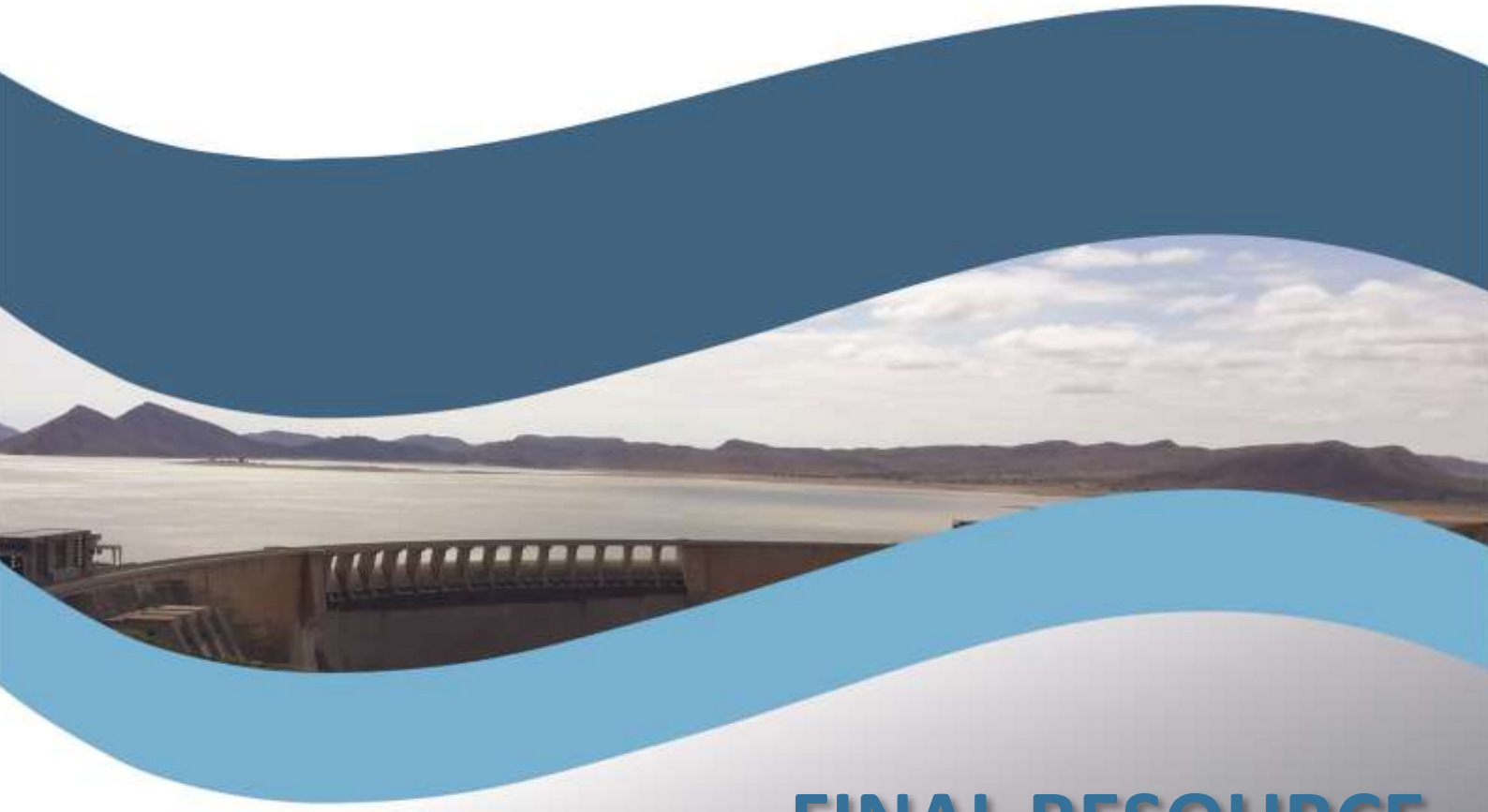

# FINAL RESOURCE MANAGEMENT PLAN

# GARIEP DAM




water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

**March 2015**

**Volume 1 of 2 – Main Report**

**Deliverable 4 of 5**

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- South African Maritime Safety Authority;
- Free State Department of Economic Development, Tourism and Environmental Affairs;
- Eastern Cape Department of Economic Development, Environmental Affairs and Tourism;
- Free State Yacht Club;
- Gariep Local Municipality;
- Oviston Resort;
- Gariep South African Police Service; and
- Joe Gqabi District Municipality.

# Title and Approval Page

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**Review:**

| Review Period | Month | Year | | | | |
|---|---|---|---|---|---|---|
| Annual Review of Business Plans | August | 2015 | 2016 | 2017 | 2018 | 2019 |
| Five (5) Yearly review of RMP | August | 2019 | | | | |

# Amendments Page

| Date | Description | Version. |
|---|---|---|
| 6 May 2014 | First Draft for DWS Review | 1 |
| 30 June 2014 | Draft RMP for PSC Review | 2 |
| 08 September 2014 | Draft RMP for Public Review | 3 |
| 15 October 2014 | Final RMP for PSC Review | 4 |
| 31 October 2014 | Final RMP for Public Review | 5 |
| 15 March 2015 | Final RMP | 6 |
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# Executive Summary

According to the Guidelines for the Compilation of Resource Management Plans (2006), the main aim of and RMP is to "attain the objectives underlying sustainability and to compile workable, functional sustainable access and utilisation plans for water resources and in particular State Dams". A Resource Management Plan is thus a planning tool aimed at working within the requirements of existing policies, while taking into account the needs and interests of stakeholders.

A Resource Management Plan can also be described as a systematic process for the sustainable development and management of a water resource in the context of social, economic and environmental objectives. One of the main functions of the Resource Management Plan process is to implement an **Institutional Plan**. The focus on institutional arrangements is accompanied by a **Zonal Plan** together with a detailed **Strategic Plan**. In addition, a **Financial Plan** provides guidance on funding opportunities and how these should be used for the improved management of the Dam. Together these components provide a comprehensive guide on the "what?"; "why?"; "how?" and "who?" of the management of prioritised Government Waterworks.

Gariep Dam is one of the largest Dams in South Africa (approximately 100 km in length, at an average of 3.74 km in width) and was built in 1965 as part of the Orange River Scheme. The main aim of the scheme is to provide a solution to chronic water shortages and to generate hydro-electricity.

The Dam supplies water to the Eastern Cape via the Great Fish River for drinking, agricultural, and, in the case of Port Elizabeth, industrial purposes. It also supplies water to the Free State and as part of the Orange River Project, one of Africa's largest irrigation projects, supplies in excess of 22 000 ha of farmland with vital water.

The Dam is also used to generate hydropower and the electricity generated at Gariep Dam feeds into the Eskom network at the Hydra Distribution Station near De Aar, which is one of the distribution stations fed by the transmission lines linking the Western Cape with the Power Stations in Mpumalanga. Furthermore, Gariep Dam supplies electricity during peak and emergency demand periods which covers emergency shortages. The Power Station produces base load energy during times of flood risk to prevent the Dam from overspilling.

The main users of the water are Eskom for hydro electrical production and Bloem Water for water supply to the Free State, Northern and Eastern Cape Provinces.

In compiling the Resource Management Plan for Gariep Dam the following process was applied.

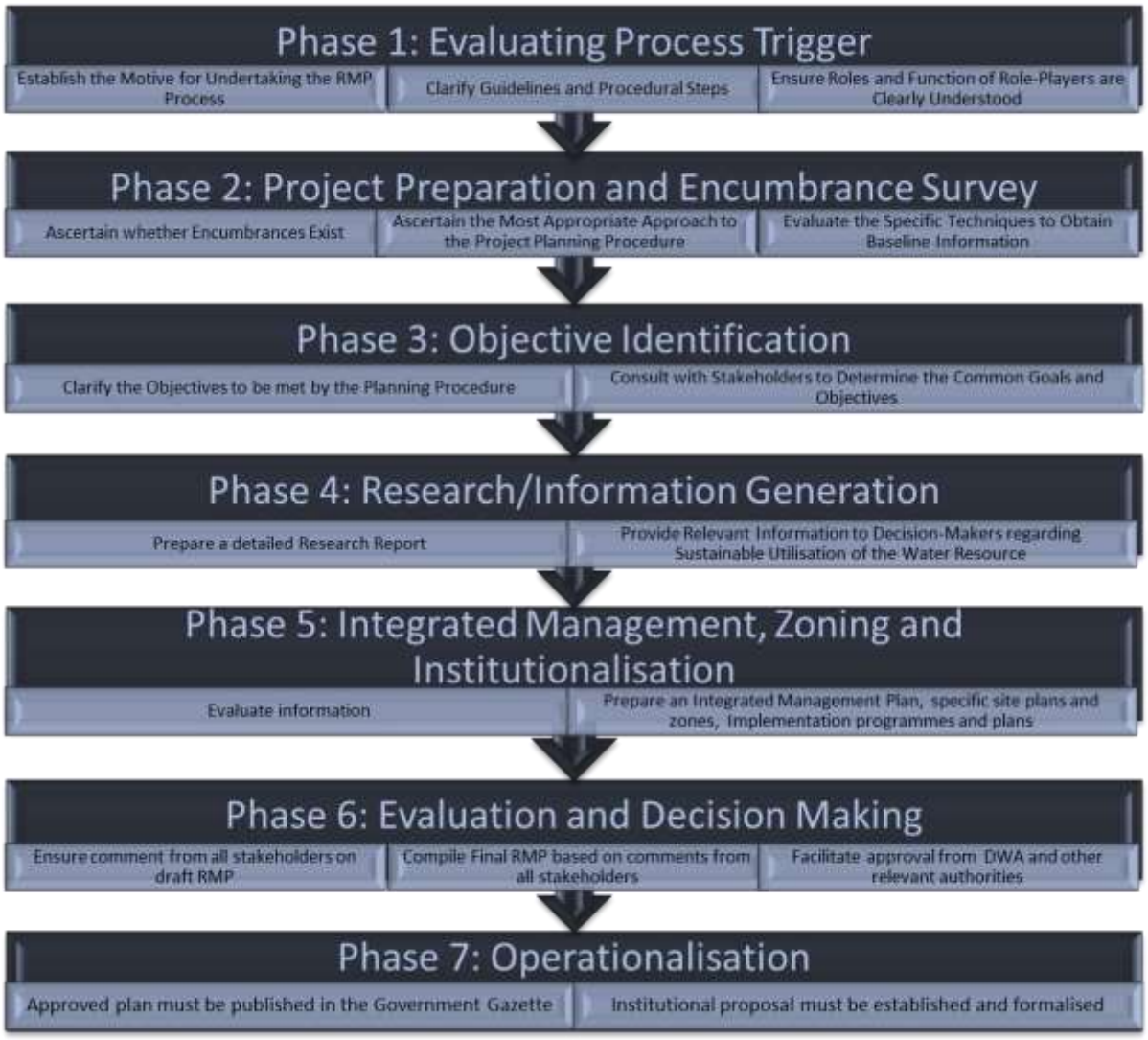


*Figure 1: RMP Process (DWA, 2006)*

It is important to note that the Resource Management Plan was compiled based on detailed stakeholder engagement and input. This formed the cornerstone of the Resource Management Plan through the establishment of a Vision for the Dam with a number of Key Objectives.

The key recommendations of the Gariep Dam Resource Management Plan are as follows:

- Implementation of the Institutional Plan including the formation of a Dam Management Committee, Operations Management Committee and Resource Management Plan Steering Committee. As part of this Institutional Plan, it is vital that all agreements are updated to take into account the findings of the Resource Management Plan;
- Implementation of standardised and harmonised Aids to Navigation and Demarcation Markers as well as the Unique Positioning Number System and the Wash Bay System at the Dam;

- Information brochures to be developed to inform communities about the potential uses of the Dam and how to join recreational clubs and societies;
- Formalised Safety System in place at the Dam including a formalised position to assist in monitoring/alerting SAPS of safety issues and formalised Safety System in place at Gariep Nature Reserve and Oviston Nature Reserve. In addition, a Personalised Locator Beacon rental system to be put in place and a Fire Management Association should be formed;
- All unofficial access points to be closed or regulated through an access agreement. In addition, all land matters to be resolved and new agreements to be drafted including agreements with Eastern Cape Department of Economic Development, Environmental Affairs and Tourism and  Free State Department of Economic Development, Tourism and Environmental Affairs to be updated. In addition, agreements between the aforementioned provincial Departments and Clubs should be drafted;
- Wash Bay Officers and South African Maritime Safety Authority Enforcement Officers to be trained (including first aid training). In addition, the  Free State Department of Economic Development, Tourism and Environmental Affairs Education Facility should be completed;
- Implementation of local community access card at Oviston Resort as well as formalised Picnic Area as well as a Public Picnic Area near the Forever Resort to be put in place. The potential for a public access area near Bethulie should also be assessed;
- Picnic Areas around Dam should be put in place;
- Potential for meat processing from Hunting and Culling to be assessed;
- Commercial fishing or Small scale fisheries to be put in place taking into account the lessons learnt from previous attempts';
- Linkage to Vanderkloof Dam and Gariep Dam to be assessed and there should be improved marketing to take advantage of the tourism potential of the Dam. This includes revitalization of the Lake !Gariep Initiative and determining the potential for a Public Private Partnership for eco-tourism and recreational activities (such as House Boats, Night Drives, Shoreline Development, hiking, horse riding and cycling trails etc.);
- Water Quality Monitoring protocol to be set up at the Dam. The potential for water quality monitoring data to be linked to the Unique Positioning Number system should be determined so that if water quality issues are noted they will activate the Unique Positioning Number system;
- Management of Alien Invasive Aquatic Species to be undertaken including education programmes regarding the impacts of alien invasive species to be put in place; and
- A Containment Plan for Invasive Fish Species such as Bass and Carp should be developed and implemented so that the economic benefits of recreational angling can be achieved without the further spread of these species to other valuable water resources.

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# Tables



# Figures

# Acronyms and Abbreviations

| | |
|---|---|
| **AA** | Automobile Association |
| **AGIS** | Agricultural Geo-referenced Information System |
| **AtoN** | Aids to Navigation |
| **BP** | Business Plan |
| **CARA** | Conservation of Agricultural Resources Act (Act 43 of 1983) |
| **CCA** | Carrying Capacity Assessment |
| **CIWSP** | Cooperative Inland Waterways Safety Programme |
| **COGTA** | Department of Cooperative Governance and Traditional Affairs |
| **CPSI** | Centre for Public Service Innovation |
| **DAFF** | Department of Agriculture, Forestry and Fisheries |
| **DEA** | Department of Environmental Affairs |
| **DEA EP NRM** | Department of Environmental Affairs Environmental Programmes – Natural Resource Management |
| **EC-DEDEAT** | Eastern Cape Department of Economic Development, Environmental Affairs and Tourism |
| **DMC** | Dam Management Committee |
| **DMR** | Department of Minerals Resources |
| **DoT** | Department of Transport |
| **DWA** | Department of Water Affairs |
| **DWS** | Department of Water and Sanitation |
| **ECPTA** | Eastern Cape Parks and Tourism Agency |
| **EEDZ** | Environmental and Economic Development Zone |
| **FS DETEA** | Free State Department of Economic Development, Tourism and Environmental Affairs |
| **FSYC** | Free State Yacht Club |
| **FSTA** | Free State Tourism Authority |
| **GGP** | Gross Geographic Product |
| **GN** | Government Notice |
| **GNR** | Gariep Nature Reserve |
| **GVA** | Gross Value Added |
| **Ha** | Hectares |
| **IALA** | International Association of Marine Aids to Navigation and Lighthouse Authorities |
| **IDP** | Integrated Development Plan |
| **I&APs** | Interested and Affected Parties |
| **LAAP** | Local Accountable AtoN Parties |
| **LAC** | Limits of Acceptable Change |
| **LED** | Local Economic Development |

| | |
|---|---|
| **LGI** | Lake !Gariep Initiative |
| **NEMA** | National Environmental Management Act (Act 107 of 1998) |
| **NEMBA** | National Environmental Management: Biodiversity Act (Act 10 of 2004) |
| **NEMPA** | National Environmental Management: Protected Areas Act (Act 15 of 2009) |
| **NWRI** | National Water Resource Infrastructure |
| **NWRI:IEE** | National Water Resources Infrastructure: Integrated Environmental Engineering |
| **NSDP** | National Spatial Development Perspective |
| **OMC** | Operations Management Committee |
| **ONR** | Oviston Nature Reserve |
| **OR** | Oviston Resort |
| **ORP** | Orange River Project |
| **PCC** | Physical Carrying Capacity |
| **PFMA** | Public Finance Management Act (Act 29 of 1999) |
| **PGDS** | Provincial Growth and Development Strategy |
| **PLB** | Personal Locator Beacon |
| **PPP** | Public Private Partnership |
| **PSDES** | Provincial Spatial Economic Development Strategy |
| **RCC** | Real Carrying Capacity |
| **RHIB** | Rigid-Hulled Inflatable Boat |
| **RMP** | Resource Management Plan |
| **ROP** | Rescue Operation Point |
| **RSC** | RMP Steering Committee |
| **RWU** | Recreational Water Use |
| **SAMSA** | South African Maritime Safety Authority |
| **SANBI** | South African National Biodiversity Institute |
| **SAPS** | South African Police Service |
| **SASCOC** | South African Sports Confederation and Olympic Committee |
| **SDF** | Spatial Development Framework |
| **SMME** | Small, Medium and Micro Enterprises |
| **SRSA** | Department of Sports and Recreation |
| **ToR** | Terms of Reference |
| **UFS** | University of the Free State |
| **UOWMA** | Upper Orange Water Management Area |
| **UPN** | Unique Positioning Number (used in the CIWSP) |
| **WMA** | Water Management Area |
| **WWTWs** | Wastewater Treatment Works |

# 1. WHAT IS A RMP AND WHY IS IT NECESSARY?

A Resource Management Plan (RMP) is a management tool which provides guidance on how recreational use at Government Waterworks, such as Dams, should be managed. RMPs focus on the current and future uses of the Dam, as well as requirements that must be met, to ensure the optimal, equitable and sustainable management of the Dam.

According to the Guidelines for the Compilation of RMPs (DWA, 2006), the main aim of the RMP is to "attain the objectives underlying sustainability and to compile workable, functional sustainable access and utilisation plans for water resources and in particular State Dams". A RMP is thus, a planning tool aimed at working within the requirements of existing Government Policy, while taking into account the needs and interests of stakeholders.

A RMP can also be explained as a systematic process for the sustainable development and management of a water resource in the context of social, economic and environmental objectives. In many ways, it shares similarities with Integrated Water Resource Management (IWRM). Hence, one of the main functions of the RMP process is to implement an **Institutional Plan** for the effective management of State Dams. The focus on institutional arrangements is accompanied by a **Zonal Plan** together with a detailed **Strategic Plan**. In addition, a **Financial Plan** provides guidance on the requirements and options for funding. Together these components provide a comprehensive guide on the "what?"; "why?"; "how?" and "who?" of the management of prioritised Government Waterworks.

The RMP lays the foundation required to consolidate objectives for the resource, within the framework of existing policy priorities. The RMP also informs decision-making which may have a direct impact on the resource. Further, the RMP creates a platform to unlock economic potential at the Dam without compromising environmental principles and recreational use of the Dam. Recreational use includes activities which range from leisure, sport to culture and religion. Although recreational use is not consumptive, it is still a major water use and needs to be managed correctly to ensure increased personal, societal and economic benefits with minimal disturbances and environmental impacts.

RMPs are managed by the National Water Resource Infrastructure Branch (NWRI) of the Department of Water and Sanitation (DWS). This Branch is tasked with developing, operating and maintaining strategic water resource infrastructure in an efficient way to ensure that the needs of the Nation are met.

The RMP also provides a platform for coordination between different spheres of government that have official mandates regarding the management of the Dam. These Departments include:

*Table 1:* Departments involved in the management of the Dam

| DEPARTMENT | MANDATE |
|---|---|
| **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 inland waterways. |
| **Department of Environmental Affairs (DEA)** | Responsible for biodiversity management within the Dam including Invasive alien species. |
| **Nature Conservation** | Responsible for the management of State Owned Land around the Dam.<br><br>In the case of Gariep Dam, the Free State Department of Economic Development, Tourism and Environmental Affairs (FS DETEA ) and the Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (EC DEDEAT) are responsible for the management of land between the full supply line and the purchase boundary. FS DETEA is also responsible for management of the surface water. |
| **Department of Water and Sanitation (DWS)** | DWS is the official custodian of all surface water in South Africa. However in the case of Gariep Dam, this function was transferred to FS DETEA. DWS is also responsible for the establishment, operation and maintenance of Government Waterworks (as per the National Water Act, 1998 (Act 36 of 1998). This includes management of Dam Safety and operation and management of Dams. |
| **South African Maritime Safety Authority (SAMSA)** | Administers and executes maritime related legislation and regulations. |

Each Government Department has its own suite of Legislation to govern the use and management of the Dam. The RMP consolidates these roles and functions into a coherent management platform.

The RMP presents the twenty-year vision of the Dam which is distilled into 5 year goals and annual Business Plans (BPs). Hence, the RMP is a tool aimed at meeting the expectations of users without sacrificing the environment.

# 2. WHERE ARE WE NOW?

## 2.1. Overview of the Water Management Area (WMA)

Due to the size of the Dam and its importance as part of the Orange River Scheme, information is provided at the Water Management Area (WMA) level instead of a catchment level.

Gariep Dam is located within the Upper Orange Water Management Area (UOWMA) and is one of the main Dams in the Orange-Vaal drainage basin. The UOWMA is predominantly in the Free State Province, but also flows through parts of the Eastern and Northern Cape Provinces. It borders on Lesotho in the east and six other WMAs.

Although, the landscape is mostly flat, between 1000 and 1500 metres in elevation, many tributaries originate at altitudes of nearly 3000 metres in the Drakensberg highlands (Alexander and van Wyk, 2005).

The climate in the WMA is cool to temperate and ranges from semi-arid to arid. Rainfall mainly occurs as summer thunder showers, and reduces dramatically from as high as 1 000 mm per year in South Africa at locations in the east to about 200 mm per year in the west. In Lesotho, which is the source of most of the water in the UOWMA, rainfall varies between 600 mm to approximately 1500 mm per year (Basson and Rossouw, 2003).

The geology mainly consists of sedimentary rocks of the Karoo Supergroup, with relatively little water bearing capacity. Soils are generally shallow with arable soils mostly found in the north-eastern areas (Basson and Rossouw, 2003).

### *2.1.1. Surface Water and River Systems*

The Orange River originates in Lesotho as the Senqu River and contributes close to 60% of surface water yield in the UOWMA. Large transfer schemes characterize this catchment, with 70% of the yield transferred to other WMAs. Transfers out of the UOWMA include transfers to the Upper Vaal WMA (Lesotho Highlands Water Project), to the Fish/Tsitsikamma WMA (Orange-Fish Tunnel) and to the Lower Vaal WMA (Orange-Vaal Transfer) and from the Orange and Caledon Rivers to the adjacent Modder-Riet catchment (River Health Programme, 2003).

Major Dams on the Orange River include the Katse, Mohale, Gariep and Vanderkloof Dams.

The overall health assessments of the rivers in the Free State Region are fair to poor. Some of the upper reaches of the river are good to fair, deteriorating downstream as the impact of human activities becomes more evident. Most of the rivers in the study area have no flow during the dry winter months (River Health Programme, 2003).

Based on information by Murray *et al.* (2011), most of the rivers in the WMA are moderately to largely modified. The most prominent modification to the instream habitat of the Orange River is the channel, bed and flow modification as a result of Gariep and Vanderkloof Dams (Heath and Brown, 2007).

Water abstraction for agricultural irrigation has influenced the flow and water quality in the catchment. The middle and lower reaches (from Kraai/Orange River confluence to Gariep Dam is critically modified as a result of flow regulation (Heath and Brown, 2007).

### *2.1.2. Land Use*

Agriculture is the major economic activity in the Orange River Basin (including the Gariep Dam area), with livestock being kept in the drier areas, and grapes and vegetables being farmed in a narrow riparian strip supported by intensive irrigation drawn from the river. There are also several mining operations in the lower reaches of the Basin.

### *2.1.3. Water Quality*

The water quality of the Orange River upstream of Gariep Dam is fairly good (River Health

Programme, 2003). However, it deteriorates downstream of Gariep Dam and particularly after the confluence of the Vaal River with the Orange River (Earle *et al.* 2005). Water quality is coupled with water quantity as the ability of the river to absorb wastes decreases with a drop in the flow volume River (Earle *et al.* 2005). Large amounts of municipal and industrial effluent are released into the Vaal River in Gauteng Rivers (Earle *et al.* 2005). This includes phosphates from sewage treatment plants, as well as nitrates from industrial processes, with a specific hot-spot around the East Rand area that includes the SASOL Secunda plant (Earle *et al.* 2005).

### *2.1.4. The Social Environment*

The UOWMA contributes approximately 5% to the Gross Domestic Product (GDP) of South Africa. The largest contributing sectors in terms of Gross Geographic Product (GGP), as per 1997 figures, are (DWAF, 2004):

- Government 24.6%;
- Finance 16.0%;
- Trade 15.7%; and
- Transport 14.4%.

There are no distinct primary drivers to stimulate strong economic growth in the WMA. Potential for economic growth can be found in the agricultural sector converting to higher value products, such as from grains to orchard crops and cut flowers, and through further processing and packaging. Growth in the transport sector, given the strategic central location of Bloemfontein, is likely to be stimulated by increasing economic activity elsewhere in the country (Basson and Rossouw, 2003).

### *2.1.5. Tourism Potential*

The Gariep Dam area has both historical and recreational tourist attractions. In particular, these include a unique combination of natural scenery, and floral diversity. Some of the more significant attractions are:

- Water sports such as skiing, wind surfing, sailing and motor boating;
- Gariep Dam Wall;
- Oviston Nature Reserve (ONR);
- Gariep Nature Reserve (GNR);
- Gariep Hydro-Power Station;
- Norvalspont Concentration Camp;
- Grave yard at Norvalspont and Bethulie;
- British Concentration Camps of the South African War 1900 - 1902;
- The longest bridge in SA is located at Bethulie and is 1 km in length;
- Hiking trails;
- Horse riding;
- Fish Hatchery;
- Collection of over 4 000 shells at 10 Tinktinkie Street;
- Quad biking at Siloam Village;
- Bird watching; and
- River rafting.

### *2.1.6. Catchment Management Agency*

There is currently no Catchment Management Agency in place.

### *2.1.7. Safety of Navigation*

In addition to its common law responsibility, DWS is, in terms of the requirements described in the National Water Act (Act 36 of 1998), amongst others, responsible for the safety of Government's waterways 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[1] AtoN for general navigation.

Furthermore, Local Accountable AtoN Parties (LAAP) and other Bodies (clubs, commercial enterprises etc.) which provide access to the Dam have a responsibility to ensure that the required fixed and/or floating AtoN are provided. These bodies are required to obtain

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

the necessary support and permission from DWS and SAMSA.

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

There are currently no adequate, standardised and harmonised fixed and floating AtoN and Demarcation Markers in place.

## 2.2. Purpose of Gariep Dam

Gariep Dam is one of many Dams built as part of the Orange River Project. The main purpose of the Dam is threefold, namely

- To secure water supply in the area;
- To provide water for irrigation; and
- To generate hydro-electricity.

The Dam is the central structure of the original Orange River Project which involves the supply of water to parts of the Vaal, Fish and Sundays Catchments, including the 82 km Orange–Fish transfer tunnel from Gariep Dam to Grassridge Dam (located on a tributary of the Great Fish River).

Gariep Dam serves to generate hydropower (Eskom), capable of providing up to 360 MW of electricity at a flow rate of 800 m3/s (four generators, each having the capacity of 90 MW at a flow rate of approximately 200 m3/s), served by the outlet structure on the left flank of the Dam. However, both outlet structures are used for controlled releases.

The Dam also supplies water for irrigation along the Orange River, as well as a 2.8 Ml per day of water to Bloem Water for treatment and distribution to the Gariep area (Bloemwater, 2013).

*Table 2: Orange River Basin Water Requirements including Requirements from Gariep Dam (http://www.dwaf.gov.za/orange/waterreq.aspx)*

| Description of water requirement | Annual requirement (million $m^3$/a) |
|---|---|
| **Irrigation** | |
| Upstream of Gariep (36 400 ha) | 395 |
| Supplied locally in Riet and Modder (7 100 ha) | 70 |
| *Directly from Gariep and Vanderkloof (24 300 ha)* | *278* |
| To Eastern Cape through Orange/Fish Tunnel (52 700 ha) | 627 |
| Lower Orange River in South Africa (63 790 ha) | 751 |
| Lower Orange River in Namibia (2 270 ha) | 39 |
| Total from the Orange River excluding the irrigation in the Vaal River basin upstream of the Vaal/Riet confluence (179 640 ha) | 2 160 |
| **Urban/Industrial Demands** | |
| Orange River upstream of Vanderkloof Dam | 70 |
| Eastern Cape demands through Orange/Fish Tunnel | 20 |
| *Downstream of Vanderkloof Dam including Namibia* | *40* |
| Total urban/industrial demands | 130 |
| **Other Requirements/return flows** | |
| Environmental | 300 |
| River evaporation losses (varies with flow) | 960 |
| Return flows from irrigation | -50 |
| Total other requirements | 1 210 |
| Total Orange River Requirements | 3500 |

## 2.3. Overview of the Dam

The Gariep Dam falls within two local municipalities: the Gariep Local Municipality (LM) and the Kopanong LM. The Dam falls within the Xhariep and the Ukhahlamba District Municipalities. As discussed in the previous sections, it also falls within the UOWMA. Table 3 provides an overview of the catchment and the Dam whilst Figure 2 provides the location of the Dam.

