act, 2004 (Act No. 11 of 2004)	"To provide legal security by transferring communal land to communities or by granting comparable compensation. Based on South Africa's complex history most communities who used to reside in the vicinity of the Dams have been forcefully removed. During the implementation of the RMP it is essential to comply with the act where necessary."
Conservation of Agricultural Resource Act, 1983 (Act No. 43 of 1983) [CARA]	"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 Act deals with the protection of wetlands and water courses, while regulations 15 and 16 deals with Alien Invasive Plant Species and bush encroachment."
1st Draft National Inland Fisheries Policy Framework for South Africa. Department of Agriculture, Forestry and Fisheries, 2018	In terms of the National Water Act (Act No. 36 of 1998), the Department of Water and Sanitation (DWS) is the custodian of South Africa's water resources and is responsible for access to and the control of activities on Government waterworks (state dams) under its jurisdiction. As such, access to DWS government water works land for fishing activities is subject to DWS control. A system of RMPs is being implemented by the DWS to manage the activities of multiple user groups on public water works.
Government Immovable Asset Management Act, 2007 (Act No. 19 of 2007) (GIAMA)	"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

Legislation: Acts, ordinances, bylaws	Relevance: Description
	minimum standards in respect of immovable asset management by a national or provincial department; and to provide for matters incidental thereto."
Local Government: Municipal Systems Act, 2000 (Act No. 32 of 2000)	"To provide for the manner in which municipal powers and functions are exercised and performed; to provide for community participation; to establish a simple and enabling framework for the core processes of planning, performance management, resource mobilisation and organisational change which underpin the notion of developmental local government."
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."
National Environmental Management Act, 1998 (Act No. 107 of 1998) [NEMA]	"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."
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) [NEMBA]	"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."
National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) [NEMPAA]	"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."
National Environmental Management: Waste Act, 2014 (Act No. 59 of 2008) [NEWA]	"Provides for the national domestic waste collection standards and national norms and standards for the storage of waste."
National Heritage Resources Act, 1999 (Act No. 25 of 1999) [NHRA]	"To nurture and conserve their heritage resources so that they may be hand down to future generation. To introduce an integrated system for the identification, assessment and management of the heritage resources of South Africa. All heritage sites and cultural artefact must be protected and should be demarcated in the RMP zoning map."
National Water Act, 1998 (Act No. 36 of 1998) [NWA]	"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

Legislation: Acts, ordinances, bylaws	Relevance: Description
	state owned land may be made available for recreational purposes, subject to controls determined by the Minister and regulations made by the Minister."
Occupational Health and Safety Amendment (Act No. 181 of 1993G.15369 GoN. 2471)	"It requires the employer to bring about and maintain, as far as reasonably practicable, a work environment that is safe and without risk to the health of the workers. The workers and the employer must share the responsibility for health and safety in the workplace."
Public Finance Management Act, 1999 (Act No. 29 of 1999) [PFMA]	"Section 76 of the Act secures transparency, accountability and sound management of the revenue, expenditure, assets and liabilities of government departments. The Act promotes the objective of good financial management in order to maximise service delivery. The Act allows DWS to enter into PPP agreements with the private sector for the commercial use of state assets."
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 *inter alia* responsibility for safety and security at the events, risk categorization of events and safety certificates."
South African Maritime Safety Authority Act, 1998 (Act No. 5 of 1998) [SAMSA]	"One of SAMSA's three legislative mandates is "to ensure safety of life and property at sea". The Act enables SAMSA to administer and execute the relevant maritime legislation."
Water Services Act, 1997 (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."
Municipal Policy, By-Laws, Reports & Guidelines	**Significance to the RMP:**
UMkhanyakude District Municipality IDP (2018 - 2019)	"The IDP is an overarching strategic tool that guides and informs all Planning and Economic Development, and decisions taken regarding planning, management and development within the municipality. Further to this, the IDP provides for effective performance monitoring, evaluation and measureable development frameworks with key performance areas, indicators and performance targets."
Ezemvelo KZN Wildlife (2011) *Protected Area Management Plan:* Hluhluwe-Imfolozi Park, South Africa. Ezemvelo KZN Wildlife, Pietermaritzburg	"Clearly defines objectives and activities to direct the protection and sustainable use of its natural, scenic and heritage resources over a five-year period."

CHAPTER 2: ENVIRONMENTAL ANALYSIS

2.1 BIOPHYSICAL ENVIRONMENT

2.1.1 Climate

Climate Data.ORG (n.d.), describes the Hluhluwe climate as mild, generally warm and temperate as the area lies 81m above sea level. Hluhluwe area has a significant amount of rainfall during the year. The average temperature in Hluhluwe is 21.3 °C. In a year, the average rainfall is 894 mm. Whilst South Africa is a dry country with an average annual rainfall of about 464 mm (compared to a global average of 860 mm).

2.1.2 Topography

EKZNW (2011), describes the topography of the area as steep broken landscapes, rolling hills and valleys. Area north of the Hluhluwe River is characterised by steep, broken landscapes.

2.1.3 Geology and Soil

The KZN Biodiversity Sector Plan (2014), generally describes the soil covering the area around the Dam as well drained, dark reddish soils having a pronounced shiny, strong blocky structure (nutty), usually fine (red structured soils). In addition, one or more of vertic and melanic soils may be present.

Vertic soils are described as soils with high clay content that becomes very sticky when wet. Whereas, the melanic soils have a black or dark grey topsoils that are well structured.

EKZNW (2019), indicates that high silt loads resulting from poor catchment management outside of the Hluhluwe Imfolozi Park (HiP) has resulted in many of the pools utilized by hippos within the Hluhluwe section of the Park being in-filled with sediment.

2.1.4 Hydrology

Water Surface

The Dam lies within the W32F quaternary drainage which forms part of the Pongola-Mzimkhulu WMA. The Dam impounds the Hluhluwe River. **Figure 2** shows the fluctuations of water level over a year.

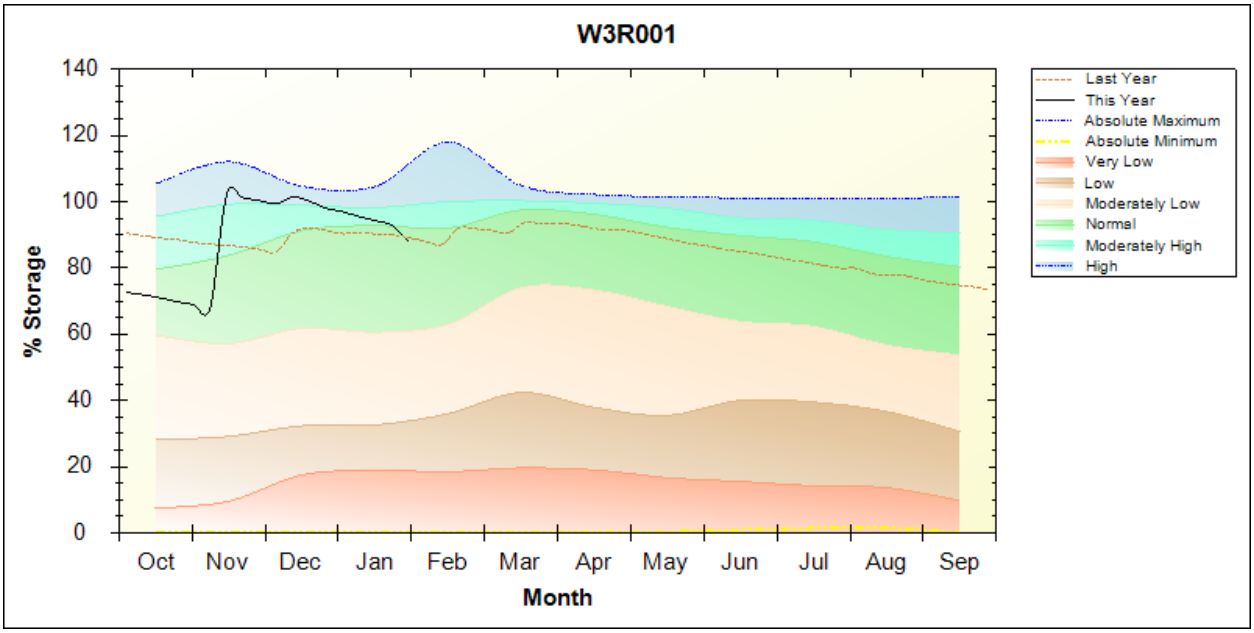

Figure 2: Fluctuations of Hluhluwe Dam water level over a year.
Source: DWS, (2020)

As per **Figure 2**, the average storage level for the year 2019 was recorded at approximately 92% which is considered normal. In 2020 the average storage capacity was recorded at approximately 91% which is moderately high (compared to last year this time). However, due to drought conditions it is not certain whether the water level would remain high and stable for the implementation of potential recreational activities on the water surface

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).

According to [Talbot Laboratories (Pty) Ltd**,** (2019)], "there is a presence of coliforms in the Dam as a result of contamination from the soil or vegetation. This becomes worse after rain, however, the health risk is minimal due to low numbers of coliforms in the Dam. The pH was found to be in the acceptable range for recreational use."

The e-coli count in the Dam was low which may have minimal health risk. However, safety precautions needs to be implemented prior to engaging in water contact sports [Talbot Laboratories (Pty) Ltd**,** (2019)].

EKZNW (2019), indicated that there are high silt loads in the Hluhluwe system from poor catchment management. Silt causes the water to lose its transparency. The water appears to be muddier.

Precautionary measures should therefore be exercised for contact sports within or around the Dam.

2.1.5 Flora

The shoreline vegetation around the Dam is threatened by overgrazing from the domestic livestock which may cause soil erosion. Soil erosion may increase the siltation problem in the Dam.

2.1.6 Fauna

The Dam is a habitat to crocodiles and hippos which are naturally occurring in the Hluhluwe system. The number of hippos at the Dam is currently sitting at 20 individuals as described by EKZNW (2019). The Dam is located near local communities of Mpukunyoni, EMdletsheni and others, hence, livestock (domesticated) such as cattle, goat and sheep were seen on the banks of the Dam grazing and drinking water.

Ezemvelo KZN Wildlife (2019), mentioned that the indigenous fish species such as South African Sharp tooth Catfish (also known as the Barbel) and *Oreochromis mossambicus* (Mozambique tilapia) are commonly found in the Dam. Alien fish species of *Oreochromis niloticus* (Nile tilapia) are good for aquaculture developments. However, Ezemvelo has indicated that they will not support the introduction of alien fish species into the Dam given that the Dam extends into a Protected Area. Barbel fish is identified as one of the aggressive alien fish as they are well known for "pack hunting" other fish.

2.2 BUILT ENVIRONMENT

The aspects that have been investigated consists of (and are presented under the following sub-headings):

- On-site facilities;
- Fencing;
- Management and operation; and
- Safety.

2.2.1 On-site Facilities

The existing facilities at the Dam includes:

- DWS offices;
- Guard house at the Dam wall;
- Dilapidated picnic area;
- DWS slipway; and
- DWS boat house.

2.2.2 Fencing

The Dam is fenced around the Dam wall and associated infrastructure only. As a result access control remains a challenge. It is alleged that facilities at the Dam wall have been vandalised by local community members as a result of

uncontrolled access. However, the issue has since been addressed by appointing security personnel to monitor the Dam wall.

2.2.3 Management and Operation

The management and operation of the Dam for primary purpose is done by DWS. Currently there is no institutional structure managing the Dam for potential recreational use. Through the process of developing the RMP, an appropriate DMC is proposed for the management of the potential recreational use for this Dam.

There are no suitable fixed and floating Aids to Navigation (AtoN) and demarcation markers in place. 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 the DWS and thereafter the permission by South African Maritime Safety Authority (SAMSA).

2.2.4 Safety

There is currently no specific incident management system in place to ensure that incidents are recorded and responded to in a co-ordinated manner. As part of the RMP process, the Incident Management Plan will be implemented to ensure that incidents are recorded and responded to.

The Dam is a habitat to crocodiles and hippos which are naturally occurring at the Hluhluwe system. As a result, communities next to the Dam have co-existed with dangerous and damage causing animals such as crocodiles and hippos. This results to human-wildlife conflicts.

Domestic livestock such as cattle, sheep and goat often graze on the banks of the Dam and drink water from the Dam. They risk getting attacked and drowning.

2.3 SOCIO-ECONOMIC ENVIRONMENT

The purpose of assessing the socio-economic conditions is to determine matters that need to be addressed through the implementation of the RMP to uplift the standard of living of the communities. The study focuses on the socio-economic conditions of Ward 08 of Big Five False Bay Local Municipality (BFFBLM), refer to **Figure 3** for the Municipal Ward Boundary.

The Big Five Hlabisa Local Municipality (BFHLM) was established by the amalgamation of The Big Five False Bay Local Municipality (BFFBLM) and Hlabisa Local Municipality (HLM) on 03 August 2016. Therefore, financial, employment and service delivery information is not yet available for the new municipality (BFHLM). However, for the purpose of this report the socio economic status of the de-established BFFBLM will be used.

