NATIONAL WATER RESOURCE INFRASTRUCTURE (NWRI)

Resource Management Plan OHRIGSTAD DAM

REPORT – Volume 4 of 5

March 2020



WATER IS LIFE - SANITATION IS DIGNITY



water & sanitation

Department: Water and Sanitation REPUBLIC OF SOUTH AFRICA



Prepared by:

ENGINEEREX (PTY) LTD

107 Haymeadow Street Boardwalk Office Park Faerie Glen Pretoria 0043

Tel: 012 664 1180 Fax: 012 664 1165 Website: <u>www.engineerex.co.za</u>

Prepared for:

DEPARTMENT OF WATER AND SANITATION Private Bag X313

Pretoria 0001

Tel: 012 336 8582 Fax: 012 324 6692 Website: <u>www.dws.gov.za</u>

ACKNOWLEDGEMENT

Engineerex (Pty) Ltd would like to express its gratitude to the following Stakeholders that immensely contributed in the development of this Resource Management Plan for Ohrigstad Dam.

- Department of Environmental Affairs: Working for Water;
- Department of Water and Sanitation;
- Thaba Chweu Local Economic Development Agency;
- Thaba Chweu Local Municipality;
- Mpumalanga Tourism and Parks Agency;
- MT Anderson Catchment Nature Reserve;
- Ohrigstad Dam Nature Reserve; and
- The community members of Ohrigstad.

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

TITLE AND APPROVAL PAGE

Recommended:

Name	Title	Signature	Date
	Project Manager: National Water Resource Infrastructure: Integrated Environmental Engineering (NWRI: IEE)		
	Director: NWRI: IEE		
	Director: Northern Operations, NWRI		
	Chief Director: Infrastructure Operations, NWRI		

Approved:

Name	Title	Signature	Date
	Deputy Director General / Head: NWRI		

Review:

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

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

AMENDMENTS PAGE

Revision No	Description	Date
1	Draft RMP Report for DWS Review	15/12/2016
2	Final Draft RMP Report for DWS Review	06/06/2017
3	Final RMP Report for DWS Approval	20/07/2017
4	Final RMP Report for DWS Sign-off	16/08/2017

LIST OF ACRONYMS

AIPs	Alien Invasive Plants
AtoN	Aid(s) to Navigation
BID	Background Information Document
BP	Business Plan
CATHSSETA	Culture, Arts, Tourism, Hospitality, Sports Sector, Education and Training Authority
CD: IO MANCO	Chief Director: Infrastructure Operations Management Committee
CIWSP	Cooperative Inland Waterways Safety Programme
CoGTA	Corporative Governance and Traditional Affairs
CPSI	Centre for Public Service Innovation
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DHS	Department of Human Settlement
DMC	Dam Management Committee
DoT	Department of Transport
DPW	Department of Public Works
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
ECC	Effective Carrying Capacity
EMF	Environmental Management Framework
EPIP	Environmental Protection and Infrastructure Programme
FSL	Full Supply Level
GP	Guideline-Programs
GPS	Global Positioning System
GWWs	Government Waterworks
I&APS	Interested and Affected Parties
	Implementing Agency
	Integrated Development Plan
	Integrated Environmental Engineering
	Integrated Nanagement Plan
	Key Performance Areas
	Local Accountable Aten Darties
	Local Accountable Aton Parties
MAD	Mean Annual Precipitation
ΜΤΡΔ	Moumalanga Tourism and Parks Agency
ΝΕΜΔ	National Environmental Management Act
NPSC	National Project Steering Committee
NWA	National Water Act
NWRIB	National Water Resource Infrastructure Branch
ODNR	Ohrigstad Dam Nature Reserve
OMC	Operational Management Committee
PCC	Physical Carrying Capacity
PP	Public Participation
РРР	Public Private Partnership
PSP	Professional Services Provider
RCC	Real Carrying Capacity
RMP	Resource Management Plan

v

OHRIGSTAD DAM RESOURCE MANAGEMENT PLAN

RWU	Recreational Water Use
SAMSA	South African Maritime Safety Authority
SAPS	South African Police Service
SASCOC	South African Sports Confederation and Olympic Committee
SDF	Spatial Development Framework
SWOT	Strengths, Weaknesses, Opportunities and Threats
TCLM	Thaba Chweu Local Municipality
THALEDA	Thaba Chweu Local Economic Development Agency
WfW	Working for Water
WMA	Water Management Area
WSP	Water Service Provider

EXECUTIVE SUMMARY

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

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

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

Location of the Dam: Ohrigstad Dam is a rockfill type da which impounds the Ohrigstad River. It located within Ohrigstad Nature Reserve and is widely known as Ohrigstad Dam Nature Reserve (ODNR). It falls under Ward 13 within the jurisdiction of Thaba Chweu Local Municipality (TCLM) which forms part of Ehlanzeni District Municipality (EDM) in Mpumalanga Province, South Africa. It's is on Global Positioning System (GPS) coordinates 24°56'26.17"S 30°38'1.69"E. The dam is situated on the Eastern side of the R533 Road between Pilgrims Rest and Ohrigstad approximately 20 km from the R36 Road.

Purpose of the dam: The primary purpose of Ohrigstad Dam is to provide raw water for irrigation use for downstream farmers. The dam also offers recreational activities

such as boating, fishing and camping.

Dam ownership and management: Ohrigstad is owned and operated by DWS for primary use. Mpumalanga Tourism and Parks Agency (MTPA) manages the dam for secondary use as part of ODNR for recreational purposes. This RMP proposes an improvement on the current institutional structure to include other relevant role players to assist in effectively managing the dam.

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

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

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

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

- Informing stakeholders about the RMP project;
- Meeting the stakeholders to present the RMP process; and

• Giving Feedback in the form of meeting minutes, follow-up emails, telephonic and direct communication.

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

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

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

The identified key common objectives are:

- To maintain the dam-wall infrastructure for leakage;
- To have Ohrigstad Dam basin free of Alien Invasive Plants and to maintain the ecological aspect of the area;
- To review and update the existing zoning plan which was conducted in 2005 during the development of

ODNR Integrated Management Plan (IMP); and

 To implement environmental protection and infrastructure programme (EPIP) project in terms of the approved Environmental Authorizations.

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

"Facilitate the optimal utilisation of Ohrigstad Dam without compromising its ecological integrity and scenic beauty".

The aforementioned objectives and vision are aimed at supporting the attainment of DWS's vision, mission and objectives.