*Table 3:* Overview of Gariep Dam

| **Dam Characteristics** | |
|---|---|
| Year of completion | 1971 |
| Purpose of the Dam | Irrigation, water supply and power generation |
| River | Orange River |
| Nearest Town and Province | Venterstad (Eastern Cape) and Bethuli (Eastern Cape) |
| Type | Arch-gravity Dam |
| Net Storage capacity | 5 340 000 megalitres |
| Wall height | 88 m |
| Crest length | 924 m |
| Material content of Dam wall | Concrete |
| Type of spillway | Radial Gates which discharge floodwaters into 6 chute spillways |
| Capacity of spillway | 8 100$m^3$/s |
| Surface area of Dam at full supply | 374 $km^2$ (37 400 ha) |
| Owner, designer and construction | DWS |

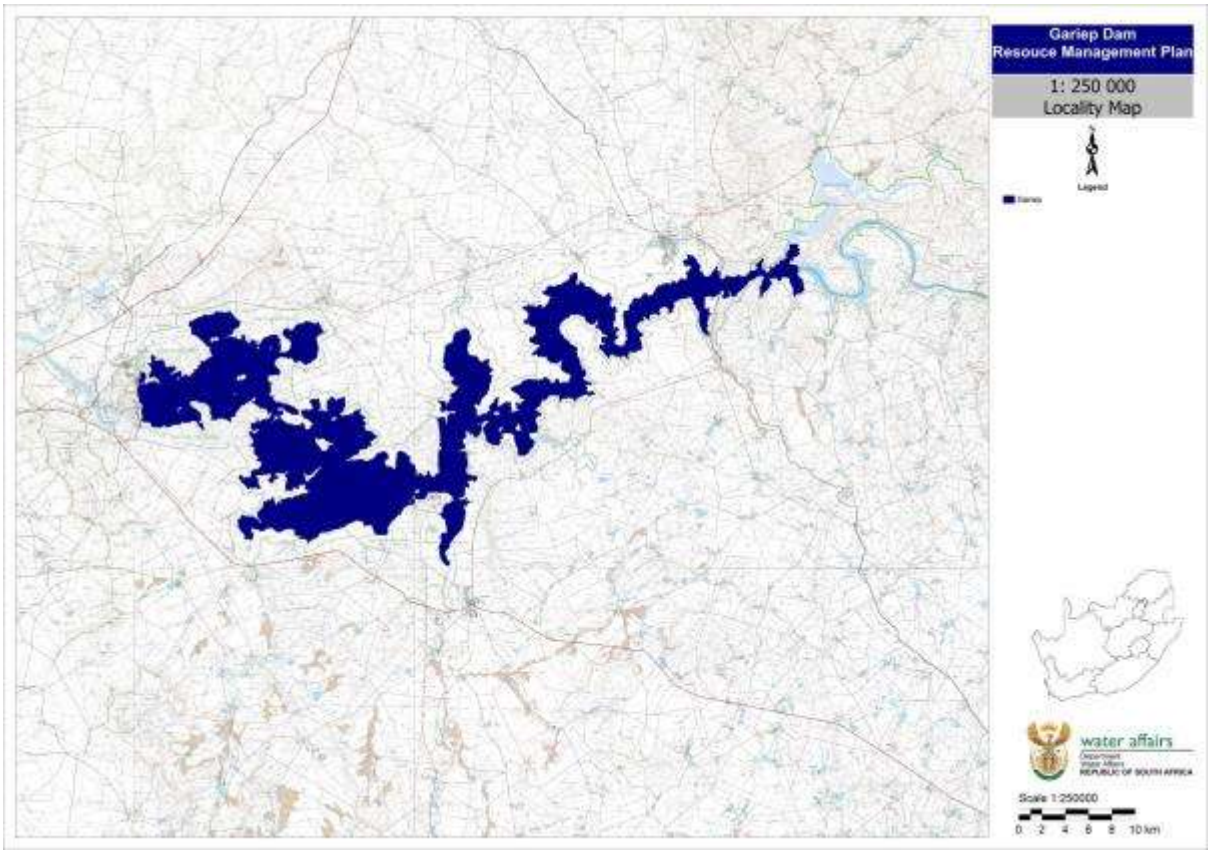


*Figure 2: Location of Gariep Dam*

## 2.4. Legislative Framework

The RMP forms the overarching framework for the management of Gariep Dam. It is informed by relevant policy, legislation and planning documents administered by other Government Departments. Similarly, these Government Departments are required to use the RMP to inform the development of future policy, legislation and planning documents.

The Gariep Dam RMP was informed by the following policies, legislation, frameworks and strategies:

- Constitution of the Republic of South Africa, (Act 108 of 1996);
- National Water Act (Act 36 of 1998);
- Municipal Systems Act, 2000 (Act 32 of 2000);
- The Development Facilitation Act, 1995 (Act 67 of 1995);
- Communal Land Right Act, 2004 (Act 11 of 2004);
- Restitution of Land Rights Act, 1994 (Act 22 of 1994);
- Intergovernmental Relations Framework Act, (Act 13 of 2005);
- Disaster Management Act, 2002 (Act 57 of 2002);
- Water Services Act, 1997 (Act 108 of 1997);
- State Land Disposal Act, 1961 (Act 48 of 1961);
- Land Administration Act, 1995 (Act 2 of 1995);
- Environment Conservation Act (Act 73 of 1989);
- National Environmental Management Act (NEMA) (Act 107 of 1998);
- National Environmental Management Air Quality Act (Act 39 of 2004);
- National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004);
- National Environmental Management: Protected Areas Act (Act 57 of 2003);
- National Environmental Management: Waste Act (Act 59 of 2008);
- National Veld and Forest Fire Act, (Act 101 of 1998);
- Minerals and Petroleum Resources Development Act (Act 28 of 2002);
- National Heritage Resources Act (Act 25 of 1999);
- Conservation of Agricultural Resources Act (Act 43 of 1983);
- Tourism Act (Act 72 of 1993);
- South African Maritime Safety Authority Act (Act 5 of 1998);
- National Sport and Recreation Act (Act 110 of 1998 as amended);
- Safety at Sports and Recreational Events Act (Act 2 of 2010);
- Game Theft Act, (Act 105 of 1991);
- Merchant Shipping (National Small Vessel Safety) Regulations, 2007
- NEMA EIA Regulations (2010);
- (Free State) Nature Conservation Ordinance, (Act 8 of 1969);
- The Free State Tourism Authority Act, 2011 (Act 4 of 2011);
- Northern Cape Tourism Entity Act, 2008 (Act 5 of 2008);
- Nature and Environmental Conservation Ordinance, 1974 (No 19 of 1974);
- Eastern Cape Parks and Tourism Agency Act, 2010 (Act 2 of 2010).
- South African National Biodiversity Institute (SANBI) Biodiversity GIS information;
- Sport and Recreation SA Strategic Plan - 2011-2015;
- Provincial Conservation Plan; and
- Provincial State of the Environment Report.

The Section below provides an overview of how the RMP has considered some of key policies, legislation and strategies.

### *2.4.1 National Water Act (Act 36 of 1998)*

The Act aims to ensure that the Nation's water resources are protected, used, developed, conserved, managed and controlled in ways which take into account (amongst other factors):

- Meeting the basic human needs of present and future generations;
- Promoting equitable access to water;
- Redressing the results of past racial and gender discrimination;
- Promoting the efficient, sustainable and beneficial use of water in the public interest;
- Facilitating social and economic development;
- Providing for growing demand for water use; protecting aquatic and associated ecosystems and their biological diversity;
- Reducing and preventing pollution and degradation of water resources;
- Meeting international obligations;
- Promoting Dam safety; and
- Managing floods and droughts.

Further, Section 113 of the Act makes provision for the recreational use of Dams. It further allows that the Minister may control or prohibit access to Dams and make reasonable charges for the a.) use of; b.) entrance into; and c.) use of any water surface or land associated with any Government Waterworks for recreational purposes.

The definition of water use in the Act includes the use of water for recreational use (Section 21k). Based on this requirement, the Department has published guidelines for recreational use of water and requires the following:

- DWS structures or infrastructure in and around water resources need to be constantly protected and maintained;
- Enforcement through mechanisms such as a Zonal Map, which is developed as part of the RMP process, is essential to resolve conflict amongst users both within the recreational water use; e.g. skiing vs. angling, or with other uses; e.g. agriculture;
- An appropriate degree of policing of irresponsible use should be maintained;
- Establishing water management institutions for the water resource users allows the institutions to charge for their activities therefore improving management and policing which instils a sense of ownership and responsibility among users; and
- Involving Public Private Partnerships (PPPs) could address commercial use but also assist with safety management at the Dam.

Once the RMP has been gazetted, 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 including the Merchant Shipping (National Small Vessel Safety) Regulations, 2007, The National Water Act, 1998 (Act No 36 of 1998), 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 and the relevant provincial ordinances.

According to DWAF (2007) Internal Guideline: Generic Water Use Authorisation Application Process, the term Recreational Water Use (RWU) encompasses the uses of water, including the surface, for:

- The exclusive purpose of sport, tourism or leisure;

- Personal or commercial recreational water use; and
- Activities which contribute to the general health, well-being and skills development of individuals and society.

In addition, the only water use entitlement that currently applies to RWU is Schedule 1 of the Act. Currently the Act is silent on Commercial RWU (although the Strategic Plan for Commercialisation (2009) does deal with Commercial RWU) and thus it is necessary for the RMP to provide guidance this regard.

### *2.4.2 GN 654 of May 1964*

The only Departmental Regulations limiting RWU at Government Waterworks is Government Notice R654, dated 1 May 1964.

These Regulations are read together with section 113 of the National Water Act (Act 36 of 1998) and only apply to the water surface and surrounding State Land of a State Dam, and not to other water resources.

The Regulations provide guidance on access control, use of firearms and other weapons, speed limits, parking areas, trading, reserved areas, fire management, hygiene, camping and accommodation, access to works, photography, safety rules, reckless and unseemly conduct, damage to property, prohibited areas, protection of fauna and flora, swimming, angling, boat Regulations, water skiing and hydroplaning; and general rules.

### *2.4.3 Water Services Act (Act 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 management of the Dam cannot compromise the purpose of the Dam especially if it is for domestic water supply.

### *2.4.4 National Environmental Management Act (Act 107 of 1998) as Amended*

The National Environmental Management Act (Act 107 of 1998), or NEMA, as it is simply known, is the foundation piece of legislation for environmental management in South Africa.

Section 2 of the Act has the largest impact on the RMP in that future development and management of the Dam must ensure the following:

- The disturbance of ecosystems and loss of biological diversity both in and around the Dam must be avoided, or, where they cannot be altogether avoided, are minimised and remedied;
- Pollution and degradation of the Dam is avoided, or, where it cannot be altogether avoided, is minimised and remedied;
- The disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;
- Development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised;
- A risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and
- Negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.

Coupled with these considerations, the following is stipulated with regards to integrating social and economic aspects into the purely biophysical aspects of the environment:

*"Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option."* ***(National Environmental Management Act, 1998 (Act 107 of 1998)***

### *2.4.5 National Environmental Management: Protected Areas Amendment Act (Act 15 of 2009)*

The National Environmental Management: Protected Areas Amendment Act (NEMPA) (Act 15 of 2009) ensures the protection and conservation of ecologically viable areas in the country. It further seeks to achieve co-operative environmental governance and to promote sustainable and equitable utilisation and community participation.

### *2.4.6 The National Environmental Management: Biodiversity Act (Act 10 of 2004)*

The National Environmental Management: Biodiversity Act (NEMBA) (Act 10 of 2004) provides for the consolidation of biodiversity legislation through establishing national norms and standards for the management of biodiversity across all sectors and by different management authorities.

Chapter 4, Part 2 of the Biodiversity Act provides a listing of species as threatened or protected. If a species is listed as threatened, it must be further classified as critically endangered, endangered or vulnerable. The Act defines these classes as follows:

- **Critically endangered species:** any indigenous species facing an extremely high risk of extinction in the wild in the immediate future.
- **Endangered species**: any indigenous species facing a high risk of extinction in the wild in the near future, although it is not a critically endangered species.
- **Vulnerable species**: any indigenous species facing an extremely high risk of extinction in the wild in the medium-term future; although it is not a critically endangered species or an endangered species.
- **Protected species:** any species which is of such high conservation value or national importance that it requires national protection. Species listed in this category will include, among others, species listed in terms of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Certain restricted activities are regulated on listed species using permits by a special set of regulations published under the Act. Restricted activities regulated under the Act are keeping, moving, having in possession, importing and exporting, and selling. The first list of threatened and protected species published under NEMBA was published in the government gazette on the 23rd of February 2007 along with the Regulations on Threatened or Protected Species. Many Dams around South Africa are likely to have threatened or protected species. The management of these species in line with NEMBA must be taken into account in the RMP and by managers at the Dam.

### *2.4.7 National Environmental Management: Biodiversity Act (Act 10 of 2004): Alien and Invasive Species Lists, 2014 (GN 599 of 2014)*

The Alien and Invasive Species Lists were promulgated on 1 August 2014. They provide certain prohibitions of use of Invasive alien species. This includes Catch and release of a specimen of a listed invasive fresh-water fish or listed invasive fresh-water invertebrate species. However certain exemptions apply depending on the area and species in question. The details are

provided in Notice 3 of the Species List and include:

| Species | Category/Area |
|---|---|
| Large-mouth bass | a. 2 in National Parks, Provincial Reserves, Mountain Catchment Areas and Forestry Reserves declared in terms of the Protected Areas Act.<br>b. 3 in all rivers, wetlands, natural lakes and estuaries in which it occurs.<br>c. 2 for conveying, moving or otherwise translocating a live specimen.<br>d. Large-mouth bass is not listed for dams within discrete catchment systems in which it occurs (excluding (a) above). |
| Common carp | a. 1b in National Parks, Provincial Reserves, Mountain Catchment Areas and Forestry Reserves declared in terms of the Protected Areas Act.<br>b. 2 for release into a dam within a discrete catchment system in which it occurs.<br>c. 3 in all rivers, wetlands, natural lakes and estuaries in which it occurs.<br>d. Subject to b, common carp is not listed for dams within discrete catchment systems in which it occurs. |

The Dam does occur in a protected area although some exemptions do apply for both bass and carp.

### *2.4.8 The National Environmental Management: Biodiversity Act (Act 10 of 2004): Alien and Invasive Species Regulations (GN 33683 of 19 July 2013)*

The Alien and Invasive Species Regulations require the development and coordination of Species Management Programmes for all Invasive Species listed in Category 1B.

These species management programmes must stipulate the following:

- The listed invasive species to which it relates;
- The measures to eradicate or control the listed invasive species;
- The areas in which the measures are to be applied; and
- The schemes to fund the measures, if applicable.

Species monitoring, control and eradication plans are also required and the Department will publish guidelines on the compilation of these documents within a year of the publication of the regulations.

The Regulations provide for a register of alien and listed invasive species to be compiled. In addition, all research on invasive species needs to be lodged. This has implications for the RMP as any small-scale fishery proposals or alien invasive management plans will need to be approved in line with these regulations.

### *2.4.9 The Municipal Systems Act (Act 32 of 2000)*

The Municipal Systems Act (Act 32 of 2000) serves to provide the framework to enable municipalities to ensure access to essential services to their citizens. The Act gives priority to the basic needs of the community, but also gives local government the freedom to set tariffs, and charge for services independently of other municipalities, providing that decisions made are in the best interest of the community.

The Act is of particular relevance to the RMP process, as it requires integrated planning from all spheres of government to ensure equitable and accessible municipal services. This means that any planning or policy-making must be in line with local government policies, planning and initiatives.

### *2.4.10 Conservation of Agricultural Resources Act (Act 43 of 1983)*

The Conservation of Agricultural Resources Act (CARA) (Act 43 of 1983) seeks to provide for the conservation of natural agricultural resources by maintaining the production potential of land, combating and preventing erosion and weakening or destruction of water resources, protecting vegetation and combating weeds and invader plant species.

Given that much of the land surrounding the Dam is State Owned Land it needs to be managed in such a way that it reduces the threat and spreading of invasive alien species.

In addition, Invasive Alien Plants are known to use significant volumes of water in correlation to the plants biomass and thus affect the volume of water available for use.

### *2.4.11 Public Finance Management Act (PFMA) (Act 29 of 1999)*

The object of the Act is to secure 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.

### *2.4.12 Treasury Regulations of 15 March 2005*

Section 76 of the Public Finance Management Act (PFMA) (Act 29 of 1999) provides for the making of Regulations for governing the efficient use and financial management of State Resources.

Section 16 of the Treasury Regulation provides guidance on PPP including the process that needs to be followed, procurement and management of PPPs.

### *2.4.13 Safety at Sports and Recreational Events Act (Act 2 of 2010)*

The purpose of the Safety at Sports and Recreational Events Act (Act 2 of 2010) is to provide measures to safeguard the physical wellbeing and safety of people at at sports, recreational, religious, cultural or similar events held at stadiums, venues or along a route. It also provides for the accountability of event role-players. The Act also provides for Access Control Officers which can be appointed by the Event Organisers. These officers control access of both people and motor vehicles to an event and prevent a person from entering or requesting that a person leaves should the need arise. The act also allows for Peace Officers to be in charge of search and seizures at an event.

The Act also specifies that an Event Planning and Safety Committee must be set up for all events categorized as medium or high risk. This committee should include the following stakeholders:

- The National Commissioner or an authorised member;
- A local authority disaster management department or centre;
- A controlling body, in respect of high-risk events only;
- A stadium or venue owner;
- The event organiser; and
- An emergency service provider.

### *2.4.14 Merchant Shipping (National Small Vessel Safety) Regulations (GN.R 705 of 8 August 2007)*

The National Small Vessel Safety Regulations, 2007 were promulgated under Section 356 of the Merchant Shipping Act (Act 57 of 1951) and provides a number of requirements including:

- Vessel Safety Requirements;
- Crewing; and
- Requirements for Water Skiing.

It also provides for the provision of an Enforcement Officer who can go aboard a vessel and search it and take possession of any intoxicating drugs or liquor. The Enforcement Officer may also request that the Identification Documents, Skipper's Licenses etc. be produced. The Officer may also direct the movement of the Small Vessel where necessary.

### *2.4.15 South African Maritime Safety Authority Act (Act 5 of 1998)*

One of the South African Maritime Safety Authority's (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.

#### 2.4.16 *Provincial Parks Board Act (Act 12 of 2003)*

Provincial Parks Board Act, 2003 provided for the establishment of the Eastern Cape Parks and Tourism Agency (ECPTA) now called EC-DEDEAT as a Public Entity.
The EC-DEDEAT mandate is to ensure biodiversity conservation and sustainable utilisation of natural resources inside the province's Nature Reserves. As EC-DEDEAT is responsible for the management of ONR, the Act has implications on the management of the Dam.

#### 2.4.17 *Nature and Environmental Conservation Ordinance (No 19 of 1974)*

The aim of the Nature and Environmental Conservation Ordinance, 1974 was to consolidate and amend the laws relating to nature and environmental conservation including the establishment of the Department of Nature and Environmental Conservation, establishment of provincial and local nature reserves, protection of fish in inland waters, management of angling, management of noxious aquatic weeds and protection of wildlife and flora.

#### 2.4.18 *Eastern Cape Parks and Tourism Agency Act (Act 2 of 2010)*

The aim of the Act is to provide for the establishment of the ECPTA in order to develop and manage protected areas, to promote and facilitate the development of tourism in the Province and to confer powers, functions and duties upon that Agency; to provide for the management thereof by a Board and the appointment of members thereof; to establish the Eastern Cape Tourism Development Fund and the Eastern Cape Biodiversity Conservation and Development Fund; to provide for the registration of certain persons and amenities involved in tourism; to provide for the collection of levies in respect of registered persons and amenities; to provide for the inspection of premises.

#### 2.4.19 *The Free State Tourism Authority Act, 2011 (Act 4 of 2011)*

The Free State Tourism Authority Act (Act 4 of 2011) mandates the Free State Tourism Authority to achieve four important goals, namely:

- Marketing of tourism,
- Promotion of tourism;
- Development of sustainable tourism within the province; and
- Promotion of major sports events to promote tourism.

#### 2.4.20 *(Free State) Nature Conservation Ordinance, (Act 8 of 1969)*

The Act provides for the conservation of fauna and flora and the hunting of animals. The Act also deals with fishing, the requirement for fishing licenses and management of Nature Reserves. As Gariep Dam is within the GNR the Act needs to be taken into account

## 2.5. Existing Plans

An RMP cannot function in isolation and so all associated planning initiatives must be considered and used to inform the development of the RMP.

The following planning initiatives of both Local Municipalities and both Provinces were taken into account in developing the RMP:

- The Integrated Management Plan for Gariep Nature Reserve;
- The IDP of Gariep and the Kopanong Local Municipality;
- Free State and Eastern Cape Provincial Growth and Development Strategy (PGDS);
- Spatial Development Framework (SDF;
- Local Economic Development Plans;
- Water Services Development Plans;
- Land Use Management Plans;

- Provincial Integrated Environmental Management Plan;
- The Strategic Framework of Water Services, 2003;
- The Provincial Spatial Economic Development Strategy, 2003;
- National Spatial Development Perspective, 2006; and
- The Cooperative Inland Waterways Safety Programme (CIWSP).

In addition, a number of tourism plans and initiatives have been developed and are detailed below.

Figure 3 below provides an overview of how the RMPs is informed by existing plans at different spheres of government.


*Figure 3: Relationship between the RMP and Planning Initiatives*

### *2.5.1. Lake !Gariep Initiative*

Another important aspect of the development potential is the Lake !Gariep Initiative (LGI) which aimed to build cooperation and economic development, by focusing on key sectors such as tourism, agriculture and poverty alleviation programmes around the Gariep Dam.

The LGI has its earliest beginnings in the cooperation between nature reserves that surround the Dam. Amalgamation of these reserves was identified as an opportunity as early as 1996, when a management plan was developed for the Gariep Complex. It was anticipated that the amalgamation of nature reserves could improve the promotion of the region and drive economic development, through improved tourism facilities and game management. The amalgamation would aim to increase the biodiversity, increase community involvement, manage the recreational opportunities and activities, provide infrastructure to support recreational users, achieve a co-operative utilization of resources and with the least impact on the environment in the reserves (Schultz, 1997). The Gariep complex amalgamation would act as a catalytic project for the establishment of the proposed LGI.

The second phase of LGI was the Tri-District Alliance; a forum of neighbouring district and local municipalities, sector departments and the private sector. The forum was initially created out of the need to discuss access to water rights from the Gariep Dam, during a particularly severe drought for Eastern Cape farmers. It developed into a forum to discuss local planning and implementation issues. A sub-committee was later established to look at formalising the relationship and cooperation between the entities. The forum developed a concept document for the development of the area; the concept was of an Environmental and Economic Development Zone (EEDZ) and associated projects

The initiative is between the three provincial governments that border the Gariep Dam: the Free State, Northern Cape and Eastern Cape and the three District Municipalities of these adjoining provinces. The District Municipalities involved in the LGI are Xhariep in the Free State, Joe Gqabi (formerly Ukhahlamba) in the Eastern Cape and Pixley ka Seme in the Northern Cape. According to the LGI Management Strategy (Bopa-Lesedi, 2006) the concept was developed out of a need from communities, municipalities and provincial government structures to integrate conservation and development initiatives around the Gariep Dam Complex into a single initiative for the development of the area and the promotion of poverty alleviation (Crozier, 2011).

The LGI focusses on the potential of cross-border cooperation around tourism. There are a number of tourism establishments surrounding the dam, which include the ONR; GNR and Tussen die Riviere. Gariep Town's small but growing tourism sector consists of hotels, resorts and bed and breakfasts. The main reason for tourists to visit the dam is to over-night between Johannesburg and Cape Town on the N1. The Dam is located close to the N1, between Johannesburg and Cape Town. The most well developed tourism markets in the area are Gariep Town and Colesberg. Colesberg is an established stop-over destination for travellers on the N1 and the gateway for the Lake Gariep region. The smaller towns that surround the dam offer accommodation, but lack product development and variety in comparison to Gariep Dam and Colesberg. There is the potential to link up the more established tourism centres such (Gariep Town and Colesberg) with the smaller towns around the Dam so as to increase tourists to the region. Thus regional cooperation through the LGI was identified as a means of marketing the area, improving infrastructure and product development (Crozier, 2011).

Crozier (2011) assessed the tourism sector in the study area through analysis of product marketing materials, interviews with product owners and analysis of previous tourism surveys and found the following:

- The majority of establishments interviewed were not graded (60%). Those who were graded, were graded through the South African Tourism Grading Council, the Automobile Association (AA) or ECPTA;
- The analysis of the supply of accommodation within study area

indicates that Gariep Town and Colesberg are the most established nodes, with a greater number of accommodation facilities. Gariep Dam has a wider variety of accommodation types such hotels, resorts, self-catering and bed and breakfasts;

- Towns with fewer accommodation establishments included Bethulie and Steynsburg;
- Permanent employment was on average higher in Colesberg and Steynsburg per establishment, when compared to bed and breakfasts in a similar accommodation type. Overall the Gariep town, including employment at the resort, had the highest direct employment;
- The high season was December to January; the summer school holidays, with Easter school holidays and long weekends in March and April also popular.The summer months also allow leisure travellers to enjoy boating, swimming and water based activities around the dam;
- The most popular average length of stay is one night (76%) followed by four nights or more (12%). Thus the region was in line with it being a stopover destination, especially for holiday-makers during December and January holidays. It was also popular with those who stayed for longer periods usually as part of a caravanning, camping or family resort style holiday, where the attractions of the area could be enjoyed;
- Sixty-eight percent (68%) of products have been established in the last ten years; 12% in the last three years and 12% in the last twenty years. Eight percent (8%) were established more than twenty years ago. Thus the sector is one that has seen growth in the last ten years in the number of establishments; it also has long established products and new market entrants. Thus it could be said to have a growing tourism sector;
- The most prevalent accommodation type was bed and breakfasts (35%), followed by guest houses (30%), self-catering (22%), hotels (9%) and camping and caravan parks (4%);
- On average 94% of tourists are domestic and 6% are international visitors;
- Key activities undertaken by visitors that were mentioned include visiting the Gariep Dam (48% of visitors), game viewing (40%), fishing (36%), birding (24%), boating (16%), horse trails (12%) and historical sites (12%).Thus the key activity undertaken by most visitors to the region is a visit to the Gariep Dam. Thereafter fishing, birding and boating are popular activities; and
- Eighty-four percent 84% of respondents belonged to a tourism association. The most popular association was the Lake !Gariep Tourism Association (65%) followed by Free State Tourism Association (10%) and Eastern Cape Tourism Association (10%).

Further, the geographical extent of the study area means that route tourism with a common link - that being the Gariep Dam - is needed to draw tourists to small towns and increase their length of stay. This is especially true for towns that are further from the national routes. These towns include Bethulie, Oviston, Steynsburg and Venterstad. A well marketed route and effective destination tourism marketing campaign is needed to draw tourists to these towns.

Attractions that were not mentioned at all by product owners in terms of activities that tourists undertook included visiting the water control tower or the Orange Fish river tunnel. Visiting the Gariep Dam, formed part of the itinerary of 48% of all visitors to the area and was thus by far the most popular activity. The other activities which offer access to engineering attractions and could also be of interest to these visitors were thus promoted or developed as attractions. The Gariep Dam is enjoyed as a passive activity by many and as an activity to those who water-ski, fish or take part in water sports. Thus the area experiences a high

degree of seasonality, with summer holidays being the most popular periods to visit. The potential of additional activities could be considered along with product development to offer all year round enjoyment of the dam (Crozier, 2011).

### *2.5.2. DEAT Lake !Gariep Tourism Project*

In 2001 representatives of the Eastern Cape Department of Economic Affairs, Environment and Tourism (DEDEA) met with the MEC for Economic Affairs and local stakeholders. At this meeting the need for a project to promote tourism development in the region was identified. An application was lodged for Poverty Relief Funding with the National Department of Environmental Affairs and Tourism (DEAT). R2.8million was granted by the national department and administered by DEDEA for the development of several projects (Tshani Consulting, 2004). The project aimed to establish a community based tourism programme based a number of projects:

- Cultural Centre Venterstad;
- Refurbishment of Caravan Park in Oviston; and
- Establishing a Community Fisheries project (Tshani Consulting, 2004).

The project advised the establishment of three Public Private Partnerships (PPP) to operate the three identified community projects. The programme resulted in:

- Rehabilitation of the Caravan Park and day visitor centre and the construction of two chalets; and
- Establishment of a Community Fishery.

Other opportunities identified as part of the project was a marketing plan for the region, *Gateway* signage and a proposal for the funding of a houseboat venture on the Gariep Dam (Tshani Consulting, 2004).

The fisheries project was started and later collapsed only to be revived again. It is not operational at present. The reasons for operational problems appear to be community institutional challenges. The cultural centre was never implemented, as the identified private partners were unable to secure finance and the municipality did not enforce deadlines on performance (Wanklin, 2011).

The key challenges faced with this implementation programme were around the unique requirements of the grant and the ability of community structures to take the project forward:

- The funding was prescriptive in terms of the need to establish business organisations: A disadvantage of the DEAT funding requirements was that it was compulsory for the business organisations to be established before the project started. The report identifies this as a serious challenge as it rushed enterprise development and forced establishment when additional training was necessary;
- The institutions formed were to be made inappropriate by changes in legislation: Aspects that hampered the sustainability of these projects were changes in legislation that made the Lake !Gariep Development Foundation, the apparatus for organising tourism and other LED projects in the region inappropriate;
- Lack of capacity at municipal level: There was a lack of capacity in the Gariep Municipality, to manage financial and legal aspects of the partnerships. The houseboat venture was affected by a legal dispute between the municipality and the operator, and was closed;
- Community Governance issues: were unable to be resolved around the Fisheries project which was unable to continue its operations; and
- Deadlines were not enforced with private partner: as the Gariep Municipality did not enforce deadlines for the identified private partner to secure its financial contribution, this caused the process to drag on and did not allow for another investor to be sought.
- Insufficient funds were left for the Gateway signage project.

The Tri-District Alliance had identified integrated projects for development, these projects were located around Lake !Gariep and as such involved locations in the Northern Cape, Eastern Cape and Free State. The projects that were identified included:

- Route Signage;
- Management Plan for Van der Kloof Resort;
- Upgrading of the !Gariep Resort;
- Promotion of information and marketing of Lake !Gariep, including information centres;
- Information Centre in Bethulie; and
- The Oviston Nature Reserve and Management Plan (Atkinson, 2008).

According to Crozier (2011), the key challenges that were experienced with this project included:

- Stakeholders felt the service provider awarded the project, was foisted on them and was not familiar with the area or able to build on the successes of the previous project. Local Government was not included in the appointment or drafting of the Terms of Reference, and were not provided a role in the project implementation. The service provider was answerable only to DEAT and as such local knowledge and expertise were not utilised. The service provider lost credibility with the community and was accused of playing the one municipality off the other;
- Jealousies and conflict over employment on projects arose. There were efforts to steer employment opportunities to a particular constituency;
- Work was incomplete and poorly undertaken. Three incomplete buildings were constructed at the Lake !Gariep Resort; two chalets and an office. Funding is still to be spent to redress the incomplete chalets. The need to access additional funding for a completed project reduces the effectiveness of the project and reduces the momentum of tourism development in the region. The project completed in 2008 has left municipalities and the private operator with the burden of sourcing additional funding to repair the chalets; and
- Poor positioning of projects: The Bethulie Tourism Centre was placed in a location far from the main road, the established tourism attractions and off the tourist route. It was also left un-signposted. On enquiries in the town, local residents were unaware of its existence. When it was constructed it caused a controversy with tourism stakeholders due to its location. On visiting the site it is unclear what the motivation for building the tourism centre in its present position was. The Tri-District Alliance identified a need supported through its planning and consultation for the Tourism Centre, however the implementation failed to incorporate the inputs of local tourism stakeholders. Thus the establishment of a Bethulie Tourism Centre failed to use tourism market research or existing resources.

### *2.5.3. The Eastern Cape Industrial Development Strategy*

In addition to the LGI Initiative, the Eastern Cape Industrial Development Strategy identified the Lake Gariep Development and an inter-provincial mega reserve at the !Gariep Dam as a key tourism product development and investment support intervention for the province (DEDEA, 2008). Further, the Eastern Cape Tourism Master Plan identified the Karoo Heartland as a key attraction but this included regional towns such as Craddock, Graaff Reinet and Middelberg (Eastern Cape Government, 2008). The master plan identified the need for co-ordination to improve implementation and the development of previously undeveloped tourism attractions. It identified the need to increase the volume and value of tourism offerings (Eastern Cape Government, 2008). The master plan also identified the need for strategic partnerships for tourism development between government

departments but does not specifically indicate whether this would include cross-border collaboration). The masterplan also identified the development of the Gariep Dam as a key tourism project for the Eastern Cape.