The socio-economic conditions, according to the Stats SA Community Survey (2016), are summarised in the sub-sections as follows:

- Education level;
- Monthly income; and
- Community beneficiation.

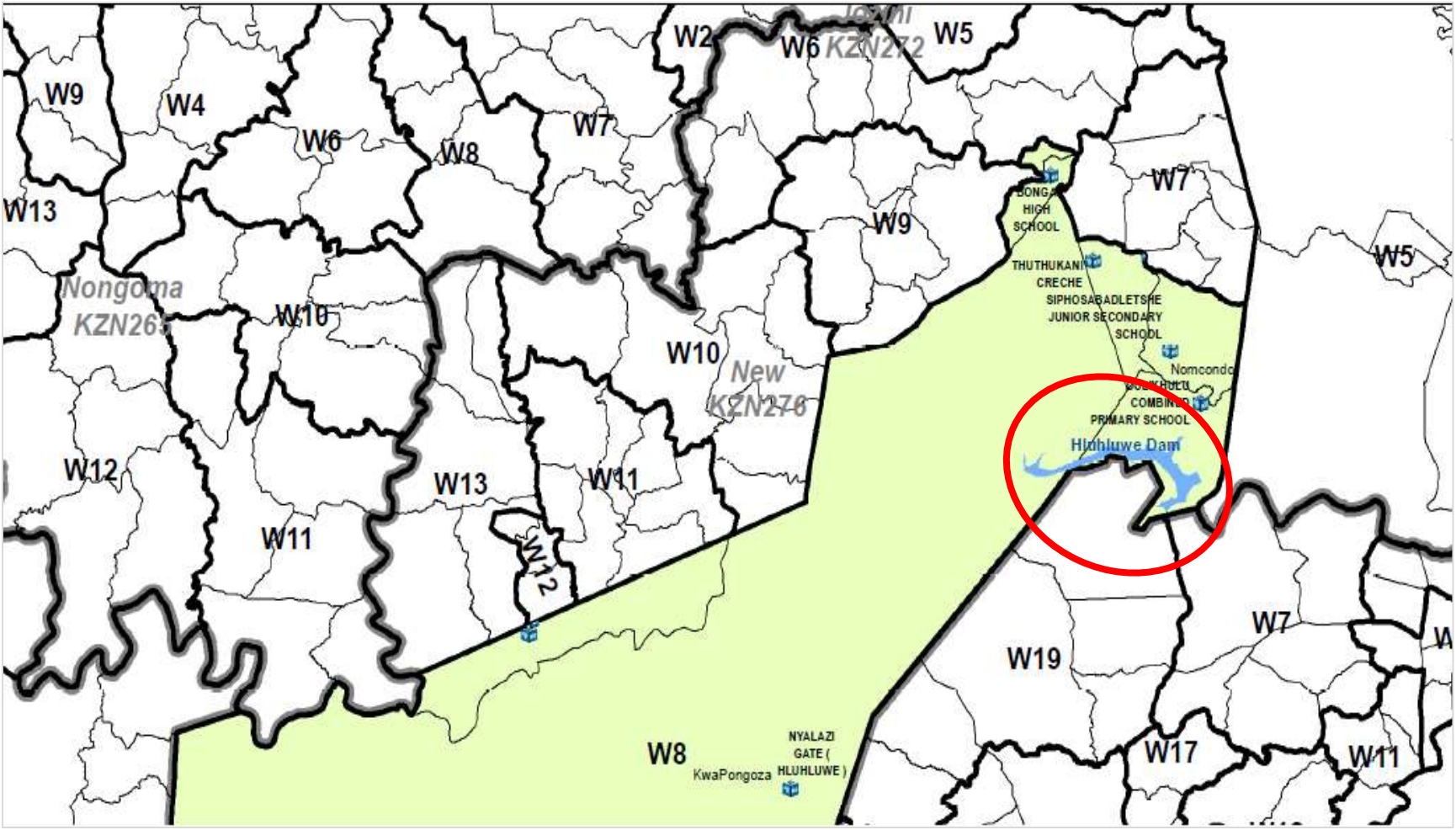

Figure 3: Big Five False Bay Local Municipality Ward 08 Boundary
Source: Ward Demarcation Board (2016)

Educational Level

The Stats SA Community Survey (2016), breaks down educational levels into each year of study. For the purpose of this report, the educational levels are grouped into primary, higher educational and no schooling categories. In ward 08 (Hluhluwe) 26% of people within BFFBLM have secondary level education. Only 11.5% of people in the same ward have furthered their studies up to higher education level as illustrated in **Table 4** and **Figure 4**.

Table 4: Educational Level for Ward 08 versus BFFBLM

Description	Ward 08 (2016)	BFFBLM (2016)
No Schooling	6.9%	4.6%
Some Primary	10.4	46.9%
Completed Primary	3.3%	7%
Some Secondary	26%	29.2%
Completed Secondary	-	11%
Matric	42%	-
Higher Educational Level	11.5%	0.6%
Not Applicable	-	0.7

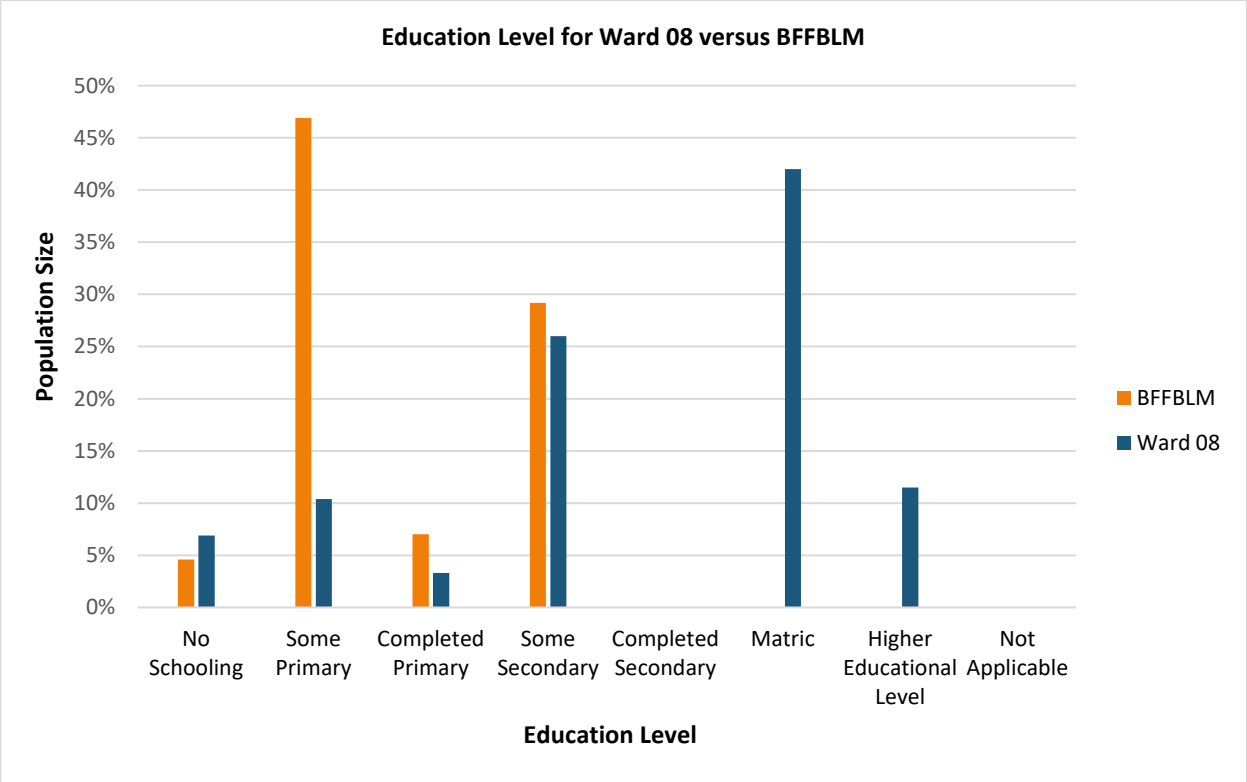

Figure 4: Educational Level for Ward 08 versus BFFBLM
Source: Stats SA Community Survey (2016)

Monthly Income

Figures 5 shows that in ward 08 within BFFBLM 12.4% people receive no income (Stats SA Community Survey, 2016). This then requires concerted and integrated efforts by the municipalities to create decent work and sustainable livelihoods for the people.

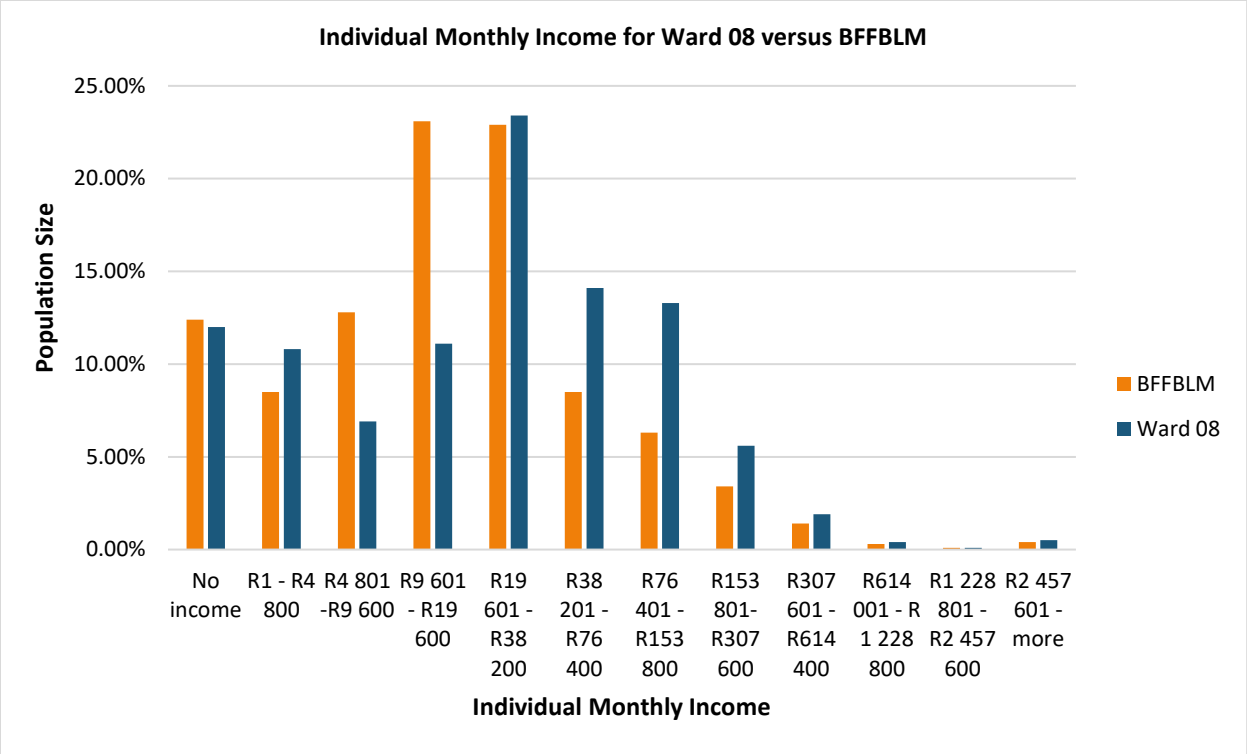

Figure 5: Individual Monthly Income for Ward 08 versus BFFBLM
Source: Stats SA Community Survey (2016)

2.3.1 Community Beneficiation

It is the DWS's policy that local communities should equally share the benefits emanating from the utilisation of the Dam for recreational purpose.

According to DWAF (2006), "it is important to ensure that communities have physical access to the resource, as well as access to the water-based recreation economy. This will ensure that the water resource remain protected for present and future generations."

Recreational angling sector has a substantial participation rate and a significant economic impact through the tourism sector and angling supply value chains. It is therefore important that recreational anglers are recognised as important stakeholders in South African inland fisheries and that their interests are recognised in future fisheries development initiatives.

The value chain associated with the recreational fishing sector has the potential to support rural food security through decent jobs, entrepreneurship and participation in the fishing linked tourism service sector.

In addition to the above, subsistence and small-scale fishing is widely practiced by rural community members to sustain their livelihoods. Furthermore, subsistence and small-scale fishing achieve the following objectives by promoting:

- Food security and production;
- Rural development;
- Job creation;
- Poverty alleviation; and
- Socio-economic development.

Involving the communities in the utilisation and management of the Dam will ensure that communities benefit through:

- Controlled access to the Dam;
- Safety while accessing and using the Dam;
- Being given first preference when there are employment opportunities and skills

development through the Public Private Partnership (PPP); and

- Participating in decision-making with respect to major developments planned or proposed for the Dam through the DMC.