Tourism Potential: The following was identified as some of the potential recreational developments at the Ohrigstad Dam that could enhance tourist attraction:

 Implementation of EPIP project to construct four (4) self-catering chalets next to the Ohrigstad Dam as overnight visitor accommodation in the Nature Reserve;

TABLE OF CONTENTS

ACKNOWLEDGEMENT	ii
TITLE AND APPROVAL PAGE	
AMENDMENTS PAGE	iv
LIST OF ACRONYMS	v
EXECUTIVE SUMMARY	vii
LIST OF APPENDICES	xiii
CHAPTER 1: INTRODUCTION	1
1.1 BACKGROUND OF OHRIGSTAD DAM	1
1.2 BIOPHYSICAL ENVIRONMENT	
1.2.1 Climate	
1.2.2 Flora	4
1.2.3 Fauna	6
1.2.4 Topography	7
1.2.5 Geology and Soils	7
1.2.6 Hydrology	9
1.3 BUILT ENVIRONMENT	
1.3.1 Infrastructure	
1.3.2 Access	
1.4 USERS AND USES OF THE DAM	
1.5 RECREATIONAL INSTITUTIONAL STRUCTURE	
1.5.1 Mpumalanga Tourism and Parks Agency	
1.6 LAND OWNERSHIP	
1.6.1 Land Claims	
1.7 SAFETY	
1.7.1 Safety of Navigation	
1.7.2 Incident Management	
1.8 SOCIOECONOMIC ENVIRONMENT	
1.8.1 Social Audit	
1.8.2 Community Beneficiation	
CHAPTER 2: LEGISLATIVE FRAMEWORK	
CHAPTER 3: WHAT IS RESOURCE MANAGEMENT PLAN	
3.1 DEFINITION OF RMP	
3.2 PURPOSE OF THE RMP	
3.3 PROCESS TRIGGERS	
3.4 RMP DEVELOPMENT PROCESS	23
3.5 RMP PLANNING STAGES	24

OHRIGSTAD DAM RESOURCE MANAGEMENT PLAN

3.5.1	Desktop Study	24
3.5.2	Site Inspection	24
3.5.3	Public Participation	24
3.6	RMP DATA ANALYSIS	28
3.6.1	Encumbrance Survey (Phase 2)	28
3.6.2	2 SWOT Analysis and Objective Identification	29
3.6.3	Research / Information Generation (Phase 4)	30
CHAPTER	4: INTEGRATED MANAGEMENT, ZONING AND INSTITUTIONAL PLANNING (PHASE 5)	
4.1	INSTITUTIONAL PLAN	38
4.1.1	Dam Management Committee (DMC)	38
4.1.2	2 Operations Management Committee (OMC)	41
4.1.3	National Project Steering Committee (NSPC)	42
4.2	ZONING PLAN	46
4.2.1	Water Surface Zoning	46
4.2.2	Shoreline Zoning	49
4.2.3	Carrying Capacity	54
4.3	STRATEGIC PLAN	55
4.4	FINANCIAL PLAN	59
WAY FOR	WARD	60
CONCLUSI	IONS	61
REFERENC	ES	62

х

LIST OF FIGURES

Figure 1: Locality Map for Ohrigstad Dam2
Figure 2: Average Temperature and Rainfall of the area
Figure 3: Vegetation type around ODNR4
Figure 4: Vegetation type around the dam4
Figure 5: Land Cover Map for Ohrigstad Dam5
Figure 6: Hippopotamus6
Figure 7: Ohrigstad Dam Landscape
Figure 8: Soil type around ODNR7
Figure 9: Geological Map for Ohrigstad Dam8
Figure 10: Overview of the dam wall9
Figure 11: Fluctuations of the dam's water level over a year (DWS, 2016)9
Figure 12: Hydrological Map for Ohrigstad Dam10
Figure 13: Camping Facilities
Figure 14: Ablution Facilities12
Figure 15: Municipal Ward Boundary: Ward 13 (Demarcation Board, 2016)
Figure 16: Population Groups
Figure 17: Education Level15
Figure 18: TCLM Monthly Income Status16
Figure 19: RMP Procedure
Figure 20: Proof of Onsite Notices
Figure 21: Research Data
Figure 22: Site Plan of Authorised Chalets
Figure 23: Current Ohrigstad Dam Zoning Plan
Figure 24: Integrated Resource Management Plan37
Figure 25: Proposed DMC
Figure 26: Existing CD: IO MANCO
Figure 27: Proposed NPSC43
Figure 28: Proposed Water Surface Zoning Map48
Figure 29: Proposed Shoreline Zoning Map52
Figure 30: Proposed Overall Zoning Map53
Figure 31: RMP and BP Review Framework60

LIST OF TABLES

Table 1: Ohrigstad Dam Profile	1
Table 2: Common Mammals around ODNR	6
Table 3: Ohrigstad Dam Water Quality Variables (DWS Water Quality Management System, 201	.6).11
Table 4: Population Group	15
Table 5: TCLM Monthly Income Status	15
Table 6: Trigger Factors for the Development of Ohrigstad Dam RMP	22
Table 7: Planning Partners and their Respective Mandates	27
Table 8: Summary of Biophysical Encumbrances	28
Table 9: Summary of Social Encumbrance	28
Table 10: Summary of Existing Plans	28
Table 11: SWOT Analysis for Ohrigstad Dam	29
Table 12: Feasibility of Potential Recreational Objectives	34
Table 13: Proposed Water Surface Zoning Description	47
Table 14: Proposed Shoreline Zoning Description	51
Table 15: Strategic Plan for KPA 1: Resource Management	56
Table 16: Strategic Plan for KPA 2: Resource Utilisation	57
Table 17: Strategic Plan for KPA 3: Benefit Flow Management	58

LIST OF APPENDICES

- Appendix A : Stakeholder Database Register
- Appendix B : Background Information Document (BID)
- Appendix C : Newspaper Advert
- Appendix D : Flyers
- Appendix E : Emails
- Appendix F : Comments and Responses Register

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND OF OHRIGSTAD DAM

Ohrigstad Dam, known as Ohrigstad Dam Nature Reserve (ODNR), is situated within the Ohrigstad Nature Reserve which is owned and controlled by MTPA under the jurisdiction of Thaba Chweu Local Municipality within Ehlanzeni District Municipality.

The ODNR covers an area of 2,400 ha around the dam which impounds a stretch of the Ohrigstad River. The dam was built in 1955 for the purpose of irrigation for downstream farms. For secondary use, the dam offers camping and fishing leisure to the visitors of **Table 1**: Ohrigstad Dam Profile the ODNR. MTPA has developed basic camping facilities around the reserve such as camping site, ablution facilities, etc. The dam is owned and controlled by DWS.

The dam is on Global Positioning System (GPS) coordinates **24°56'26.17"S 30°38'1.69"E**. The dam is situated on the Eastern side of the R533 Road between Pilgrims Rest and Ohrigstad approximately 20 km from the R36 Road. The Locality Map for the dam is shown in **Figure 1**.

A detailed description of the Ohrigstad Dam is shown on **Table 1**.

Ohrigstad Dam Profile		
Location	South Africa	
Province	Mpumalanga Province	
District Municipality	Ehlanzeni District Municipality	
Local Municipality	Thaba Chweu Local Municipality	
Nearest Town	Ohrigstad	
Completion Year	1955	
GPS Coordinates	24°56'26.17"S 30°38'1.69"E	
Purpose	Irrigation	
Owner	Department of Water and Sanitation	
Water Management Area	Olifants Proto CMA	
Quaternary Catchment Area	B60E	
Catchment area (km ²)	84	
River	Ohrigstad River	
Capacity (m ³)	14 216 000	
Surface Area (ha)	99.2	
Wall type	Rockfill	
Wall Height (m)	51.8	
Length (m)	377	

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

OHRIGSTAD DAM RESOURCE MANAGEMENT PLAN



Figure 1: Locality Map for Ohrigstad Dam

1.2 BIOPHYSICAL ENVIRONMENT

1.2.1 Climate

The climate is warm and temperate in Lydenburg. In winter, there is much less rainfall in Lydenburg than in summer. According to Köppen and Geiger, this climate is classified as Cwb. The temperature here averages 16.3 °C. The average annual rainfall is 758 mm. The driest month is July, with 5 mm of rainfall. With an average of 134 mm, the most precipitation falls in January. The difference in precipitation between the driest month and the wettest month is 129 mm. During the year, the average temperatures vary by 9.7 °C (www.climate-data.org).

Figure 2 depicts the average temperature and rainfall of Hoedspruit over a year.



Figure 2: Average Temperature and Rainfall of the area.