### *2.5.4. Northern Cape Growth and Development Strategy*

In terms of Northern Cape planning, the Northern Cape Growth and Development Strategy placed a strong focus on building strategic partnerships. It stated that the Northern Cape does not have the resources in place to achieve goals around economic development and growth alone, it requires the support and partnerships of private sector, donor organisations and national government. Tourism was identified as a strategic sector for the Northern Cape, based around the natural resources that the province had to offer.

### *2.5.5. The Free State Growth and Development Strategy*

The Free State Growth and Development Strategy identified as one of its ten key provincial priorities; the development of tourism along the N1 and around the Gariep Dam. The Gariep Dam was also identified as a key tourism priority (Free State Provincial Government, 2005). The strategy identified as a core issue the need for co-ordinated efforts as regards tourism in order to maximise the potential of the area. The strategy further identified the Lake !Gariep Initiative as a key economic initiative for the Province. Projects identified included the environmental cluster around the Lake !Gariep (UFS, 2007). The focus however was centred on the Eastern Free State with only one project in the South that being the Lake !Gariep compared to 54 projects located elsewhere. It was noted that the strategy regards the Southern Free State as an area of limited potential (UFS, 2007). The Free State Tourism Master Plan (2009) identified water based tourism around the Gariep Dam as a key product development opportunity. It did not however emphasise the potential benefits of cross-border marketing or product development with the Eastern Cape and Northern Cape.

### *2.5.6. The Gariep Tourism plan (Gariep Local Municipality)*

The Gariep Tourism plan identified the Gariep Dam as the key tourist attraction of the GLM. Key challenges identified for tourism that related to the Lake !Gariep Initiative included the lack of communication between municipalities, tourism bodies and private tourism associations surrounding the area and the apparent poor relationship between these parties (Seaton Thomson, 2007). Other key institutional blockages included inter-government 'squabbling' and the apparent lack of interest in the area by provincial governments (Seaton Thomson, 2007). Tourism development opportunities identified included the unification of the conservation areas surrounding the Gariep Dam and cooperative planning between local municipalities. Although the Gariep Local Municipality Tourism Plan identified communication issues of the parties to the Lake !Gariep Initiative it did not indicate how these issues could be tackled or offer any mention of the advantages of cross-border cooperation for tourism development. The plan has also never been formally adopted by the Municipality's council.

### *2.5.7. The Kopanong Local Economic Development (LED) Strategy*

The Kopanong LED Strategy identified the Gariep Dam as a key tourism attraction and node for the Municipality along with the existence of its nature reserves and its strategic position on the N1. Identified tourism projects within the strategy for the Gariep Dam included a route, sporting and culture events promotion and the development of the heritage of the area and a Trans-Gariep Museum. In addition the upgrading of the Bethulie dam resort was identified as a tourism opportunity (Kopanong, 2007). The potential benefits of cross-border collaboration or joint marketing around the Gariep Dam was not identified in the strategy. Thus the potential benefits of collaborating and sharing resources around tourism planning were not identified as a key opportunity.

### 2.5.8. The Ukhahlamba Tourism Responsible Marketing and Development Plan

The Ukhahlamba Tourism Responsible Marketing and Development Plan identified the Gariep Dam for water sport activities. The Gariep Municipality was identified in the study as the least developed municipality in the district in terms of tourism, with lowest number of accommodation establishments. The opportunities for tourism development were identified as the expanded eco-tourism activities and activity based holidays around the Gariep Dam and the upgrade of the Oviston Nature Reserve Resort.

### 2.5.9. The Cooperative Inland Waterways Safety Programme (CIWSP)

The Cooperative Inland Waterways Safety Programme (CIWSP) project is a partnership between multiple government entities and between the government and the community. The aim is to enhance the development of a best practice model to ensure a safe and structured inland maritime environment and culture, whilst protecting the country's precious water resources.

Although Gariep Dam is not one of the Pilot Dams for this project, this RMP integrates information from the CIWSP into the management objectives for this Dam.

## 2.6. Socio-Economic Environment

The Gariep Dam falls within two District Municipalities and two Local Municipalities. The Gariep LM falls within the Ukhahlamba District Municipality. The Kopanong LM falls in the Xhariep District Municipality.

Unless otherwise indicated, all information in the section was obtained from the Census 2011 (Statistics South Africa, 2011) data.

### 2.6.1. Population

Gariep LM has a total population of 32 944 people, of whom 73% are black African, and 18% are coloured. The other population groups make up the remaining 9%.

Between the age group 20 years and older, 7% have completed primary school, 32% have some secondary education, 16% have completed matric, and 7% have some form of higher education. Youth in total account for 29% of the population indicating that youth are expected to contribute towards the households bearing more responsibility than what is normal. Only 5% of the population are over 65 years of age.

According to Census 2011, Kopanong LM has a total population of 49 171 people, of whom 72% are black African, 18% are coloured, and 9% are white.

Of those aged 20 years and older, 7% have completed primary school, 33% have some secondary education, 21% have completed matric, and 6% have some form of higher education, while 13% of those aged 20 years and older have no form of schooling.

### 2.6.2. Education

In both Gariep and Kopanong LM, the majority of the population (53.6% and 45.8% respectively) have received some primary school education only (Table 4). This indicates that the skills levels in the area are low.

*Table 4: Education Level of the Populations of Kopanong and Gariep LMs*

| | Kopanong | Gariep |
|---|---|---|
| No schooling | 3.20% | 3.40% |
| Some primary | 45.80% | 53.60% |
| Completed primary | 7.20% | 7.50% |
| Some secondary | 31.20% | 27.50% |
| Grade 12/Std 10 | 8.70% | 5.60% |
| Higher Education | 0.60% | 0.60% |
| N/A | 3.30% | 1.80% |

### 2.6.3. Employment

In the Gariep LM, 11 096 of the residents are economically active (employed or unemployed but looking for work), and of these, 33.6% are unemployed. In Kopanong LM, 15 529 people are economically active and the unemployment rate is 27%. This is a relatively high level of unemployment

and job opportunities are required in the area (Table 5).

*Table 5: Employment Status of the Populations of Kopanong and Gariep LMs*

| Employment Status for 2011 | Kopanong | Gariep |
|---|---|---|
| Employed - Formal and informal | 15529 | 11096 |
| Unemployed | 4193 | 2858 |
| Not economically active | 13625 | 1523 |
| Unemployment rate | 27% | 33.6% |

### *2.6.4. Monthly Personal Income*

Personal income is grouped into the following brackets:

- No income R0
- Low Income R1 – R3 200
- Middle Income R3 201 - R 25 600
- High Income R25 601+

Table 6 below shows monthly income per person for 2011. 36 % of the population in Kopanong LM and 27% of the population in Gariep LM earn no income at all.

*Table 6: Monthly Income Levels of the Populations of Kopanong and Gariep LMs (Gariep Draft IDP , 2013/14)*

| Municipality | Kopanong | Gariep |
|---|---|---|
| No income R0 | 36% | 27% |
| Low Income R1 – R3 200 | 53% | 36% |
| Middle Income R3 201 - R 25 600 | 6% | 9% |
| High Income R25 600+ | 0% | 0.2% |
| Response not given | 3% | 27% |
| Institutions | 1% | 3% |

### *2.6.5. Gross Value Added*

Gross Value Added (GVA) is defined as the total value of all the goods produced in a specific area during a specific period.

Quantec Research defines the major sectors into Primary Sector, which is extractive, Secondary Sector, made up of manufacturing and the Tertiary Sector, which comprises of services. The Figure below shows the GVA per sector for 2011. This data is taken from Quantec Research and the variables are explained below.

Primary Sector:

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

Secondary Sector:

- Manufacturing. This includes food, beverages and tobacco, textiles, clothing and leather goods, wood, paper, publishing and printing; petroleum products, chemicals, rubber and plastic; other non-metal mineral products; metals, metal products, machinery and equipment; electrical machinery and apparatus; radio, TV, instruments, watches and clocks; transport equipment; and furniture and other manufacturing;
- Electricity, gas and water; and
- Construction.

Tertiary Sector:

- Wholesale and retail trade, catering and accommodation. This sector represents the tourism sector through catering and accommodation and the sale of goods through trade;
- Transport, storage and communication;
- Finance, Insurance, Real Estate and business services;
- Community, social and personal services; and
- General Government.

The GVA differs significantly per Local Municipality. Kopanang LM contributes the most to GVA at R1 353 million. The largest contributing sectors are Finance, Insurance, Real Estate and business services, General government and Transport, storage and communication (Table 7).

Gariep LM contributes R517 million to the GVA. The largest contributing sectors is again Finance,

Insurance and Real Estate and General Government.

*Table 7: GVA Contribution of Each Sector in the Four LMs in R millions at 2005 constant prices*

| Municipality | Kopanong | Gariep |
|---|---|---|
| Agriculture, forestry and fishing | 10% | 8% |
| Mining and quarrying | 1% | 0% |
| Manufacturing | 8% | 9% |
| Electricity, gas and water | 2% | 1% |
| Construction | 4% | 4% |
| Wholesale and retail trade, catering and accommodation | 8% | 12% |
| Transport, storage and communication | 15% | 1% |
| Finance, insurance, real estate and business services | 27% | 28% |
| Community, social and personal services | 12% | 12% |
| General government | 15% | 26% |
| Total GVA (million) | 1353 | 517 |

## 2.7. Development Potential

The development potential of Gariep Dam and the surrounding town is relatively high especially in terms of tourism.

The area also has few attractions including:

- Water sports at Gariep Dam;
- Fishing;
- Annual competitions (e.g. rubber duck race, fishing competitions etc.);
- Many South African historical sites (e.g. Bethulie and South African war concentration camps);
- ONR and GNR; and
- The area has a wealth of bird species.

It could be suggested that, as the area has so much to offer, more lodges should be built closer to the Dam.

A new retirement village near the Gariep Dam has been proposed with three affordable ownership models has been launched to cater for the growing demand from retirement buyers. The second phase includes construction of a hospital with 24-hour assistance.

The key attractions in the area are the built form attractions of the Gariep Dam itself and the Dam wall (Crozier, 2011). Historical and cultural attractions include rock-art, historic homes, museums and Anglo-Boer War battle-fields and concentration camps sites. The nature based attractions include the Gariep Dam, the Orange River and the nature reserves bordering the Dam. Table 8 provides the main attractions per town in the areas surrounding the Dam.

*Table 8: Attractions around Gariep Dam (Crozier, 2011)*

| | |
|---|---|
| **Gariep** | |
| Views of the Gariep Dam | Small craft marina |
| Forever Resort | Gariep Nature Reserve |
| **Oviston** | |
| Oviston Nature Reserve | water control tower |
| **Bethulie** | |
| DH Steyn Bridge (longest road and rail bridge in South Africa) | Boy from Bethulie' - Patrick Manhardt Museum |
| Dutch Reformed Church | Anglo Boer War Sites |
| Paleontological Sites | San Rock Art |
| Pellisserhuis Museum | Anglo Boer War Concentration Camp and Cemetery |
| **Colesberg** | |
| Historic Town with many listed houses. An established historic route and self-guided trail guides tourists through the town | Historic Cemeteries - Miltary, Anglo Boer War Concentration Camp and Jewish Cemetries |
| Colesberg- Kemper Museum | Colesberg Four Memorial |
| Anglo Boer War Battle Sites - Skietsberg, Coleskop and British Camp | Historic stone homes of Kuyasa |
| **Novalspont** | |
| Historic Glasgow Pont Hotel | Bridge |
| Novalspont Concentration Camp and Memorial | Railway Station |
| **Philliopolis** | |
| Adam Kok's Home | Library and Museum |
| Lauren van der Post Family Home | Tiger Breeding Centre |

## 2.8. Access and Infrastructure

Access to the water is allowed at GNR, Oviston Resort (OR), Forever Resort (FR) and Free State

Yacht Club (FSYC). Some stakeholder's mentioned that some farmers may have slipways which allow access although this was not confirmed.

In addition, ONR is one of the only Nature Reserves in the Eastern Cape which does not have any form of access control. According to Atkinson (2008), approximately 50-60 visitors per day access the reserve, during the summer months, for recreational uses such as angling, cycling and walking. This is based on a voluntary system whereby visitors fill in permits and leave them in boxes at the entrance. There is therefore no way of ensuring that visitors do not launch boats from the shoreline directly.

Infrastructure at the Dam includes the Dam wall and associated infrastructure such as the Orange-Fish River Canal.

A number of picnic areas and braai facilities are located at the public area near the Dam wall. This site does not have access to the surface water.

In addition, there is recreational infrastructure such as slipways, picnic areas, ablution facilities and accommodation located at OR, FR, FSYC and ONR.

## 2.9. Biophysical Environment

### *2.9.1. Water Quality*

The water quality at Gariep Dam has been monitored by DWS since 1975. However sampling has not occurred since 2009 which is a potential encumbrance as the water quality may have changed in the past five years.

During stakeholder consultation, some concern was raised regarding water quality especially in relation to increased sedimentation of the Dam due to land use practices in Lesotho and in the catchment. As in general, the Gariep Dam acts as sediment trap (DWAF 1999; Heath and Brown 2007), and thus increased sedimentation can be a problem.

In addition, there is concern regarding a Goat Kraal near the Forever Resort as effluent from the kraal washes into the Dam and may also impact water quality. The Bethulie and Oviston Waterwater Treatment Works (WWTWs) may also compromise water quality at the Dam.

Table 9 provides the average values during the period between 1975 and 2009 for Monitoring Point D34_101835. For the most part, the quality is good and the time series analysis does not show any worrying trends at this point (Figure 5).

*Table 9:* Water Quality at Gariep Dam (DWA)

| Variable | Average (1976-2013) |
|---|---|
| Calcium (Ca) | 16.54 |
| Chloride (Cl) | 3.45 |
| Dimethyl sulphide (DMS) | 122.63 |
| Electrical Conductivity (EC) | 16.22 |
| Fluoride (F) | 0.17 |
| Potassium (K) | 1.61 |
| KJEL_N_Tot_Water | 1.22 |
| Magnesium (Mg) | 6.37 |
| Sodium (Na) | 6.08 |
| Amonia (NH4_N) | 0.06 |
| Nitrates (NO3_NO2) | 0.41 |
| Phosphorous (P) | 0.12 |
| pH | 7.16 |
| Phosphates (PO4_P) | 0.05 |
| Silicon (Si) | 8.14 |
| Sulphates (SO4) | 6.62 |
| Total Alkalinity (TAL) | 64.63 |

The Maucha Diagram below shows that the Total Alkalinity (TAL) is high (Figure 4).

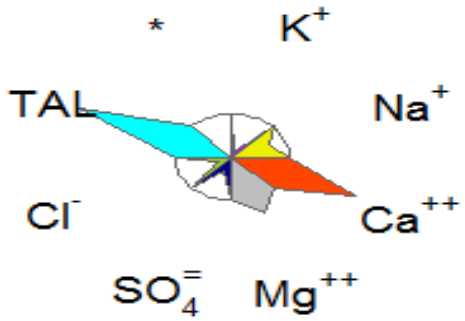


*Figure 4: Maucha Diagram for Gariep Dam*

Figure 5 shows an overview of the water quality in the Dam from 1975 to 2009.

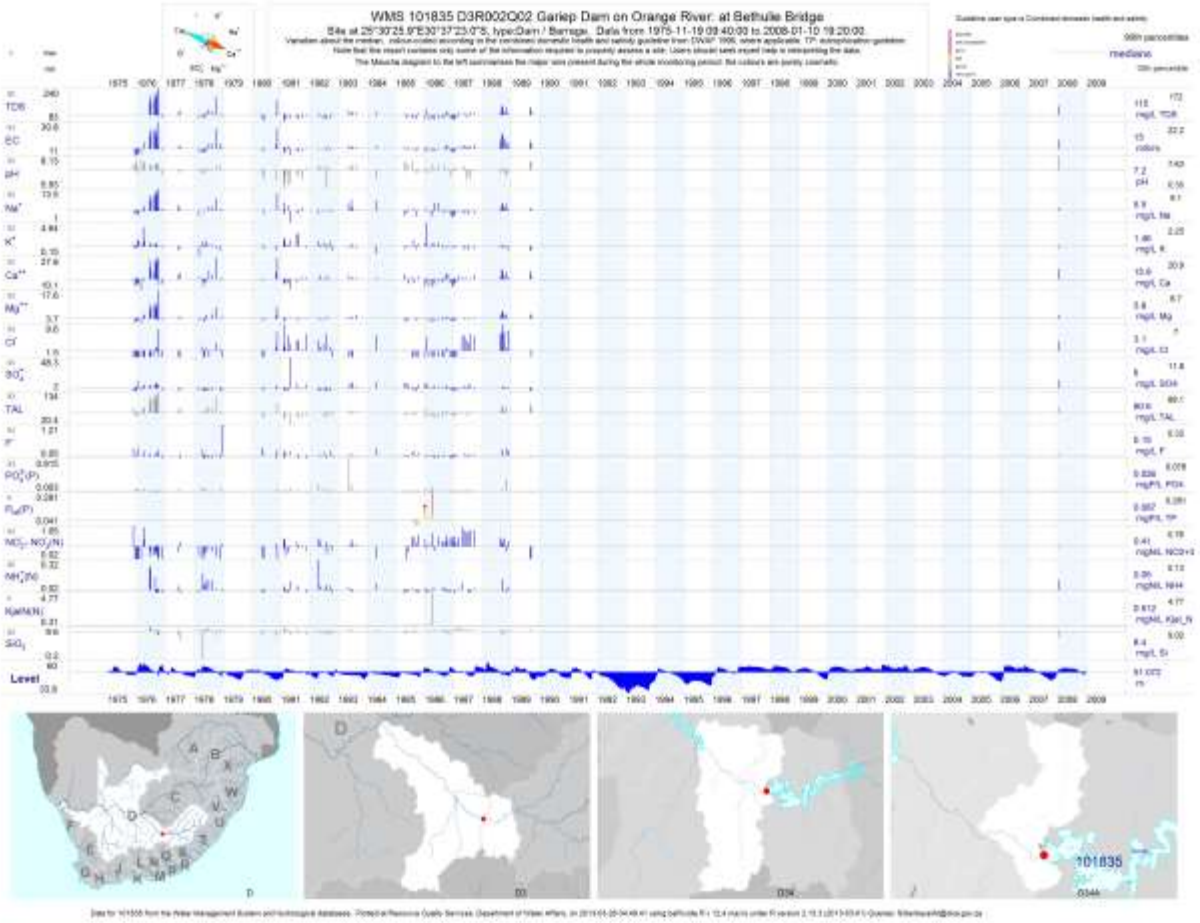


*Figure 5: Water quality at Gariep Dam from 1975 to 2009(DWA)*

### *2.9.2. Geology and soil*

According to AGIS (2007), the Gariep Dam occurs on soils with minimal development that are usually shallow or hard weathering rock.

### *2.9.3. Topography*

The general topography of the area is described as flat with occasional gentle slopes.

### *2.9.4. Flora*

The Gariep Local Municipality (in the Eastern Cape Province, south of the Dam) is 891105.8 ha is size and of that, 95.5 % are areas that have remained natural habitat. The remaining 4.8% are areas where there is no natural habitat remaining. Gariep Local Municipality has eight vegetation types in two biomes (the Grassland biome and the Nama-Karoo biome). There are no threatened ecosystems in this municipality.

The Kopanong Local Municipality (in the Free State Province, north of the Dam) is 1524830.5 ha in size. Of this 1430147.6 ha is naturally remaining habitat while the 94682.2 ha are areas which have no natural habitat remaining. This municipality also falls within the Grassland and Nama-Karoo biome. The Kopanong Local Municipality has ten vegetation types and one is currently listed as vulnerable.

### *2.9.5. Aquatic Invasive Plant Species*

There are currently no significant invasive aquatic weeds in Gariep Dam. P. *pectinatus* is problematic on the Orange River. There is a risk of reed infestation from upstream in the Orange River and a potential of re-infestation by the power generation plant on the Dam.

Although no specific aquatic invasive species have been noted at the Dam, *Azolla filiculoides* (red water fern) and *Arundo donax* (Giant Spanish Reed) occurs in the Quarter Degree Square (QDS) surrounding the Dam (According to the Agricultural Geo-Referenced Information System (AGIS) Weed and Invasive Plant (WIP) Database (AGIS, 2007).

Historically, South Africa's waters have been invaded by a number of aquatic macrophytes that have detrimental economic and environmental effects. The worst of these include water hyacinth (*Eichhornia crassipes* Solms-Laub.), parrot's feather (*Myriophyllum aquaticum* (Vell.) Verdc.), salvinia (*Salvinia molesta* D.S. Mitchell), water lettuce (*Pistia stratiotes* L.), and red water fern (*Azolla filiculoides* Lamarck). The majority of these species however are under acceptable control. Recent studies have shown that South Africa is home to a number of emerging invasive aquatic species. Submerged macrophytes in South Africa such as Brazilian/ dense waterweed, *Egeria densa* Planch. and spiked/Eurasian watermilfoil, *Myriophyllum spicatum* L. are seen to be a potential threat to water quality and biodiversity in aquatics systems. There is great potential for these species to spread further, and for others, such as cabomba, *Cabomba caroliniana* A.Gray (Cabombaceae), and Canadian water weed, *Elodea canadensis* Mitch. (Hydrocharitaceae), to invade waterways due to the nature of South Africa's aquatic systems.

For example, *Hydrilla verticillata* was first recorded in South Africa in 2006 and is only found at Pongolapoort Dam in KwaZulu-Natal. Based on surveys of Dam users and climate data, Coetzee *et al*., (2009) found that most of South Africa had the potential to become infested. Although Gariep Dam occurs in an area which is unlikely to become infested, a focus on prevention is required at State Dams throughout South Africa.

### *2.9.6. Invasive Fish Species:*

The Carp (*Caprinus carpio*), which is an aggressive invader that is threatening indigenous species over large parts of the world, is very common in Gariep Dam. Rainbow Trout (*Oncorhynchus mykiss*.) and bass (*Micropterus* spp.) have been caught in isolated cases, but due to the muddy water of Gariep Dam and the Orange River they do not appear to be an immediate threat to the indigenous fish fauna, as they are aggressive hunters that need clear water. Nonetheless the species may increase turbidity of the water. Further, the draft Alien and Invasive Species List (National Environmental Management: Biodiversity Act (Act 10 of 2004): Draft Alien and Invasive Species Lists, 2014 (GN 78 of 2014)) lists Carp as Category 1b in fish Sanctuary Areas, National Parks, Provincial Reserves and Mountain Catchment Areas. Catch and Release is exempted in Dams however a Containment Plan for the species would be required.

### *2.9.7. Fauna*

#### 2.9.7.1. Amphibians

The Eastern Cape Province has 61 described frog species and the Free-State Province has 36.

11 species were found using the South African Frog Atlas Project (www.sarca.adu.org.za). *Amietophrynus rangeri ,Poyntonophrynus vertebralis,Vandijkophrynus gariepensis, Kassina senegalensis, Xenopus laevis, Amietia angolensis, Amietia fuscigula, Cascosternum boettgeri,Pyxicephalus adspersus, Tomoptera cryptotis* and *Tomopterna nataensis* were found in the quarter degree grids (3025DA, 3025DB, 3026CA and 3026AC which surrounds the Dam.

#### 2.9.7.2. Reptiles

The Eastern Cape Province has 163 described reptile species and the Free-State Province has 131. Of these, 32 are found around Gariep Dam (South African Reptile Assessment www.vmus.adu.org.za )

#### 2.9.7.3. Mammals

The Eastern Cape Province has a total of 86 recorded mammal species and the Free-State has 59. However, only three species have been record around the Dam: Kudu (*Tragelaphus*

*strepsiceros*), springbok (*Antidorcus marsupialis*) and rock hyrax (*Procavia capensis*).

#### 2.9.7.4. Avifauna

The Gariep Dam has 313 bird species around the area. Species such as the Blue Crane is also of concern and is listed as vulnerable in the Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland (Barnes, 2000). The species has declined in much of its former stronghold mostly due to habitat loss, but has adapted well to the artificial habitat of the wheat producing areas of the Western Cape Province (Shaw, 2003) to such a degree that it is estimated that about 50% of the total population now occurs in that Province (McCann, 2001)

## 2.10. Heritage

According to Rossouw (2013), Gariep Dam is situated within the *Dicynodon* Assemblage Zone (AZ) near the latter's eastern boundary with the Early Triassic sediments of the younger *Lystrosaurus* AZ (Rubidge 1995). The *Dicynodon* Assemblage represents the terminal phase of the Palaeozoic continental biota, that was dominated by therapsid "mammal-like reptiles" and Glossopteris Flora before it was largely wiped out by the end-Permian Mass Extinction Event (Ward *et al.* 2005). This Late Palaeozoic extinction event, which severely reduced the diversity of life represented in the terrestrial fossil record (a disappearance of over 70% in the number of tetrapod families), is used as a marker to define the boundary between the Permian and Triassic periods.

The area around Bethulie in particular, produces a wealth of Karoo vertebrate localities related to the Permian-Triassic transition and extinction event. For example, the principal casualties of the end-Permian extinction include all Gorgonopsian predators, and most Dicynodontian herbivores, with the exception of *Lystrosaurus*. A shift to *Lystrosaurus*-dominated vertebrate faunas is seen in early Triassic sections of the Katberg Formation (Kitching 1977, 1995). Overlying Late Cenozoic valley fill deposits may occasionally contain much younger fossil biotas, including the skeletal remains of Quaternary mammals, non-marine molluscs and a variety of other microfossils (Klein 1984; Berger & Brink 1996; Rossouw 1999; Rossouw 2006). Unlike the wealth of Karoo vertebrate fossil localities found in the region, the distribution of Late Cenozoic (primarily Quaternary) palaeontological deposits is localized and infrequent.

The upper Orange River valley represents a long and rich archaeological record that spans back to the Early Stone Age. Prehistoric archaeological remains previously recorded in the region include Stone Age artefacts and mammal fossil remains from sealed and or exposed contexts as well as rock engravings. Well-known sites near the Dam include Riversmead Shelter, Glen Elliot and Holmsgrove Shelter. Along much of the course of the upper Orange River and its tributaries alluvial deposits in the form of river terraces occur that contain occurrences of Middle and Later Stone Age material eroding out of the overbank sediments. Surface sites are common along valley floors, dolerite hills and ridges (Samson 1984). Stone tools found in the region are mostly made of hornfels, a dark, fine-grained isotropic rock found in the hot-contact zone between the dolerites and shales in the area.

The establishment of the town of Bethulie dates back to the founding of a mission station there during the 1830's while remnants of early 19th century veeboer farmsteads or kraals as well as Anglo-Boer War graveyards and concentration camps are well-recorded in the region.

The Gariep Nature Reserve also notes some heritage resources in its Management plan.

Crozier (2011) also noted a number of heritage attractions in the towns surrounding the Dam. These are tabulated in Table 10.

*Table 10:* Attractions around Gariep Dam (Crozier, 2011)

| | |
|---|---|
| **Bethulie** | |
| Anglo Boer War Concentration Camp and Cemetery | Anglo Boer War Sites |
| Paleontological Sites | San Rock Art |
| **Colesberg** | |
| Historic Town with many listed houses. An established historic route and self-guided trail guides tourists through the town | Historic Cemeteries - Miltary, Anglo Boer War Concentration Camp and Jewish Cemetries |
| Anglo Boer War Battle Sites - Skietsberg, Coleskop and British Camp | Historic stone homes of Kuyasa |
| **Novalspont** | |
| Historic Glasgow Pont Hotel | Novalspont Concentration Camp and Memorial |

## 2.11. Current Institutional Arrangement

### *2.11.1. Official Institutional Structure*

DWS is the official custodian and owner of the Gariep Dam. However, landownership within the purchase boundary is also not available. In order to compile the shoreline zonal plan as part of the RMP process, an assumption was made that land which falls part of the nature reserves around the Dam would have originally been purchase by DWS and then handed over to FS DETEA and EC-DEDEAT for management. The shoreline zonal plan is therefore based on the extent of the protected area around the Dam. However it should be noted that the area around the Dam wall and near the Forever Resort does not fall within any protected area. In this case, adjacent land has been selected and will be included in the Zonal Plan. There is no way however of verifying if this is state land at this point.

Further, the Department signed over control of the Dam and the State Land within the Purchase Boundary to both Eastern Cape and Free State Provinces, then known as the Cape Provincial Administration and Provincial Administration of Orange Free State.

The basis of this transfer was that both Provincial Administrations would conclude an agreement to divide responsibility and control between the two Administrations. This agreement was signed on 11 November 1974 and included the following conditions:

- The Provincial Administration of Orange Free State, FS DETEA assumed responsibility for the control of the surface water as well as the waterside land of the Dam within the Free State as well as the responsibility of control for the entire game farm, Tussen-die-Riviere (as demarcated by boundary fences at the time of signing) which occurred in both Provinces;
- The Cape Provincial Administration, now EC-DEDEAT assumed responsibility for the control of the waterside land of the Dam occurring within the Province Cape of Good Hope, now known as the Northern Cape; and
- Both Administrations undertook to exercise any right to use the waterside land for purposes other than protection of fish and game and conservation of plants and animals only in consultation with the other Administration.

### *2.11.2. Informal Institutional Structure*

There are a number of unauthorised access points and commercial activities. There is also a number of different management systems in place. Control of recreational use is therefore very informal in nature. More detail is provided in the sections to follow.

### *2.11.3. Management of Access*

Firstly, ONR does not have any form of access control. According to Atkinson (2008), there are approximately 50-60 visitors per day during the summer months that access the reserve for recreational uses such as angling, cycling and walking.

There is a voluntary system, based on filling in permits at the entrance. Many illiterate people

(and other visitors) do not fill in the permits. However, it is not financially or logistically feasible to put in a full access control system.

There is a potential conflict regarding the desire of visitors to go outside the visitor areas, because the fishing is better there. This causes problems of control (due to the dispersed nature of the reserve), as well as the conflicting interests of hunters and fishers during the winter.

There is therefore no way to ensure that users do not launch vessels from the shoreline and thus there may be safety issues. Secondly, there are potential issues regarding poaching. Thirdly, as there is no access control or management, there is no way to ensure that the visitor's area is not negatively impacted by littering. There are also no ablution facilities which may result in additional pollution at these areas. However, it should be noted that this form of access control allows easy access by local community members as no access fees are charged and local community members are therefore able to access the Dam.

Access to the Free State Yacht Club (FSYC) is through Forever Resorts. There is also no agreement available between DWS and the FSYC or between FS DETEA and FSYC. Access to the club is mainly for members only however, one member of the FSYC has a pleasure boat which is used by members of the public. Access to the pleasure boat is also through Forever Resorts and FSYC.

There is also no public access point at the Dam which allows access to the surface water. There is however, a picnic site near the Dam wall which has braai facilities and ablution facilities which is perceived to be a public access point however it is not possible to access the surface water of the Dam at this point. This results in inequitable access of the surface water and the Dam.