CHAPTER 3: RESOURCE MANAGEMENT PLAN PROCESS

3.1 DEFINITION OF RMP

A Resource Management Plan (RMP) is a tool which regulates access to and the recreational utilisation (secondary use) of a water resource and the surrounding state land, in ways that promote community participation and beneficiation, environmental conservation and the unlocking of socio-economic potential of the water resource.

Secondary use includes leisure, culture and religious activities. Although recreational use does not involve consumption of water, it is still a major water use and needs to be managed effectively with minimal detrimental environmental impacts.

3.2 PROCESS TRIGGERS

Process triggers are factors used to initiate the planning and public participation process in which stakeholder and potential Interested and Affected Parties (I&AP) are given an opportunity to comment or raise issues of concern that are relevant and site specific in line with the process triggers and potential challenges. Triggers for this Dam are detailed in **Table 5.**

The resource management planning process aims to achieve a common goal, identify site specific challenges and establish a set of objectives and projects to attain community participation and beneficiation, environmental conservation and the unlocking of socio-economic potential of the water resource.

Table 5: Summary of triggers and potential challenges for Hluhluwe Dam

Trigger (s)	Potential Challenge (s)
Resource Management	**Access Control** • The Dam is fenced around the Dam wall and associated infrastructure only, hence, access control is a challenge. • Lack of control of local community livestock that is grazing and drinking at the Dam. **Management Structure** • There is no management structure to oversee the recreational activities. • High silt loads in the Hluhluwe system from poor catchment management.
Resource Utilisation	**Safety** • Communities next to the Dam have co-existed with dangerous and damage causing animals such as crocodiles and hippopotami (hippos). This results to human-wildlife conflicts. • Hippos often graze and destroy the nearby croplands. • Livestock drink water from the Dam and risk being attacked by crocodiles and hippos or drowning whilst reaching for water in deeper areas. • Subsistence fishing is practiced at the Dam by the neighboring community members and it is proved to be unsafe due to the presence of dangerous animals in the Dam. • The area where Hluhluwe River (river feeding into the Hluhluwe Dam) exits the Hluhluwe Imfolozi

Trigger (s)	Potential Challenge (s)
	Park (HiP) is identified as high risk for animal escape from the park. In the past a herd of elephants have escaped from this point. **Recreational activities** • Approximately 20 years ago a sun set boat cruise was operated at the Dam by Ezemvelo KwaZulu-Natal Wildlife (EKZNW), however, due to drought conditions and low levels of water in the Dam, the activity was not viable.
Community participation and beneficiation	**Community Participation and Beneficiation** • Local communities should be involved in managing and utilising the Dam for recreational purposes. This will assist in ensuring that the Dam is utilised in a sustainable manner and in a way that fulfills the interests of the community. • According to EKZNW (2019), the eco-tourism potential of the Dam and the surrounding area outside of the HiP has long been recognised, but for various reasons it has not been taken forward with the community.

3.3 RMP DEVELOPMENT PROCESS

The RMP is developed in accordance with the RMP guideline procedure (DWAF, 2006) which stipulates the stages that needs to be adhered to as shown in **Figure 6**.

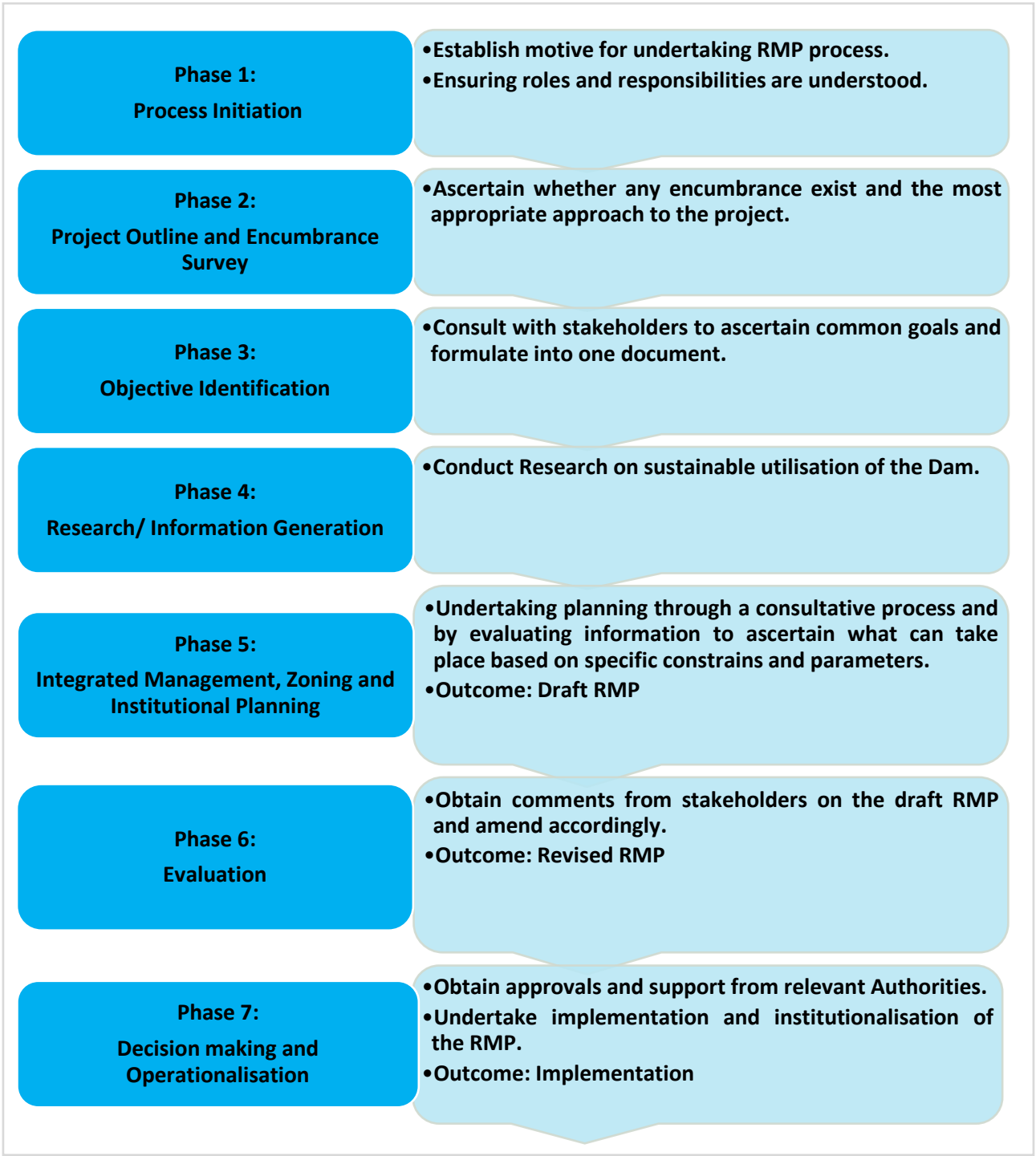

Figure 6: RMP Procedure
Source: Adapted from DWAF (2006)

3.4 RMP PLANNING STAGES

3.4.1 Desktop Study

A desktop study was conducted with the aim of acquiring background information about the Dam. This stage included the review of legislative and regulatory framework, decision-support tools, specialist reports, policies and guidelines, local and district municipal plans, biodiversity sector plans and integrated water information systems.

3.4.2 Site Inspection

A site inspection was conducted with the DWS officials (DWS IEE, Eastern Operations Champion and Dam Control Officer) on **10 September 2019.**

During the site inspection the following were observed: picnic area no longer in use; fencing of the Dam wall and the associated infrastructure only; and livestock grazing and drinking water from the Dam.

Additional background information was collated from consultation with different stakeholders. Some Interested and Affected Parties were identified during site inspection through liaison with the Dam operator.

3.4.3 Public Participation

The Public Participation (PP) process is a process in which potential I&APs are given an opportunity to comment or raise issues of concern on specific matters. The three (3) fundamental and theoretical objectives of the 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.

The PP process was conducted in order to obtain information for Phase 2 (Encumbrance Survey), Phase 3 (Objective Identification) and Phase 4 (Research/ Information Generation) from stakeholders, authorities and I&APs that was used to complete Phase 5 (Integrated Management, Zoning and Institutional Planning).

Stakeholder Database Register

Various stakeholders were identified and invited to participate in an open and consultative process. The stakeholder database was updated on a continuous basis throughout the RMP process (refer to **Appendix A**).

Advertising Process

The purpose of advertising is to notify the public about the proposed RMP project and to give the public an opportunity to register as I&APs.

The following advertising methods were used:

- **Newspaper Advert:** A Newspaper advert regarding the RMP project was placed in the **Eyethu Bay Watch**. The advert invited the public to attend the Public Participation Meetings. The advert was published in English on **16 October 2019** (see attached **Appendix C**). For the draft RMP no newspaper advert was published because the meeting was scheduled with the Steering Committee only and not the entire community.
- **Flyers and Onsite Notices:** Flyers and onsite notices were compiled in English and isiZulu and were distributed on **07 October 2019.** For the draft RMP presentation, the flyers and the draft RMPs were distributed on **04 February 2020** (refer to **Appendix D**).

Consultation and Engagement

Consultation with stakeholders shall continue until the approval of the RMP.

The following consultation and engagement methods were used:

- **E-mails:** Initial meeting invitations were sent to stakeholders on **14 October 2019,** notifying them about the scheduled consultative meetings. The meeting invites for the draft RMP presentation were sent on **06 February 2020** (refer to **Appendix E**).
- **Background Information Document (BID):** The BID was sent to stakeholders *via* email with background information about the proposed RMP project (refer to **Appendix B**).

- **Authority Meeting:** The initial authority meeting was held on **31 October 2019** at the
  Big Five Hlabisa Local Municipality: Council Chamber. The draft RMP was presented on **19 February 2020** at **Big Five Hlabisa Local Municipality: Council Chamber**. The purpose of the meeting was:
  - To present the RMP, its goal and the objectives to the authorities; and
  - To allow the authorities an opportunity to participate in the project by sharing information on their respective mandates.
- **Public Meeting:** The initial public meeting were held on **30 October 2019** at **Hluhluwe Dam**. The draft RMP was presented to the Steering Committee on **19 February 2020** at **Hluhluwe Dam**.
- **Comment and Responses Register:** Copies of the draft RMP were circulated to the Steering Committee on **04 February 2020** for public review. The commenting period lapsed on **19 February 2020.** The comments received were documented in the Comments and Responses Register (refer to **Appendix F**).

3.4.4 Planning Partners

This RMP process addresses both the institutional structure required to effectively manage the water resource, as well as the site planning parameters (environment, community and visitor) resulting in a management plan specific to the Dam. Both the proposal regarding the institutional structure and the management plan are consolidated into a RMP. These will serve as guide for the development and management of the water resource for recreational use.

In order to successfully complete the RMP, it is essential that the information obtained in the previous phases is utilised as planning input. The RMP provides for coordination between different government departments and agencies as shown in **Table 6.** This is to ensure that not only the objectives of DWS are achieved but also that the functions/ objectives of the planning partners (relating to the recreational use of the Dam) are taken into consideration when developing the RMP.

Table 6: Planning Partners and their Respective Mandates

Department	Functions / objectives
UMkhanyakude District Municipality	The Dam is within the jurisdiction of the UKDM which is the Water Service Authority. The Local Economic Development (LED) unit within UKDM primary focus is to improve *inter alia* the tourism sector. The main purpose for LED is to support economic development initiatives that will empower the community, create job opportunities, minimise income leakages and growth by building partnerships within relevant stakeholders in order to create a conducive environment for job creation.
Ezemvelo KZN Wildlife: Hluhluwe-Imfolozi Park	The Hluhluwe Dam extends into the park.
Department of Environment, Forestry and Fisheries (DEFF)	The purpose of the DEFF includes sustainable development and management of resources to maximise the economic potential of the fisheries sector while protecting the integrity and quality of the country's aquatic ecosystems. Operation Phakisa's expansion to inland Dams is one of the DEFF's initiatives aimed at unlocking the economic potential of the fisheries sector of inland water. The latter programme will be used as a benchmark for the implementation of conservation policies, while implementing job creation in the fishery and fish processing market.
Department of Environmental Affairs (DEA)	The 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 DEA is responsible for biodiversity management within the GWWs, including invasive alien species. In addition, the Department should ensure that Environmental Impact Assessments (EIAs) is undertaken for all activities that triggers EIA Regulations. The DEA through the WfW programme, can assist in eradicating alien invasive plants species (blue gums and parrot furthers) and alien invasive fish species.
Department of Public Works (DPW)	The DPW is tasked with the function to regulate and control the use of state land outside the GWWs.
Department of Rural Development and Land Reform (DRDLR)	The Department will assist in terms of land claims/ ownership issues (i.e. land under traditional authorities). The Department are also involved in rural development by improving both economic infrastructure (such as roads) and social infrastructure (e.g. communal sanitation and non-farming activities).
Department of Transport (DoT)	Responsible for legislation, policy and regulations for all transportation in South Africa, including shipping and other transport by water, and inland waterways. For the purpose of Inland Waterways, DoT has established an agency called the South African Maritime Safety Authority (SAMSA). SAMSA has been charged with the responsibility of executing the administration of the Merchant Shipping (National Small Vessel Safety) Regulation, 2007 (as amended). The Regulations extends SAMSA's core mandate to include inland waterways accessible to the public within the Republic, to ensure boating safety on our waters.
National Treasury (NT)	The use of state assets is governed by National Treasury Regulations, requiring the DWS to plan concessions in compliance or association with the National Treasury, guided by the Tourism Public Private Partnership (PPP) Toolkit of 2005.