1.2.2 Flora

The dam is situated within the Lydenburg Thornveld. It occurs at lower levels at the foot of the mountains and on undulating plains. It comprises closed grassland which is almost wooded, sometimes densely so in rocky areas and less so in frost ridden valleys where Acacia Karoo is still able to persist (*Mucina et al, 2006*).

Previous study of the Basic Assessment (BA) Process for development of recreational facilities through Environmental Protection and Infrastructure Programme indicates that approximately 46 plant species representing 22 families were recorded inside the study area. None of these are threatened species and only one protected species, Aloe castanea was found. Few exotic species were recorded the most prevalent of which are Pseudognaphalium luteo-album near the water's edge. The area surveyed included the demarcated project site as well as the terrain within a 100-meter radius of the site.

Figures 3 and 4 show the vegetation type around the ODNR and the dam while Figure 5 shows the Vegetation Map of the area.



Figure 3: Vegetation type around ODNR



Figure 4: Vegetation type around the dam



Figure 5: Land Cover Map for Ohrigstad Dam

1.2.3 Fauna

1.2.3.1 Aquatic Species

ODNR is known for camping and fishing and has abundance of game. Hippopotamus were also evident during the site visit at the dam. Refer to **Figure 6**.



1.2.3.2 Terrestrial Species

According to *Enpact Environmental 2015*, a study was done to determine which mammals could possibly be found at the study site and surrounding area. Some of the species commonly seen inside the reserve are listed in **Table 2**.

Figure 6: Hippopotamus

Table 2: Common Mammals around ODNR

Common Name	Scientific Name
White Rhinoceros	Ceratotherium simum
Cape Buffalo	Syncerus caffer
Eland	Taurotragus oryx
Kudu	Tragelaphus strepsiceros
Bushbuck	Tragelaphus scriptus
Waterbuck	Kobus ellipsiprymnus
Plains Zebra	Equus burchelli
Steenbok	Raphicerus campestris
Grey Duiker	Sylvicapra grimmia
Oribi	Ourebia ourebi
Mountain Reedbuck	Redunca fulvorufula
Grey Rhebuck	Pelea capreolus
Warthog	Phacochoerus africanus
Bushpig	Potamochoerus porcus koiropotamus

1.2.4 Topography

Situated in a mountainous area, elevation ranges from 1320 to 1882 meters above sea level. It varies from small plateaus on higher lying ground through steep cliffs and a variety of slope types to some deep valleys where natural springs occur. Most of these leads down to the valley bottom where the dam is situated. **Figure 7** depicts the topography of the Ohrigstad Dam Nature Reserve.



Figure 7: Ohrigstad Dam Landscape

1.2.5 Geology and Soils

According to ODNR IMP (2005), the main geological formations present on the surface are of sedimentary origin, consisting mostly of red to grey locally laminated shale. Medium grained quartzite is visible towards the western boundary where its resistance to weathering forms steep cliff faces. These are being intersected by later diabase intrusions. Diabase dykes, with its characteristic rocks occur mainly on the eastern portion or few other lower lying sections of the reserve. **Figure 8 and 9** outlines the soil types and geological map of ODNR respectively.



Figure 8: Soil type around ODNR



Figure 9: Geological Map for Ohrigstad Dam

1.2.6 Hydrology

1.2.6.1 Surface Water

One of Mpumalanga's larger perennial rivers, namely the Ohrigstad River flows through the reserve for a distance of 6.5 kilometres. The perennial Ohrigstad River, as well as seven (7) other smaller perennial mountain streams, five (5) of which originate within the boundaries of the reserve, provide water to the dam. This water is used for large-scale irrigation in the Ohrigstad valley downstream.

The dam was completed in 1955 and is one of only three (3) dams in South Africa with a rock filled wall. However, the dam wall leaks severely and during the dry season the water level can drop quite drastically at times. **Figure 10** depicts the overview of the damwall.



Figure 10: Overview of the dam wall

1.2.6.2 Water Levels

The state of dams released by DWS indicated that Ohrigstad Dam was approximately 10% empty on 11 July 2016 as indicated on the **Figure 11** below.



Figure 11: Fluctuations of the dam's water level over a year (DWS, 2016)

The dam is situated on quaternary drainage B60E and is part of the Olifants River Catchment as shown in **Figure 12**.



Figure 12: Hydrological Map for Ohrigstad Dam

1.2.6.3 Water Quality

The term water quality is used to describe the physical, chemical and biological properties of water, all of which determine its fitness for use and its ability to maintain the health of aquatic organisms (DWAF, 1996). Water quality therefore expresses the suitability of water to sustain various uses or processes. Any particular use will have certain requirements for the physical, chemical or biological characteristics of water. Water quality can be measured by a range of variables which concentrations might affect water use for its intended water use purposes.

Human health is affected directly by the proximity, availability and quality of water resources. **Table 3** shows the water quality variables within the dam.

Table 3: Ohrigstad Dam Water Quality Variables (DWS Water Quality Management System, 2016)

Characteristic	Tests Results	Target Water Quality Range (Recreational Purposes)	Description
Turbidity (Secchi disc, m)	-	3.0	 Most users will perceive water as suitable for swimming. This allows water depth to be judged and possible hazards will be visible. Risk of disease transmission by organisms associated with particulate matter is minimal but cannot be excluded on the basis of clarity or turbidity measures alone. No adverse effects on aesthetic appreciation.
рН (pH units)	7.69	6.5 - 8.5	 Minimal eye irritation occurs. The pH of water is well within the buffering capacity of the lachrymal fluid of the human eye. Skin, ear and mucous membrane irritation absent.
Algae (Chlorophyll- a method, μg/chl- a)	-	0 - 15	 Nuisance conditions negligible for lower end of range, but at a mean concentration of 15 Fg/R, severe nuisance. 0 - 15 conditions encountered for < 12 % of a year. No health effects.
Phosphate (measured as Inorganic Phosphorus mg/l)	-	<5	 Oligotrophic conditions; usually moderate levels of species diversity; usually low productivity systems with rapid nutrient cycling. No nuisance growth of aquatic plants or blue-green algae.

Algae:

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

<u>рН:</u>

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

Turbidity:

The turbidity is low but might be associated with a possibility of microbiological pollution associated with turbidity.

Phosphate:

The phosphate concentration in the dam is low and this results to no nuisance growth of aquatic plants or blue-green algae in the dam.

Based on the water quality results for the dam, the water will not cause effects on the current recreational activities and the dam's aesthetic quality.

1.3 BUILT ENVIRONMENT

1.3.1 Infrastructure

MTPA has developed basic camping area near the dam as part of tourism development facilities within the ODNR. The existing facilities includes ablution block as well as concrete tables and chairs. **Figure 13 - 14** depicts the existing camping area of ODNR.



Figure 13: Camping Facilities



Figure 14: Ablution Facilities

1.3.2 Access

The dam is approximately 40kms from Lydenburg Town and 33kms from Ohrigstad. From Lydenburg, it can be accessed through R36 to Ohrigstad Town and Turn right on to R533 Road towards Pilgrim's Rest. The ODNR has access control with internal gravel roads leading to the dam and other areas within the reserve.

1.4 USERS AND USES OF THE DAM

The dam is owned and controlled by DWS. The Ohrigstad DWS Office is responsible for the overall management of the dam and release of water for irrigation to the nearby farms.

MTPA uses the dam as part of ODNR for conservation and recreational uses.