Access is also an issue in Bethulie, during consultation it was noted by FS DETEA that the land adjacent to the Dam falls between the two Nature Reserves (Gariep Nature Reserve and Tussen die Riviere) and thus is not managed. There is therefore no access point for this community despite their close proximity to the Dam. Using Google Earth imagery, it was noted that there is an area which appears to have tracks leading to the water surface. This suggests that the community does access the surface water. There is however no management of this access in place.

#### *2.11.4. Management of Commercial Activities*

One of the main commercial activities at the Dam is the Gariep Dam Forever Resort which has approximately 175 rooms, a slipway, picnic areas, camping areas and ablution facilities. No agreement was available regarding the sale of land to Forever Resorts. Consultation suggests that land sold to the Resort is within the purchase boundary beacons (which are still on site). As Forever Resorts is a private entity, commercial activity on the Dam must be in line with National Treasury requirements.

It was further noted that a Pleasure Boat is run by a private individual. The boat is anchored at the FSYC Bay and access to the boat is through both Forever Resorts and FSYC although neither Forever Resorts nor the FSYC are involved in the activity. It is not known whether the Pleasure Boat meets SAMSA requirements. There is also an adjacent landowner who is in process of building a house boat at the Dam.

During consultation, a number of potential fisheries were noted. In particular, FS DETEA has approved a provisional six month commercial fishing permit for a fishery at Venterstad. The status of this fishery was not known. The feasibility study however was undertaken by Rhodes University. The management structure for the fishery is not known. In addition, there is no indication that DWS has been involved in the approval of this activity or that there is any specific measures in place regarding safety management.

Further, during the public consultation process, it was noted that Gariep LM had leased the Oviston Resort to a Private Individual. There is approximately 35 years left on the lease and at

the time of consultation, the lease was being re-negotiated with the Municipal Manager. The outcome of the negotiations are not known. The resort has 2 chalets and camping and ablution facilities. There is also a slipway and day visitor facilities. There is no information on whether this lease takes into account Treasury requirements, safety requirements and equitable access requirements is not known.

### *2.11.5. Management of the Water Surface*

Management of the water surface and infrastructure (including AtoN and demarcation markers related to the Dam wall) is carried out by DWS.

Officially, FS DETEA is responsible for the management of the surface water. Although GNR does have a boat available, patrols only take place in terms of nature conservation. There is no specific management of recreational activities on the surface water.

There is close relationship and cooperation between DWS and Eskom on the hydroelectric operations of the Dam.

### *2.11.6. Permits*

According to Provincial Legislation, a Freshwater Angling License is required for angling within the Free State. These fishing licenses can be purchased from GNR.

### *2.11.7. Safety*

There is no official structure to ensure safety on the water at the Dam. Access to the water is allowed at Oviston Resort, Forever Resort and FSYC. Some stakeholder's mentioned that some farmers may have slipways which allow access although this was not confirmed. There is no formal Rescue Operation Point (ROP) or Rescue Boat available. There are also no standardized AtoN or demarcation markers to ensure safe use, although the SA Navy has undertaken a underwater survey of the Dam which shows obstacles.

Most stakeholders noted that in an emergency they would call the SAPS however during discussions with SAPS it was noted that SAPS does not have a working vessel available for rescues.

### *2.11.8. Overnight facilities*

There are many overnight facilities around the Gariep Dam. This includes basic self-catering chalets, hotels, camping sites and caravan parks. The main facilities which have access to the surface water include:

- GNR;
- Oviston Resort;
- ONR;
- Forever Resort; and
- FSYC.

Members of the FSYC often leave their yachts on the Dam and occasionally use the yachts as overnight accommodation.

While there are no camping facilities at ONR, camping is allowed on their shore for a fee of R35 per person. To camp in the GNR, a written request is sent to the reserve. ONR also has three main accommodation venues: Komweer Lodge (sleeps nine); Apies Bay Cabin (sleeps four) and the Ihodi Campsite with basic facilities.

GNR has a resort with 7 fully equipped self-catering chalets consisting of 3 x 5 Bed chalets and 4 x 6 bed chalets. In addition there are 15 caravan sites are equipped with power points, overhead light and braai. In the western side of the terrain is an ablution block consisting of showers and toilets, laundry room and cleaning store. Each camping site is designed to accommodate a maximum of 8 persons.

Oviston Resort has a number of self-catering chalets as well as camping and caravan sites with electricity. Forever Resort offers 2-, 4-,and 6-sleeper chalets as well as camping and caravan sites.

In and around the Gariep town there are approximately 10 guesthouses and six guest farms / lodges. Upstream of the Dam wall is

Tussen-die-Riviere Nature Reserve which also offers various types of accommodation.

#### *2.11.9. Event Management*

Event management is through FS DETEA. The FSYC holds a number of events at the Dam. Currently, DWS is not notified of any events at the Dam.

## 2.12. Users and Uses of Gariep Dam

#### *2.12.1. Irrigation*

Gariep Dam is one of the largest reservoirs of water within the borders of South Africa and stores water from South Africa's largest river – the Orange River. About half of South Africa's annual rainfall is stored in reservoirs, and about 14% of it makes its way to the Atlantic Ocean via the Orange River.

The Dam supplies water to both Provinces: the Eastern Cape via the Great Fish River for domestic use, agricultural, and, in the case of Port Elizabeth, industrial use. The Gariep Dam also forms part of the ORP, one of Africa's largest irrigation projects, supplying a farmlands area in excess of 22 000 ha with vital water.

#### *2.12.2. Hydropower*

In addition to the Dam's function as a reservoir, it also functions as a hydroelectricity plant which feeds water to four 90 megawatt generators. This allows Eskom to produce 360 megawatts of power at a flow rate of 800 cubic metres per second. The Gariep and Vanderkloof Dams, together with the Eskom hydro power stations, are integral components of the Orange River Water Scheme. Hydroelectric power is generated by using energy from the falling water to drive the water turbines which drives electric generators.

#### *2.12.3. Recreational Use*

In addition to agriculture and animal husbandry, ecotourism provides an additional, though modest, income earning opportunity. The scenic beauty of the Orange River Basin in Lesotho's mountain ranges has led to the development of ecotourism ventures that, to some extent, involve the surrounding communities and contribute to their incomes. Areas around major Dams in the Orange River are protected as Provincial Nature Reserves. These Reserves, such as ONR and the GNR, are utilised for recreation and conservation, with wildlife having been introduced to restore populations to historic numbers and species, as part of provincial biodiversity conservation objectives. The following recreational activities commonly take place at the Dam:

- Birdwatching;
- Fishing from Shore;
- Camping;
- Boardsailing/windsurfing;
- Kite surfing
- Fishing from Boats;
- Paddle skiing/rowing/canoeing;
- Yachting;
- Swimming;
- Jet skiing and power boating;
- Hiking;
- Hunting; and
- Picnicking and sunbathing.

#### *2.12.4. The Orange River Project*

The main user of water in the Lower Orange River (and indeed of all the catchment), is the Orange River Project (ORP), which was first proposed in 1962 (Alexander and van Wyk, 2005). This project depends on flows from the Vanderkloof and Gariep Dams.

The project was initially developed to utilise the water of the Orange River for extensive irrigation schemes (to irrigate thousands of hectares especially in the Eastern Cape, Northern Cape and Free State areas) and for the generation of hydroelectric power, and for urban supply, thus providing for the increasing demand for water and food (Diederichs *et al.,* 2005)

The original main aims of the ORP were:

- To make provision for new irrigation development along the Orange River and various other areas within reach of the river;
- To stabilise the water supply to existing irrigation schemes;
- To afford new life to the fertile but water-deficient Great Fish River and Sundays River valleys;
- To supply water to various urban centres; and
- To generate hydroelectric power.

In addition, water from the Orange River is used to solve water quality problems in the Vaal River at Douglas, and is used to generate peak power for the Eskom Network at the Gariep and Vanderkloof Dams. The ORP also supplies water to cities and small towns such as Upington, Prieska, Port Elizabeth, Grahamstown, Alexander Bay and Port Nolloth.

### *2.12.5. Conservation, Wildlife and Game Management*

Gariep Dam is located within ONR and GNR and thus forms part of conservation initiatives. Upstream at the confluence between the Orange River and the Caledon River is Tussen-die-Riviere Nature Reserve. The Nature Reserve mainly caters for hunters during the winter months although hiking and game viewing is allowed in summer.

GNR also has a large number of larger ungulate species, considered as game species, which require population management as their population numbers have the potential to increase to unsustainable numbers within the confines of the Reserve. This could result in overgrazing and trampling of the vegetation and eventually accelerated soil erosion and biodiversity losses.

The following control mechanisms are utilised:

- Public Hunting;
- Culling Programmes; and
- Live Capture (the sale or other disposal of live animals).

In addition, GNR has an abattoir which is divided into areas for dressing, cleaning, skinning and weighing of carcasses. A cold room provides short term cooling facilities and the butchery provides an area for the processing and sale of carcasses. This is also used as a form of income generation.

### *2.12.6. Events at the Gariep Dam*

The FSYC holds a number of events at the Dam including:

- Formula 1 powerboat race;
- Angling Competitions (Big Masters); and
- Regattas

There are also additional events such as:

- President's Trophy Air Race which will take place at Gariep Dam Airfield. This Air Race is one of the most prestigious events on the aviation calendar. It was originally known as the Governor General's Air Race and was first held in 1937;
- Each year in February the Gariep 500 Rubber Duck Race is held. This is a popular item for speed boat owners and enthusiasts;
- The SA Hunter's Society has since 2004 presented their annual target shooting competition at Gariep Dam town;
- The Round-the-lake cycling competition is one of the cycling race tours of national significance;
- Angling at the Dam is a highly popular sport with various competitions; and
- The latest addition is the prestigious Eric van Enter Cycling Competition, sanctioned by Cycling South Africa.

### *2.12.7. Educational Programmes*

FS DETEA has an education centre at the Dam which they are currently in the process of upgrading. The upgrade consists of additional

accommodation facilities so to allow schools to stay at the Centre as part of school tours.

The use of the facilities would mainly be for Free State Schools and there will be no charge for the accommodation. The idea is to promote environmental education. FS DETEA tailors the curriculums based on the age of the children and the teacher's requirements. But sometimes these trips include tours of the Dam wall and the Eskom hydro power plant.

Although the Dam does not feature as the main part of this education programme there is an opportunity for extending the programme to include activities at the Dam.

#### *2.12.8. Community Based Commercial Fisheries and Food security*

There have been a number of attempted fisheries at Gariep Dam. Most recently FS DETEA has approved a 6 month permit for a community based commercial fishery on the Eastern Province shoreline (near Venterstad). The exact details of the fishery were not available however during public consultation it was noted that feasibility of the fishery had been assessed by Rhodes University.

Further, Ellender *et al.,* (2010) found that while the Dam is of importance to recreational anglers as a source of leisure, angling is also an important subsistence activity, with 67% of all angler interviews undertaken for their study being conducted with subsistence anglers. In addition, 41% of subsistence anglers and 25.6% of all interviewed anglers sold some of their catch (Ellender et al., 2010). At an average fish price of ZAR5.72·kg$^{-1}$, the sale of fish from angling is a low- revenue activity. This must, however, be seen in the context of the prevailing economic conditions. Given that most subsistence anglers are unemployed and that 52% of the economically active population in the area have an income of < R400·month-1 (Ellender et al., 2010), fish generates at least some income in an area where opportunity costs are low. Furthermore, when fish price is compared to the midyear price of fresh whole chicken and thus fish provides a cheap source of protein not only for angling households but also for non-angling households that purchase the fish.

In addition, there is a China-South Africa Agricultural Demonstration Centre which has been set up just west of the Dam wall. As aquaculture was identified as one of the priority areas of cooperation between China and South Africa during the 2nd Joint Agriculture Working Group meeting held in China during May 2005, a Memorandum of Understanding (MoU) between the two governments was signed during 2006 to set up aquaculture capacity building programme for South African officials, scientists and farmers.

The centre has been developed as a modern research, demonstration, aquaculture promotion and training facility for freshwater fish and farming technologies. There is a hatchery facility as well as a pond culture system in place available for broodstock holding/conditioning and fingerling production. The DAFF has recently undertaken a Risk Assessment to determine the Biodiversity Risk and benefit associated with the introduction of the Nile Tilapia (*Oreochromis niliticus*), the Mozambique tilapia (*Oreochromis massambicus*) and the common carp (*Cyprinus carpio*) for use at the demonstration centre.

## 2.13. Catchment Interactions

Based on the status quo of Gariep Dam, it is clear that there are a number of factors that influence the ecological status, the use and management of the Dam.

- Operating conditions of the Dam for hydro-electricity;
- Land use in the catchment, especially agriculture has an impact on the water quality of the Dam;
- The fish stocks at the Dam allow for varied competitive and recreational angling as well as the potential for commercial fisheries;
- The lack of management of access results in potentially unsafe recreational use;

- The lack of public access points result in inequitable use of the surface water and the Dam;
- The lack of institutional management threatens future growth and development at the Dam;
- The Lake !Gariep Initiative provides an opportunity for improved management and tourism; and
- The location of the Dam half way between Johannesburg and Cape Town and in a picturesque area offers opportunities for increased eco-tourism.

It is important to understand how the Dam is influenced by these factors so that management of the Dam through the RMP are taken into account.

# 3. WHERE DO WE WANT TO BE?

## 3.1. Vision

A visioning exercise was carried out with a combination of stakeholder input from public meetings, authorities meetings, one on one stakeholder meetings and community focus group meetings.

The vision for Gariep Dam is a long-term, 20-year goal that is achieved through a series of objectives. While the vision is constant for a 20 year period, RMPs are updated every five years. This allows the objectives to be re-visited taking into account progress towards achieving the vision.

The vision for Gareip Dam is informed by the needs, interests, requirements and uses of the Dam. Stakeholders agreed that sustainable and cooperative use of the resource is a high priority to ensure that all can enjoy clean water for a multiple of uses. Main concerns centred around institutional arrangements and developing tourism potential.

The need for institutional arrangements to manage the Dam was noted and cooperation is required. The Dam is seen as an important resource for education and skills training. The vision for the Dam is therefore:

*"The harmonious use of our unique resource for sustainable growth and development of surrounding communities while still protecting the resource for current and future generations"*

## 3.2. Objectives

The vision was distilled into the following key objectives which are listed below. Key actions required to ensure that these objectives are met are also provided. More detail on these actions is provided in Section 4.5. (The Strategic Plan).

**Increased but Well Managed and Safe Recreational Use**

- Zonal plan to take into account different recreational activities;
- Implementation of standardised and harmonised AtoN and Demarcation Markers;
- Wash Bay and UPN System to be implemented;
- Formalised position to assist in monitoring/alerting SAPS of safety issues;
- Additional resources for GNR (FS DETEA) and ONR (EC-DEDEAT);
- Formalised Safety System in place at the Dam;
- Formalised Safety System in place at GNR and ONR;
- Personalised Locator Beacon (PLB) rental system;
- All unofficial access points to be closed or regulated through an access agreement;
- Wash Bay Officers and SAMSA Enforcement Officers to be trained; and
- First Aid Training for Enforcement Officers and Wash Bay Officers.

**Improved Institutional Arrangements and Coordination between Provincial Authorities**

- Formalised institutional structure including Dam Management Committee (DMC), Operations Management Committee (OMC) and RMP Steering Committee (RSC);
- Updated agreements taking into account RMP.
- Agreements with EC-DEDEAT and FS DETEA to be updated.
- Agreements between EC-DEDEAT, FS DETEA and Clubs to be drafted.
- Formation of Fire Management Association.
- Formalised institutional structure

- Wash Bay, AtoN, demarcation markers and UPN System to be implemented;

**Swift Resolution of Land Matters**

- Land matters to be resolved and new agreements to be drafted.

**Management of Development Pressure**

- DMC to have dedicated agenda item regarding EIAs and developments in the area.

**Improved Resource Management**

- Water Quality Monitoring protocol to be set up at the Dam. The potential for water quality monitoring data to be linked to the UPN system should be determined so that if water quality issues are noted they will activate the UPN system;
- All recreational or tourism developments should assess the potential impact on water quality;
- Discussions with FS DETEA, EC-DEDEAT, DWS and Yacht Club to take into account access for skills training and increased education with regards to invasive species;
- Management of Alien Invasive Aquatic Species;
- Education programmes regarding the impacts of alien invasive species;
- A Containment Plan for Invasive Fish Species such as Bass and Carp should be developed and implemented so that the economic benefits of recreational angling can be achieved without the further spread of these species to other valuable water resources;
- Potential for commercial fishing or small scale fisheries programme to be assessed; and
- Wash bay system to be implemented to prevent alien invasive species infestations.

**Improved equitable access and use**

- Implementation of local community access card at Oviston Resort as well as formalised Picnic Area;
- The potential for public picnic and fishing facility near the Forever Resort entrance (Gariep) to be assessed. A potential public access area near Bethulie should also be assessed; and
- Information programmes to be implemented by DMC to educate local community about benefits of the Dam.

**Sustainable Development to Facilitate Tourism and Recreational Use and Benefit the Local Community**

- Coordination between Provincial Authorities and DWS with regards to marketing and tourism;
- Marketing and Tourism Strategy to be compiled and implemented;
- Potential linkage between Vanderkloof Dam and Gariep Dam to be explored;
- Potential Public Private Partnerships (PPPs) for the House Boats, Night Drives, Shoreline Development etc. to be explored;
- Potential of meat processing from Hunting and Culling to be assessed. The main purpose of this would be to create employment opportunities in the local community;
- Formalised Picnic Areas should be put in place around the Dam;
- Potential of hiking, horse riding and cycling trails to be assessed; and

- The Lake !Gariep Initiative should be revived including determining the feasibility of linking the three games reserves around the Dam into one cohesive unit.

**Management of Fishing**

- Status of current commercial fishing or small scale fisheries programme to be determined. Lessons learnt and issues encountered should be noted; and
- The feasibility of reviving the Commercial/Small Scale Fisheries should take place (if necessary). The feasibility study should take into account the impact on indigenous fish species, local community members who are dependent on subsistence fishing as well as the studies documenting low fish stocks at the Dam.

**Increased Education and Skills Training**

- Discussions between FS DETEA& BD, DWS and Yacht Club should be undertaken to coordinate increased education and skills training programmes which include the local schools in the area.
- FS DETEA Education Facility should be completed;
- Discussions between DWS, DAFF and FS DETEA to be undertaken regarding the China-South Africa Agricultural and technology demonstration centre to ensure community skills training is undertaken as part of this programme; and
- Coordination between Yacht Club and local schools and SAS to introduce youth sailing programme at local schools.

# 4. HOW DO WE GET THERE?

## 4.1. How does the RMP Work?

The overarching framework for the Gariep Dam RMP is presented in Figure 6 below. It highlights the consultative nature of the RMP process where stakeholder meetings, public meetings and authority meetings were used to identify the Vision and Objectives for the Dam. The Vision and Objective forms the central tenet around which the RMP is based. The RMP is further broken down into 4 main Plans namely, the Institutional Plan, Financial Plan, Strategic Plan and Zonal Plan.

Each of the major areas of the RMP will be presented in detail further in this chapter. Briefly: The **Institutional Plan** provides a framework for the institutional arrangements at the Dam. In this case a three-tiered management system is proposed. This three-tiered approach includes a RMP Steering Committee (RSC), Operations Management Committee (OMC) and Dam Management Committee (DMC). However, it should be noted that DWS reserves the right to appoint an Implementing Agent (IA) to manage the surface water and Dam Basin. The IA would then for part of the institutional structure.

The RSC includes representatives of National Government Departments and fulfils a monitoring and high level guidance function to ensure that all functions of the DMC and OMC are being undertaken.

The OMC will be formed at an Operations or Cluster Level and is a current reporting line within DWS. The DMC will include authorised access point representatives and those who have an official mandate at the Dam. All three committees are chaired by a DWS official.

The Institutional Plan discusses requirements for agreements, development targets (in relation to community development of water sports) and information on the affiliations required. The detailed Institutional Plan is provided in the **Chapter 4.2.**

The **Financial Plan** provides information on how money generated through recreational use should be used, by whom and for what. It also provides guidelines on the financial reporting required. Further, the information from the Financial Plan is used to inform the Business Plan. The detailed Financial Plan is provided in **Chapter 4.3.**

The **Zonal Plan** has three main components:

- Shoreline Management Zones;
- Water Surface Management Zones; and
- Activities allowed in each zone.

The activities are presented in Table 12 and provide information on activities that are not allowed within a zone together with preferred or potential activities. The detailed Zonal Plan is provided in **Chapter 4.4.**

In terms of the **Strategic Plan**, the vision for the Dam was distilled into a number of objectives. These objectives are further distilled into actions required in order to achieve the Vision. This information was used to inform the BP for each objective. The detailed Strategic Plan is provided in **Chapter 4.5.**

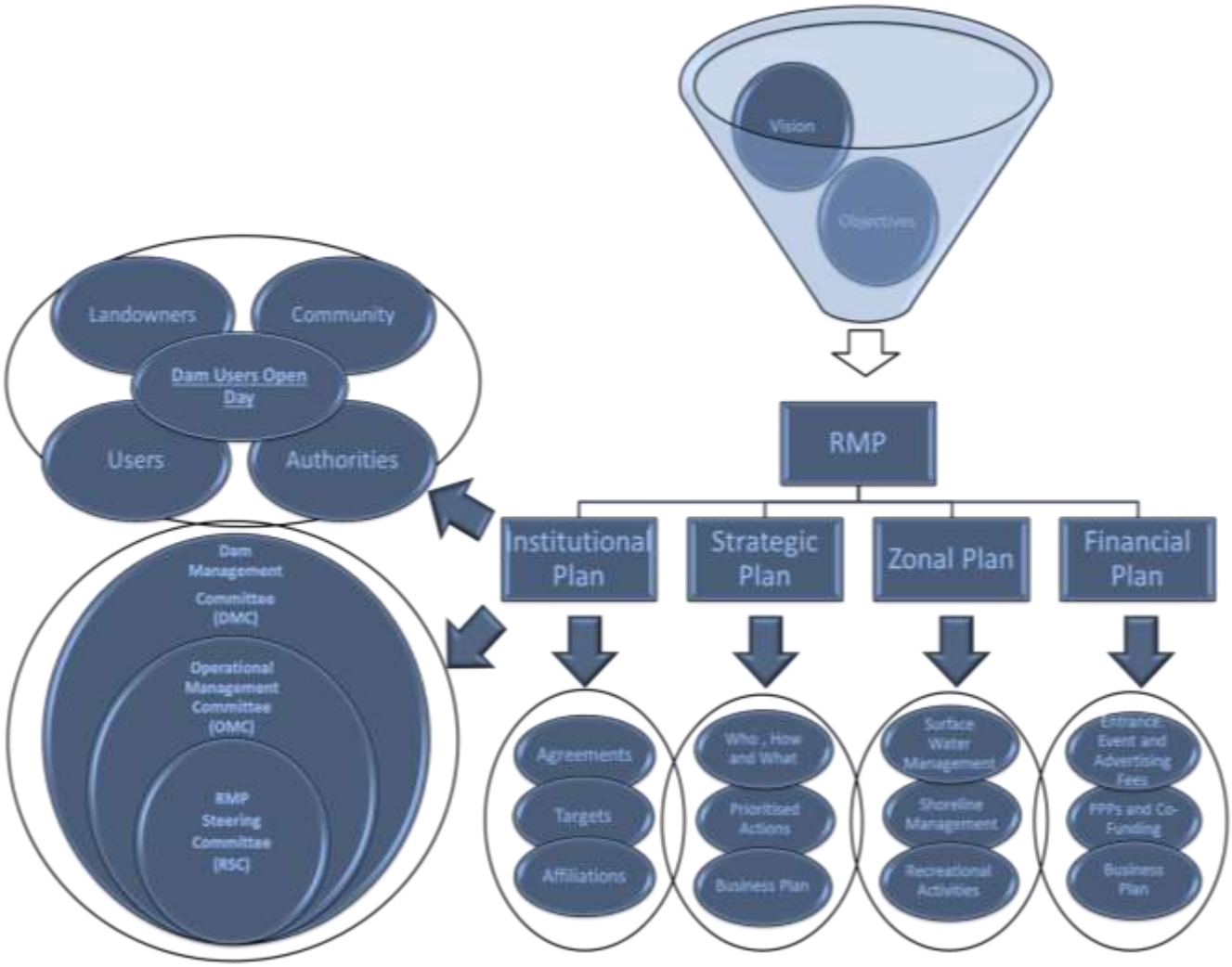


*Figure 6: RMP Framework*

## 4.2. Institutional Plan

The Institutional Plan is the backbone of the RMP as it identifies the management system which is required to ensure the objectives of the RMP are met. The Institutional Plan consists of three sets of tools which will be used to manage the Dam so that the Vision can be met.

The first toolset involves three separate but interlined committees all Chaired by the DWS because DWS is the custodian of all surface water in South Africa. The membership of each committee and their roles and responsibilities is provided in Section 4.2.1., 4.2.2. and 4.2.3. below.

The second toolset involves an open communication forum which allows all stakeholders to be involved in the management of the Dam. The purpose of this forum is to share information and allow stakeholders to raise concerns and ideas regarding the management of the Dam. It also provides a platform for dealing with issues and challenges faced by users.

The third toolset includes a number of management tools including agreements, affiliations and targets.

Figure 7 below provides a visual representation of how these toolsets function together

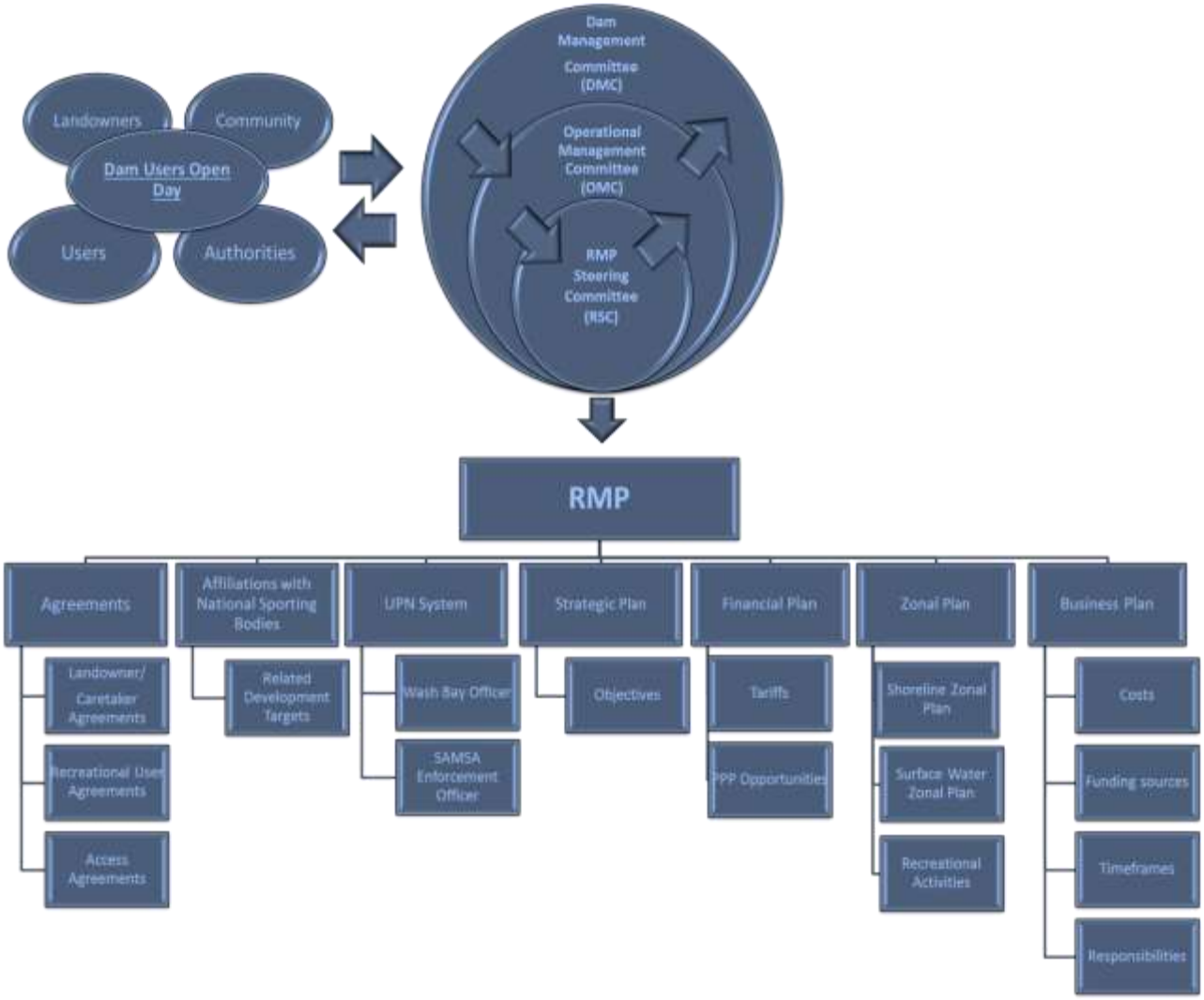


*Figure 7: Institutional Framework*

### *4.2.1. RMP Steering Committee (RSC)*

The RSC is made up of representatives from National Government and National Agencies. The main focus of this meeting is to ensure that both the DMC and OMC are performing all necessary functions. The committee will also provide high level guidance. The RSC allows for a formal reporting structure between the Chief Director: Operations and Integrated Environmental Engineering (IEE). Relevant departments from DWS including Operations, Water Quality Management and Catchment Management will be included in the RSC. The committee will meet every six months. The figure below provides details of the membership of the RSC.