Department	Functions / objectives
Cooperative Inland Watercourse Safety Programme (CIWSP)	The CIWSP is the programme under DWS and 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 watercourses and to implement responsible water use within the broader socio-economic context of the country. The CIWSP 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 the culture, hospitality, tourism and sport sectors.
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. Another function of the Department is to support provinces and local government in fulfilling their constitutional and legal obligations
Department of Basic Education (DBE):	The function of the DBE is to develop, maintain and support a South African school education system. In this regard, the DBE can collaborate with nature reserves that encompasses GWWs, in order to provide an opportunity for school environmental tours, as this can also have influence on career options.
Department of Sports and Recreation (DSR)	The Department is mandated to promote and develop sport and recreation activities and also to co-ordinate the relationships between the sports commission, national and recreational 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.
South African Police Service (SAPS)	The South African Police Service has been entrusted with the responsibility of creating a safe and secure environment for all people in South Africa, as well as preventing anything that may threaten the safety or security of any community. Hosting of recreational events must comply with the Safety at Sports and Recreational Events Act, 2010 (Act No. 2 of 2010).
South African Sports Confederation and Olympic Committee (SASCOC)	SASCOC is mandated to promote and develop high performance in sports, as well as to act as a controlling body for sports in South Africa. It can also assist in coordinating organised events at the Dam.

3.5 RMP DATA ANALYSIS

3.5.1 Encumbrance Survey (Phase 2)

The purpose of the encumbrance survey is to investigate/ascertain whether any impediments exist around the development and implementation of the RMP for the Dam.

The survey also identifies the information that is required for effective decision-making regarding the RMP (DWAF, 2006).

The identified encumbrances are categorized into Biophysical and Socio-cultural. **Table 7** summarises the identified biophysical and socio-cultural encumbrances/ limitations, that might affect the development or implementation of the RMP for the Dam.

Table 7: Summary of Biophysical and Socio-cultural Encumbrances

Item	Description
Climate	• Climate change affects the possibilities or levels of rainfall which negatively impacts on the availability of water in the Dam. If the drought persist it will be impossible to implement the RMP for the Dam. • Approximately 20 years ago a sun set boat cruise was operated at the Dam by EKZNW, however due to drought conditions and low levels of water in the Dam, the activity was not viable.
Fauna	• The area where Hluhluwe River (river feeding into the Dam) exits the Hluhluwe Imfolozi Park is identified as high risk for animal escape from the park. In the past a herd of elephants have escaped from this point. • Communities next to the Dam have co-existed with dangerous and damage causing animals such as crocodiles and hippos. This results to human-wildlife conflicts. • Livestock gets attacked by crocodiles and hippos whilst drinking water from the Dam. • Hippos often graze on and destroy the nearby croplands. • Subsistence fishing at the Dam is dangerous.
Geology and soil	• There is heavy silt load in the Hluhluwe system due to poor catchment management. Silt reduces the capacity of the Dam and the issue needs to be urgently addressed since South Africa is a water scarce country.
Hydrology	• According to (DWS, 2020), the Dam level is moderately high, however, due to drought conditions it is not certain whether the water level would remain high and stable for the implementation of potential recreational activities on the water surface. • According to EKZNW (2019), "in recent years (from 2009), a number of boreholes in the Hluhluwe River upstream of HiP have led to increasingly low water levels in the Hluhluwe river and the Hluhluwe Dam. In times of drought, the Hluhluwe River runs dry and the water level of the Dam drops considerably. This could be problematic if accommodation and activities are focused solely on the water resource - it may restrict the types of potential nature-based tourism opportunities and activities that can be offered."
Expectations	• If the community expectations towards the RMP project are not better managed, the community may become negative towards the RMP implementation phase.
Education Level	• The new municipality (BFHLM) does not have the socio-economic information. • Only 11.5% of people in ward 08 have furthered their studies up to higher education level. The implication in the project is that the majority of residents in the aforementioned wards will not have received any kind of training to become active participants in the tourism sector.
Monthly Income	• Ward 8 of BFFBLM has 12.4% with no sources of income. This will result to a lack of community participation in the tourism developments at the dam.

3.5.2 SWOT Analysis and Objective Identification

Engineerex Pty Ltd as the process facilitator conducted the Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis. This was done to determine the **Strengths** and **Opportunities** that define the potential of the Dam whereas the challenges regarding the Dam were identified through **Weaknesses** and **Threats**. Refer to **Table 8** for the SWOT analysis. See EKZNW Official comments dated **02 December 2019** attached as **Appendix G**.

Table 8: SWOT Analysis for Hluhluwe Dam

Strengths	Weaknesses
• The Dam is located in a prime location – the upper reaches of the Dam extend into the province's (KZN) flagship protected area the Hluhluwe Imfolozi Park (HiP). • The water quality is good and likely to remain good into the future. The HiP provides a high ecosystem service value (cleans and purifies water). • The open water body and relatively undeveloped hilly terrain is scenically attractive - the area has a high eco-tourism / nature-based tourism potential. • The landscape topography (series of steep sided valleys) around the Dam has restricted settlement and agriculture in this area, making the eco-tourism / nature-based a possibility. • Ezemvelo has independently identified the Biodiversity Economy potential of the Hluhluwe area and the opportunity for Community Beneficiation. • Hluhluwe is a beautiful land with tourism potential.	• Lack of potable water supply. • Short term employment contracts when economic opportunities arise at the Dam. • Weak network connections will affect tourism development at Hluhluwe. • Water levels in the Dam will also determine the extent of tourism development in the Hluhluwe area. • There is silt in the Dam reducing the actual storage capacity. • A certain white farmer claims ownership of the Hluhluwe Dam. • Communities downstream are littering. • In recent years (from 2009), a number of boreholes in the Hluhluwe River upstream of HiP have led to increasingly low water levels in the Hluhluwe river and the Hluhluwe Dam. • In times of drought, the Hluhluwe River runs dry and the water level of the Dam drops considerably. This could be problematic if accommodation and activities are focused solely on the water resource - it may restrict the types of potential nature-based tourism opportunities and activities that can be offered. • There is no opportunity to raise the Dam wall and increase the surface area of the Dam as it will result in the flooding of the HiP.
Opportunities	**Threats**
• Economic opportunities (when available) at the Dam should first benefit the locals. • Permission to be granted by the chief to make use of the land near the Dam. • Business developments to benefit the locals. • Subsistence farming. • Construction of canals to supply communities with water for irrigation. • House boats for leisure cruises on the Dam. • Skills development. • Boat fishing.	• Some community members do not have confidence on the elected steering committee to take a lead in the Hluhluwe Dam RMP development process. • High silt loads from poor catchment management outside of the Park has resulted in excessive sedimentation of the Hluhluwe River, which could also pose a risk to Dam capacity and the life of the Hluhluwe Dam should intervention not happen.

• Eco-tourism / nature-based tourism opportunities for this area are high. The area lends itself to ecologically sensitive, nature-based tourism activities such as: canoeing on Dam (and possibly canoe 3 km upstream into the Hluhluwe River into Park), boat cruises, bird watching, hiking / trail running / mountain biking and possibly fishing. The opportunity exists to sensitively develop this area - facilities such as bird hides, picnic sites and formal tourist accommodation (lodge, chalets, camping, home-stays) etc. • The opportunity exists for the HiP to drop its fence at this location and incorporate the greater part of the Dam surface area (and possibly adjacent land that the Community would like to see included, into the Park). • Wildlife from the Park such as elephant would benefit from access to an open water resource. Animals would add to the tourist product offering. • The opportunity exists to investigate the desirability and feasibility of creating a new access / entry point into the Park from this location (Dam) - this would add to the tourism product offering of the area.	• Hippos and crocodiles naturally occur in the Hluhluwe system. • The Dam, being partly located within the HiP will always pose a threat to people. • Human wildlife conflict (human and livestock safety as well as damage to croplands) will likely remain a threat. • Any future nature based tourism planning will need to take cognisance of dangerous animals. • Fencing of the Dam and / or purchase boundary, will pose a significant threat to the HiP and Hluhluwe hippo population. Fencing will cut off grazing opportunities. A reduction in forage / grazing could ultimately result in the demise of the hippo population. • Future development that is not sensitive to the Park or the landscape, could result in lighting impacts and noise intrusions into the HiP, which will impact on the ecological integrity and the tourist appeal of the Park. • Infrastructure (chalets and ablutions) sighted too close to the dam has the potential to threaten the water quality of the dam. • The dam and surrounding area fall within the designated project area for the EMdletsheni Phase 2 - 4 Rural Housing Projects. The siting of new houses in this area could foreclose on opportunities that could be created through the Biodiversity Economy. • Creating unrealistic expectations in community engagements, and not meeting one of the most important objectives of the RMP project, which is to create real, tangible benefits for adjacent communities within reasonable timeframes.

Key objectives were formulated from the identified **Strengths** and **Opportunities** of the Dam.

The vision and key performance areas (KPA) for the Dam for a period of 20-years was formulated from the key objectives, discussed in the paragraphs to follow.

KPA 1: Resource Management

- To investigate fencing the entire Dam in order to control access to the Dam and ensure safety of the people and livestock;
- To construct a wash bay to prevent the introduction and spread of alien invasive species into the Dam;
- To investigate the removal of silt from the Dam; and
- To establish an effective and functional institutional structure inclusive of community representative to manage access and recreational use of the Dam.

KPA 2: Resource Utilisation

- To ensure the provision of potable drinking water for domestic use to downstream and surrounding communities;

- To investigate the construction of a swimming pool since swimming in the Dam is prohibited due to the presence of hippos and crocodiles;
- To ensure public safety by improving security around the Dam;
- To promote subsistence fishing at the Dam;
- To revive the picnic area and tourism in general at the Dam;
- To conduct awareness programs to educate local communities about the importance of protecting and conserving water resources; and
- To establish more compatible tourism facilities (B&Bs, resource centres) and recreational activities such as cruise boating.

KPA 3: Benefit Flow Management

- To investigate constructing water ponds near the Dam to supply water for irrigation and to promote farming and livestock watering; and
- Uplift the Local Economy and increase Benefit Flows to the surrounding communities through meaningful community empowerment.

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

A 20 year vision for the Dam, formulated from the objective identified by the stakeholder, is as follow:

"To enhance public participation, beneficiation and empowerment with an aim to create an safe and secure environment in and around the Dam as well as to uplift he local economy by identifying and supporting potential tourism development".

3.5.3 Research/ Information Generation (Phase 4)

The main aim of the research was to identify the Dam's tourism development potential and to evaluate the practicality/ feasibility of the identified objectives.

Tourism Development Potential

The headwaters of the Dam are situated within the HiP, with the main body of the dam immediately abutting (adjacent) the HiP. The HiP is under the management of EKZNW that indicated that eco-tourism / nature-based tourism opportunities for the Hluhluwe area are high. Furthermore, if more tourism facilities are put in place, they will open economic opportunities to the area within which the Dam is located.

According to (EKZNW, 2019), "The eco-tourism potential of the Dam and the surrounding area outside of the HiP has long been recognised by Ezemvelo, but for various reasons it has not been taken forward with the community. Ezemvelo did operate a Sunset Boat Cruise on the Dam from the Maphumulo campsite many years ago (in excess of 20 years ago), but this did not prove to be viable, primarily due to drought and low water levels of the Dam."

The Traditional Authority in Ward 08 of Big 5 Hlabisa Local Municipality indicated that the Dam has a potential for development such as developing parking bays, and a caravan park.

Practicability/ Feasibility of Potential Objectives:

According to the DWAF (2006), the feasibility of the proposed objectives needs to be determined prior to the RMP implementation. Based on the desktop study done for the Dam, not all identified objectives are considered to be practical/ feasible during the implementation stage, others will be subjected to a feasibility study, refer to the Strategic Plan in **Section 4.3** of this RMP.

CHAPTER 4: INTEGRATED RESOURCE MANAGEMENT PLANNING

The purpose of Integrated Resource Management Planning (IRMP) is to evaluate the information obtained from preceding phases (Process Triggers, Encumbrance Survey, Objective Identification and Research/ Information Generation) to ascertain what could be achieved based on specific constraints and parameters of the water resource and surrounding State land.

The IRMP consists of four (4) plans namely the Institutional Plan, Zoning Plan, Strategic Plan and Financial Plan. **Figure 7** shows the plans and their components.