1.5 RECREATIONAL INSTITUTIONAL STRUCTURE

1.5.1 Mpumalanga Tourism and Parks Agency

The Ohrigstad Dam Nature Reserve is a declared protected area in terms of Mpumalanga Nature Conservation Act, 1998 (Act No. 10 of 1998) and National Environmental Management Protected Areas Act, 2003 (Act No. 57 of 2003) (NEMPA). MDNR is managed by Mpumalanga Tourism and Parks Agency (MTPA) which have the mandate to provide for the sustainable management and promotion of tourism and nature conservation in Mpumalanga and to ensure the sustainable utilisation of natural resources.

MTPA controls the access and use of the ODNR and charge an access fee to the visitors of the reserve.

1.6 LAND OWNERSHIP

The dam is located within the Ohrigstad Nature Reserve, which is controlled by MTPA. MTPA is a provincial agency responsible to the management of provincial nature reserves.

1.6.1 Land Claims

No land claims have been recorded at Ohrigstad Dam Nature Reserve.

1.7 SAFETY

1.7.1 Safety of Navigation

There are floating Aids to Navigation (AtoN)² and demarcation markers for no-go area and safety zone at the dam wall.

² A marine Aid to Navigation (AtoN) is defined by the international Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) as "A device or system external to vessels that is designed and operated to

1.7.2 Incident Management

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

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

1.8 SOCIOECONOMIC ENVIRONMENT

1.8.1 Social Audit

The main purpose of social audit is to examine the general status of the study area and to determine issues that need to be addressed when developing the RMP in order to overcome potential difficulties in TCLM as shown in **Figure 15**. An understanding of socioeconomic conditions of Ward 13 can be used at a later stage to determine the impact of a RMP in the area in terms of changed socioeconomic conditions.

A social Audit which focused on the population composition of the ward, Education level, employment status and monthly income was undertaken and is presented in section 1.8.1.1 to 1.8.1.3, respectively.

enhance the safe and efficient navigation of vessels and/or vessel traffic".



Figure 15: Municipal Ward Boundary: Ward 13 (Demarcation Board, 2016)

1.8.1.1 Population Dynamics

Table 4 and **Figure 16** indicate the population groups in Lydenburg Town. The highest population in the area is Black with 90.7%, then follows White with 8.9%. Indians and coloureds are the lowest with 0.1% and 0.2% respectively.

Table 4: Population Group

Group	Percentage
Black African	90,7%
Coloured	0,2%
Indian/Asian	0,1%
White	8,9%
Other	0,0 %



Figure 16: Population Groups

1.8.1.2 Educational Level

The Census (2011) breaks down educational levels into each year of study. For the purpose of this report, educational levels have been grouped as indicated in the **Figure 17**.



Figure 17: Education Level

1.8.1.4 Employment Status

Table 5 and Figure 18 show the economic status of Ward 13. It shows the income on a monthly basis. The "No-income group" is of great concern as they have no any source of income.

Table 5: TCLM Monthly Income Status

Income	Percentage
No income	16,9%
R1 - R4,800	3,5%
R4,801 - R9,600	5%
R9,601 - R19,600	21,5%
R19,601 - R38,200	25%
R38,201 - R76,400	15,4%
R76,401 - R153,800	8,5%
R153,801 - R307,600	2,3%
R307,601 - R614,400	0,8%
R614,001 - R1,228,800	0,8%
R1,228,801 - R2,457,600	0,4%
R2,457,601+	0%



Figure 18: TCLM Monthly Income Status

1.8.2 Community Beneficiation

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

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

- By having equitable access to the dam;
- The community needs will be addressed in an appropriate and equitable manner;
- Safety while accessing and using the dam;
- Preference will be given to local community when employment and opportunities and skill development arise.
- Through the PPP; and
- By participating in decision-making through the Dam Management Committee.

CHAPTER 2: LEGISLATIVE FRAMEWORK

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

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

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

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

 Responsibilities of authorised agencies (governing boards/ clubs/ organisations and regulating authorities).

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

- IX. Methodology for Carrying Capacity Assessment for the Use of Water for Recreational Purposes: The carrying capacity of a water resource represents the maximum level of visitor/recreational use and related infrastructure that the water resource and surrounding area can accommodate, without diminishing user satisfaction or adverse impacts upon the local or host community, the economy and culture of the area.
- Χ. National Environmental Management Act, 1998 (Act No. 107 of 1998): NEMA serves as South Africa's Environmental Framework Legislation. It was designed to provide for co-operative and Integrated Environmental Governance bv establishing a general framework for decision-making on matters affecting the environment.
- XI. National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) and Related Regulations: This Act aims to provide the framework, norms and standards for the conservation, sustainable use and equitable benefit-sharing of South Africa's biological resources.

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

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

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

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

execute the relevant maritime legislation.

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

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

- Broad-based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003).
- Communal Land Rights Act, 2004 (Act No.11 of 2004).
- Development Facilitation Act, 1995 (Act No. 67 of 1995).
- Intergovernmental Relations Framework Act, 2005 (Act No.13 of 2005).
- Land Administration Act, 1995 (Act No. 2 of 1995).
- Local Government: Municipal Systems Act, 2000 (Act No. 32 of 2000).
- Limpopo Environmental Management Act, 2003 (Act No. 7 of 2003).
- National Heritage Resources Act, 1999 (No. 25 of 1999)
- Occupation Health and Safety Act, 1993 (Act No. 85 of 1993).
- Restitution of Land Rights Act, 1994 (Act No. 22 of 1994).
- State Land Disposal Act, 1961 (Act No. 48 of 1961).
- Sustainable Development Goals (2015)

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

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

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

Not only do these Acts, Regulations and Frameworks guide specific decisions and actions, they also provide the framework for monitoring performance and compliance, and provide guidelines regarding contravention, offences and penalties. This list is not complete and other legislation could be applicable.

CHAPTER 3: WHAT IS RESOURCE MANAGEMENT PLAN

3.1 DEFINITION OF RMP

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

Recreational use includes activities ranging from leisure, sport to culture and religion. Although recreational use does not involve water consumption, it is still a major water use and needs to be managed correctly to ensure increased community participation and beneficiation with minimal disturbances and environmental impacts.

3.2 PURPOSE OF THE RMP

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

Without approved management plans related ic to the utilization of the water resource in ill place, it makes it difficult for informed

decisions to be made, necessitating a precautionary approach to access, utilization and development of the water resource.

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

3.3 PROCESS TRIGGERS

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

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

Table 6: Trigger Factors for the Development of Onligstad Dam Rivip				
Trigger Factors	Description			
	• To incorporate the dam into the Integrated Management Plan for the Ohrigstad			
Resource	Dam Nature Reserve.			
Management	• Several Alien Invasive Plants have been identified by DEA: Working for Water			
	programme.			
	• The dam has a leakage at the dam-wall which affects the water level drastically.			
Community	 Lack of water provision to the surrounding Community. 			
Participation and				
Beneficiation				
Recreational Industry	MTPA to implement and manage the recreational activities in accordance to the			
	approved Integrated Management Plan (IMP) for Ohrigstad Dam Nature Reserve.			
	Ohrigstad Dam should be integrated in local planning initiatives and decision			
Public Policy	support tools such as Thaba Chweu Local Municipality Integrated Development			
	Plan (IDP), Spatial Development Framework (SDF), Environmental Management			
	Framework (EMF), etc.			
3.4 RMP DEVELOPMENT PROCESS

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

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

Figure 19: RMP Procedure

3.5 RMP PLANNING STAGES

3.5.1 Desktop Study

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

3.5.2 Site Inspection

A site visit was conducted for Ohrigstad Dam on the **26 November 2015** to gather the baseline information about the dam using a checklist questionnaires. The site inspection was undertaken with the DWS IEE and MTPA Assistant Reserve Manager.