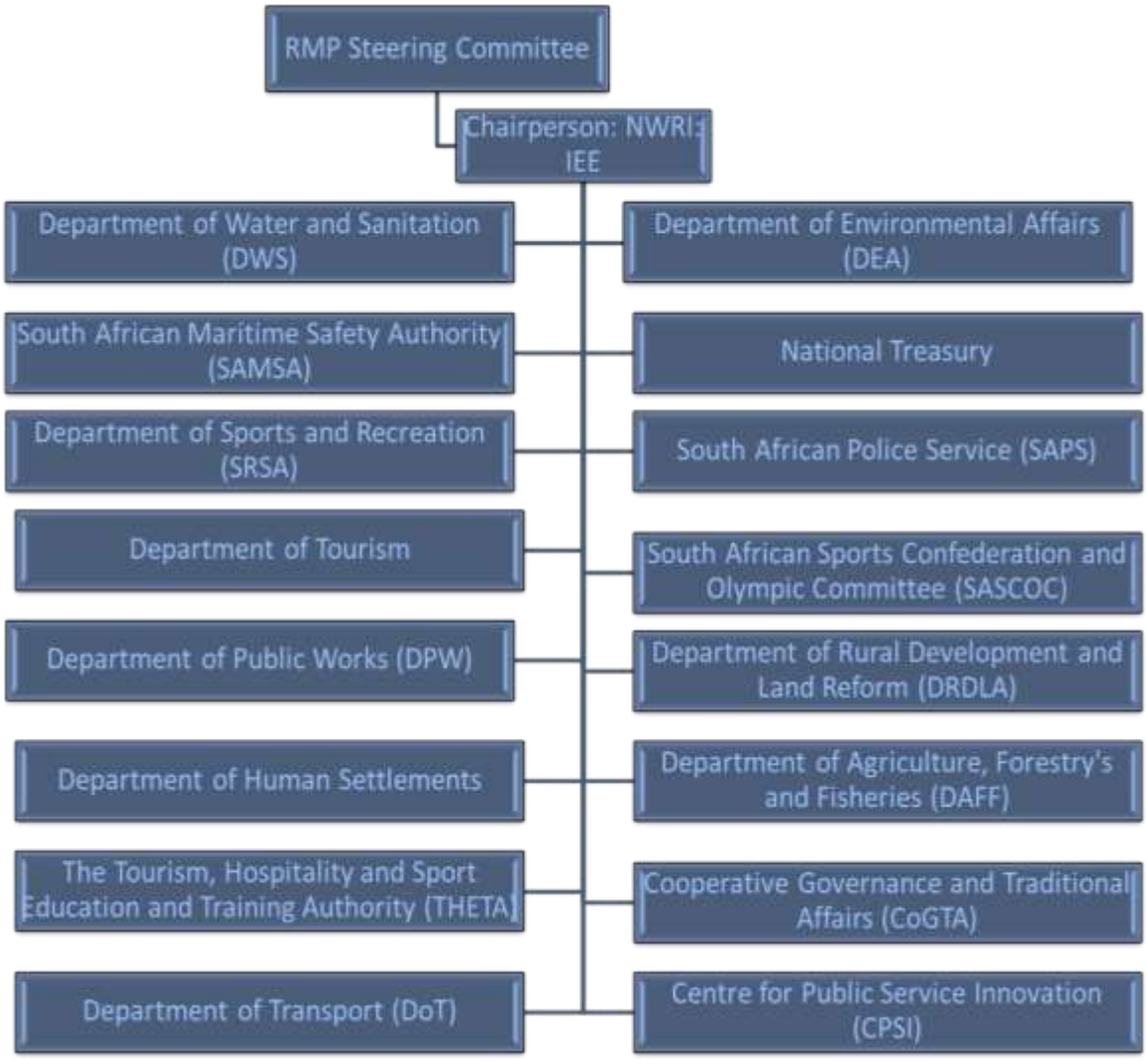


*Figure 8: RSC Membership*

### *4.2.2. Operations Management Committee (OMC)*

The OMC will function at a catchment level and will provide high level guidance for all Dams occurring within one catchment. This is an existing reporting line between Area Managers for various schemes, the Regional Manager and the Director: Operations. The implementation of the RMP will be added as an agenda item, hence providing an opportunity to discuss the RMP. The Regional Manager will be fully aware of all commercial and/or recreational activities/opportunities at all Dams within the cluster.

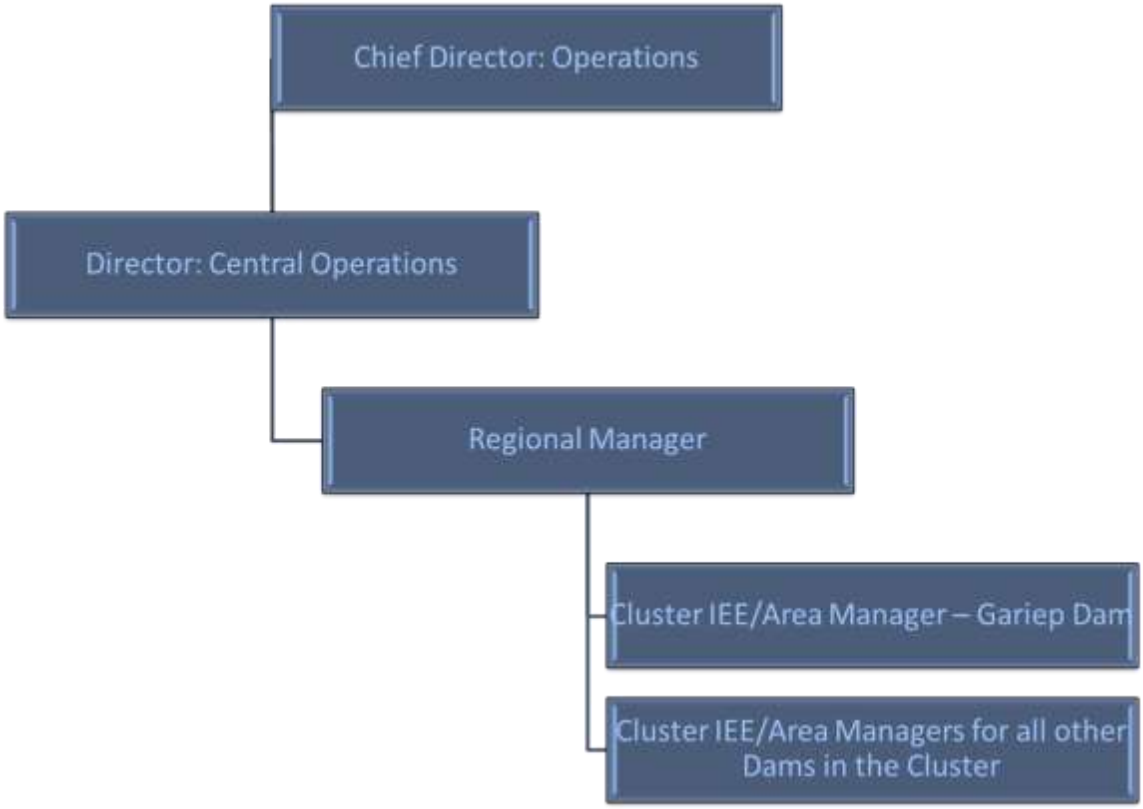


*Figure 9: OMC Structure*

### *4.2.3. Dam Management Committee (DMC)*

The DMC is responsible for the operationalisation of the RMP and includes a larger pool of representatives. This committee is chaired by the delegated DWS Official/IA. The DMC is involved in the management of the UPN System as part of the CIWSP and includes the following representatives:

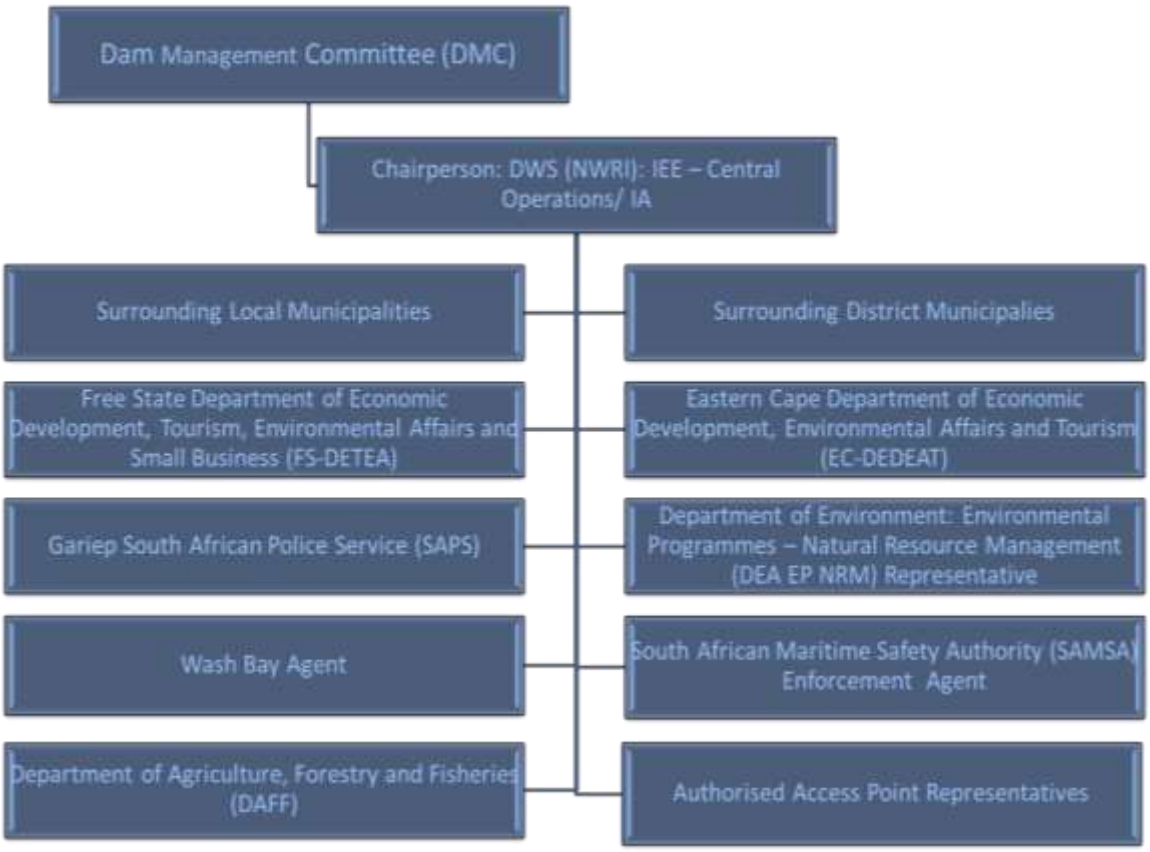


*Figure 10: DMC Membership*

One of the main functions of the DMC is to assess commercial opportunities at the Dam. As such, an agenda item related to the Strategic Plan for Commercialisation (SPC) is required. In addition, changes in water quality, developments in the area, status of Aquatic Invasive Species and education and information programmes should be discussed. The DMC should meet every three months (i.e. quarterly).

Another important function of the DMC is to organise and facilitate the quarterly Dam User Open Day. All stakeholders should be invited to this meeting so that issues regarding use of the Dam can be discussed. If necessary, serious issues can be escalated from the Public Open Day to the OMC and then RSC so to ensure swift conflict resolution. The Open Day also provides an opportunity for the DMC to inform users of the Dam of all rules and regulations governing the access and use of the Dam. Due to the length of the Dam, it is suggested that the venue for the DMC and public open day moves between Gariep, Oviston and Bethulie to ensure all users have an opportunity to attend the Open Day.

Operational management of recreational activities such as ensuring the AtoN and demarcation markers system is in place and setting times for use of the Dam (within the current framework of GN 654 of 1964) will also be managed by the DMC.

Stakeholders such as SAPS are to be included on the DMC to ensure proper safety on the surface water especially in terms of emergency response.

The final structure of the DMC may change once agreements with Authorised Access Points Representatives are concluded. The updated DMC membership list will be added as an addendum of the Gazetted RMP.

Lastly, the DMC is also responsible for ensuring the BP is implemented.

### *4.2.4. Management tools*

The RSC, OMC and DMC will have a number of management tools which will enable proper management of the Dam in line with Legislative requirements.

#### 4.2.4.1. Terms of Reference

The RSC, and DMC will be guided by Terms of Reference regarding roles and responsibilities. The Terms of Reference will provide guidance on the following management aspects:

- Meeting frequency;
- Roles and Responsibility of Chairperson;
- Roles and Responsibilities of Members;
- Minutes and attendance requirements;
- Reporting requirements;
- Management of agreements;
- Management of access objectives;
- Management of development targets;
- Strategic Plan for Commercialisation (SPC);
- Management of Water quality monitoring;
- Management of the Control of Aquatic Invasive Species;
- Management of Development Pressure; and
- Management of UPN system and wash bays.
- Terms of Reference are not required for the OMC as this is an existing reporting structure.

#### 4.2.4.2. Agreements

1.) Agreements between DWS and Provincial Authorities

One of the main management tools available is the use of Agreements to ensure proper use of the Dam in line with the RMP vision and objectives. Gariep Dam (then Hendrik Verwoerd Dam) is situated along the centre line between Northern Cape (then the Cape of Good Hope) and Free State (then Orange Free State), DWS signed over control of the Dam and the State Land within the Purchase Boundary to both Provinces.

The first objective of the RMP is to update these agreements in line with the requirements of the RMP. These agreements should be updated within 12 months of the gazetted RMP.

The updated agreements between FS DETEA and EC-DEDEAT and DWS must as a minimum achieve the following:

- Terms and conditions regarding equitable access must be included in ALL agreements;
- Safety management to be in line with SAMSA requirements;
- Roles and responsibilities regarding the following:
    - Maintenance of AtoN and Demarcation Markers;
    - Maintenance of Wash Bays;
    - Maintenance of Recreational Infrastructure;
    - Maintenance of Fencing; and
    - Maintenance of the UPN System including signage.
- Management of agreements with other recreational users;
- Conditions on the use of the Dam for small scale fisheries or for commercial fisheries projects; and
- Conditions for the negotiations of agreements with recreational clubs. All

agreements between FS DETEA and any boat clubs, fishing clubs etc. should be reviewed and accepted in writing by DWS. They should also be presented to the DMC prior to signature to ensure the vision and objectives of the RMP are met.

Irrespective of the nature of the agreement the following must be incorporated:

- Clear start and end dates and terms of renewal/extension;
- Rights and obligations of both parties;
- Access points to be used must be stipulated. Failure to do so will result in unauthorized access points being closed (see section on Access agreements for more details);
- FS DETEA and therefore DWS's exclusion of liability;
- Terms and conditions of improvements made to the property should be stipulated. All improvements require consent from DWS and the DMC. Furthermore, the financial consequences should this requirement not be met should also be stipulated in the agreement. No permanent structures shall be built within the 1:100 year floodline without additional approval as required by Section 21 (c) and (i) of the National Water Act (Act no 36 of 1998);
- The extent of the rights to use the resource should be stipulated;
- Clear instructions on the financial requirements of both parties, and where and when money must be paid should also be stipulated. All recreational clubs and societies on State Land must be managed in line with National Treasury requirements. Lease agreements for use of State Land should include fair remuneration at the current market value;
- All agreements should include a cancellation clause if requirements cannot be met;
- All clubs or associations must be affiliated to a National Sporting Body recognised by the South African Sports Confederation and Olympic Committee (SASCOC). All agreements must include a cancellation clause if clubs or associations fail to obtain affiliation within one year from date of signature of the agreement;
- Limitations of the number of people allowed to access the water surface of the Dam based on carrying capacity of Dam as well as the carrying capacity of the CIWSP wash-bays must be adhered to;
- A list of current and potential recreational activities allowed at the Dam;
- Requirements for safety, disaster management and emergency response plans;
- Duties and responsibilities of either party regarding maintenance, management and infrastructure;
- A list of prohibited activities;
- Prohibition of subletting portions of the leased area;
- A mandate for programmes to assist in equitable access and redressing past imbalances at the Dam, such as sponsored gate-fees for members of previously disadvantaged communities. This should be in line with the RMP. The DMC will then be required to report against all targets at the OMC.
- All recreational activities must be in line with the RMP, which once gazetted, becomes the mechanism to control and manage recreational use. Although no Section 21k Water Use License Application (WULA) is required, all activities must comply with all other relevant legislation requirements including the following:
    - The Merchant Shipping (National Small Vessel Safety) Regulations, 2007, - Control of Boating;

- Section 21 (a) of the National Water Act, 1998 – abstraction;
- Section 21 (c) and (i) of the National Water Act, 1998 – construction of slipways/infrastructure;
- Safety at Sports and Recreational Events Act, 2010 – Events; and
- Provincial Ordinances – Fishing.

These agreements should be updated within one year of the RMP being gazetted.

2.) Recreational Use Agreements

Furthermore, all recreational users of the Dam must sign an agreement with FS DETEA as they are responsible for the surface water management of Gariep Dam. All recreational use at the Dam must be through an appropriate legal framework between the recreational user and FS DETEA or EC-DEDEAT whichever institution is applicable. However all agreements must be approved in writing by DWS and the DMC.

Recreational Use Agreements must be developed in line with the conditions stipulated in the agreement between DWS and FS DETEA and EC-DEDEAT.

All agreements must be finalised within one year of the RMP being gazetted.

3.) Land Management Agreements

There is a lack of landownership information, thus it would be necessary for the DMC to actively consider land management strategies which are more efficient including co-management agreements with surrounding or adjacent landowners which may result in environmentally sustainable and more efficient land management.

Agreements must be developed with appropriate legal advice and consultation.

Land Management Agreements would also thus need to take into account management of access to the shoreline.

All agreements must be finalised within one year of the RMP being gazetted.

4.) Access Agreements

Even though access to the water is allowed at GNR, Oviston Resort, Forever Resort and FSYC, there are no formal agreements nor any coordination between these different role players. It is suggested that additional agreements regarding access be signed thereby providing a legal mechanism to ensure that all access requirements are being met.

Access to the surface water through private property without an access agreement in place is an illegal activity. A formal agreement with DWS/IA will be required by all adjacent landowners, stakeholders and recreational clubs that have direct access to the water surface of the Dam through 1.) constructed slipways; 2.) natural slipways; or 3.) jetties for angling and/or launching of boats.

DWS mandate is to build a wash bay on State Owned Land at Gariep Dam. The Wash Bay Officer will be employed through DEA: Working for Water. DEA will supply the herbicide which will be used to ensure vegetative material washed off vessels and towing vehicles at the Wash Bay do not infest the Dam.

Further, all adjacent landowners who wish to access the Dam for personal use will require an access agreement to be in place.

Access agreements must be developed with appropriate legal advice and consultation. All agreements must be finalised within one year of the RMP being gazetted.

5.) Safety of Navigation Agreements

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

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

6.) Event Applications

FS DETEA manages events. The FSYC holds a number of events at the Gariep Dam.

All events must be managed through an event application process. While the application may be made to FS DETEA or EC-DEDEAT, DWS and the DMC must approve the application. These applications must follow a specific template and will include but not limited to the following:

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

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

#### 4.2.4.3. National Affiliations and Development Targets

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

Should sports clubs wish to continue to operate at Gariep Dam they must become affiliated within two years of the RMP coming into effect.

#### 4.2.4.4. Community Participation and Beneficiation

The RMP has suggested a number of different objectives, actions, interventions, agreements and institutional arrangements to ensure that community participation and beneficiation of the resource takes place. These are captured throughout the different plans and in the vision and objectives. However, in order to ensure a strong focus on this aspect by the DMC, OMC and RSC going forward, the different elements of community participation and beneficiation are consolidated below.

1.) Socio-Economic Development

Socio-economic development is a key aspect of the RMP. The vision makes specific mention of sustainable growth and development and therefore socio-economic development is one of the central tenets of the RMP. There are two objectives (and related actions) which relate to socio- economic development.

**Sustainable Development to Facilitate Tourism and Recreational Use and Benefit the Local Community**

- Coordination between Provincial Authorities and DWS with regards to marketing and tourism;
- Marketing and Tourism Strategy to be compiled and implemented;
- Potential linkage between Vanderkloof Dam and Gariep Dam to be explored;
- Potential Public Private Partnerships (PPPs) for the House Boats, Night Drives, Shoreline Development etc. to be explored;
- Potential of meat processing from Hunting and Culling to be assessed. The main purpose of this would be to create employment opportunities in the local community;
- Formalised Picnic Areas should be put in place around the Dam;
- Potential of hiking, horse riding and cycling trails to be assessed; and
- The Lake !Gariep Initiative should be revived including determining the feasibility of linking the three games reserves

around the Dam into one cohesive unit.

**Management of Fishing**

- Status of current commercial fishing or small scale fisheries programme to be determined. Lessons learnt and issues encountered should be noted.
- Revival of Commercial Fisheries should take place.

Further, as discussed in the Financial Plan below, Gariep Dam can become a key economic lever for the region, thereby creating job opportunities for the local community.

One of the key mechanisms for this is the use PPPs. However in regards to potential PPPs, the following should be noted:

- A balance between high and small cap opportunities is required to ensure that revenue generation occurs together with the promotion of equitable access and job creation at the Dam; and

- While the tariff structure can be used for revenue generation, it should not be used to deny people access to the dam.

The BP has a specific intervention regarding determining the feasibility of a PPP for managing tourism and recreational activities There is also a specific BP for compiling and implementing a marketing plan. A BP for reviving the LGI and determining the feasibility for linking the Nature Reserves is also included as well as a BP for meat processing from culling and hunting.

Further, due to the fact that Gariep Dam is known as a good fishing area, a specific BP is included to determine the feasibility of potential commercial fisheries programmes. This is especially important due to the fact that there are a number of poor and marginalised communities around the Dam. Fisheries have the opportunity to provide a source of protein for poor households as well as a source of income.

2.) Equitable Access

One of the main triggers for the RMP was the issue of inequitable access. In order to rectify this, one of the objectives (and related actions) has aspects which are specifically related to equitable access:

**Improved equitable access and use**

- Implementation of local community access card at Oviston Resort as well as formalised Picnic Area;
- The potential for public picnic and fishing facility near the Forever Resort entrance to be assessed. A potential public access area near Bethulie should also be assessed; and
- Information programmes to be implemented by DMC to educate local community about benefits of the Dam.

On the Free State side, GNR does have public access, while on the Eastern Cape side, ONR has a fishing area which has no infrastructure or management system in place. There is also a picnic spot at the Dam wall however this does not provide access to the surface water. ONR and GNR are outside of town and less accessible therefore a specific public access area (near the current Forever Resort) is suggested. In Bethulie, (further upstream) there is only an informal area. A BP is therefore provided to create two public access areas. In Oviston, there is currently a resort. It suggested that a local community access card be implemented at the resort to ensure access to local community members.

Section 4.2.4.1. provides guidance on the aspects which should be included in the ToR for the DMC and RSC. Specific mention is made of Management of access objectives and Management of development targets. While, Section 4.2.4.2. provides the guidance on the aspects which should be included in all agreements. This includes the following:

- A mandate for programmes to assist in equitable access and redressing past imbalances at the Dam, such as sponsored gate-fees for members of

previously disadvantaged communities. This should be in line with the RMP. The DMC will then be required to report against all targets at the OMC.; and

- All agreements must include a cancellation clause should community access targets not be met.

3.) Skills Development and Training

Skills training and development can ensure socio-economic benefits by providing skills to the local community which can be used for job creation. There is one objective (and related actions) related to skills development and training.

**Increased Education and Skills Training**

- Discussions between FS DETEA, DWS and Yacht Club should be undertaken to coordinate increased education and skills training programmes which include the local schools in the area.
- FS DETEA Education Facility should be completed;
- Discussions between DWS, DAFF and FS DETEA to be undertaken regarding the China-South Africa Agricultural and technology demonstration centre to ensure community skills training is undertaken as part of this programme; and
- Coordination between Yacht Club and local schools and SAS to introduce youth sailing programme at local schools.

**Increased but Well Managed and Safe Recreational Use**

- Wash Bay Officers and SAMSA Enforcement Officers to be trained; and
- First Aid Training for Enforcement Officers and Wash Bay Officers.

The BP has a specific intervention relating to development and implementation of a skills training programme as there is an opportunity for local community members to obtain skills (such as first aid) to be employed at the public access area as 'lifeguards'. This would have the added benefit of improving community safety at the Dam. In addition, FS DETEA has an education facility which is not completed. Once completed, the facility will be used for environmental education training for provincial schools. Coordination between the Yacht club and local schools could also develop sailing skills in the area.

In addition, the DAFF has recently opened the China-South Africa Agricultural and technology demonstration centre, which is intended as a modern research, demonstration, aquaculture promotion and training facility for freshwater water fish and farming technologies. DWS, FS DETEA and DAFF to ensure that community training and skills development takes place as part of this.

## 4.3. Financial Plan

Gariep Dam is an economic lever and can become central to development in the Region. 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.

With PPPs, the private party assumes the financial, technical and operational risks but receives a benefit for this. PPPs allow for DWS to make State Assets such as Dams available to private parties who wish to engage in tourism related commercial operations (DWAF, 2009). This risk sharing mechanism aims to unlock socio-economic potential of State Dams. In addition, development of PPPs in remote areas often require related infrastructure upgrades and thus there is the opportunity for new infrastructure investment and development and related services which would benefit local communities.

Although high cap PPPs result mostly in revenue generation, small cap opportunities (less than R10 million (2007 figures) are more likely to fulfil socio-economic objectives such as job creation, promotion of Broad-Based Black Economic Empowerment, LED and Small, Medium and Micro Enterprises. A balance between high and small cap opportunities is required to ensure that revenue generation occurs together with the promotion of equitable access and job creation at the Dam.

Further, Gariep Dam is a State Resource and as such all profits made from the recreational use of the Dam should be used for further development of the Dam.

While the fees for use of the Dam can be used for revenue generation, it should not be used to deny people access to the Dam. Thus it should take into account the socio-economic status of recreational users. For example, a sliding scale, cross subsidy fee structure and/or contractual obligations which ensure equitable access must be considered when setting a fee.

The BP provides a financial framework to undertake certain interventions.

## 4.4. Zonal Plan

The Zonal Plan for Gariep Dam has three main sections. The first involves the current recreational activities together with an identification of potential recreational and/or commercial opportunities. This section also includes the determination of carrying capacity. The second section involves the shoreline management zones (together with preferred activities and prohibited activities within each zone) and the third involves surface management zones (together with preferred activities and prohibited activities within each zone).

### *4.4.1. Current Recreational Uses*

Gariep Dam is surrounded by the ONR and GNR, which provide recreation and conservation. A variety of recreational uses currently take place at the Dam, refer to Section 2.12.3 for further details.

### *4.4.2. Potential Recreational and/or Commercial Opportunities and Uses*

A matrix model was used to determine the feasibility of possible recreational and eco-tourism activities in line with the operational requirements of the Dam, the biophysical environmental conditions and safety requirements. The scores utilised to determine viability are as follows:

*Table 11: Scores for Recreational Use*

| Score | Meaning | Comment |
|---|---|---|
| 0 | Not Feasible | High Negative Impact to Dam Environment + High Negative Impact to Recreational Users. Text provided in red highlights the specific factors which make the activity not feasible at the Dam. |
| 1 | Likely to be Feasible however feasibility study is required. | **Feasibility Study is required** |
| 2 | Likely to be Feasible | Benefits appear to outweigh impacts<br>Allowed should there be an interest.<br>Adequate agreements and safety measures would be required as per RMP. **No feasibility study is required** |
| 3 | Current use | Benefits outweigh impacts.<br>**No feasibility study is required** |

Based on the table below the following commercial activities have been assessed as potential commercial activities that require further feasibility assessments.

- Hiking Trails along the length of the Dam;
- House Boats;
- Formalised Picnic Area and swimming area at Gariep and Bethulie;
- Small cap PPP for additional guided activities such as Horse-Riding, Game Drives, Hiking Trails and formalised Kayak Tours linking Gariep Dam to Vanderkloof Dam;
- Formalised Picnic Areas;
- Open Water Sailing School;
- Open water swimming school;
- Camping for hikers, canoeists etc.; and
- Commercial/Small-scale Fisheries opportunity.

*Table 12: Potential and Current Recreational Activities*

| Contact Type | Activity | Operational Management Issues | | Environmental Impacts on Recreational Use | | | Recreational Use Impacts on the Environment | | | Safety Requirements | | | | | Recreational Requirements | | | | | Legal Requirements | Economic Viability | | Score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Change in Water Level | Impacts on Dam Wall | Water Quality (E. Coli) | Health Impacts | Aquatic Invasive Species | Fish Spawning | Bird Nesting | Impacts on Wildlife | AtoN and Demarcation Markers | Water Depth | Visibility | Radio Signal | Emergency Response | Conflicts with current activities | Winds required | Accommodation / Facilities | Ablution facilities | Access to water | Access to Land | Interest in the activity | Funding Opportunities | |
| No Contact | Guided Horse trails in GNR, ONR and links to Vanderkloof | N/A | No impact | N/A | N/A | N/A | N/A | Possible disturbances but can be mitigated through route selection | Possible disturbances | N/A | N/A | N/A | Cell phone signal | As part of PPP for guided tours | No conflicts | N/A | Not required | Not required | Not required | Occurs in existing Nature Reserves | Yes, mentioned at public meeting and included in GNR Management Plan | PPP or through agreement with GNR. Feasibility required as part of PPP process | 1 |
| | Cycling | N/A | No impact | N/A | N/A | N/A | N/A | Possible disturbances but can be mitigated through route selection | Possible disturbances | N/A | N/A | N/A | Cell phone signal | UPN system would need to be extended | No conflicts | N/A | Trails and signposts would be required | Guided tours only so no trails would be required | Not required | Occurs in existing Nature Reserves | Yes, mentioned at public meeting and included in GNR Management Plan | N/A | 3 |
| | Walking (not restricted to specific hiking trails) | N/A | No impact | N/A | N/A | N/A | N/A | Possible disturbances but can be mitigated through route selection | Possible disturbances | N/A | N/A | N/A | Cell phone signal | UPN system would need to be extended | No conflicts | N/A | Trails and signposts would be required | At GNR | Not required | Occurs in existing Nature Reserves | Yes, mentioned at public meeting and included in GNR Management Plan | N/A | 3 |
| | Hiking (restricted to specific hiking trails) | N/A | No impact | N/A | N/A | N/A | N/A | Possible disturbances but can be mitigated through route selection | Possible disturbances | N/A | N/A | N/A | Cell phone signal | UPN system would need to be extended | No conflicts | N/A | Trails and signposts would be required | At GNR | Not required | Occurs in existing Nature Reserves | Yes, mentioned at public meeting and included in GNR Management Plan | N/A | 3 |
| | Hiking – Full Length of the Dam | N/A | No impact | N/A | N/A | N/A | N/A | Possible disturbances but can be mitigated through route selection | Possible disturbances | N/A | N/A | N/A | Poor Radio signal – PLB Rental System Required. | UPN System would need to be extended | No conflicts | N/A | Trails and signposts would be required. | Long trails typically do not have ablution facilities. So at this point no ablution facilities would be required. | Not required | Occurs in existing Nature Reserves | Similar long hiking trails such as Blyde River Canyon, Otter Trail, Num-Num Trail, Amatola Hiking Trail and Fish River Canyon Trail are all successful | Possible con-funding Department of Tourism or through PPP for external activities | 1 |
| | Camping | N/A | No impact | N/A | N/A | N/A | N/A | Current | Possible disturbances | N/A | N/A | N/A | N/A | GNR ONR OR FR FSYC | No conflicts | N/A | GNR ONR OR FR FSYC | At GNR | Not required | Occurs in existing Nature Reserves | Current activity | N/A | 3 |
| | Camping for hikers/ canoeist along full length of Dam | N/A | No impact | N/A | N/A | N/A | N/A | Possible disturbances but can be mitigated through site selection | Possible disturbances | N/A | N/A | N/A | Poor Radio signal – PLB Rental System Required. | UPN System would need to be extended | No conflicts | N/A | Camping areas would need to be identified. Low level of maintenance required as camping facilities associate with | Long trails typically do not have ablution facilities. So at this point no ablution facilities | Not required | Occurs in existing Nature Reserves | Kayak tours currently use area adjacent to Dam for camping however this is not formalised | Possible con-funding opportunities with Department of Tourism, FSTA or PPP for external activities | 1 |