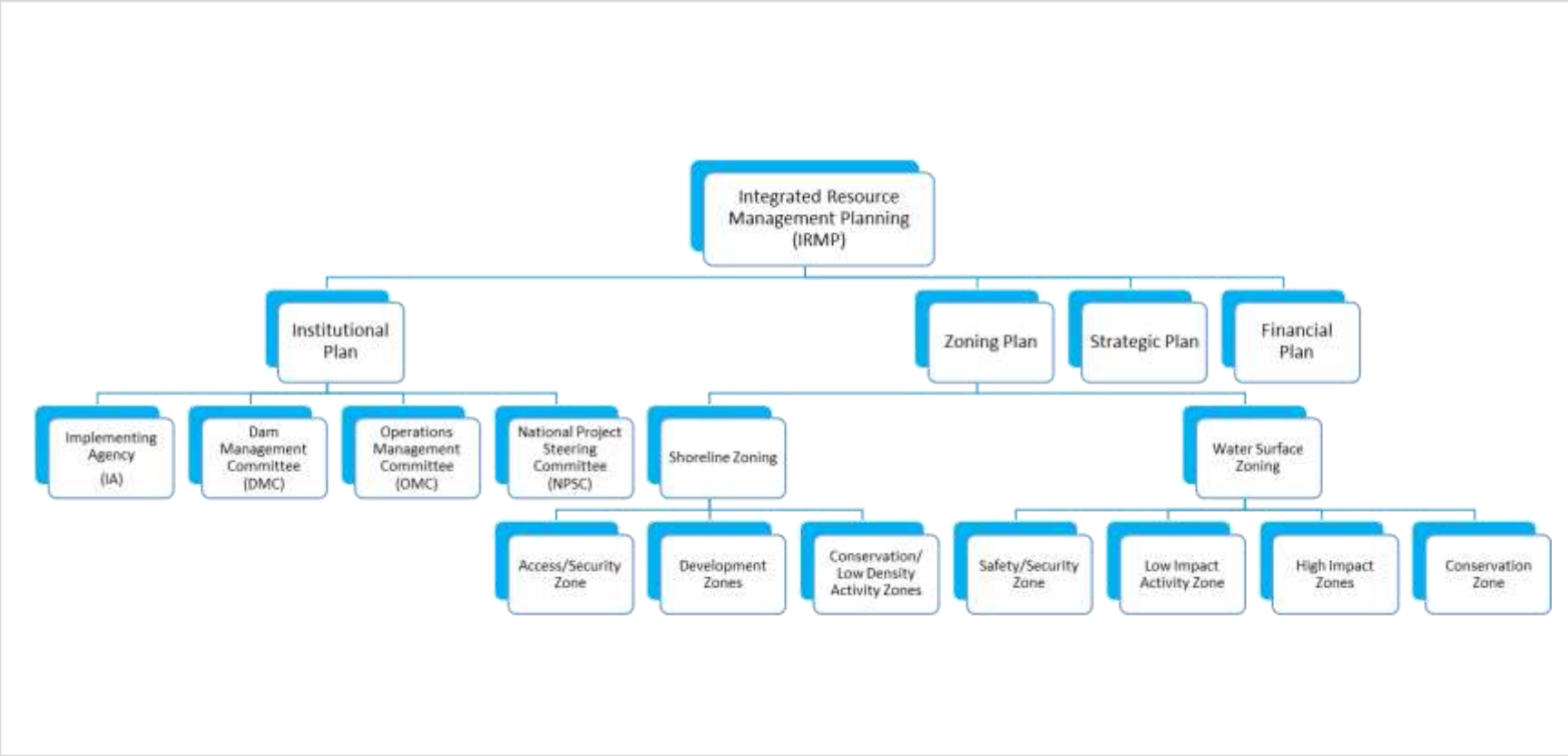

Figure 7: Integrated Resource Management Planning

4.1 INSTITUTIONAL PLAN

The Institutional Plan provides a framework for the institutional arrangements at the Dam. The proposed management systems include four (4) committees/ institutions namely; the Implementing Agency (IA), Dam Management Committee (DMC), Operations Management Committee (OMC); and National Project Steering Committee (NPSC).

The management authorities appointed by the Department at the Dam, also form part of the institutional structure.

4.1.1 Implementing Agency (IA)

The IA is an institution that would implement a programs or project on behalf of DWS.

According to DWS, the minimum requirements of an IA include the following:

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

The IA shall facilitate the implementation of programmes or action projects identified in the RMP. The IA and DWS will sign a Memorandum of Agreement (MOA), which is a legally binding document that outlines the roles and responsibilities and conditions to be followed by both parties with regards to managing the Dam for recreational use.

Some of the functions/ responsibilities of the IA include:

- Management of public access area;
- Management of recreational and tourism related activities;
- Management of agreements entered between DWS and third parties;
- Implementation of an incident management system and wash bays;
- Management of community skills and training programmes;
- Management of commercial activities (in line with Treasury Requirements); and
- Management of AtoN and demarcation markers.

4.1.2 Dam Management Committee (DMC)

The DMC comprises of user groups representatives that are interested or affected by the Dam and will assist in raising and addressing issues relating to the Dam. Any issues that the DMC is unable to resolve will be escalated to OMC (described in detailed in 4.1.4). The DMC is required to meet quarterly.

The functions of the DMC include the following (amongst others):

- To give support to Implementing Agency (IA);
- To assess commercial opportunities at the Dam;
- Seeking resolution for general management issues;
- Monitoring the practical implementation of the RMP and BP;
- Seeking and reviewing feedback received from I&APs;
- Operational management of recreational activities, such as ensuring that the floating AtoN and demarcation markers are in place and setting times for use of the Dam;
- Assist in conveying the management objectives and decisions pertaining to the Dam to the relevant stakeholders; and
- Assist in the management of the incident management system and wash bays.

Figure 8 shows the proposed parties to form part of the DMC for Hluhluwe Dam.

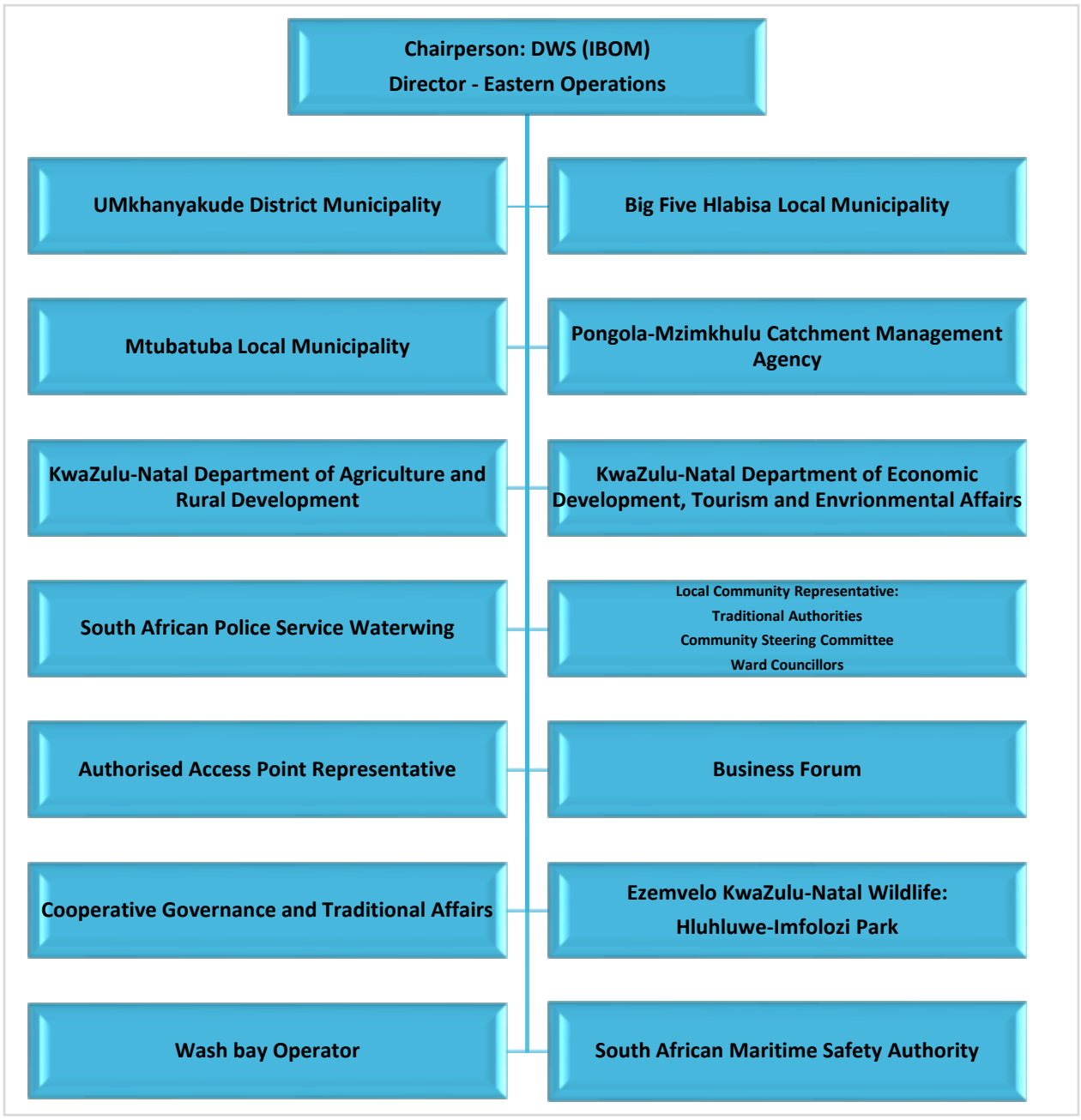

Figure 8: Proposed DMC

Management Tools:
The DMC will have a number of management tools which will enable proper management of the Dam in line with legislative requirements. Some of the management tools includes the Terms of Reference.

Terms of Reference (ToR) define the purpose and structure of the DMC and its management aspect for the implementation of the RMP. The management aspects that will be guided by the ToR includes:

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

4.1.3 Agreements and Permits

The purpose of agreements is to ensure proper use of the Dam in line with the RMP requirements and the relevant acts and regulations.

The applicable agreements for the implementation of RMP are as follows:

Memorandum of Agreement (MOA)[3]:
MOA is a legally binding document that outlines the roles, responsibilities and conditions to be followed for the management of the water resource for recreational use. An MOA will be signed in an event where the DWS is tasking another organization with its function of managing the Dam for recreational purposes.

Safety of Navigation Agreements:
The purpose of this agreement is to allow access of boating vessel to government waterworks. This agreement to be concluded between SAMSA, the DWS and other relevant parties or bodies to allow them to:

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

Access Agreements:
All access points to the Dam and surrounding State Land must be authorised. Accessing the Dam through unauthorised access points is an illegal activity. Therefore, a formal agreement with DWS will be required for all adjacent landowners and recreational clubs that have direct access to the Dam and surrounding State Land.

A formal agreement on building, management and maintenance of the wash bay is necessary between the DWS and DEA. A wash bay must be built on State Property as part of the Cooperative for Inland Watercourse Safety Programme (CIWSP).

Event Applications:
All events at the Dam and surrounding state land must be managed through an event application process. The events application will be submitted to DWS for approval through the IA. These applications must follow a specific template and will include amongst others 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.

[3] The Department of the Water and Sanitation reserves the right to appoint the Implementing Agency at their own discretion.

All events will be expected to meet the requirements of the Safety at Sports and Recreation Act, 2010 (Act No. 2 of 2010).

4.1.4 Operations Management Committee (OMC)

There is an existing Chief Directorate: Infrastructure Operations Management Committee (CD: IO MANCO) within the DWS IBOM which comprises of directors of the IBOM's four (4) operations (Northern, Southern, Eastern and Central) and is chaired by the Chief Director: Infrastructure Operations within the IBOM as illustrated in **Figure 9**.

The committee shall meet quarterly to discuss matters relating to operations and maintenance of all GWWs. An RMP must be a standard agenda item. Any matters relating to the RMP that are outside the scope of the DWS will be escalated to the NPSC (described in detail in 4.1.5).