3.5.3 Public Participation

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

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

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

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

• The identification of role players;

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

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

3.5.3.1 The Planning Phase

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

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

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

3.5.3.1.1 The Role Players

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

3.5.3.2 **The Participation Phase**

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

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

3.5.3.3 The Exit Phase

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

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

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

3.5.3.4 Advertising Process

3.5.3.4.1	Compilation	and	Distribution
	Background		Information
	Document (Bl	D)	

The purpose of this document was to provide stakeholders (Authorities and I&APs) with the

background information about the proposed RMP project and to introduce the processes to be followed in the development of the plan. It also aimed at informing authorities and I&APs on how to fully participate in the process and to encourage active attendance in stakeholder engagement meetings. The BID was compiled from the information collated through the desktop study and site inspection. (See attached **Appendix B**).

3.5.3.4.2 Newspaper Advert

A Newspaper advert regarding the RMP project was placed in the Steelburger Newspaper on the **22 April 2016**. The advert invited the public to attend the Public Participation Meeting. Furthermore, an advert for the draft RMP was advertised in **Platinum Gazette Newspaper on 10 March 2017** (See attached **Appendix C**).

3.5.3.4.3 Flyers Compilation and Distribution

Flyers were distributed on the **13th of April 2016.** The flyers were compiled in English for distribution to Interested and Affected Parties (I&APs) in communities around the dam (See attached **Appendix D**).

The Onsite Notices were also erected on the area accessible to the Public around the dam. This includes entrance gate and fence of the dam as shown in **Figure 20**.

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



Figure 20: Proof of Onsite Notices

3.5.3.5 Direct Communication

3.5.3.5.1 E-mails

Meeting invitations were sent out to Authorities and I&APs notifying them about the scheduled consultative meetings, the invitation entailed the BID, meeting venue and time. The email notification was sent out on 19 April 2016.

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

3.5.3.5.2 Authority Meeting

The initial authority meeting was held on the 05 May 2016 at Ohrigstad DWS Offices.

The purpose of the meeting was:

To present the RMP, its goal and the objectives of the project to the authorities: and



Water source point for local community

То allow the authorities an opportunity to participate in the project by sharing information on their respective mandates.

The draft RMP was presented to the authorities on 30 March 2017 at Ohrigstad **DWS Office.**

3.5.3.5.3 Public Meeting

The initial public meeting was held on **05 May** 2016 at Mabaso Primary School. A platform was also given to I&APs to identify encumbrances/challenges that might hinder the progress of the RMP as well as to identify objectives and vision for the Ohrigstad Dam.

3.5.3.6 Comments and Responses Register

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

3.5.4 Planning Partners

RMPs are developed through a process of cooperative governance and Stakeholder participation. The distinctly different roles and responsibilities of the Stakeholders, and their relationship towards each other and the steps in the planning procedure are imperative in the success compilation of the RMP. The RMP provides for coordination between different governments and agencies to ensure that not only the objectives of DWS are attained, but also the objectives of other relevant Government Departments are attained. The relevant Departments/agencies are listed in **Table 7.**

Department/ Agency	Responsibility
Thaba Chweu Local Municipality	The dam is within the jurisdiction of the Thaba Chweu Local Municipality.
Mpumalanga Tourism and Parks Agency (MTPA)	To grow tourism and manage bio-diversity to stimulate sustainable economic growth that is inclusive and creates decent employment. MTPA currently manages Ohrigstad Dam Nature Reserve for recreational activities.
	The purpose of DAFF includes sustainable development and management of resources to maximizing the economic potential of the fisheries sector while protecting the integrity and quality of the country's aquatic ecosystems.
Department of Agriculture, Forestry and Fisheries (DAFF)	Operation Phakisa expansion to inland dams is one of DAFF initiative aimed at unlocking economic potential of fisheries sector within the inland water. The latter programme will be used as benchmark for implementation of conservation policies while implementing job creation within fishery and fish processing market.
Department of Rural Development and Land Reform (DRDLR)	The department will assist in terms of Land Claims/Ownership issues.
Department of Environmental Affairs (DEA)	Responsible for Biodiversity Management within the dam including Invasive Alien Species.
Department of Public Works (DPW)	Has the power to regulate and control the use of state land outside the GWWs. In this regard, lease agreements or permits will be required from the department as some of the recreational activities will overlap into the state land.
Department of Transport (DoT)	Responsible for legislation, policy and regulations for all transportation in South Africa, including shipping and other transport by water or sea also inland waterways.
National Treasury (NT)	The use of State assets is governed by National Treasury Regulations, requiring DWS to plan concessions in compliance or association with National Treasury, guided by the Tourism Public Private Partnership (PPP) Toolkit of 2005.
South African Maritime Safety Authority (SAMSA)	One of SAMSA's three legislative mandates is "to ensure safety of life and property at sea". The Act enables SAMSA to administer and execute the relevant maritime legislation.

3.6 RMP DATA ANALYSIS

3.6.1 Encumbrance Survey (Phase 2)

The purpose of the Encumbrance Survey is to investigate/ ascertain whether any encumbrances exist around the dam and other factors that may influence the development and implementation of the RMP. The survey also identifies the information that is required for effective decision-making regarding the RMP (DWAF, 2006). The identified encumbrances will assist DWS to identify hindrances and other factors that may influence the development and implementation of the RMP. The identified encumbrances are broken down into **Biophysical, Social and Existing Plans.**

Tables 8 - 10 outline the summary oflimitations that might affect the developmentor implementation of the RMP for the dam.

Table 8: Summary of Biophysical Encumbrances

Item	Description
Vegetation	• Several Alien Invasive Plants namely; Giant Reed, Grey and Silver Poplar, Black Wattle, Syringa, Bramble and Mulberry were identified by DEA: Working for Water programme.
Hydrology	 The dam has a leakage at the dam-wall which affects the water level drastically. There is a drought which affects the primary and secondary use of the dam and operational levels.
Alien Invasive Plants	 Several Alien Invasive Plants namely; Giant Reed, Grey and Silver Poplar, Black Wattle, Syringa, Bramble and Mulberry has been identified by DEA: Working for Water programme.

Table 9: Summary of Social Encumbrance

ltem	Description
Access Fee	• To evaluate the access fee for day visitor in accordance to the socio-economic status of the surrounding communities.
Expectations	• The local communities are still experiencing the shortage of water for domestic uses and other municipal services.

Table 10: Summary of Existing Plans

ltem	Description
Environmental	• The implementation of EPIP project as per the approved environmental authorisation
Protection and	for tourism development facilities funded by DEA as part of their corporate social
Infrastructure	investment programme.
programme	
(EPIP) Project	

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

3.6.2 SWOT Analysis and Objective Identification

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

3.6.2.1 SWOT Analysis Approach

There were issues of concerns that were raised in the stakeholder engagement meetings prior to conducting the SWOT Analysis. Other challenges or encumbrances that may hinder the progress of the dam's RMP process were identified by the stakeholders following the SWOT analysis approach as illustrated in **Table 11**.

Strengths	Weaknesses
 The dam has been integrated into the reserve and is well managed and controlled. MTPA obtained an environmental authorisation to implement recreational facilities under environmental protection and infrastructure programme (EPIP) project funding from Department of Environmental Affairs. MTPA is in the process of updating its existing Integrated Management Plan (IMP) for Ohrigstad Dam Nature Reserve. Good water quality. 	 The closest community does not have water for domestic use. No signage of the dam from R533 Road to Ohrigstad. The dam has a severe leakage at the dam wall which needs maintenance.
Opportunities	Threats
 Revenue generation through camping and fishing. Located on a well marketed tourism route. 	 Poaching of rhino which happened two (2) years back. There is a prospecting permit for a potential gold mining around the area which might require water from the dam. Existence of dangerous aquatic animals, i.e. Hippopotamus. Several Alien Invasive Plants have been identified within the Ohrigstad Basin.