| Contact Type | Activity | Operational Management Issues | | Environmental Impacts on Recreational Use | | | Recreational Use Impacts on the Environment | | | Safety Requirements | | | | | Recreational Requirements | | | | | Legal Requirements | Economic Viability | | Score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Change in Water Level | Impacts on Dam Wall | Water Quality (E. Coli) | Health Impacts | Aquatic Invasive Species | Fish Spawning | Bird Nesting | Impacts on Wildlife | AtoN and Demarcation Markers | Water Depth | Visibility | Radio Signal | Emergency Response | Conflicts with current activities | Winds required | Accommodation / Facilities | Ablution facilities | Access to water | Access to Land | Interest in the activity | Funding Opportunities | |
| | | | | | | | | | | | | | | | | | hiking are usually rugged. | would be required. | | | | | |
| | Birding | N/A | No impact | N/A | N/A | N/A | N/A | Unlikely to cause disturbances | Unlikely to cause disturbances | N/A | N/A | N/A | N/A | GNR | No conflicts | N/A | Accommodation in Doornkloof and Rolfontein NR currently available for birders | At GNR | Not required | Occurs in existing Nature Reserves | Current activity | N/A | 3 |
| | Game viewing | N/A | No impact | N/A | N/A | N/A | N/A | Unlikely to cause disturbances | Unlikely to cause disturbances | N/A | N/A | N/A | N/A | GNR | No conflicts | N/A | Accommodation in Doornkloof and Rolfontein NR currently available for game viewers. | At GNR | Not required | Occurs in existing Nature Reserves | Current activity | N/A | 3 |
| | Picnic Areas – GNR | N/A | No impact | N/A | N/A | N/A | N/A | Unlikely to cause disturbances | Unlikely to cause disturbances | N/A | N/A | N/A | N/A | UPN System | No conflicts | N/A | Demarcated picnic facilities are currently in place in GNR. Picnic areas in ONR are required. | At GNR | Not required | Occurs in existing Nature Reserves | Current activity | N/A | 3 |
| | Public Access Picnic Areas | N/A | No impact | N/A | N/A | N/A | N/A | Unlikely to cause disturbances | Possible littering or feeding of animals | N/A | N/A | N/A | Cell phone signal up to Hondeblaf River | UPN System | No conflicts | N/A | Formalised picnic area including braais and shade would be required. | Required. | There is currently no public access area to the Dam. Access to the water should be taken into account in the location of new public access area. | The purchase boundary needs to be determined. It is suggested that land near the current Forever Resort entrance be earmarked for public access. | The only public picnic area is outside the Dam area and thus there is no public picnic area with access to the water. | Funding may be available through government funding. Possible job opportunities for Picnic site officers. Possible "Working For Dams" Opportunity | 1 |
| | Organised Public Hunting | N/A | No impact | N/A | N/A | N/A | N/A | Gunshot likely to cause disturbances | Population management in line with GNR | N/A | N/A | N/A | Cell phone signal | GNR | Conflict with birding, game viewing, picnicking etc. Requires strict management | N/A | Accommodation at available at GNR | Not required | Not required. | Occurs in existing Nature Reserves | Current activity | N/A | 3 |
| Primary Contact | Open Water Swimming - Recreational | Due to use for hydro-electricity water levels can be quite low. | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. Therefore full contact recreational activities | In 2009, present state values were below RWQOs reference values. | No infestations at present | No Impact | No Impact | No Impact | Zonal Plan has zoned area for swimming. | Water depth unknown | Gariep Dam acts as sediment trap how visibility is acceptable for swimming. | N/A | UPN System | Conflicts with fast motorboat activities however zonal map has taken this into account. | Not required | Not required | Required at public access area | Access at public access area or FSYC or FR | Public access would be required. | Extreme heat in summer. Swimming was mentioned during public consultation as community pool is not working | Funding may be available through government funding. Possible job opportunities for Picnic site officers. Possible "Working For Dams" Opportunity | 1 |

| Contact Type | Activity | Operational Management Issues | | Environmental Impacts on Recreational Use | | | Recreational Use Impacts on the Environment | | | Safety Requirements | | | | | Recreational Requirements | | | | | Legal Requirements | Economic Viability | | Score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Change in Water Level | Impacts on Dam Wall | Water Quality (E. Coli) | Health Impacts | Aquatic Invasive Species | Fish Spawning | Bird Nesting | Impacts on Wildlife | AtoN and Demarcation Markers | Water Depth | Visibility | Radio Signal | Emergency Response | Conflicts with current activities | Winds required | Accommodation / Facilities | Ablution facilities | Access to water | Access to Land | Interest in the activity | Funding Opportunities | |
| | | | | are allowed. | | | | | | | | | | | | | | | | | | | |
| | Open Water Swimming – Development School | Due to use for hydro-electricity water levels can be quite low. | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. Therefore full contact recreational activities are allowed. | In 2009, present state values were below RWQOs reference values. | No infestations at present | No Impact | No Impact | No Impact | Zonal Plan has zoned area for swimming. | Water depth unknown | Gariep Dam acts as sediment trap how visibility is acceptable for swimming. | N/A | UPN System | Conflicts with fast motorboat activities however zonal map has taken this into account. | Not required | Not required | Required at public access area | Access at public access area would be required | Public access would be required. | No specific interest at this point. | SwimSA Telkom Splash | 1 |
| | Snorkelling | Water level changes are not expected to impact snorkelling however Hydrographic survey is required to determine which areas have the required depth. | N/A | In 2009, E Coli levels were 66/100ml which is below the RWQO of 130. Therefore full contact recreational activities are allowed. | In 2009, present state values were below RWQOs reference values. | N/A | N/A | N/A | N/A | N/A | Water depth unknown | Gariep Dam acts as sediment trap. Visibility is most likely too poor for Snorkelling. | N/A | N/A | N/A | Not required. | Not required. | Not required. | Access at public access area would be required | Public access would be required. | N/A | N/A | 0 |
| | Diving | Water level changes are not expected to impact swimming however Hydrographic survey is required to determine which areas have the required depth. | N/A | In 2009, E Coli levels were 66/100ml which is below the RWQO of 130. Therefore full contact recreational activities are allowed. | In 2009, present state values were below RWQOs reference values. | N/A | N/A | N/A | N/A | N/A | Water depth unknown | Gariep Dam acts as sediment trap. Visibility is most likely too poor for diving. | N/A | N/A | N/A | Not required. | Not required. | Not required. | Access at public access area would be required | Public access would be required. | N/A | N/A | 0 |
| Secondary Contact | Commercial/ small scale fisheries | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. Therefore full contact recreational activities are | In 2009, present state values were below RWQOs reference values. | N/A | Potentially negative impacts | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | Potential negative impacts on fish population and community fisherman. Feasibility study should take this into account | Not required. | Not required. | Not required. | Access would need to negotiated | Access would need to negotiated | Feasibility Study conducted by Rhodes University and numerous commercial fisheries have been attempted. | DAFF Funding PPP | 1 |

| Contact Type | Activity | Operational Management Issues | | Environmental Impacts on Recreational Use | | | Recreational Use Impacts on the Environment | | | Safety Requirements | | | | | Recreational Requirements | | | | | Legal Requirements | Economic Viability | | Score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Change in Water Level | Impacts on Dam Wall | Water Quality (E. Coli) | Health Impacts | Aquatic Invasive Species | Fish Spawning | Bird Nesting | Impacts on Wildlife | AtoN and Demarcation Markers | Water Depth | Visibility | Radio Signal | Emergency Response | Conflicts with current activities | Winds required | Accommodation / Facilities | Ablution facilities | Access to water | Access to Land | Interest in the activity | Funding Opportunities | |
| | | | | allowed. | | | | | | | | | | | | | | | | | | | |
| | Subsistence fishing | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. Therefore full contact recreational activities are allowed. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | No conflict | Not required. | Not required. | Not required. | Zonal Map has identified potential areas. Shoreline fishing currently occurs at ONR, OR, FR, GNR | Zonal Map has identified potential areas. Shoreline fishing currently occurs at ONR, OR, FR, GNR | Current activity. | N/A | 3 |
| | Shore Fishing | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. Therefore full contact recreational activities are allowed. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | No conflict | Not required. | Not required. | Not required. | Zonal Map has identified potential areas. Shoreline fishing currently occurs at ONR, OR, FR, GNR | Zonal Map has identified potential areas. Shoreline fishing currently occurs at ONR, OR, FR, GNR | Current activity. | N/A | 3 |
| | Tube Fishing | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. Therefore full contact recreational activities are allowed. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | May be conflict with Bass Fisherman, Anglers and Subsistence Fisherman. | Not required. | Not required. | Not required. | FSYC FR GNR OR | N/A | Not known at this time. | Not known at this time. | 2 |
| | Pontoon Fishing | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. Therefore full contact recreational activities are | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | May be conflict with Bass Fisherman, Anglers and Subsistence Fisherman. | Not required. | Not required. | Not required. | FSYC FR GNR OR | N/A | Not known at this time. | Not known at this time. | 2 |

| Contact Type | Activity | Operational Management Issues | | Environmental Impacts on Recreational Use | | | Recreational Use Impacts on the Environment | | | Safety Requirements | | | | | Recreational Requirements | | | | | Legal Requirements | Economic Viability | | Score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Change in Water Level | Impacts on Dam Wall | Water Quality (E. Coli) | Health Impacts | Aquatic Invasive Species | Fish Spawning | Bird Nesting | Impacts on Wildlife | AtoN and Demarcation Markers | Water Depth | Visibility | Radio Signal | Emergency Response | Conflicts with current activities | Winds required | Accommodation / Facilities | Ablution facilities | Access to water | Access to Land | Interest in the activity | Funding Opportunities | |
| | | | | allowed. | | | | | | | | | | | | | | | | | | | |
| | Bass Fishing | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. Therefore full contact recreational activities are allowed. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | May be conflict with, Anglers and Subsistence Fisherman. | Not required. | Not required. | Not required. | FSYC FR GNR OR | N/A | Current Activity | N/A | 3 |
| | Motorised Boats | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. Therefore full contact recreational activities are allowed. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | Possible conflict with swimmers and Jet Ski's | Not required. | Not required. | Not required. | FSYC FR GNR OR | N/A | Current Activity | Not known at this time. | 3 |
| | Jet Powered Boats | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. Therefore full contact recreational activities are allowed. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | May conflict with swimming however zonal map has taken this into account. | Not required. | Not required. | Not required. | FSYC FR GNR OR | N/A | Not known at this time. | Not known at this time. | 2 |
| | Rigid hulled Inflatable Boats (RHIB) | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. Therefore full contact recreational activities are allowed. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | May conflict with swimming however zonal map has taken this into account. | Not required. | Not required. | Not required. | FSYC FR GNR OR | N/A | Current activity | Not known at this time. | 3 |
| | Jet Ski | N/A | N/A | In 2009, E Coli levels | In 2009, present | N/A | N/A | N/A | N/A | Zonal Plan has | Water depth | N/A | Cell phone | UPN System | May conflict | Not required. | Not required. | Not required. | FSYC FR | N/A | Current Activity. | Not known at this time. | 3 |

| Contact Type | Activity | Operational Management Issues | | Environmental Impacts on Recreational Use | | | Recreational Use Impacts on the Environment | | | Safety Requirements | | | | | Recreational Requirements | | | | | Legal Requirements | Economic Viability | | Score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Change in Water Level | Impacts on Dam Wall | Water Quality (E. Coli) | Health Impacts | Aquatic Invasive Species | Fish Spawning | Bird Nesting | Impacts on Wildlife | AtoN and Demarcation Markers | Water Depth | Visibility | Radio Signal | Emergency Response | Conflicts with current activities | Winds required | Accommodation / Facilities | Ablution facilities | Access to water | Access to Land | Interest in the activity | Funding Opportunities | |
| | | | | were 66/100ml which is below the RWQO of 130. | state values were below RWQOs reference values. | | | | | zoned area for Jet Skis | unknown | | signal up to Hondebl af River | | with swimming however zonal map has taken this into account. | | | | GNR OR | | | | |
| | Dragon Boats | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | May be conflict with Bass Fisherman , Anglers and Subsistence Fisherman . | Not required. | Not required. | Not required. | FSYC FR GNR OR | N/A | Not known at this time. | Not known at this time. | 2 |
| | Slalom Canoe | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | None | Not required. | Not required. | Not required. | FSYC FR GNR OR | N/A | Not known at this time. | Not known at this time. | 2 |
| | Fishing Canoe | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | May be conflict with Bass Fisherman , Anglers and Subsistence Fisherman . | Not required. | Not required. | Not required. | FSYC FR GNR OR | N/A | Not known at this time. | Not known at this time. | 2 |
| | Jet Ski Fishing | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | May be conflict with Bass Fisherman , Anglers and Subsistence Fisherman . | Not required. | Not required. | Not required. | FSYC FR GNR OR | N/A | Not known at this time. | Not known at this time. | 2 |
| | Wind Surfing | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | None | Winds required | Not required. | Not required. | FSYC FR GNR OR | N/A | Current activity | Not known at this time. | 3 |
| | Kite Surfing | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | None | Winds required | Not required. | Not required. | FSYC FR GNR OR | N/A | Current activity | Not known at this time. | 3 |

| Contact Type | Activity | Operational Management Issues | | Environmental Impacts on Recreational Use | | | Recreational Use Impacts on the Environment | | | Safety Requirements | | | | | Recreational Requirements | | | | | Legal Requirements | Economic Viability | | Score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Change in Water Level | Impacts on Dam Wall | Water Quality (E. Coli) | Health Impacts | Aquatic Invasive Species | Fish Spawning | Bird Nesting | Impacts on Wildlife | AtoN and Demarcation Markers | Water Depth | Visibility | Radio Signal | Emergency Response | Conflicts with current activities | Winds required | Accommodation / Facilities | Ablution facilities | Access to water | Access to Land | Interest in the activity | Funding Opportunities | |
| | | | | | | | impact on spawning. | | | | | | | | | | | | | | | | |
| | Ski Jumping | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | None | Not required. | Not required. | Not required. | FSYC FR GNR OR | N/A | Not known at this time. | Not known at this time. | 2 |
| | Slalom Skiing | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | None | Not required. | Not required. | Not required. | FSYC FR GNR OR | N/A | Current activity | Not known at this time. | 3 |
| | Ski and Wakeboard Boat | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | None | Not required. | Not required. | Not required. | FSYC FR GNR OR | N/A | Current activity | Not known at this time. | 3 |
| | Kayaking Sprints | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | None | Not required. | Not required. | Not required. | FSYC FR GNR OR | N/A | Not known at this point | N/A | 2 |
| | Kayaking Marathons | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | None | Not required. | Not required. | Not required. | FSYC FR GNR OR | N/A | Not known at this time. | Not known at this time. | 2 |
| | Kayaking Water Polo | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | None | Not required. | Not required. | Not required. | FSYC FR GNR OR | N/A | Not known at this time. | Not known at this time. | 2 |
| | Kayaking Tours between Gariep and | N/A | N/A | In 2009, E Coli levels were 12/100ml which is | In 2009, present state values were | N/A | N/A | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | None | Not required. | Not required. | Not required. | FSYC FR GNR OR | N/A | Current unauthorised activity however activity. | N/A | 1 |

| Contact Type | Activity | Operational Management Issues | | Environmental Impacts on Recreational Use | | | Recreational Use Impacts on the Environment | | | Safety Requirements | | | | | Recreational Requirements | | | | | Legal Requirements | Economic Viability | | Score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Change in Water Level | Impacts on Dam Wall | Water Quality (E. Coli) | Health Impacts | Aquatic Invasive Species | Fish Spawning | Bird Nesting | Impacts on Wildlife | AtoN and Demarcation Markers | Water Depth | Visibility | Radio Signal | Emergency Response | Conflicts with current activities | Winds required | Accommodation / Facilities | Ablution facilities | Access to water | Access to Land | Interest in the activity | Funding Opportunities | |
| | Vanderkloof | | | below the RWQO of 130. | below RWQOs reference values. | | | | | | | | | | | | | | | | Potential linkage to Vanderkloof Dam does exist | | |
| | Kayaking Fishing | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | May be conflict with Bass Fisherman, Anglers and Subsistence Fisherman. | Not required. | Not required. | Not required. | FSYC FR GNR OR | N/A | Not known at this time. | Not known at this time. | 2 |
| | Paddle Ski | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | None | Not required. | Not required. | Not required. | FSYC FR GNR OR | N/A | Not known at this time. | N/A | 2 |
| | Surf Ski | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | None | Not required. | Not required. | Not required. | FSYC FR GNR OR | N/A | Not known at this time. | N/A | 2 |
| | Pedal Boat | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | None | Not required. | Not required. | Not required. | FSYC FR GNR OR | N/A | Not known at this time. | N/A | 2 |
| | Hovercraft | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | Conflicts with other users and sense of place. Potentially dangerous | Not required. | Not required. | Not required. | FSYC FR GNR OR | N/A | Not known at this time. | N/A | 0 |
| | Stand Up Paddling | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. | In 2009, present state values were below RWQOs | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | None | Not required. | Not required. | Not required. | FSYC FR GNR OR | N/A | Not known at this time. | N/A | 2 |

| Contact Type | Activity | Operational Management Issues | | Environmental Impacts on Recreational Use | | | Recreational Use Impacts on the Environment | | | Safety Requirements | | | | | Recreational Requirements | | | | | Legal Requirements | Economic Viability | | Score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Change in Water Level | Impacts on Dam Wall | Water Quality (E. Coli) | Health Impacts | Aquatic Invasive Species | Fish Spawning | Bird Nesting | Impacts on Wildlife | AtoN and Demarcation Markers | Water Depth | Visibility | Radio Signal | Emergency Response | Conflicts with current activities | Winds required | Accommodation / Facilities | Ablution facilities | Access to water | Access to Land | Interest in the activity | Funding Opportunities | |
| | | | | | reference values. | | | | | | | | | | | | | | | | | | |
| | Boat Paragliding | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | None | Winds required | Not required. | Not required. | FSYC FR GNR OR | N/A | Not known at this time | Not known at this time. | 2 |
| | Sailing | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | None | Winds required | Not required. | Not required. | FSYC FR GNR OR | N/A | Current activity | Not known at this time. | 3 |
| | Water Toys | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. | In 2009, present state values were below RWQOs reference values. | N/A | Zonal Map has demarcated river areas as no fishing areas and thus fishing should not have an impact on spawning. | N/A | N/A | N/A | Water depth unknown | N/A | Cell phone signal | UPN System | None | Not required. | Not required. | Not required. | FSYC FR GNR OR | N/A | Current activity. | N/A | 3 |
| | Flying Boats/Water Planes | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. | N/A | N/A | N/A | Possible disturbance | N/A | Not zoned. Hydrographic survey required. | Water depth unknown | N/A | Cell phone signal | Specific Emergency responses required. | None | Not required. | Air Traffic Control Tower required. | Not required. | FSYC FR GNR OR | Not known | There are a number of aerodromes around the Dam | N/A | 0 |
| | Open water sailing school | N/A | N/A | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. | N/A | N/A | N/A | N/A | N/A | Zonal Plan has zoned area for general activities. | Water depth unknown | N/A | Cell phone signal | UPN System | None | Not required. | Not required | Not required. | FSYC FR GNR OR | FSYC FR GNR OR | Sailing is very popular at the Dam | FSYC/SAS | 1 |
| | House Boats | N/A | Specific house boat would need to be approved by DWS to ensure no impacts on Dam wall. | In 2009, E Coli levels were 12/100ml which is below the RWQO of 130. | N/A | N/A | N/A | N/A | N/A | Zonal Plan has zoned area for general activities. | Water depth unknown | N/A | Cell phone signal | UPN System | None | Not required. | Mooring and method for dealing with sewerage required. | Not required. | FSYC FR GNR OR | FSYC FR GNR OR | Not known at this point however house boats are generally popular. | FS DETEA, PPP | 1 |

### *4.4.3. Carrying Capacity*

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

Calculating carrying capacity for recreation is a vital step to ensure that recreation at the Dam is safe and that users do not feel crowded and enjoy their use of the Dam as a venue for recreation. 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 (such as wildlife or weather conditions) that are unique to the Dam are taken into account.
- Effective (permissible) Carrying capacity (ECC). This is the number of visitors that can use the resource, given the management capacity available at the Dam.

#### 4.4.3.1. Physical Carrying Capacity (PCC)

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

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

A is calculated as the area of the water surface:353 km $^2$, or 35 312 hectares (ha)

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

| Craft | Water Depth (m) | U/A (ha/craft) |
|---|---|---|
| Canoes | >0.6 | 0.5 (0.005 km$^2$) |
| Windsurfers | >0.6 | 0.5 (0.005 km$^2$) |
| Rowing | >1.0 | 0.5 (0.005 km$^2$) |
| Dinghies | >1.0 | 1.0 (0.01 km$^2$) |
| Yachts | >1.8 | 2.0 (0.02 km$^2$ |
| Powerboats | >1.4m | 4.0 (0.04 km$^2$ |
| Fishing | >1.0m | 4.0 (0.04 km$^2$ |
| Water-skiing | >1.4m | 16.0 (0.16 km$^2$) |

Based on the fact that most activities do not require much space, and that the average hectares per user is 3 ha (30 000 m$^2$), the value of 8 ha (80 000 m$^2$) is an acceptable area per user (taking into account that jet skiing and water skiing do take place).

As Gariep Dam is quite remote it is unlikely that people would use the Dam more than once per visit. It is far more likely that visitors to the Dam would spend the majority of the day on the water surface. In this case RF = 1.

The PCC for Gariep Dam can therefore be calculated as:

PCC = 35 312 ÷ 8 x 1

PCC = 4 413 boats on the Dam.

However, this is based on the full length of the Dam and is therefore not realistic.

#### 4.4.3.2. Real Carrying Capacity (RCC)

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

- Conservation Areas;
- Mooring Areas (this is a deadslow area and thus restricts the number of boats);
- No go areas for safety such as the Dam all and the numerous islands); and
- Swimming areas.

The above factors result in a 12% decrease in water area available for recreation at the Dam (Area available for use decreases from 35 312 ha (353.12 km$^2$) to 30 978 ha (30.97 km$^2$). Therefore, 88% of the surface area of the Dam is still available for recreation.

The RCC for Gariep Dam is therefore:

- RCC = PCC x (100 – Cf1) % x (100 – Cf2) % x … (100 – Cfn)%
- Where Cf = a corrective factor expressed as a percentage.
- RCC = 4 413 x (100 – 88)%
- RCC = 3 801 boats on the Dam at any given time

#### 4.4.3.3. Effective (permissible) Carrying Capacity (ECC)

Effective Carrying Capacity is the maximum number of visitors that a site can sustain, given the management capacity available. Given that Gariep Dam has a nationally affiliated Yacht Club as well as some agreements in place at a number of resorts/reserves, the ECC is effectively 1.

- ECC = [Infrastructure Capacity x MC]/ RCC
- Where+ ECC = Effective Carrying Capacity;
- MC = Management capacity based on staff and budget;
- RCC = Real Carrying Capacity

### *4.4.4. Water Surface Zonal Plan*

The Zonal plan for the water surface at Gariep Dam is divided into eight distinct areas or zones. These zones are based on a number of factors including:

- Operational requirements of the Dam;
- Safety requirements of each activity;
- Types of activities (in terms of contact); and
- Environmental requirements.

The overall zonal map is provided in Figure 21 below. Due to the length of the Dam, maps of each section have been provided.

The zones are as follows:

- Zone A: Secondary Contact Activities – Combination. This zone allows both motorized boats and sailing however a no wake restriction applies;
- Zone B – Secondary Contact: High Speed Motorised Boats and Sailing Activities;
- Zone C: Secondary Contact – Restricted Access Overlay Zone (PLB required). This zone allows access as long as Personal Locator Beacon (PLB) has been obtained. The rules and requirements of the zone shown underneath the overlay zone (either Zone A or Zone B) also apply;
- Zone D: Secondary Contact – Mooring;
- Zone E: Primary Contact – Swimming and Water Toys;
- Zone F: No- Go Zone – Safety;
- Zone G: Secondary Contact – Jet Ski Only;
- Zone H – Secondary Contact - No Go Zone – Conservation; and
- Zone I – No Go Zone – Infrastructure.

Detailed information of the current and potential activities together with activities that are not allowed in each zone is provided in the table below. Information on requirements for each zone is also provided.

*Table 13: Surface Water Management Zones*

| Zone Name | Contact Type | Permissible Activities - Current | Permissible Activities - Potential | Access Point | Safety Requirements for Users | Safety Requirements for DMC |
|---|---|---|---|---|---|---|
| Zone A | Secondary Contact – Combination (no wake) | Motorised Boats – No Wake zone<br>Bass fishing<br>Shore fishing<br>Sailboats<br>Wind Surfing<br>Kite Surfing<br>Canoeing;<br>Kayaking<br>Rowing;<br>Commercial fisheries<br>Subsistence fishing;<br>Kayaking Touring;<br>Recreational and competitive angling | Dragon Boats<br>Slalom Canoe<br>Fishing Canoe<br>Kayaking Sprints<br>Kayaking water polo<br>Jet Ski Fishing<br>Kayaking touring<br>Commercial/small scale fisheries<br>Kayaking Marathons<br>Kayaking Fishing<br>Paddle Ski<br>Pedal Boat<br>House Boats<br>Stand Up Paddling<br>Tube Fishing;<br>Pontoon Fishing; | GNR<br>OR; FR; FSYC (should agreements be put in place) | Registered Safe for Water Vessel;<br>Valid Skipper's License;<br>First Aid Kit<br>UPN date stamp;<br>UPN tag. | AtoN and Demarcation Markers;<br>UPN System<br>Rescue Operation Point;<br>Wash Bay;<br>Rescue Boat available at all times;<br>Wash Bay Officer;<br>Enforcement Officer<br>SAPS Patrols of Water Surface;<br>System to ensure all users access wash bay prior to accessing the water will be required for OR, FR and FYSC.<br>Agreements with GNR, OR, ONR, FSYC and FR |
| Zone B | Secondary Contact – High speed Motorised Boats and Sailboats | Motorised Boats<br>RHIB<br>Wind Surfing<br>Kite Surfing<br>Slalom Skiing<br>Ski and Wakeboard Boat<br>Boat Paragliding<br>Sailing<br>Bass fishing | Jet Powered Boats<br>Ski jumping<br>Surf ski<br>Boat paragliding<br>Open water sailing school | GNR<br>OR; FR; FSYC (should agreements be put in place) | Registered Safe for Water Vessel;<br>Valid Skipper's License;<br>First Aid Kit<br>UPN date stamp;<br>UPN tag. | AtoN and Demarcation Markers;<br>UPN System<br>Rescue Operation Point;<br>Wash Bay;<br>Rescue Boat available at all times;<br>Wash Bay Officer;<br>Enforcement Officer<br>SAPS Patrols of Water Surface;<br>System to ensure all users access wash bay prior to accessing the water will be required for OR, FR and FYSC.<br>Agreements with GNR, OR, ONR, FSYC and FR |
| Zone C | Secondary Contact – Restricted Access Overlay Zone **(PLB Required)** | Motorised Boats – No Wake zone;<br>Sailboats;<br>Wind Surfing<br>Kite Surfing<br>Canoeing;<br>Kayaking<br>Rowing; | Dragon Boats<br>Slalom Canoe<br>Fishing Canoe;<br>Kayaking Sprints<br>Kayaking Marathons<br>Kayaking Fishing<br>Paddle Ski<br>Pedal Boat | GNR<br>OR; FR; FSYC (should agreements be put in place) | Registered Safe for Water Vessel;<br>Valid Skipper's License;<br>First Aid Kit<br>UPN date stamp;<br>UPN tag.<br>**Personal Locator Beacon (PLB) required** | AtoN and Demarcation Markers;<br>UPN System<br>Rescue Operation Point;<br>Wash Bay;<br>Rescue Boat available at all times;<br>Wash Bay Officer;<br>Enforcement Officer<br>SAPS Patrols of Water Surface; |

| Zone Name | Contact Type | Permissible Activities - Current | Permissible Activities - Potential | Access Point | Safety Requirements for Users | Safety Requirements for DMC |
|---|---|---|---|---|---|---|
| | | Commercial fisheries;<br>Subsistence fishing;<br>Kayaking Touring;<br>Recreational and competitive angling | House Boats<br>Stand Up Paddling;<br>Tube Fishing;<br>Pontoon Fishing; | | **due to poor cellphone signal**<br>**This zone is an overlay zone and the rules for the zone occurring together with the overlay must be adhered too)** | System to ensure all users access wash bay prior to accessing the water will be required for OR, FR and FYSC.<br>Agreements with GNR, OR, ONR, FSYC and FR<br>PLB rental system must be in place |
| Zone D | Secondary Contact - Mooring | Mooring of Sailboats, motor boats etc.<br>Deadslow zone | Mooring of House Boats | GNR<br>OR; FR; FSYC (should agreements be put in place) | Registered Safe for Water Vessel;<br>Valid Skipper's License;<br>First Aid Kit<br>UPN date stamp;<br>UPN tag. | AtoN and Demarcation Markers;<br>UPN System<br>Rescue Operation Point;<br>Wash Bay;<br>Rescue Boat available at all times;<br>Wash Bay Officer;<br>Enforcement Officer<br>SAPS Patrols of Water Surface;<br>System to ensure all users access wash bay prior to accessing the water will be required for OR, FR and FYSC.<br>Agreements with GNR, OR, ONR, FSYC and FR |
| Zone E | Primary Contact - Swimming and Water Toys | Swimming – recreational<br>Tubing<br>Water Toys | Swimming – development school | GNR<br>OR<br>FR<br>FSYC<br>New public access areas | ' - | AtoN and Demarcation Markers;<br>UPN system;<br>OPS point;<br>Rescue Boat available at all times; |
| Zone F | No Go Zone - Safety | Management and maintenance activities only<br>No public access | None | N/A | N/A | AtoN and Demarcation Markers |
| Zone G | Secondary Contact – Jet Ski Only | Jet Ski | | GNR<br>OR; FR; FSYC (should agreements be put in place) | Registered Safe for Water Vessel;<br>Valid Skipper's License;<br>First Aid Kit<br>UPN date stamp;<br>UPN tag. | AtoN and Demarcation Markers;<br>UPN System<br>Rescue Operation Point;<br>Wash Bay;<br>Rescue Boat available at all times;<br>Wash Bay Officer;<br>Enforcement Officer<br>SAPS Patrols of Water Surface; |

| Zone Name | Contact Type | Permissible Activities - Current | Permissible Activities - Potential | Access Point | Safety Requirements for Users | Safety Requirements for DMC |
|---|---|---|---|---|---|---|
| | | | | | | System to ensure all users access wash bay prior to accessing the water will be required for OR, FR and FYSC. Agreements with GNR, OR, ONR, FSYC and FR |
| Zone H | No Go Zone - Conservation | Research and management activities | N/A | GNR | Registered Safe for Water Vessel;<br>Valid Skipper's License;<br>First Aid Kit<br>UPN date stamp;<br>UPN tag.<br>Research permits | AtoN and Demarcation Markers;<br>UPN System<br>Rescue Operation Point;<br>Wash Bay;<br>Rescue Boat available at all times;<br>Wash Bay Officer;<br>Enforcement Officer<br>SAPS Patrols of Water Surface; |
| Zone I | No Go Zone - Infrastructure | Management and maintenance activities only<br>No public access | None | N/A | N/A | AtoN and Demarcation Markers |