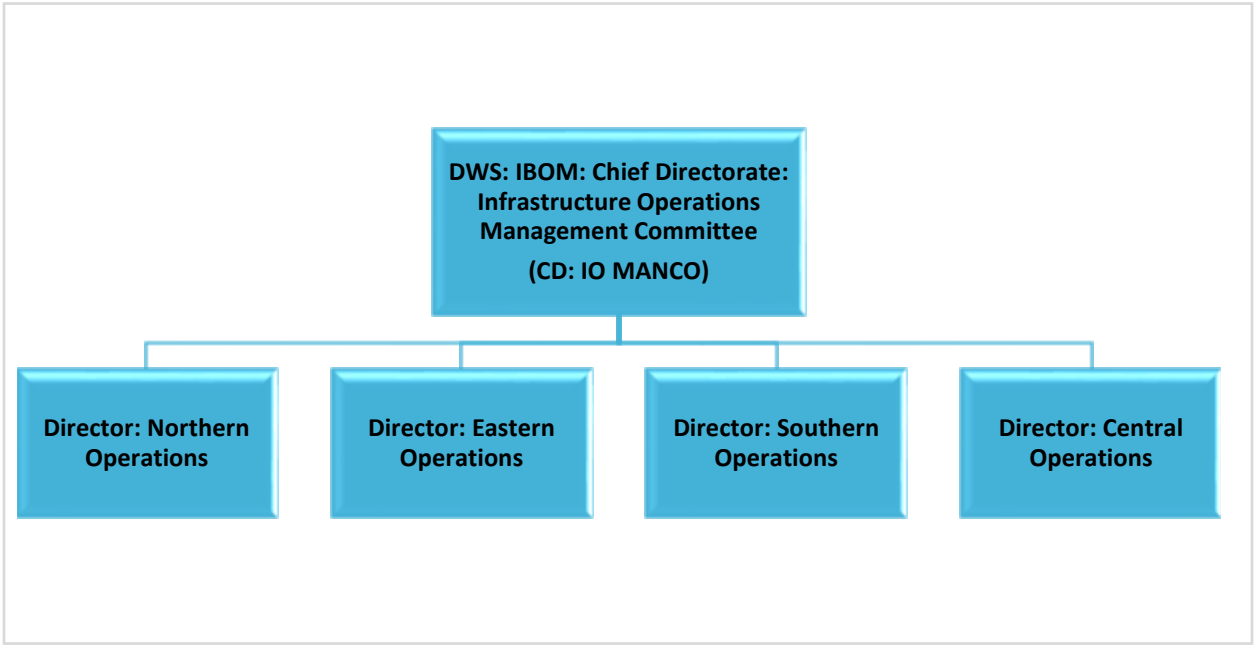

Figure 9: Existing CD: IO MANCO

4.1.5 National Project Steering Committee (NPSC)

The NPSC is formed by the DWS and is made up of representatives from national government departments and their agencies (also referred to as planning partners) that have direct and/or indirect mandate in managing the water resource. The function of the NPSC is to provide guidance and support to DWS on recreational water use in terms of their respective mandates with the aim of achieving sustainable utilisation of the Dam. The NPSC shall meet twice a year. **Figure 10** shows government departments (also referred to as planning partners and/ or authorities) and agencies that will form part of the NPSC:

Figure 10: Proposed NPSC

4.2 ZONING PLAN

The purpose of the zoning plan is to demarcate permissible and non-permissible activities on the water surface and the shoreline to avoid conflict amongst users, uncontrolled development and to protect the water resource. In order to determine the extent of possible recreational use on the water surface, the carrying capacity of the water surface was calculated.

The proposed zoning plan integrates conservation, recreation and development ensuring not to negatively interfere with the primary functions of the Dam. This RMP and /or zonation plan does not legitimise nor does it authorise any exiting built structures, infrastructure or services within the government waterworks (in both the water surface and shoreline).

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 zonation map is a desktop exercise and must not be used for navigational purposes. DWS and SAMSA will update the zonation map to be used for navigational purposes. The water surface is zoned as follows:

Safety and Security Zone:

This zone covers a minimum area of 100m from the wall and outlet works indicated by demarcation markers and AtoN. This area is reserved for the 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 Zone:

The aim of this zone is to conserve and protect sensitive aquatic habitation at the inlet of the Dam. Access to this area 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
- The area would be used by aquatic birds and fish species as habitat, refuge and breeding areas.

Low Impact Activity Zone:

This zone acts as a buffer between high impact activity zones and conservation zones. The low impact activity zone allows for low intensity activities, i.e. activities associated with little or no wake. It includes activities such as wind surfing, kayaking, swimming, rowing, sailing, paddle boating, float tubes, canoeing, angling, yachting, and small-scale fishing.

High Impact Activity Zone:

This zone is demarcated where the Dam is at its deepest level. It caters for high impact activities associated with high speed, wake and noise activities such as motorised boat, house- boating, water-skiing, and para-sailing.

Table 9 and **Figure 11** shows the proposed water surface zoning for Hluhluwe Dam.

Table 9: Proposed Water Surface Zoning Description

Zone Description	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 Zone.	• None.	• Public activities (to prevent disturbance of aquatic habitats disturbance).	• Area should be demarcated by demarcation makers and AtoN. • Strict management and control of these areas.

• Low Impact Activity Zone.	• Activities associated with no or little water wakes such as:
	  ○ Angling from a boat
	  ○ Boat cruise
	• Slipway
	• Floating Jetty
	• Floating chalets
		• Motorised boating
		• Water skiing
		• House boats
		• Para-sailing
		• Kite-surfing
		• Jet Skis
		• Wind surfing
		• Kite surfing
		• Rowing
		• Canoeing
		• Kayaking
		• Paddling boat
		• Float tubes
		• Swimming
			• Area should be demarcated by demarcation markers and AtoN.
			• No private slipways/ floating jetties to be built without approval from DWS.
			• Launching and mooring of vessels should take place at this zone.
			• Motorised boating are allowed to launch at this zone but no water wake should be formed until the designated area for motorised recreational boating is reached.

• High Impact Activity Zone	• Motorised boating • Aquaculture facilities	• Water skiing • Yachting • House boats • Para-sailing • Kite-surfing • Jet Skis • Wind surfing • Kite surfing • Rowing • Canoeing	• 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.

Zone Description	Permissible Activities	Non Permissible Activities	Recommendation
		• Kayaking • Paddling boat • Float tubes • Swimming	

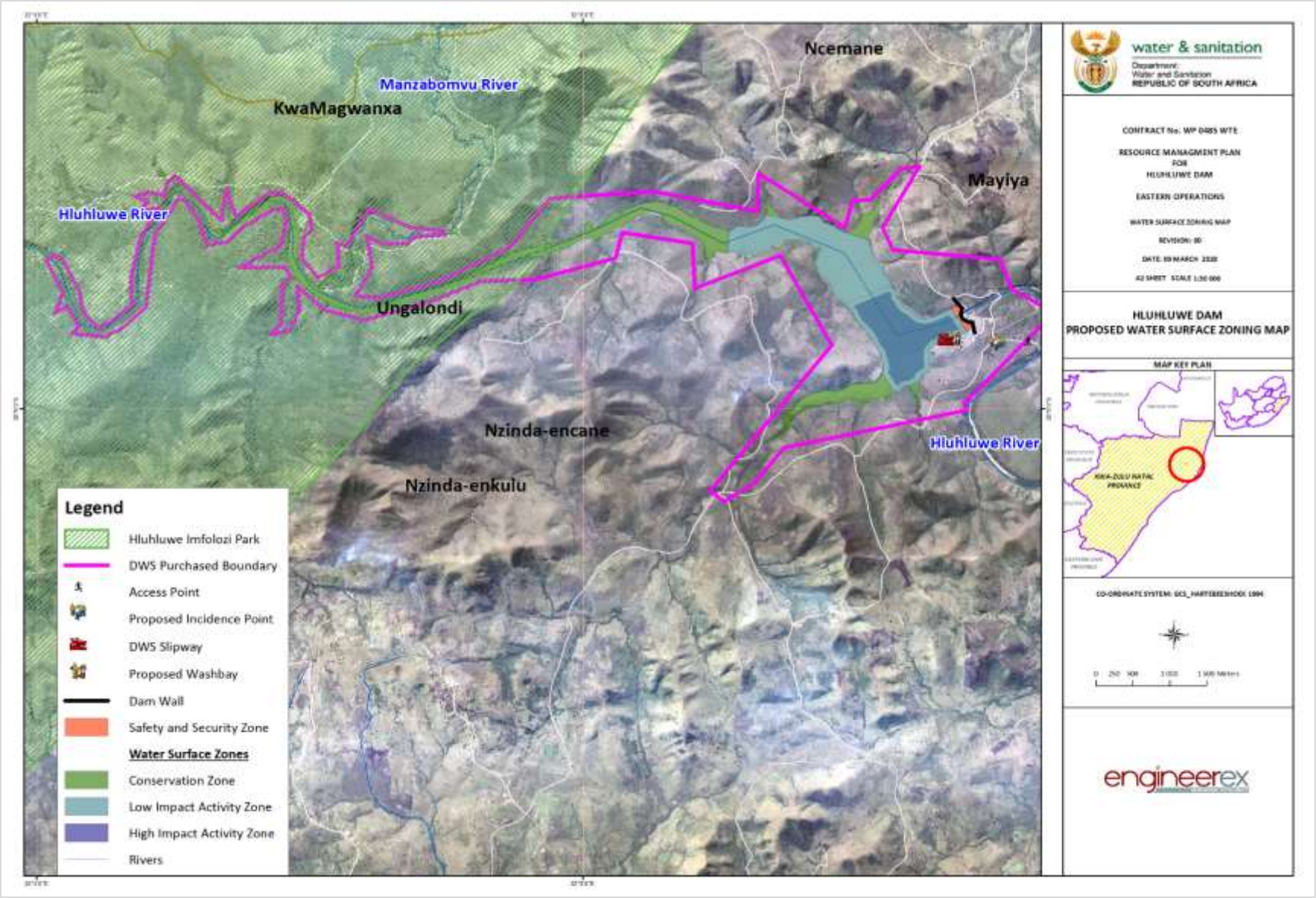

Figure 11: Proposed Water Surface Zoning

4.2.2 Shoreline Zoning[4]

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

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

This zone is applicable to the area surrounding the Dam wall and the outlet works. The extent of this zone is determined by the DWS and shall be no less than a 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 ensuring 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, and bird watching. This area is demarcated to prevent ecological Damage due to high density development activities.

Medium Density Activity Zone:

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

High Density Activity Zone:

This zone is demarcated 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 livelihoods are maintained and improved. Activities that may take place at this zone are subsistence fishing, aquaculture, livestock watering points, and small-scale community gardens.

Table 10 and **Figure 12** and **13** shows the proposed shoreline and overall zoning for Hluhluwe Dam.

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

Table 10: Proposed Shoreline Zoning Description

Zone Description	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	• Development	• Permissible activities may only be permitted provided that they are approved by the relevant Authorities and they are conduct as per the relevant legislations. • These zones should control access to ecological sensitive areas.

• Medium Density Activity Zone.	• Camping (tent and/or caravan)
	• Day visitors
	• Picnic
	• Braai facilities
	• Swimming pools
	• Ablution facilities
	• Aquaculture facilities
		• Accommodation facilities such as:
		  ○ Chalets
		  ○ Recreational club houses
		• Permanent Structures
		• Shoreline fishing
			• The management of this area should follow the PPP process in terms of National Treasury.
			• All developments must be approved by DWS.
			• Requirements of NWA and NEMA must be taken into account in all developments.
			• Noise levels to be kept at a minimum.
			• Camping, 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.

Zone Description	Permissible Activities	Non-permissible Activities	Recommendation
• Community Resource Zone	• Subsistence fishing • Livestock watering points • Small-scale gardens • Aquaculture	• Chalets • Recreational club houses • Braai facilities • Camping and picnicking • Permanent Structures	• No private slipways to be built without approval from the DWS. • Requirements of the NWA must be taken into account in all recreational activities.