3.6.2.2 **Objective Identification (Phase 3)**

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

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

• Why would we want to achieve our goals?

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

KPA 1: Resource Management

- To maintain the dam-wall infrastructure from leakage;
- To have Ohrigstad Dam basin free of Alien Invasive Plants and to maintain the ecological aspect of the area; and
- To review and update the existing zoning plan which was conducted in 2015 during the development of ODNR IMP.

KPA 2: Resource Utilisation

 To implement recreational activities in terms of the approved relevant authorizations, i.e. Environmental Authorizations.

KPA 3: Benefit Flow

- To ensure the participation and beneficiation of all stakeholders in the use of the dam; and
- To incorporate other stakeholders who have the mandate and interest in using the dam for recreational use.

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

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

"Facilitate the optimal utilisation of Ohrigstad Dam without compromising its ecological integrity and scenic beauty".

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

3.6.3 Research / Information Generation (Phase 4)

The aim of undertaking the Research Phase was to collect the relevant data about the dam that will serve as a decision-making guideline tool, guided by the objectives set for the dam and any limitations due to encumbrances. The report documents the data as illustrated in **Figure 21**.



Figure 21: Research Data

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

3.6.3.1 Tourism Development Potential

This 2400ha reserve is located between the villages of Pilgrim's Rest and Mashishing on the R533 below the Highveld plateau, conserving an important water catchment eco-system. The Ohrigstad Dam Nature Reserve, being close to a major tourist route, offers an excellent opportunity for visitors to stop over to enjoy the facilities of the reserve.

The reserve is home to most of the plains antelope species which have been reintroduced over the past few years. A breeding pair of rhino produced their first calf in June 2003.

Self-catering accommodation is available at the reserve. One of the main attractions at Ohrigstad Dam Nature Reserve is the newly developed 4x4 trail which takes visitors into the higher reaches of the reserve to some scenic view sites. This trail is not unduly testing for either driver or vehicle and thus affords the many 4x4 leisure vehicle owners the opportunity to use their vehicles to escape the more crowded tourist centres.

Fishing is permitted and excellent catches of barbel, yellow fish and carp have been

reported. A small family of hippo lives in the dam.

3.6.3.1.1 Environmental Protection and Infrastructure Programme

The Department of Environmental Affairs (DEA) through its Social Responsibility Programme has funded the People and Parks project within the Ohrigstad Dam Nature Reserve under the conservation management authority of the Mpumalanga Tourism and Parks Agency (MTPA).

The project entails constructing four (4) selfcatering chalets next to the Ohrigstad Dam as overnight visitor accommodation in the Nature Reserve.

Four (4) chalets will be constructed on the western shores of the dam overlooking the dam. It is proposed to construct log cabins of which two (2) cabins will be $133m^2$ each in size (6 beds each) and two (2) will be $113m^2$ each in size (4 beds each).

The total development area will be approximately 1 hectare in size and the area transformed by the chalets approximately 500m². The chalets will sleep a total of twenty (20) people. **Figure 22** depicts the site layout of the authorised chalets in terms of

OHRIGSTAD DAM RESOURCE MANAGEMENT PLAN



Figure 22: Site Plan of Authorised Chalets

3.6.3.2 Current Zoning Plan

MTPA is currently reviewing and updating the existing Integrated Management Plan (IMP) which was developed in 2005. The IMP encompassed the nature reserve as well as the dam.

The IMP also proposed spatial zonation including:

- Water surface zone;
- Waterfront zone; and
- Terrestrial zone.

Figure 23 depicts the current zoning plan of Ohrigstad Dam.



Figure 23: Current Ohrigstad Dam Zoning Plan

3.6.3.3 Feasibility of Identified Potential Objectives

According to DWAF (2006), the feasibility of the proposed objectives needs to be

determined in light of the local environmental conditions.**Table 12** shows the practicability of all proposed recreational objectives.

Table 12: Feasibility of Potential Recreational Objectives

KPA 1: Resource Management		
Objectives	Status Quo	Practicability
• To maintain the dam-wall infrastructure for leakages.	 The dam has a leakage at the dam-wall which affects the water level drastically. 	• DWS should develop a maintenance programme of infrastructure with National Water Resource Infrastructure Branch (NWRIB). This will assist in ensuring that assets are not left in dire state before they can be upgraded. Upgrading or fixing the leakage of the dam is of an emergency for Ohrigstad Dam.
• To have Ohrigstad Dam basin free of Alien Invasive Plants and to maintain the ecological aspect of the area.	• Several Alien Invasive Plants namely; Giant Reed, Grey and Silver Poplar, Black Wattle, Syringa, Bramble and Mulberry were identified by DEA: Working for Water programme.	• DEA WFW should incorporate Ohrigstad basin in their clearance and monitoring programme to ensure that the area is free of AIPs.
• To review and update the existing zoning plan which was conducted in 2015 during the development of ODNR IMP.	• MTPA is currently reviewing and updating the existing Integrated Management Plan (IMP) which was developed in 2005. The IMP encompassed the nature reserve as well as the dam.	• The RMP process will review the zoning plan to ensure non-conflict of water uses. The recreational activities zone should be in harmony with the approved IMP to ensure good intergovernmental relation or governance.
	KPA 2: Resource Utilization	
Objectives	Status Quo	Practicability
• To implement recreational activities in terms of the approved relevant authorizations, i.e. Environmental Authorizations.	 MTPA has been granted an Environmental Authorisation for recreational infrastructure development within ODNR. The Project was funded by Department of Environmental Affairs (DEA) through its Social Responsibility Programme. 	• The proposed Implementing Agent (AI) of the RMP should conduct a feasibility study to ascertain feasible and sustainable recreational activities in accordance to the carrying capacity, zoning as well as relevant authorisation.
 Improve safety of navigation 	• The AtoN demarcation for the dam wall safety zone has been flooded and no longer visible. Further demarcation is necessary to prevent conflict of water uses and users.	 Standardized demarcation makers are to be used to determine specific zones/areas, i.e. no go areas, safety zones, etc.

KPA 3: Benefit Flow Management		
Objectives	Status Quo	Practicability
• To ensure the participation and beneficiation of all stakeholders in the use of the dam.	 MTPA is the sole management of recreational activities within ODNR. Activities within the dam boundary should include other role players who have a mandate in using the water for recreational activities. 	• The proposed IA and Dam Management Committee should strengthen community participation and beneficiation through Public-Private Partnership initiatives.
• To incorporate other stakeholders who have the mandate and interest in using the dam for recreational use.		• DWS should develop the institutional structure which is representative of all key stakeholders.

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

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

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

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

The IRMP is broken down into four (4) main plans namely the **Institutional Plan**, **Zoning Plan**, **Strategic Plan** and **Financial Plan** as illustrated in **Figure 24**.

OHRIGSTAD DAM RESOURCE MANAGEMENT PLAN



Figure 24: Integrated Resource Management Plan

4.1 INSTITUTIONAL PLAN

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

4.1.1 Dam Management Committee (DMC)

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

One of the main functions of the DMC is to give support to the Implementing Agency (IA) in the management of the dam for recreational purposes. Moreover, to assess commercial opportunities at the dam. As such, an agenda item related to the Strategic Plan for commercialization is required. In addition, changes water in quality, developments in the area, status of Aquatic Invasive Species and education and

information programmes should be discussed. The DMC must meet quarterly.