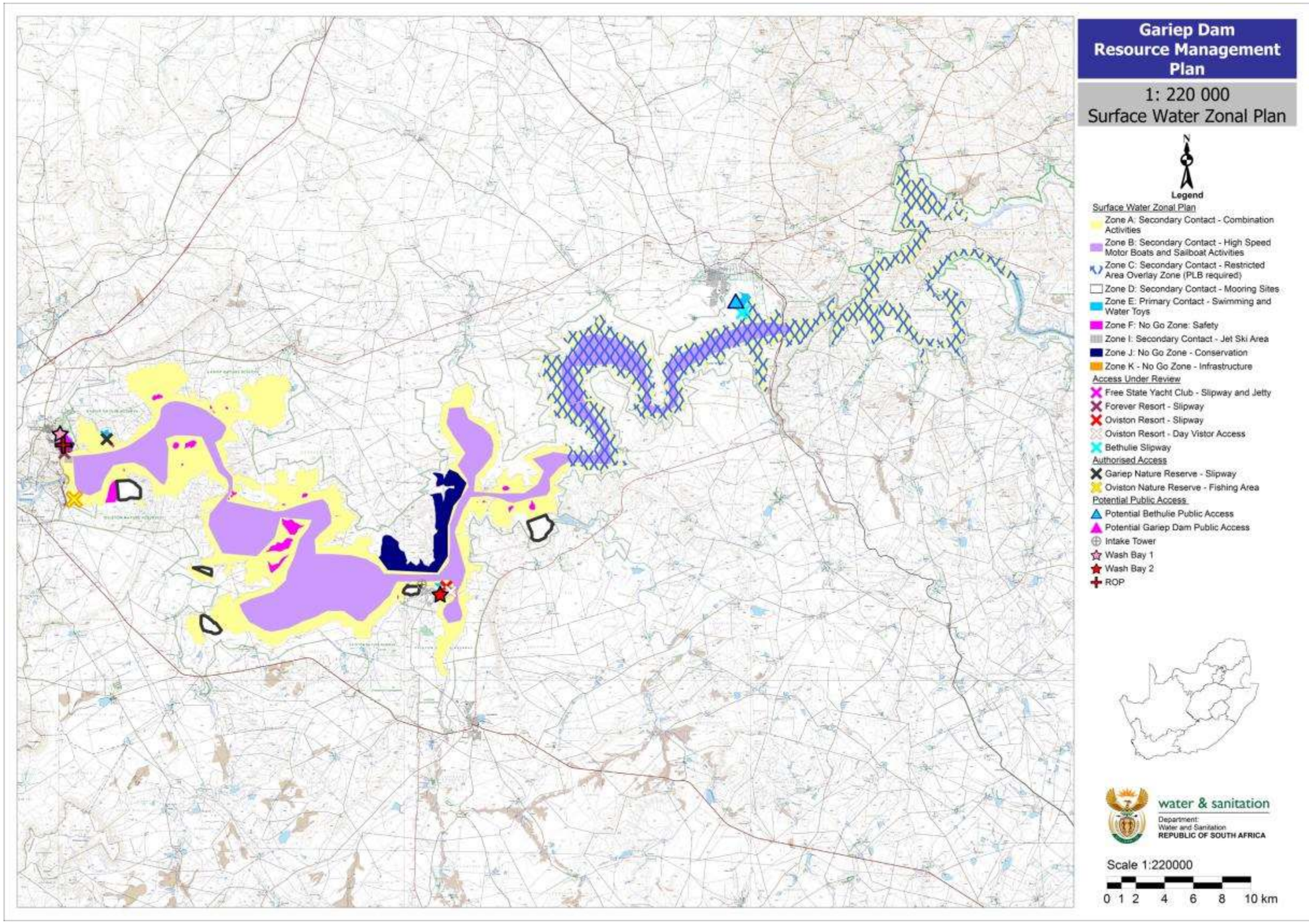


*Figure 11: Map of the Water Surface Zonal Plan*

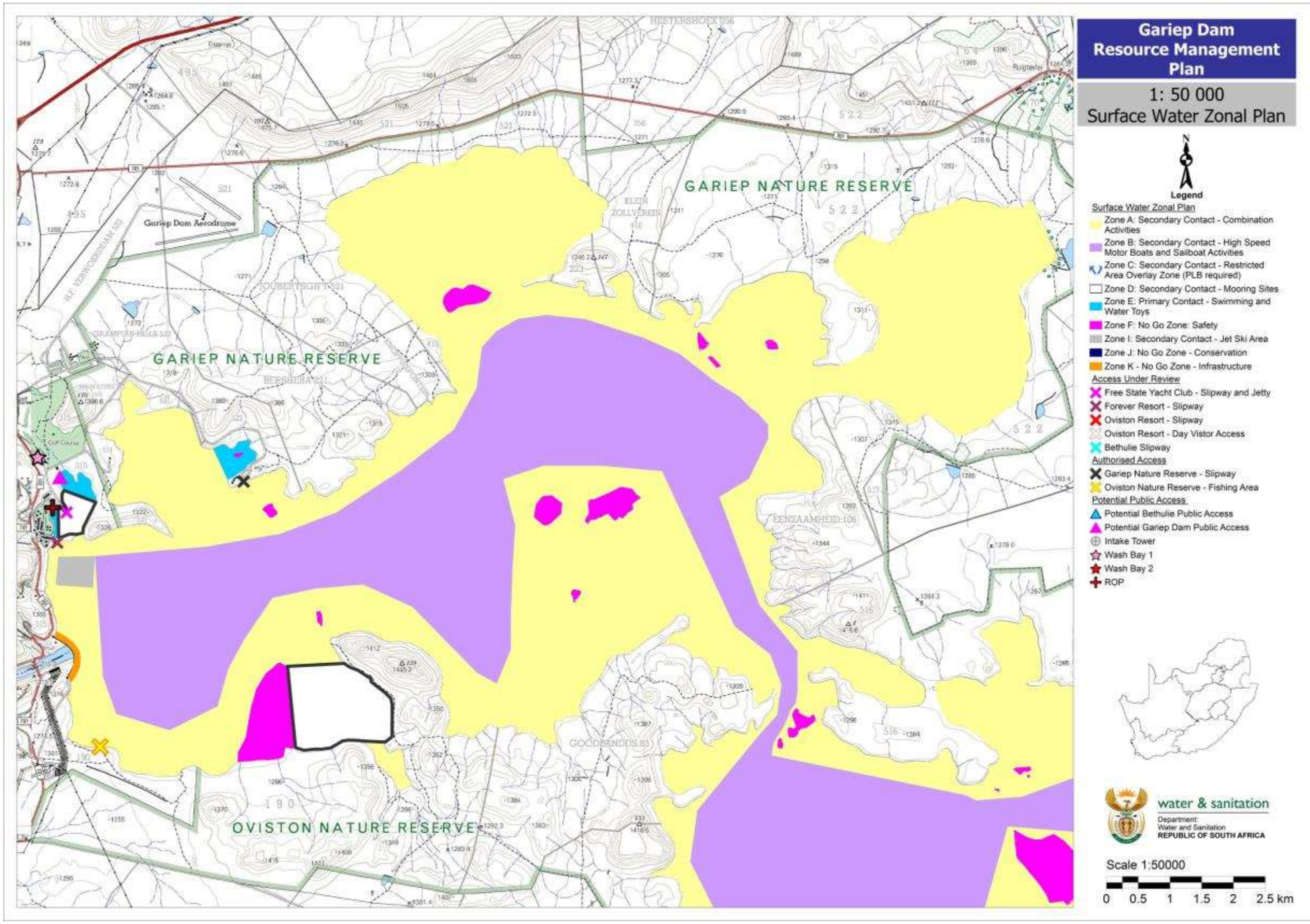


*Figure 12: Map of the Water Surface Zonal Plan – Section 1*

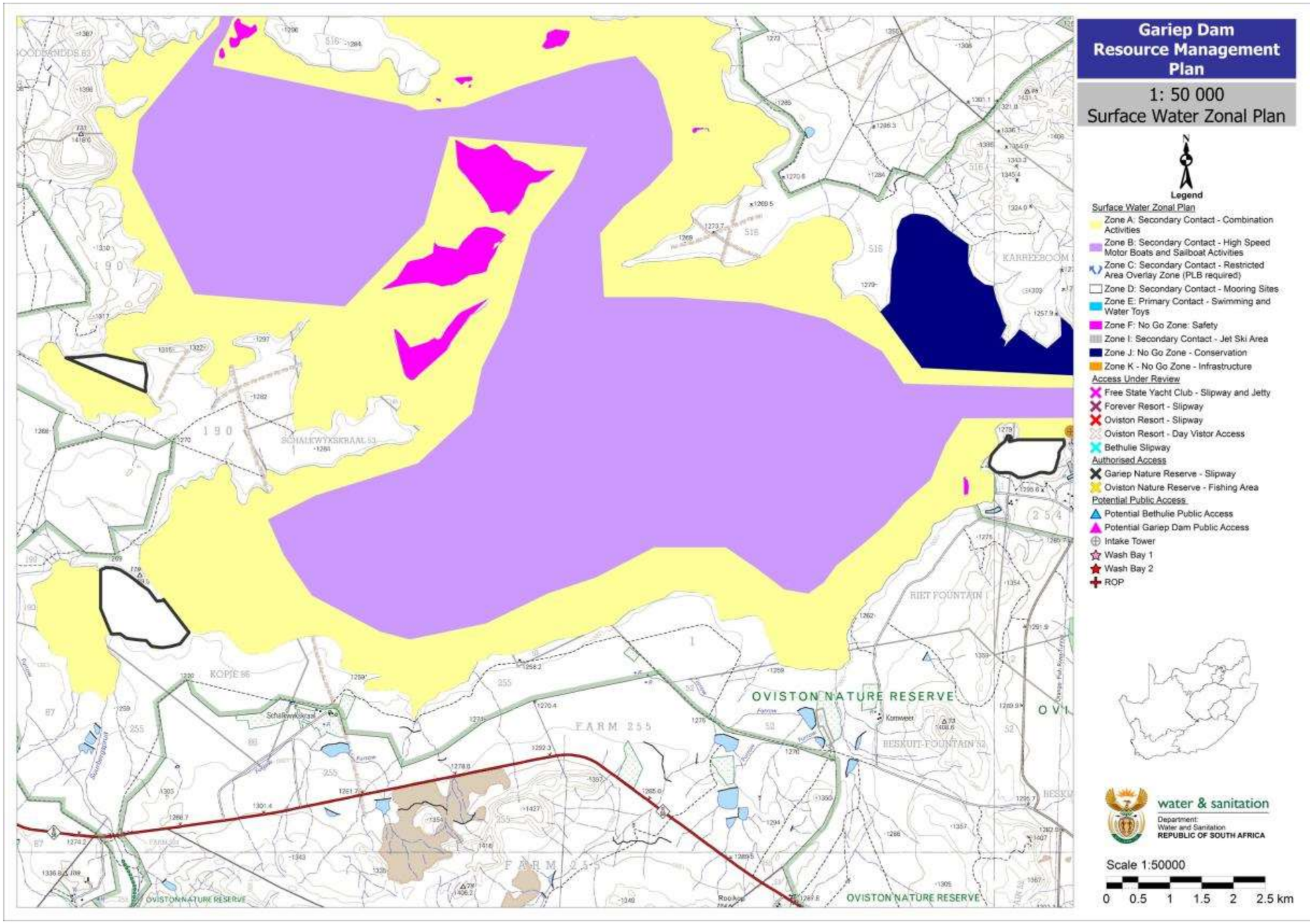


*Figure 13: Map of the Water Surface Zonal Plan – Section 2*

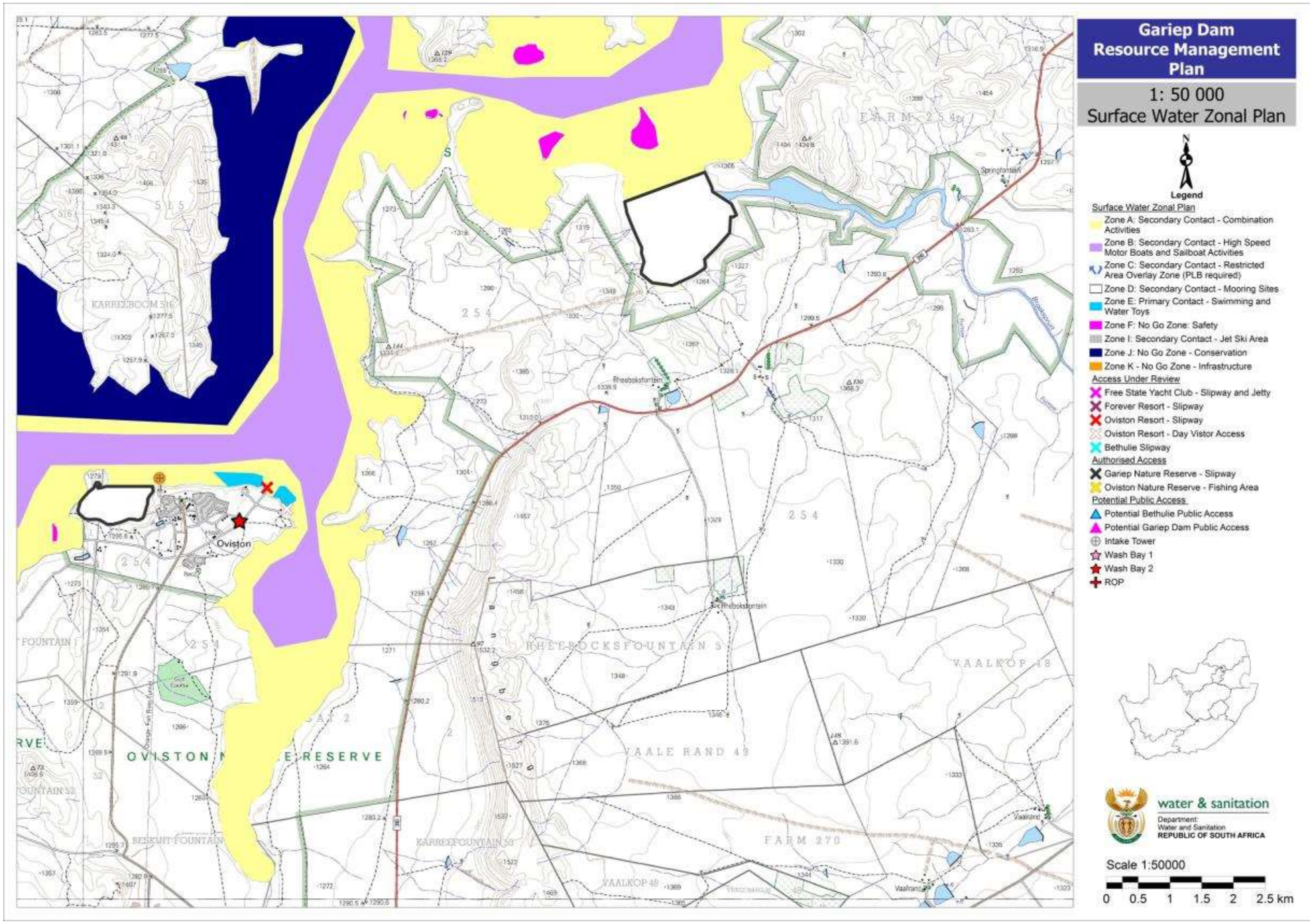


*Figure 14: Map of the Water Surface Zonal Plan – Section 3*

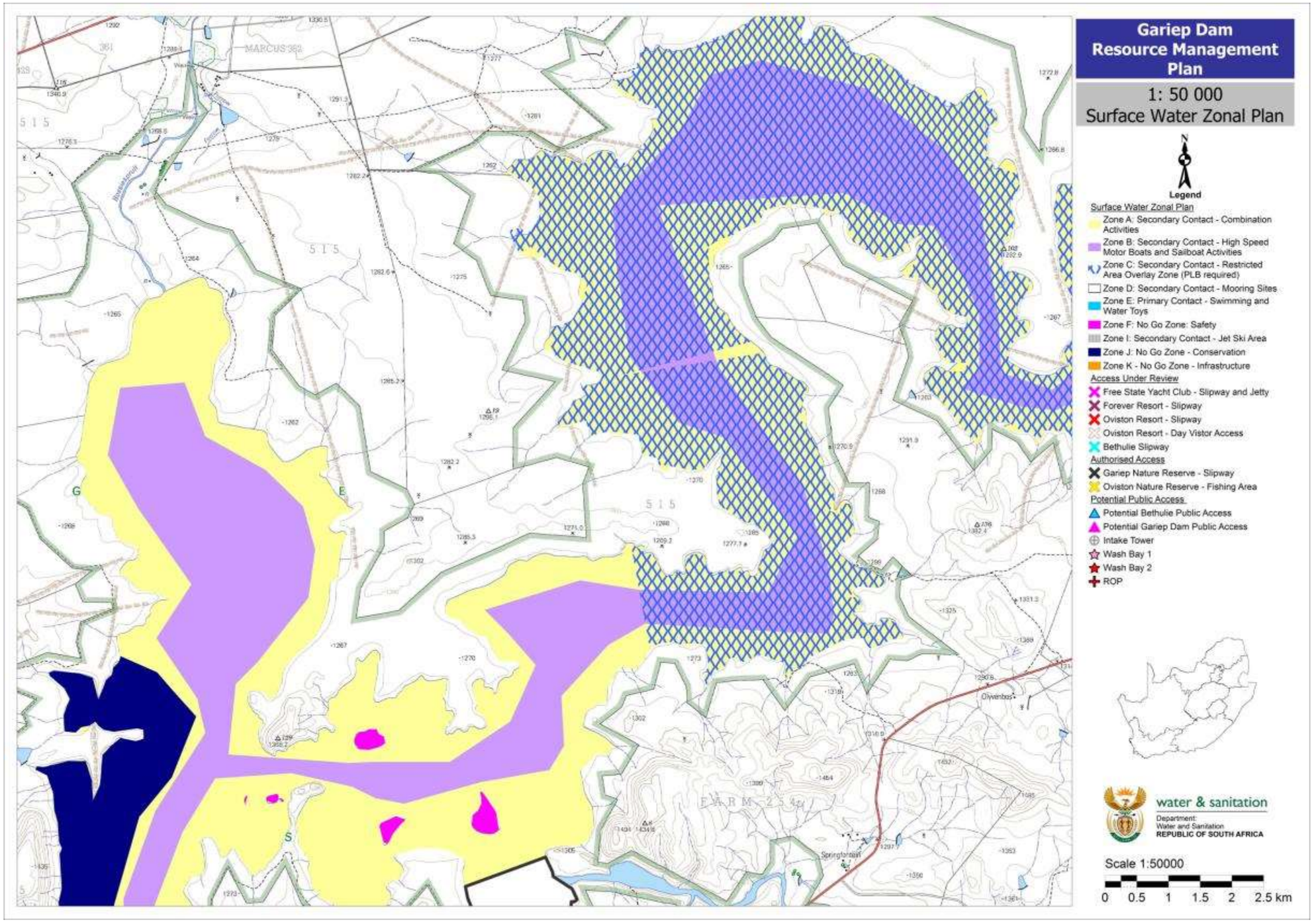


*Figure 15: Map of the Water Surface Zonal Plan – Section 4*

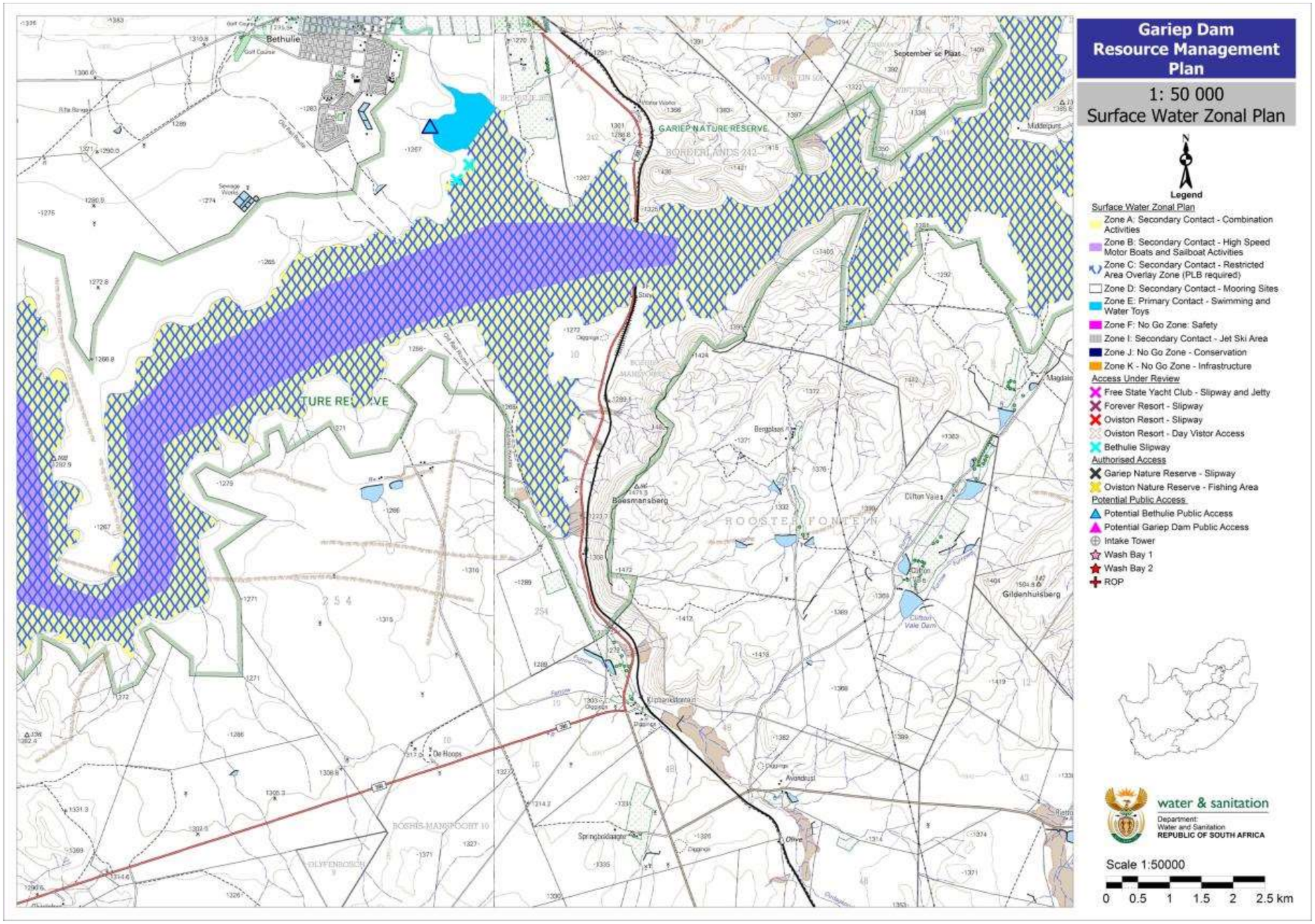


*Figure 16: Map of the Water Surface Zonal Plan – Section 5*

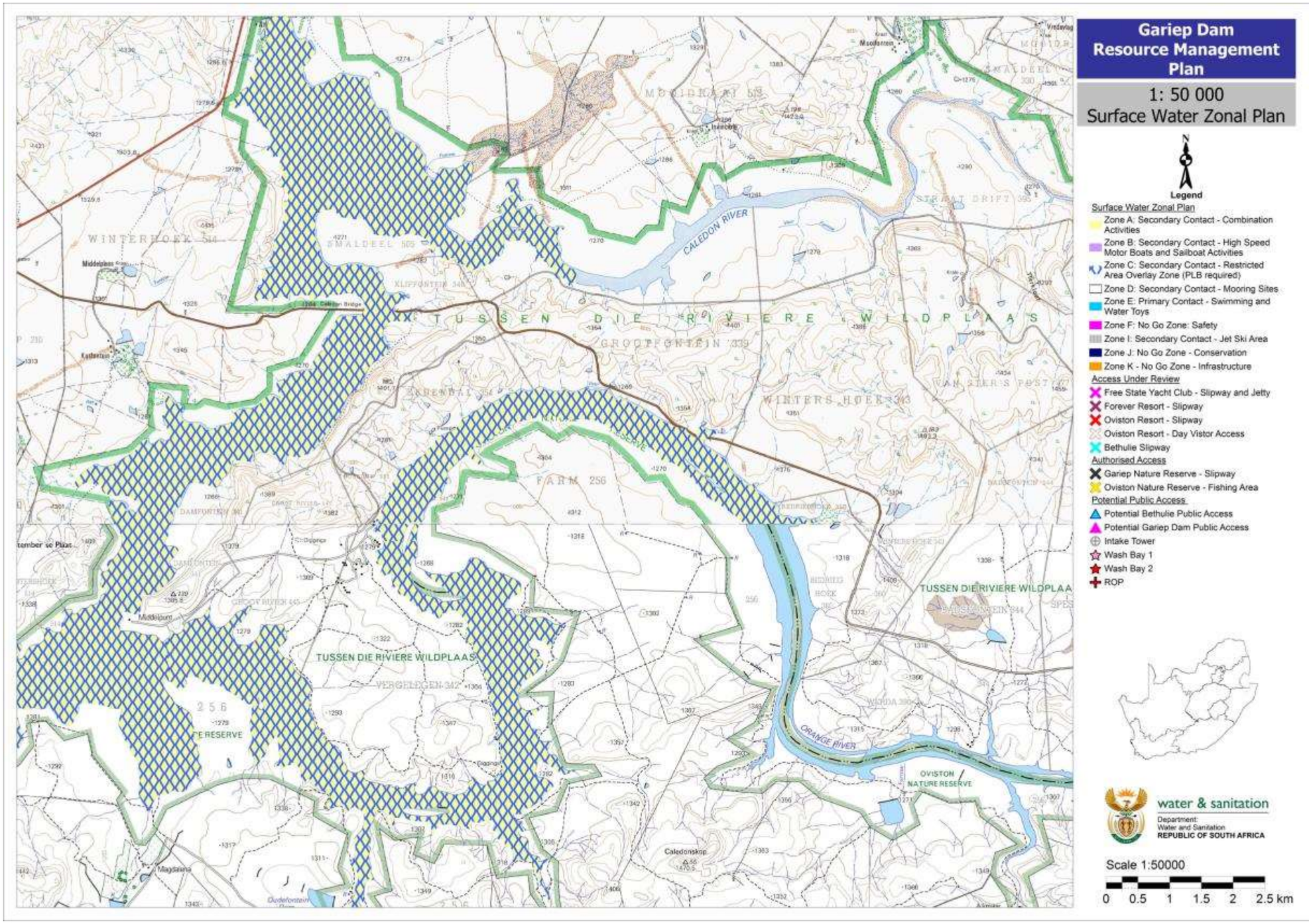


*Figure 17: Map of the Water Surface Zonal Plan – Section 6*

### *4.4.5. Shoreline Zonal Plan*

In addition to the surface water zonal plan above, an integral part of the RMP is shoreline zoning. This provides guidance on what activities (if any) are allowed in the land adjacent to the Dam.

The Shoreline Zonal Plan can only manage state owned land around the Dam. However at this point, no information was available on landownership. In order to deal with this, designated formal nature reserves from SANBI Biodiversity GIS around the Dam was selected and the shoreline zonal plan was limited to the borders of these Nature Reserves. In some areas such as around Gariep Dam Wall and near the town of Gariep, the Dam does not fall in protected areas. In these cases, the directly adjacent properties were selected.

As part of the BP, landownership will be determined and the shoreline zonal plan will be updated if necessary.

The management zones include:

- Zone A - Conservation and Recreation/Tourism
- Zone B - Development and Recreation
- Zone C- Management – No Access to the Public

Zone A includes the majority of the Nature Reserves and focuses mainly on conservation and ecotourism activities such as camping, hiking, birding and game viewing. Large scale development of this area is not allowed. This ensures that the pristine and unique character of the landscape is not transformed (mapped in yellow below). GNR has an environmental management plan in place and sub-categories have been included based on this.

This included:

- Zone A1: Remote Zone;
- Zone A2: Primitive Zone;
- Zone A3: Low Intensity Leisure Zone;
- Zone A4: High Intensity Leisure Zone;
- Zone A5: Conservation Zone; and
- Zone A6: Heritage Zone

Zone B allows for conservation, recreation and development allowing for the potential development of the following:

- Gariep and Bethulie Public Access Area picnic area;
- Wash Bay at GNR;
- Swimming Development Schools; and
- Upgrade of accommodation (where necessary)

Zone B is mapped in purple below.

Zone C provides for land management of state land but does not allow public use or access. This includes the area around the Dam wall. Zone C is mapped in orange below.

Permissible and non-permissible activities are detailed in the table below.