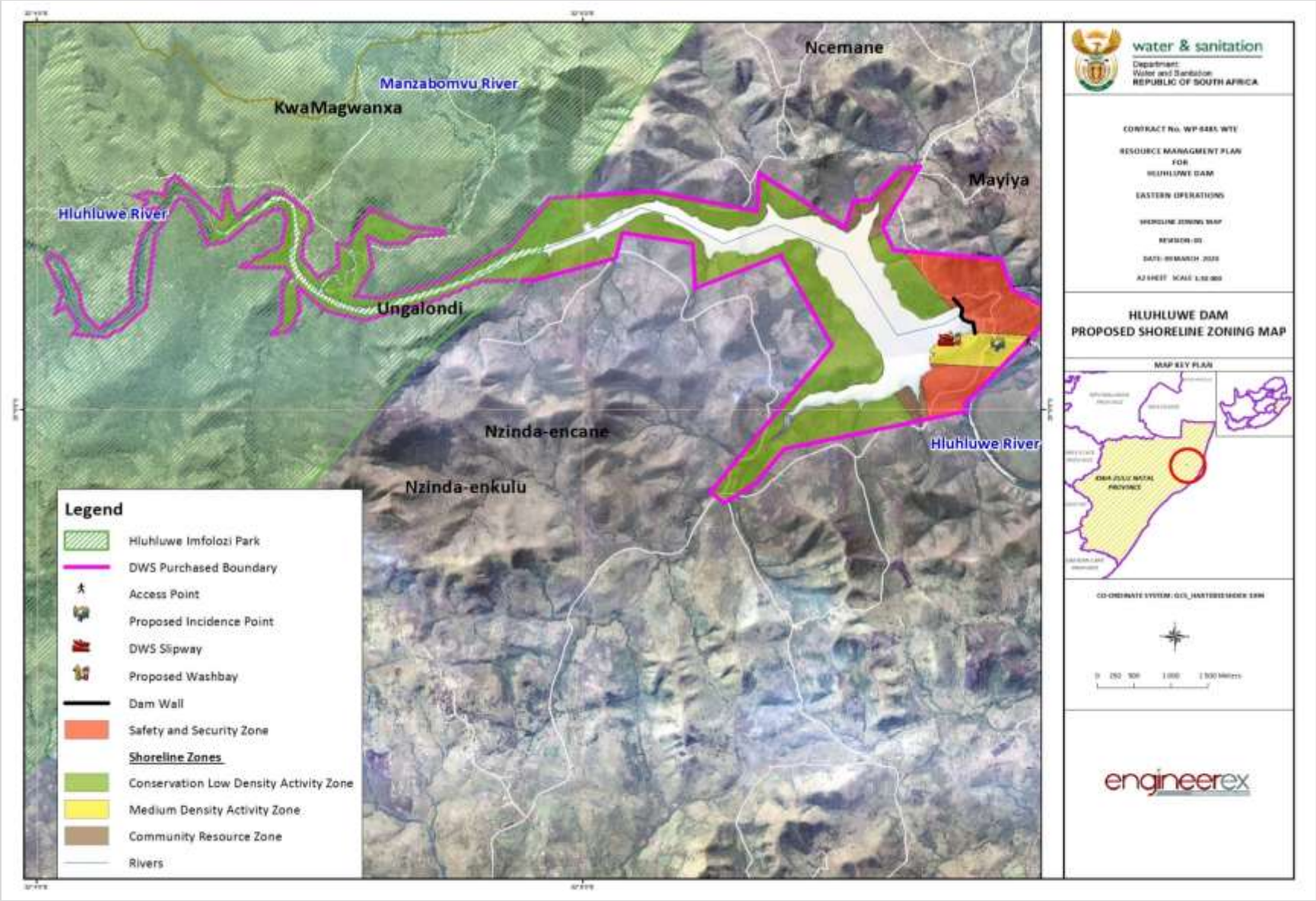

Figure 12: Proposed Shoreline Zoning Map

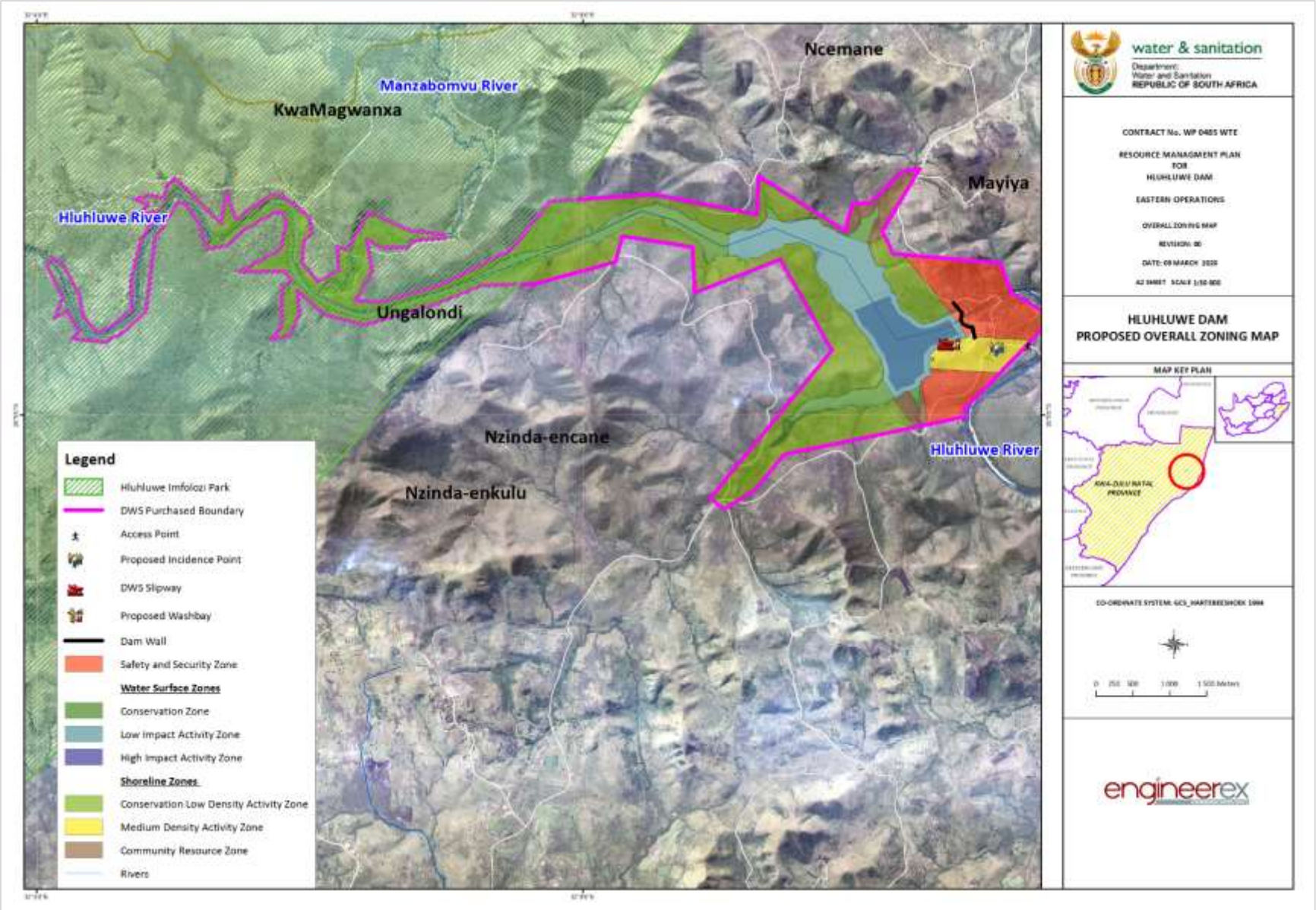

Figure 13: Proposed Overall Zoning Map

4.2.3 Carrying Capacity

The carrying capacity provides a guideline for recreation to ensure that the Dam is safe, that users do not feel crowded and that they enjoy the use of the Dam.

The Methodology for Carrying Capacity Assessment for the use of water for Recreational purposes was used as a guideline to determine the maximum level of visitor/recreational use and related infrastructure that the water resource and surrounding area can accommodate (DWAF, 2003).

There are three levels of carrying capacity:

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

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, i.e.: **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)

Formula: PCC = A x U/a x Rf

Where:

A = available Surface area for public use
U/a = area required per user
Rf = rotation factor (number of visits/day)

Table 11 shows the type of craft and the required area for use.

Table 11: Area required per user

Craft	U/A (ha/craft)
Yachts	2.0
Average	**2.0**

Based on the table above the average hectare per user is 2.0 ha (20 000 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 available surface area for Hluhluwe Dam is **364 ha** whereas ***U/a*** is assumed to be the average which was calculated as 1 craft/5 ha. And again the rotation factor (*Rf*) is assumed as 1 visit per day.

Therefore: **PCC =** A ÷ U/a x Rf
=364 x 1/5 x 1
= 73 crafts on the Dam

Real Carrying Capacity (RCC)

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

Where:

Cf = a corrective factor expressed as a percentage.

The RCC takes into account factors that limit recreation use (craft based) of the Dam. For Hluhluwe Dam, these factors includes sensitive areas, such as conservation areas

(111.6 ha) as well as aspects regarding the safe operation and management of the Dam (9.1 ha).

These factors accounts for 120.7 ha, that is 33% of the area that is not available for recreational use.

Therefore: RCC = PCC x (100 – cf1) % x (100 – cf1) % x (100 – cf1) %

= 73 x (100 – 33) %

=49 crafts

Effective Carrying Capacity (ECC)

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

Given that the Dam currently offers no recreational activities and the recreational facilities are in a bad condition. There is also no management structure in place. Hence the ECC is currently 0. Once there is an Institutional structure for the management of infrastructure capacity, then the ECC can be calculated to verify if the RCC can be possible.

4.3 STRATEGIC PLAN

The strategic plan is informed by the objectives identified by stakeholders and through research on potential opportunities at the Dam. The objectives are broken down into management fields which are listed below in a format offering ease of reference:

- Objective (What is envisaged for the Dam?);
- Motivation (Why is it important to achieve this?);
- Action Projects (How to achieve this?); and
- Management support (Who will be involved?).

In **Tables 12** to **14**, the strategic plan on how to achieve the objectives identified for the Dam is outlined.

4.3.1 KPA 1: Resource Management

Table 12: Strategic Plan for 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)
Access Control: • To investigate fencing the entire Dam in order to control access to the dam and ensure safety of the people and livestock.	• The Dam is fenced around the Dam wall and the associated infrastructure only as a result access control remains a challenge. • The Dam is a habitat to crocodiles and hippos. Communities next to the Dam have co-existed with dangerous and damage causing animals such as crocodiles and hippos. This results to human-wildlife conflicts.	• To investigate (through a feasibility study) erecting a fence at safety hotspots where the community deems dangerous for the children as well as livestock. • To implement an institutional management structure to oversee access and recreational use of the Dam. • Educate the local communities about the importance of protecting and conserving a water resource and infrastructure so as to prevent issues of theft and vandalism at the Dam. • To put notice boards notifying and warning people about the presence of crocodiles and hippos in the Dam. • The objective will be incorporated in a Business Plan to determine projected costs for the implementation of the action projects.	• DWS • DMC
Alien Invasive Species Control: • To construct a wash bay to prevent the introduction and spread of alien invasive species into the Dam.	• All motorised vessels to be entering the Dam should be washed at the bay to prevent the contamination and spread of alien invasive species.	• Develop an inspection and cleaning mechanism (wash bay) to ensure that vessels entering the Dam do not contaminate it with alien vegetation.	• Department of Environmental Affairs (DEA) • DWS
Storage capacity: • To desilt the Dam.	• There is heavy silt load in the Hluhluwe system due to poor catchment management. The silt reduces the capacity of the Dam and the issue needs to be urgently addressed since South Africa is a water scarce country.	• DWS to include Hluhluwe Dam in the list of prioritised dams for desiltation. • Donate the removed silt to the communities to manufacture bricks and other uses.	• DWS • DMC

		• If the sand is of bad quality it should be disposed appropriately.	
Recreational Institutional Structure: • To establish an effective and functional institutional structure inclusive of community representative to manage access and recreational use of the Dam.	• Currently, there is no organisation or appointed institutional structure that is managing the Dam for access and potential recreational use. • 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).	• DWS to appoint a DMC to oversee the implementation of the Hluhluwe Dam RMP.	• DWS

4.3.2 KPA 2: Resource Utilisation

Table 13: Strategic Plan for 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)
Water Supply: • To ensure the provision of potable drinking water for domestic use to downstream and surrounding communities.	• The communities adjacent to the Dam do not have access to potable drinking water.	• UKDM to review the Water Service Plan (WSP) to ensure that everyone within the district has access to potable water.	• UKDM
Swimming Pool: • To investigate the construction of a swimming pool since swimming in the Dam is prohibited due to the presence of hippos and crocodiles.	• Swimming in the Dam is prohibited due to the presence of hippos and crocodiles.	• To conduct a feasibility study to investigate possibilities of constructing a swimming pool in the picnic area.	• DMC • BFHLM • UKDM
Public Safety: • To ensure public safety by improving security around the Dam.	• Where Hluhluwe River (river feeding into the Dam) exits the HiP, is identified as high risk for animal escape from the park. In the past a herd of elephants have escaped from this point. • There are no notice boards at the Dam warning the visitors about the presence of crocodiles and hippos. • Hippos often graze on the nearby croplands and the livestock risk being attacked. • There is not suitable, standardized and harmonized fixed and floating aids to Navigation (Aton) and Demarcation Markers in Place. • There is no specific incident management system in place to ensure that incidents are responded to in a coordinated manner.	• Implement adequate, standardised, harmonised fixed and floating AtoN and demarcation markers. • Implement and manage DWS incident management system. • Establishment of an institutional management structure to oversee the access and recreational use of the Dam. • Develop information material (i.e. signage and pamphlets, etc.) to convey safety rules at the Dam.	• SAMSA • DMC • DWS • DoT • Other relevant stakeholders
Subsistence Fishing: • To promote subsistence fishing at the Dam.	• There is an interest for fishing at the Dam to sustain livelihoods. However, fishing from the Dam is dangerous due to the presence of crocodiles and hippos.	• Permits (fishing licence) must be acquired and the use of gill nets must be prevented, as it has	• KwaZulu-Natal Department of Agriculture and Rural

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)
		significant negative impact on fish population within the dam. • Educate and train community members on fishing methods that are safe and sustainable. • Preserve the core habitats for nesting, resting, feeding and breeding of fish within the inlets, by demarcating areas for subsistence fishing. • Develop a communication signage in order to effectively inform different angling groups about the Dam fishing rules. • Appoint and train safety officers from within the communities to monitor compliance of the Dam fishing rules.	Development (KZN DARD) • DEFF • DMC • BFHLM • EKZNW • DWS
<u>Refurbishment:</u> • To revive the picnic area and tourism in general at the Dam.	• The picnic area at the Dam is currently not in use and is in a state of despair.	• Construction of recreational facilities: ○ Outdoor and covered Braai Stands; ○ Construction of Lapas; ○ Angling banks; and ○ Ablution Facilities. • Should the design, development and operation of the public facility be outsourced, then local contractors should be given first priority. • Implement a signage system that communicates relevant information, especially where this pertains to zoning	• DMC • BFHLM • UKDM