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

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

Figure 25 illustrates the proposed user groups that will form part of the DMC.

OHRIGSTAD DAM RESOURCE MANAGEMENT PLAN



Figure 25: Proposed DMC

The DMC will have a number of management tools which will enable proper management of the dam in line with legislative requirements.

4.1.1.1 Management Tools

Terms of Reference

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

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

Agreements

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

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

Agreements between DWS and Implementing Agency (IA)

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

The minimum requirements of an IA include the following:

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

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

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

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

Safety of Navigation Agreements

In addition to its common law responsibility, DWS is, in terms of the requirements described in the National Water Act, 1998 (Act No. 36 of 1998), amongst others, responsible for the safety of GWWs and watercourses, including its dams. DWS, its delegated public sector partner, or a delegated water management institution, has therefore the responsibility to provide the required fixed and/or floating AtoN³ for general navigation.

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

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

Access Agreements

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

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

The wash bay must be built on State Property as part of the CIWSP. A formal agreement is necessary between the IA and DEA on the management and maintenance of the facility. commenting. These applications must follow a specific template and will include the following:

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

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

National Affiliations

All recreational clubs should be affiliated to a SASCOC affiliated organisation. The development targets set by the National Organisations must be met.

4.1.2 Operations Management Committee (OMC)

There is an existing Chief Director: Infrastructure Operations Management Committee (CD: 10 MANCO) within Infrastructure Operations which comprises of all directors of four (4) operations (Northern, Southern, Eastern and Central) and is chaired by the Chief Director of Infrastructure Operational within NWRI as illustrated in Figure 26.

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

Event Applications

All events must be managed through an event application process. The applications will be submitted to the IA and to DWS for

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



Figure 26: Existing CD: IO MANCO

4.1.3 National Project Steering Committee (NSPC)

NPSC is formed by DWS and is made up of representatives from National Government Departments and Implementing Agencies that are relevant in terms of managing the water resource. The primary function of the NPSC is to provide guidance on recreational water use in terms of their respective mandates as well as to ensure that continuous support by different Government Sectors is provided to the dam with the aim of achieving sustainable utilisation of the dam for recreational purposes. This NPSC should meet twice in a year. **Figure 27** illustrates a typical example of Governmental Departments that will form part of the NPSC:



Figure 27: Proposed NPSC

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

Centre for Public Service Innovation (CPSI):

The CPSI is supporting a multi-departmental working group that is developing an innovative approach to inland water and safety integrity. The project, was initiated out of the need to find an innovative, practical and cost-effective way to implement SAMSA' vessel safety regulations on inland waterways and to implement responsible water use within the broader socio-economic context of the country. The CIWSP is a project piloted by CPSI that is a partnership between multiple Government entities and between the Government and communities. The main aim of the project is to enhance the development of a best practice model to ensure safe and structured inland maritime environment and culture, whilst protecting the country's precious water resource.

<u>Culture, Arts, Tourism, Hospitality, Sport</u> <u>Sector, Education and Training Authority</u> (CATHSSETA):

CATHSSETA deals with the approval and financing of training relating to culture, hospitality, tourism and sport sectors.

Department of Agriculture, Forestry and Fisheries (DAFF):

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

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

Department of Corporative Governance and Traditional Affairs (CoGTA):

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

Department of Environmental Affairs (DEA):

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

Department of Public Works (DPW):

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

Department of Rural Development and Land Reform (DRDLR):

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

Department of Sports and Recreation (DSR):

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

Department of Tourism (NDT):

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

Department of Transport (DoT):

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

Department of Water and Sanitation (DWS):

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

National Treasury (NT):

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

South African Maritime Safety Authority (SAMSA):

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

South African Police Service (SAPS):

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

South African Sports Confederation and Olympic Committee (SASCOC):

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

4.2 ZONING PLAN

According to DWAF RMP Guideline (DWAF, 2006), a site specific master planning and zoning which describes a framework for the allocation of zones needs to be undertaken based on the results of the Encumbrance Survey and basic research regarding the Biophysical, Social and Cultural Environment as well as the objectives set by stakeholders (refer to section **3.6**).

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

4.2.1 Water Surface Zoning

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

Safety and Security Zone:

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

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

Conservation Zone:

The aim of this zone is to conserve and protect sensitive aquatic habitation at the inlet(s) of the dam. According to Section 12 and 26 of NWA, the existence of these zones

is thus not negotiable as it is imperative to protect the water resource for the purposes relating to basic human needs, environmental sustainability and water quality requirements. Access to these areas is generally not allowed due to the following:

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

Low Impact Activity Zone:

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

High Impact Activity Zone:

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

The water surface zoning colour coding mean the following:

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

OHRIGSTAD DAM RESOURCE MANAGEMENT PLAN

 Table 13: Proposed Water Surface Zoning Description

Zone Name	Permissible Activities	Non-Permissible Activities	Recommendation
 Safety and Security Zone. 	 Management of dam infrastructure Management and maintenance activities by DWS and authorised personnel 	Public access	 Area should be demarcated by dermacation makers and AtoN.
Conservation Zones.	• None	 Public activities (in order to prevent aquatic habitats disturbance). 	 Area should be demarcated by demarcation makers and AtoN. Strict management and control of these areas, especially with regards to illegal fishing and dumping. This zone extends towards the middle of the dam during drought season where the water level decreases drastically.
• Low Impact Activity Zone.	 Activities associated with no or little wakes, such as Angling Canoeing Rowing Paddle boating Sailing. Powerboats 	 Motorised boating Water Skiing House boats Para-sailing Jet skis Swimming 	 Area should be demarcated by demarcation makers and AtoN. Access to Low Impact Activity Zone will be through the medium Density Development Zone.



Figure 28: Proposed Water Surface Zoning Map

4.2.2 Shoreline Zoning⁴

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

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

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

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

Conservation / Low Density Activity Zone

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

Medium Density Activity Zone:

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

High Density Activity Zone:

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

Community Resource Zone:

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

The shoreline zoning colour coding mean the following as per the Zoning Map:

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

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

OHRIGSTAD DAM RESOURCE MANAGEMENT PLAN

Table 14: Proposed Shoreline Zoning Description

Zoning Name	Permissible Activities	Non-Permissible Activity	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: o Bird watching o Hiking 	Development	• These zone should control access to ecological sensitive areas.
• Medium Density Activity Zone.	 Camping (tent and/or caravan) Day visitors Picnic Shoreline fishing Allowed facilities: Braai facilities Ablution facilities 	 Accommodation facilities such as: Chalets Houses 	 The management of this area should follow the PPP in terms of National Treasury. All developments must be approved by IA and DWS. Requirements of NWA and NEMA must be taken into account in all developments. All developments should adhere to the approved MTPA IMP to ensure construction does not impact on dam and must blend in with the natural environment. 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.



Figure 29: Proposed Shoreline Zoning Map



Figure 30: Proposed Overall Zoning Map

4.2.3 Carrying Capacity

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

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

There are three kinds of carrying capacity:

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

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

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

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

Physical Carrying Capacity (PCC)

PCC is calculated as PCC = A ×U/a ×Rf

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

A is calculated as the area of the water surface available for public use: 99.2 ha

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

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

Based on the fact that most activities do not require much space, the average hectare per user is 2.7 ha (27 000 m²), the value of 5.0 ha (50 000 m²) can be acceptable area per user. This has been chosen in order to ensure that the dam is not overcrowded, as such impacting on the sense of the area.