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)
		restrictions and other rules and regulations.	
Public Awareness: • To conduct awareness programmes to educate local communities about the importance of protecting and conserving water resources.	• There were issues of theft and vandalism of the infrastructure at the dam. However, a security personnel has since been appointed by DWS to monitor the infrastructure. • The community members in the proximity of the Dam believe that Hluhluwe Dam is owned by a white farmer. • There is lack of awareness regarding the presence of crocodiles and hippos in the Dam.	• Identify specific communities of interest for the public awareness programmes. • Identify and develop information material to be used for community out reach. • Conduct the public participation on awareness.	• DMC
Recreational Facilities: • To establish more tourism facilities (B&Bs and resource centres) and recreational activities such as cruise boating.	• The headwaters of the Dam are situated within the HiP, with the main body of the Dam immediately abutting the HiP. • EKZNW has indicated that eco-tourism / nature-based tourism opportunities for the Hluhluwe area are high. • A sun set boat cruise was once operated (about 20 years ago) at the Dam. However, it was not viable due to drought conditions and low levels of water in the Dam. • If more compatible tourism facilities are put in place, they will open economic opportunities to the area within which the Dam is located. • To encourage people with art and craft talent to display and market their work at the Dam.	• Implement the RMP to regulate developments within DWS purchased boundary. • Restrict permanent structures within the DWS purchased boundary. • Explore Public Private Partnerships (PPPs). • Establish conference centres at the Dam. • Market the Dam for recreational use and tourism.	• DMC

4.3.3 KPA 3: Benefit Flow Management

Table 14: Strategic Plan for 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)
Agricultural Use: • To investigate constructing water ponds near the Dam to supply water for irrigation and to promote farming and livestock watering.	• The Dam is a habitat to crocodiles and hippos. Livestock get attacked when drinking water from the Dam.	• DWS to engage KZN DARD on the way forward regarding this matter. As Schedule 1: Permissible Water Use states that a person may use water in or from a water resource for purposes such as reasonable domestic use, domestic gardening, animal watering, fire fighting and recreational use.	• KZN DARD • DMC • DWS
Skills Development Programmes: • Uplift the local economy and increase benefit flows to the surrounding communities through community empowerment.	• Tourism sector has been identified as a vehicle for skills development, job creation, Broad-based Black Economic Empowerment (BBBEE), etc. it is imperative that the local communities derive benefits from recreational activities conducted at the Dam. • The level of unemployment in the area is high.	• Implement skills development programmes where opportunities exist. • Implementation of environmental awareness programs to the local communities in order to ensure that they are always updated with environmental information. • Educate the community on how to utilise the Dam for other recreational activities besides fishing. This will assist in terms of uplifting the surrounding local community. • Extend awareness to the communities on project management skills. • Prioritise the local community if any job and business opportunities arises.	• DMC

4.4 FINANCIAL PLAN

A Financial Plan provides guidance on how revenue can be generated through recreational use of the Dam and how it should be used to ensure community participation and beneficiation. The plan also aims to ensure sustained and improved management of the Dam.

The proposed DMC for this Dam can explore the various streams of generating revenue as presented below:

4.4.1 Potential Sources of Revenue

Access Fees: Potential revenue can be generated from access fees paid by visitors. A standard access fee can be charged per person based on their age group. The determination of access fees should take cognisance of the socio-economic profile of the area so as to cater for the local communities. The access fees cannot be used for rent or to make profit. Over and above access fees, additional fees can also be charged which includes:

Parking Fees: Motorists can be charged extra fees for parking.

- **Event and Service Based Fees:** These are extra fees that can be charged for the following:
    - Fishing (sports);
    - Private boating;
    - Functions (festivals, weddings, conferences and cultural activities); and
    - Caravan/ outdoor camping.

It is important that the identified events above be established at the Dam for the realisation of the identified fees.

Rental Charges: Potential source of revenue can also be explored on rental fees, *inter alia,* boat clubs operating from the Dam should pay the leasing fees. The terms of payment will be stipulated in the lease agreement between DWS through the DMC (leaser) and the lessee.

4.4.2 Target Market

To realise the above-mentioned revenue the following will be the target:

- Hluhluwe Town;
- Farmers;
- Cultural villages;
- Churches;
- Schools;
- Institutions;
- Group tourists; and
- Government Departments.

In light of the above mentioned, there should be sources of capital for initial investment for the upgrading of existing infrastructure as well as setting up of new facilities. The proposed DMC can consider the following sub-sections as a source of capital.

4.4.3 Co-Funding

The project can leverage its existence in the local Integrated Development Plan (IDP) to harness funding. Co-funding is also viable where DMC is appointed to manage recreational use of the Dam. Examples of projects of similar nature which were successfully co-funded are Roodeplaat Dam Nature Reserve and Nonoti Beach Resort Development (Coastal Marine Tourism Project). Details in this regard are attached as **Appendix H**.

Government Departments can fund the DMC to supplement operational costs and other scenarios by co-funding identified objectives that are related to their mandate. It is recommended that an appropriate DMC be appointed to manage recreational use of the Dam on behalf of DWS. Examples of potential co-funders are:

- The Department of Tourism;
- Industrial Development Corporation (IDC); and
- InvestSA (One Stop Shop).

More information on the co-funders is attached in **Appendix I.**

A more detailed Financial Plan (FP) is contained in the Business Plan (refer to **Appendix J**), which will facilitate the implementation of the RMP by providing an implementation program and cost

estimates for all possible economic recreational activities.

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

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

CONCLUSION AND WAY FORWARD

This RMP comprehensively covered inter alia the environmental analysis (biophysical, built and socio-economic environment) of the Dam, RMP data analysis (encumbrance survey, objective identification and research/ information generation) as well as integrated resource management planning which consists of the institutional plan, zoning plan, strategic plan and the financial plan.

The key challenges identified include:

- The Dam is fenced around the Dam wall and associated infrastructure only, hence access control is a challenge;
- Lack of control of local community livestock that is grazing and drinking at the Dam;
- There is no management structure to oversee access and the potential recreational activities;
- High silt loads in the Hluhluwe system from poor catchment management;
- Communities next to the Dam have co-existed with dangerous and damage causing animals such as crocodiles and hippopotami (hippos). This results to human-wildlife conflicts;
- Hippos often graze and destroy the nearby croplands;
- Livestock drink water from the Dam and risk being attacked by crocodiles and hippos or drowning whilst reaching for water in deeper areas;
- Community members practice subsistence fishing regardless of the presence of hippos and crocodiles, this too is a safety risk but over and above that the fishing is not controlled;
- The area where Hluhluwe River (river feeding into the Dam) exits the Hluhluwe Imfolozi Park (HiP) is identified as high risk for animal escape from the park. In the past a herd of elephants have escaped from this point; and
- Approximately 20 years ago a sun set boat cruise was operated at the Dam by Ezemvelo KwaZulu-Natal Wildlife (EKZNW), however, due to drought conditions and low water levels in the Dam, the activity was not viable.

Recommendations:

This RMP recommends the immediate establishment of the DMC with the mandate to:

- Oversee access and potential recreational use of the Dam;
- Avoid conflict amongst users, avoid uncontrolled development and to protect the water resource, the permissible and non-permissible activities on the water- and shoreline surface are delineated in the Zoning Plan and covered under Section 4.2; and
- To ensure public safety with regards to the use of inland vessels, the maximum level of recreational use the water resource can accommodate is covered under Carrying Capacity in section 4.2.3.

Way Forward:

According to DWAF (2006), the RMP may be 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 14** illustrates the RMP & BP review framework.

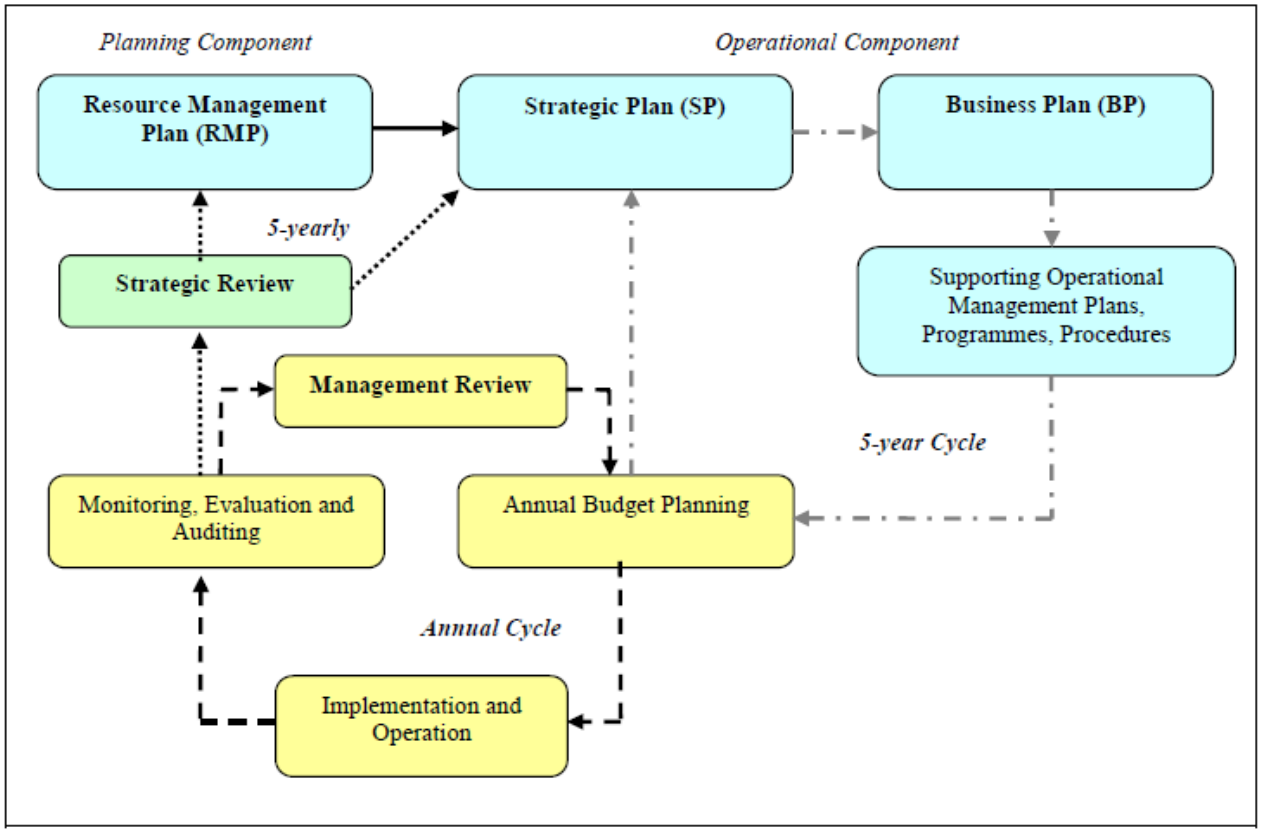

Figure 14: RMP and BP Review Framework

REFERENCES

Climate Data.ORG (n.d), viewed on 18 December 2019, from http://www.climate-data.org

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

Department of Water Affairs and Forestry, (1999), Guidelines for the Compilation of Zoning Plans for Government Waterworks.

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

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

Department of Water Affairs and Forestry, (2003a). Draft Guideline. Methodology for Carrying Capacity Assessment for the Use of Water for Recreational Purposes.

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

Department of Water and Sanitation, (2019), Hydrology, Weekly viewed 18 November 2019, from http://www.dwa.gov.za/hydrology/weekly/provinceweekly.aspx?region=KN

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

Ezemvelo KwaZulu-Natal Wildlife, (2019), Planning Division IEM Section SWOT Analysis Inputs.

South African National Biodiversity, (2014). KZN Biodiversity Sector Plan.

Statistics South Africa, (2016), Community Survey [dataset].

Talbot Laboratories (Pty) Ltd, (2019), Certificate of Analysis.

UMkhanyakude District Municipality, (2017-2018). Draft IDP.

APPENDICES

APPENDIX A : STAKEHOLDER DATABASE REGISTER

APPENDIX B : BACKGROUND INFORMATION DOCUMENT (BID)

APPENDIX C : NEWSPAPER ADVERT

APPENDIX D : FLYERS

APPENDIX E : EMAILS

APPENDIX F : COMMENT AND RESPONSES REGISTER

APPENDIX G : EZEMVELO KWAZULU-NATAL WILDLIFE OFFICIAL COMMENTS

APPENDIX H : EXAMPLES OF SUCCESSFULLY CO-FUNDED PROJECTS

APPENDIX I : POTENTIAL CO-FUNDERS

APPENDIX J : BUSINESS PLAN