The PCC for Ohrigstad Dam can further be calculated as:

PCC = $A \times U/a \times Rf$ =99.2 × 1/5 × 1 = 19.8 vessels

Real Carrying Capacity (RCC)

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

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

The above factors results in 39.68% decrease in water surface available for recreation at the dam, therefore 60.32% of the surface area of the dam is still available for recreation.

RCC for Ohrigstad Dam is therefore:

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

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

RCC = 19.8 × (100 – 39.68) %/100 = 12 vessels

Effective Carrying Capacity (ECC)

The maximum number of visitors that a site can sustain, given the management capacity (MC) available. Currently there is no formal management structure in place, as such the ECC is 0. The ECC will be calculated after the proposed Institutional structure (as part of the RMP) have been implemented in order to manage the sustainable utilization of the dam for recreational purposes.

4.3 STRATEGIC PLAN

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

The objectives were clearly defined and they effectively address the following questions:

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

In **Tables 15 – 17**, the Strategic Plan on how to achieve the identified objectives outlined.

Table 15: Strategic Plan for KPA 1: Resource Management

KPA 1: Resource Management				
Objective (What do we want)	Motivation (Why do we want to achieve this)	Action Projects (How do we achieve this)	Management Support (Who will be involved)	
MaintenanceofdamInfrastructure:• To maintain the dam-wall infrastructure.	 The dam has a leakage at the dam- wall which affects the water level drastically. 	• DWS should develop a maintenance programme of infrastructure with National Water Resource Infrastructure Branch (NWRIB). This will assist in ensuring that assets are not left in dire state before they can be upgraded. Upgrading or fixing the leakage of the dam is of an emergency for Ohrigstad Dam.	 DWS: National Water Infrastructure Branch (DWS: NWRI) with the support of MTPA (IA) and DMC. 	
 Alien Invasive Plants: To have Ohrigstad Dam basin free of Alien Invasive Plants and to maintain the ecological aspect of the area. 	• Several Alien Invasive Plants namely; Giant Reed, Grey and Silver Poplar, Black Wattle, Syringa, Bramble and Mulberry were identified by DEA: Working for Water programme.	 DEA (WfW) should incorporate Ohrigstad basin in their clearance and monitoring programme to ensure that the area is free of AIPs. Develop an inspection and cleaning mechanism such as wash bays to ensure that only alien free boats are allowed in the dam. To re-establish the native species to the area and DEA (WfW) to remove all Invasive Alien vegetation within the purchased boundary. Boat wash bay must be introduced to eliminate the spread of alien vegetation when launching the boat into the dam. 	• DEA (WfW) with the support of MTPA (IA) and DMC.	
 Update of Existing Plans: To review and update the existing Zoning Plan which was conducted in 2015 during the development of ODNR IMP. 	 MTPA is currently reviewing and updating the existing Integrated Management Plan (IMP) which was developed in 2005. The IMP encompassed the nature reserve as well as the dam. 	• The RMP process will review the zoning plan to ensure non-conflict of water uses. The recreational activities zone should be in harmony with the approved IMP to ensure good intergovernmental relation or governance.	DWSMTPA (IA)	

Table 16: Strategic Plan for KPA 2: Resource Utilisation

KPA 2: Resource Utilization				
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 adequate water supply to the local communities. 	 The community adjacent to the dam do not have access to water for domestic water use. The municipality has provided water tanks but these are often without water. 	 Include these areas as priority list in municipal plans for service delivery. Drilling of boreholes instead of transporting water from town to fill the tanks. Provide a water treatment plan for the adjacent local communities. 	• The Local Municipality has a mandate as a water service provider (WSP) through the Water Services Act, 1997 (Act No. 108 of 1997) for the purification and provision of water to the end users such as local communities.	
Recreational Activities: • To implement recreational activities in terms of the approved relevant authorizations, i.e. Environmental Authorizations.	 MTPA has been granted an Environmental Authorisation for recreational infrastructure development within ODNR. The Project was funded by Department of Environmental Affairs (DEA) through its Social Responsibility Programme. 	 The proposed Implementing Agency (IA) of the RMP should conduct a feasibility study to ascertain feasible and sustainable recreational activities in accordance to the carrying capacity, zoning as well as relevant authorisation. The involvement of the relevant industry with regards to user experience and other aspects such as safety is imperative. Environmental and other planning institutions including relevant government departments need to be consulted when establishing density controls. 	• MTPA (IA) with the support of DMC.	
 Safety of Navigation: Improve safety of navigation. 	• The AtoN demarcation for the dam wall safety zone has been flooded and no longer visible. Further demarcation is necessary to prevent conflict of water uses and users.	 Standardized demarcation makers are to be used to determine specific zones/areas, i.e. no go areas, safety zones, etc. 	• SAMSA, DWS, MTPA (IA) with the support of the DMC.	

 Table 17: Strategic Plan for KPA 3: Benefit Flow Management

KPA 3: Benefit Flow Management				
Objective (What do we want)	Motivation (Why do we want to achieve this)	Action Projects (How do we achieve this)	Management Support (Who will be involved)	
CommunityParticipationandBeneficiation:••To ensure the participation and beneficiation of all stakeholders in the use of the dam.•••To incorporate other stakeholders who have the mandate and interest in using the dam for recreational use.	 MTPA is the sole management of recreational activities within ODNR. Activities within the dam boundary should include other role players who have a mandate in using the water for recreational activities. 	 The proposed IA and DMC should strengthen community participation and beneficiation through Public-Private Partnership initiatives. DWS should develop the recreational institutional structure which is representative of all key stakeholders. 	TCLMMTPA (IA)DMC	
4.4 FINANCIAL PLAN

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

The dam is a state asset and as such all profits generated from the recreational use, should also be used to further develop the dam. People should not be denied access to the dam. All fees associated with the usage of the dam for recreation should take into account the socio-economic status of the users. The access fees should make a provision for equitable access. The information acquired from the draft RMP will be used to produce the Business Plan based on the action projects for each objective as stipulated under the Strategic Plan. However, many of the identified objectives are not of commercial nature and as such these non-economic objectives will not feature in the BP.

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

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

WAY FORWARD

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

Review of RMP

According to DWAF (2006), the RMP is reviewed and updated every five (5) years to ensure that the management objectives remains relevant and management actions are continually improved. The BP is updated annually. **Figure 31** shows the RMP & BP review framework.



Figure 31: RMP and BP Review Framework

CONCLUSIONS

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

The RMP will assist in effectively managing the dam and its surrounding environment. Furthermore its function is to implement an Institutional Plan for the effective management of dam. The focus on Institutional Plan is accompanied by a Zonal Plan which provides guidance on potential activities that are allowed on the dam, together with a Strategic Plan. The Strategic plan explains the action plans on how to achieve the identified objectives. In addition, a Financial Plan provides guidance on funding

requirements and funding options to implement the objectives of the RMP.

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

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

REFERENCES

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

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

Mpumalanga Tourism and Parks Agency (2005): Integrated Management Plan, 2005

Mpumalanga Tourism and Parks Agency (2015): Basic Assessment Report, Ohrigstad Dam Nature Reserve Infrastructure and Development. Mpumalanga Tourism and Parks Agency (2015): Specialist terrestrial assessment and impact evaluation report for the proposed construction of new chalets in Ohrigstad Dam Nature Reserve.

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

Municipal Demarcation Board (2016), Thaba Chweu Local Municipality Ward Delimitation. Ward 13 2016

APPENDICES