*Table 14: Shoreline Management Zones*

| Zone Name | Zone Type | Permissible Activities | Requirements for Users | Requirements for DMC |
|---|---|---|---|---|
| Zone A1 | Conservation and Recreation/ Tourism – Remote Zone | Guided nature observation<br>Non defined hiking trails<br>Research<br>Defined hiking trails<br>Environmental education | All activities must be undertaken in accordance with rules and Regulations of Nature Reserves | Agreements must be in place |
| Zone A2 | Conservation and Recreation /Tourism – Primitive Zone | Guided/unguided hiking trails<br>Mountain biking<br>4x4 routes<br>Horse trails | All activities must be undertaken in accordance with rules and Regulations of Nature Reserves | Agreements must be in place |
| Zone A3 | Conservation and Recreation /Tourism – Low Intensity Leisure Zone | Picnicking<br>Walking<br>Cycling<br>Game viewing<br>Bird watching<br>Fishing rock climbing<br>Hiking overnight<br>Adventure activities<br>Self drive game viewing | Camping, hiking, birding and game viewing must be undertaken in accordance with rules and Regulations of Nature Reserves<br>Camping allowed only in designated areas<br>Noise levels to be kept at a minimum.<br>No littering at Picnic spots<br>Access to surface water only through approved access points<br>All users to go through Wash Bay | Enforcement Officer to check all designated picnic spots.<br>Feasibility of employing local community members as part of "Working For Dams" programme to be assessed. Potential jobs include management of picnic sites/picking up of any litter<br>SAPS Patrols of Water Surface;<br>Requirements of National Water Act and National Environmental Management Act must be taken into account.<br>All developments should have an approved Environmental Management Plan (EMP) to ensure construction does not impact on Dam. |
| Zone A4 | Conservation and Recreation /Tourism – High Intensity Leisure Zone | Restaurants<br>Shops<br>Education centres<br>Fishing<br>Picnicking | Camping, hiking, birding and game viewing must be undertaken in accordance with rules and Regulations of Nature Reserves<br>Camping allowed only in designated areas<br>Noise levels to be kept at a minimum.<br>No littering at Picnic spots<br>Access to surface water only through approved access points<br>All users to go through Wash Bay | Enforcement Officer to check all designated picnic spots.<br>Feasibility of employing local community members as part of "Working For Dams" programme to be assessed. Potential jobs include management of picnic sites/picking up of any litter<br>SAPS Patrols of Water Surface;<br>Requirements of National Water Act and National Environmental Management Act must be taken into account.<br>All developments should have an approved Environmental Management Plan (EMP) to ensure construction does not impact on Dam. |
| Zone A5 | Conservation and Recreation /Tourism – Conservation Zone | Scientific and conservation purposes only | All activities must be undertaken in accordance with rules and Regulations of Nature Reserves | Agreements must be in place |

| Zone Name | Zone Type | Permissible Activities | Requirements for Users | Requirements for DMC |
|---|---|---|---|---|
| Zone A6 | Conservation and Recreation /Tourism – Heritage Zone | Non destructive scientific investigation and educational visits | All activities must be undertaken in accordance with rules and Regulations of Nature Reserves | Agreements must be in place |
| Zone B | Recreation and Development | Development of facilities/infrastructure for recreation<br>Development of facilities/infrastructure for development/training<br>Development of facilities/infrastructure for tourism<br>Fishing<br>Camping/Accommodation<br>Birding<br>Game Viewing<br>Picnicking<br>Operations related to small scale subsistence fisheries<br>Access to surface water for recreational purposes | Camping, hiking, birding and game viewing must be undertaken in accordance with rules and Regulations of Nature Reserves<br>Camping allowed only in designated areas<br>Noise levels to be kept at a minimum.<br>No littering at Picnic spots<br>Access to surface water only through approved access points<br>All users to go through Wash Bay | Enforcement Officer to check all designated picnic spots.<br>Feasibility of employing local community members as part of "Working For Dams" programme to be assessed. Potential jobs include management of picnic sites/picking up of any litter<br>SAPS Patrols of Water Surface;<br>Requirements of National Water Act and National Environmental Management Act must be taken into account.<br>All developments should have an approved Environmental Management Plan (EMP) to ensure construction does not impact on Dam. |
| Zone C | Management – No Public Access | Fire management<br>Invasive alien species clearing<br>Management of Dam Infrastructure | None | Access to this area for strictly management purposes |

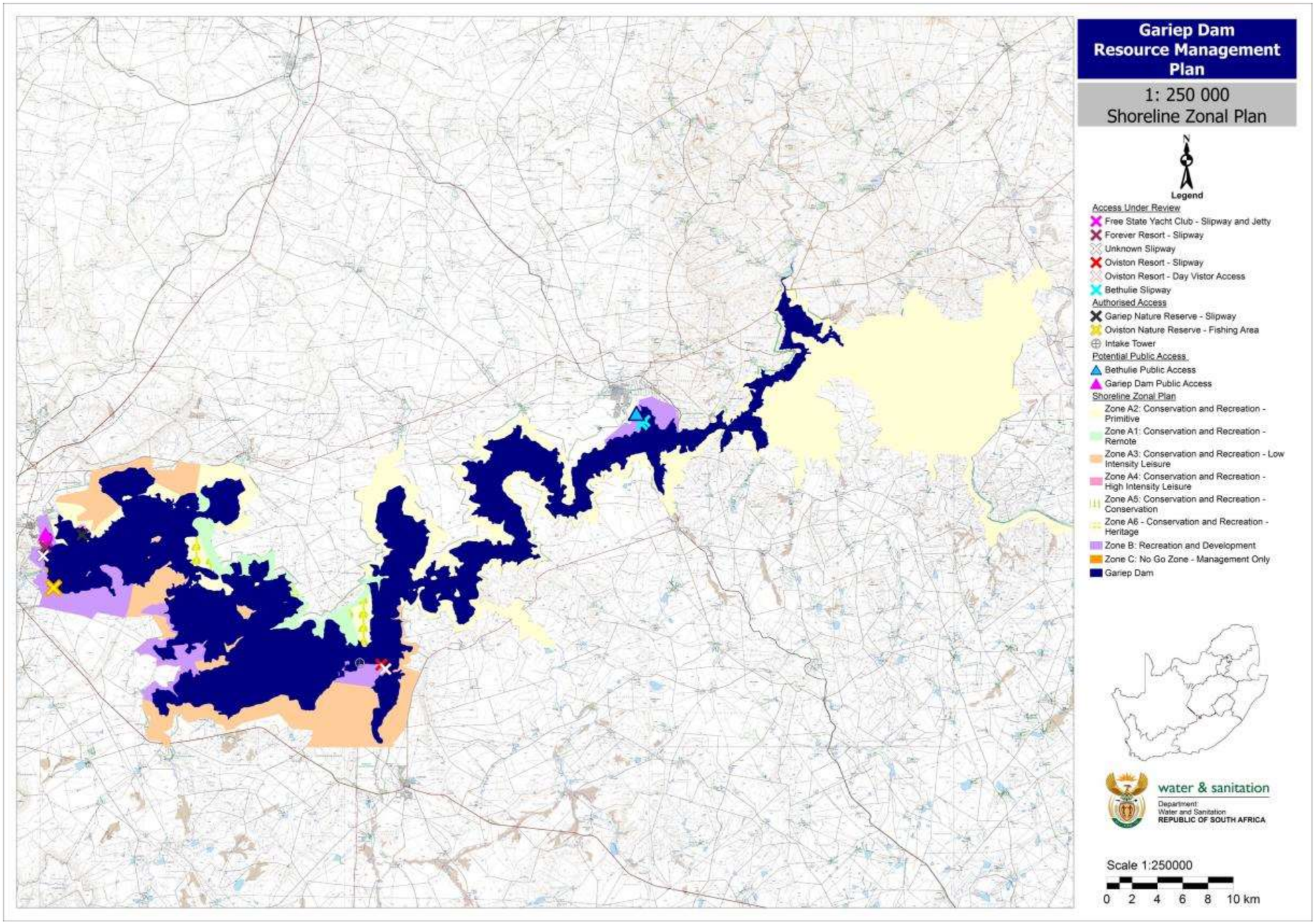

*Figure 18: Shoreline Zonal Map*

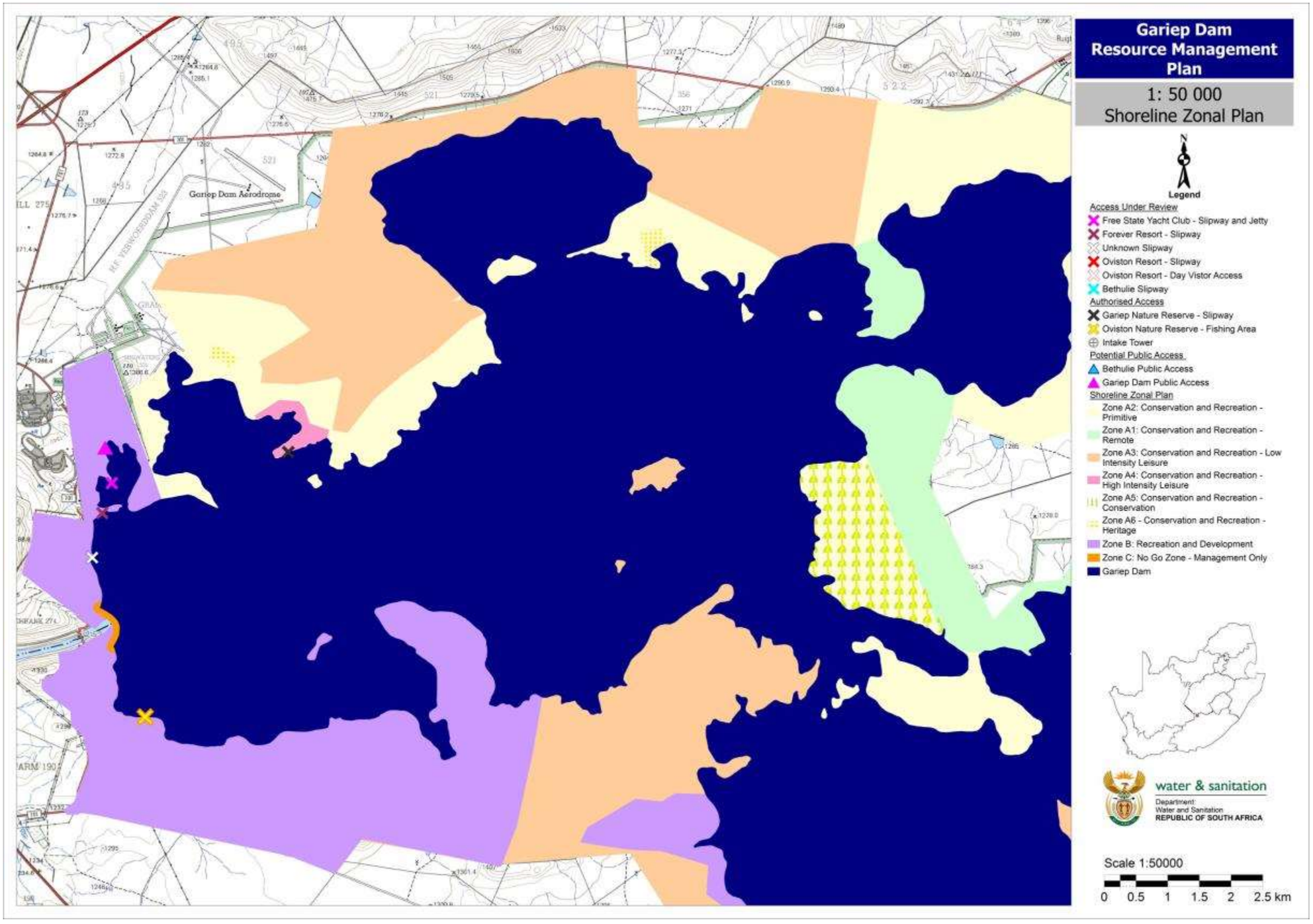

*Figure 19: Shoreline Zonal Map – Section 1*

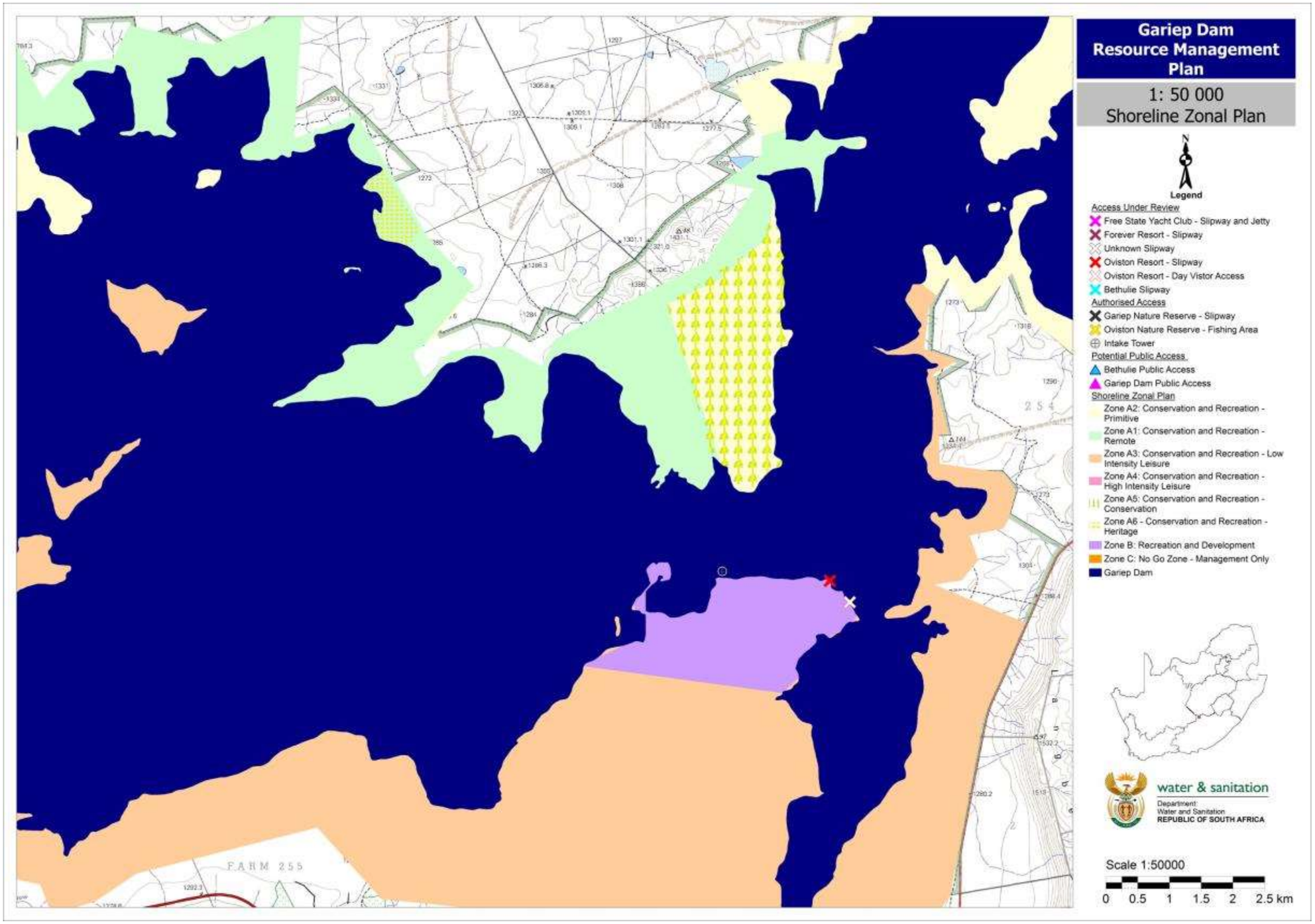


*Figure 20: Shoreline Zonal Map – Section 2*

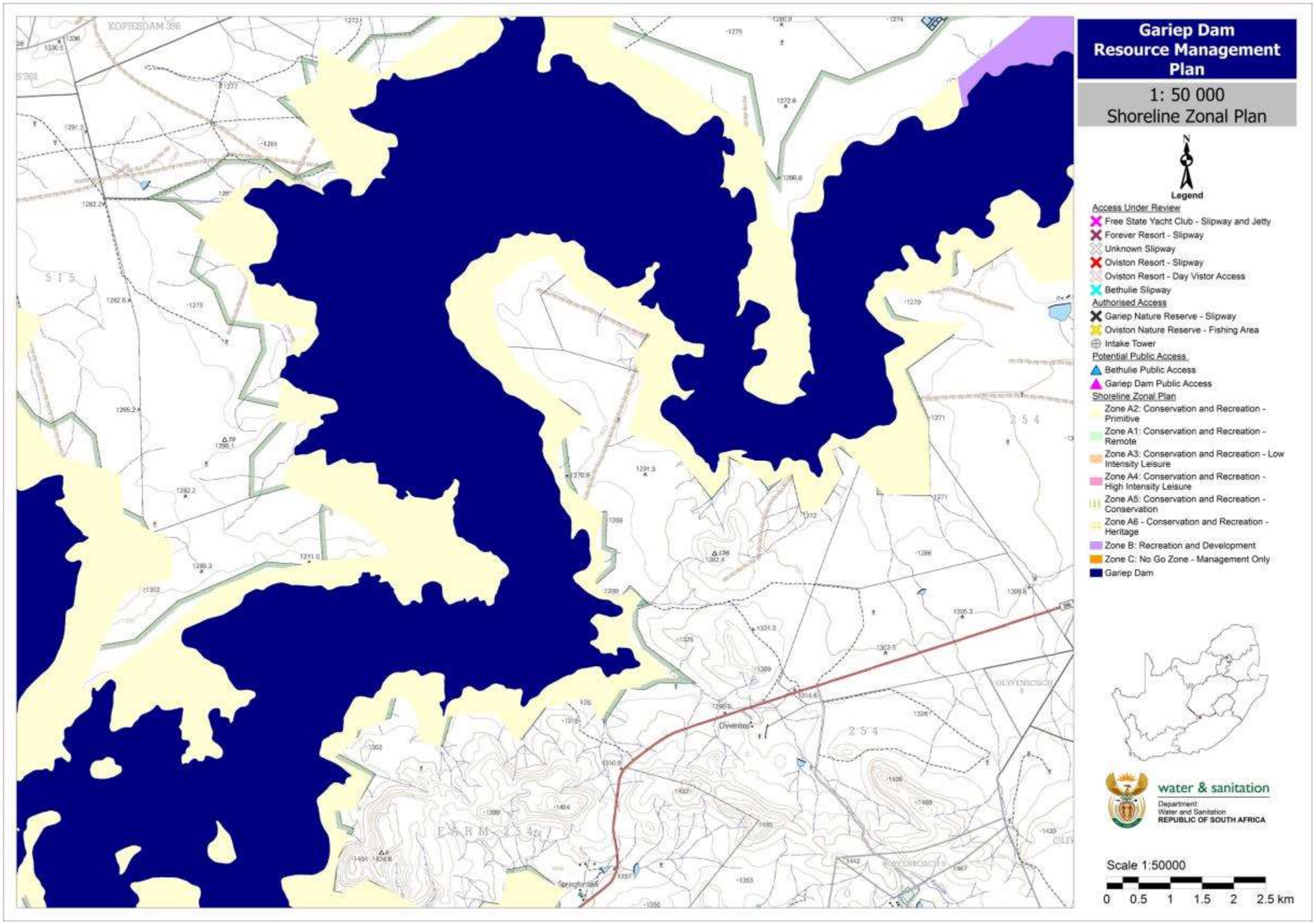

*Figure 21: Shoreline Zonal Map – Section 3*

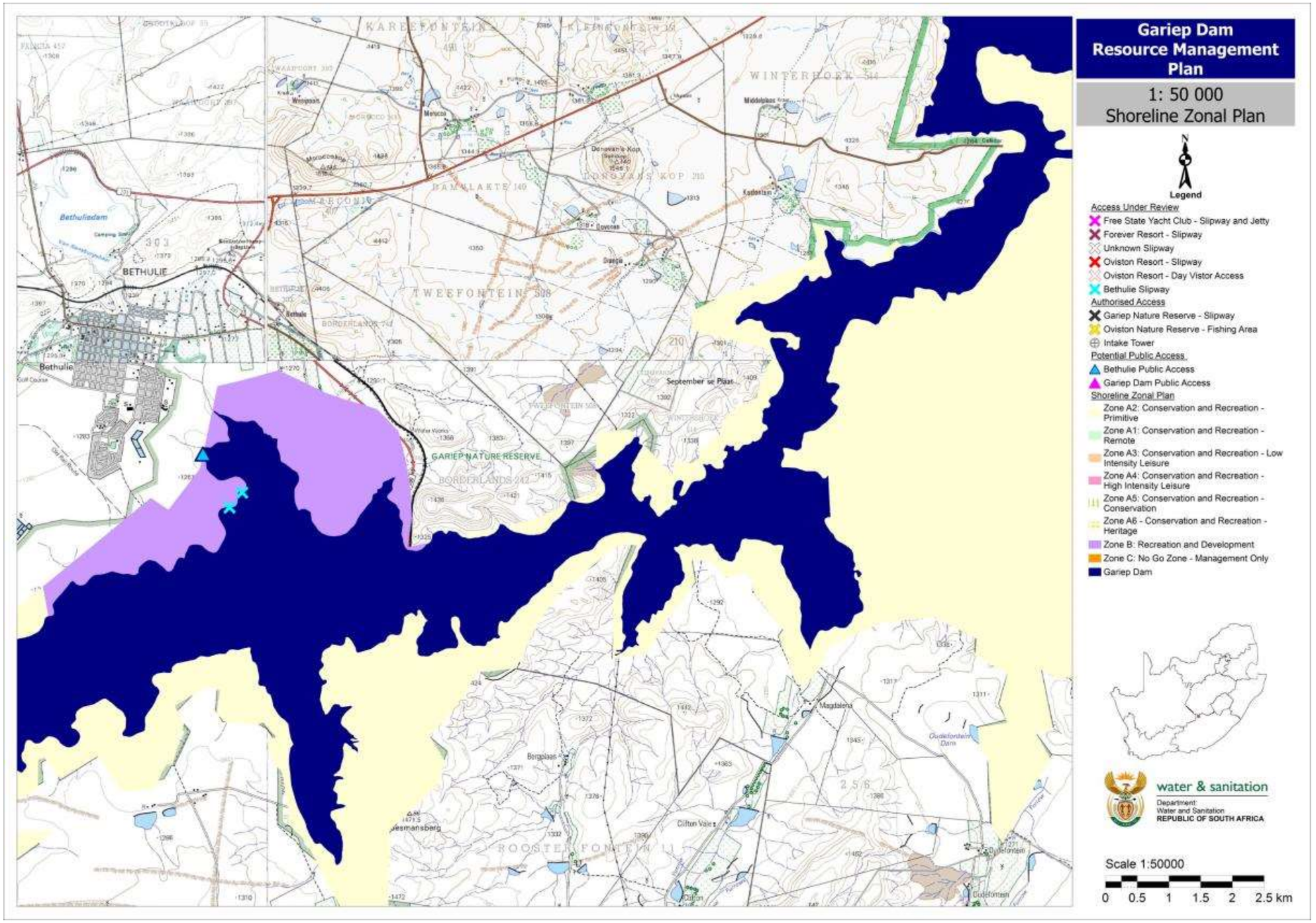


*Figure 22: Shoreline Zonal Map – Section 4*

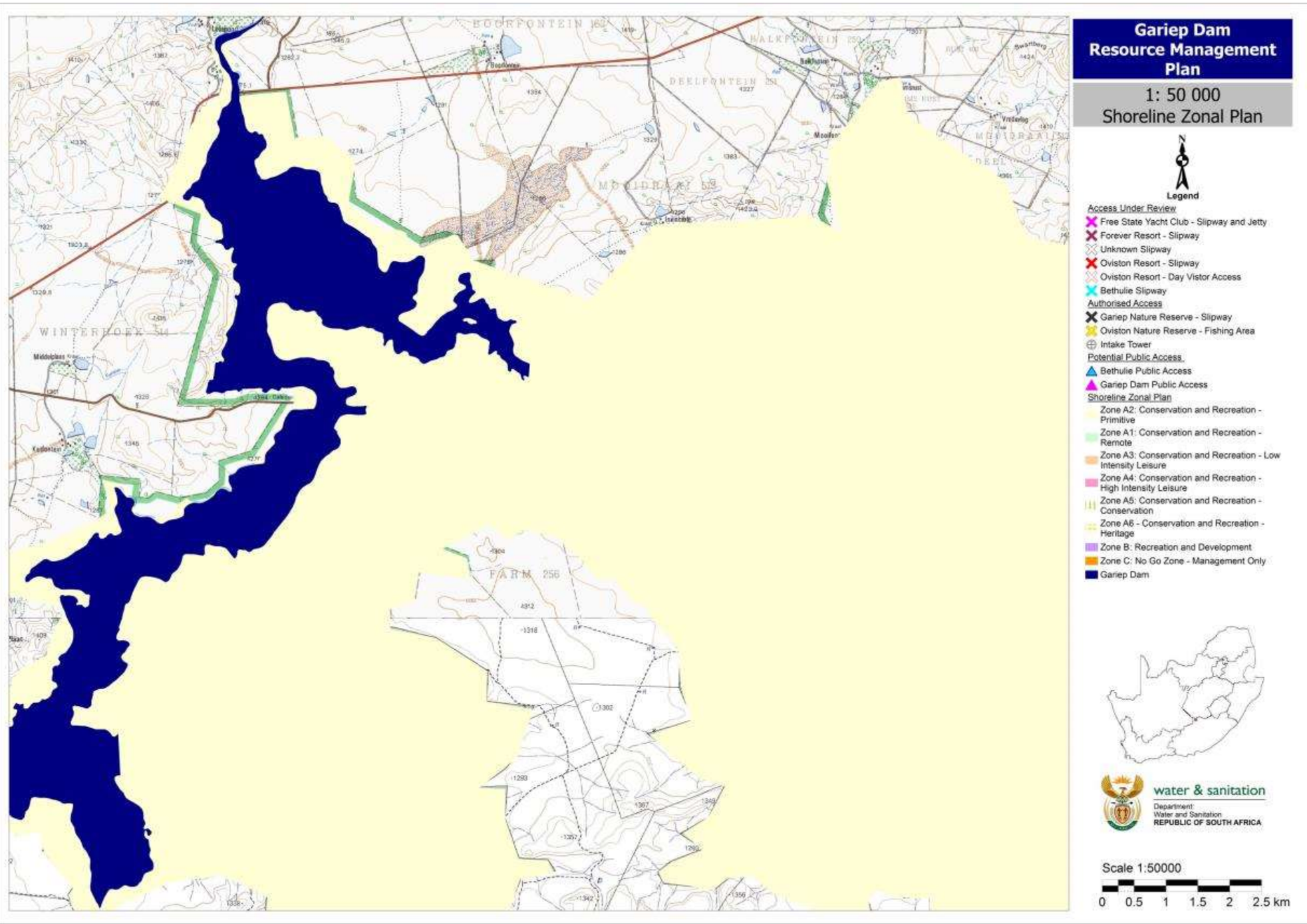


*Figure 23: Shoreline Zonal Map – Section 5*

## 4.5. Strategic Plan

The Strategic Plan is informed by the objectives determined during the Visioning exercise and through research on feasible opportunities for the Dam.

| Objective category/major objective | What | Why | How | Who |
|---|---|---|---|---|
| Increased but Well Managed and Safe Recreational Use | Zonal plan to take into account different recreational activities | Demarcations to be made as well as relevant and proper planning can be made according to identified zonal recreational activities | The Zonal Plan has suggested some areas for development and recreation.<br><br>Agreements between DEDEAT, FS DETEA DWS and Yacht required. | DMC<br>DWS<br>FS DETEA<br>EC-DEDEAT |
| | Implementation of standardised and harmonised AtoN and Demarcation Markers | Improve safety of navigation. | Implement AtoN and Demarcation markers as required.<br><br>Agreements between SAMSA, DWS, and other relevant parties to be concluded | SAMSA<br>DWS<br>Relevant Parties |
| | Wash Bay and UPN System to be implemented | There is no wash bay in place to prevent the spread of invasive aquatic species. There is also no overall safety system in place. | Establishment of DMC to ensure regulated and equitable access<br><br>Wash Bay and UPN System to be implemented. It is suggested that the Wash Bay be set up at the Public Access Area.<br><br>Access agreements to be signed | DWS<br>FS DETEA<br>EC DEDEAT<br>SAMSA<br>CIWSP |
| | Formalised position to assist in monitoring/alerting SAPS of safety issues | To provide assistance in monitoring/policing at the Dam. | Appointment of SAMSA Enforcement Officer at the Dam. The officer will be able to utilise the UPN system to alert SAPS of any illegal activity. | CIWSP<br>DWS<br>SAMSA |

| Objective category/major objective | What | Why | How | Who |
|---|---|---|---|---|
| | Additional resources for GNR (FS DETEA) and ONR (DEDEAT) | To allow FS DETEA through GNR and DEDEAT through ONR to provide a patrol function on Gariep Dam. | Ensure that vessel is safe to use on the water. If necessary a new vessel should be purchased.<br><br>Ensure training of Skipper. | FS DETEA<br>EC-DEDEAT |
| | Formalised Safety System in place at the Dam. | To ensure all recreational users have the correct licenses and that all vessels are water-worthy. | Implementation of the UPN System.<br><br>Safety Checks to be undertaken at the Wash Bay when implemented.<br><br>Wash Bay officer to be trained to undertake Safety Checks. | CISWP<br>SAPS<br>DWS<br>FS DETEA<br>EC-DEDEAT |
| | Formalised Safety System in place at GNR and ONR. | Safety System is required. | Formalised slipway and wash bay to be built (approved by DWS)<br><br>Safety Checks to be undertaken at the Wash Bay.<br><br>Wash Bay officer to be trained to undertake Safety Checks.<br><br>Business Plan to be provided | FS DETEA<br>EC-DEDEAT<br>ECPTA |
| | Personalised Locator Beacon (PLB) rental system | Due to the length of the Dam and poor/no radio signal, traversing the Dam can be dangerous. It also utilised police resources for rescue operations. The PLB system will ensure | PLB to be purchased and available for rental from relevant departments | DWS<br>FS DETEA<br>SAPS<br>EC-DEDEAT |

| Objective category/major objective | What | Why | How | Who |
|---|---|---|---|---|
| | | quick response to any emergencies. | | |
| | All unofficial access points to be closed or regulated through an access agreement. | Illegal accesses points need to be surveyed. Access though these slipways are not authorised through agreements with DWS. Agreements are required to authorise this use. Should no agreements be put in place, the access points should be closed.<br><br>Agreements with adjacent landowners to specify that no authorised access to the surface water through private land is allowed. | Agreements to be signed.<br><br>Yearly surveys to be undertaken to ensure no further slipways are built. | DWS<br>SAPS<br>Adjacent landowners |
| | Wash Bay Officers and SAMSA Enforcement Officers to be trained. | The Wash Bay Officer and SAMSA Enforcement Officer require the requisite training. This will also serve as skills development. | DEA Working For Water to provide Wash Bay Officer Training;<br><br>SAMSA to provide Vessel Safety Training to Wash Bay Officer<br><br>SAMSA to provide SAMSA enforcement officer training. | DEA<br>SAMSA<br>DMC |
| | First Aid Training for Enforcement Officers and Wash Bay Officers. | First Aid Training for Enforcement Officers will ensure enforcement officers are trained as first responders. It will also allow for skill development. | First Aid Training Programme to be developed. | DMC<br>CIWSP |
| Improved Institutional Arrangements and Coordination between Provincial | Formalised institutional structure including Dam Management Committee (DMC), Operations Management Committee (OMC) and | No formal institutional structure in place to manage access points to the water surface and purchase boundary. This has a number of implications for safety, resource management | Institutional structure suggested as part of the RMP<br><br>DWS to put in place the DMC, OMC and RSC | DWS |

| Objective category/major objective | What | Why | How | Who |
|---|---|---|---|---|
| Authorities | RMP Steering Committee (RSC) | and recreational use | | |
| | Agreements with EC-DEDEAT and FS DETEA to be updated. | Agreements should be updated taking into regard the RMP objectives as well as equitable access, development or safety. | New agreements to be drafted by DWS in consultation with DEDEAT and FS DETEA. | DWS<br>EC-DEDEAT<br>FS DETEA |
| | Agreements between EC-DEDEAT, FS DETEA and Clubs to be drafted. | No current agreements in place. | New agreements to be drafted by FS DETEA, DEDEAT in consultation with DWS and recreational clubs. | EC-DEDEAT<br>DWS<br>FS DETEA |
| | Formation of Fire Management Association. | To ensure all fires are managed in the correct way. | DMC to meet with landowners and form Fire Management Association. | DMC |
| | Resolution of unauthorised commercial activities | Gariep Dam is a State Resource and therefore commercial activities related to the use of the State Land around the Dam and/or the Surface Water need to be in line with National Treasury Regulations. This includes concluding agreements or undertaking the requisite PPP process for the following:<br>▪ Commercial resorts accessing the Dam on State or Private Land (which have access to the Dam);<br>▪ Pleasure Boats; and<br>▪ House Boats | Legality of existing commercial activities to be assessed<br><br>Discussions with National Treasury to determine the best way to resolve these issues<br><br>Lease agreements and/or access agreements to be put in place if necessary<br><br>PPP process to be followed if necessary | DWS |
| Swift Resolution of Land Matters | Land matters to be resolved and new agreements to be drafted | The landownership within the purchase boundary is unknown. The shoreline zonal plan has been based on the assumption that all land noted as a protected area around the Dam is included in the purchase boundary. Landownership needs to be determined and | Landownership within the purchase boundary to be determined<br><br>Extent of Purchase boundary included in sales agreements to be determined | DWS |

| Objective category/major objective | What | Why | How | Who |
|---|---|---|---|---|
| | | the shoreline zonal plan updated. In addition, the extent of the land sold to Forever Resort should be determined as it appears that the land within the high water mark was included in the sale. | Based on this, legality of existing sale agreements to be assessed<br><br>If necessary, shoreline Zonal Plan to be updated | |
| Improved equitable access and use | Implementation of local community access card at Oviston Resort as well as formalised Picnic Area | To ensure access to the Dam is equitable. | Agreement obligations to include access for community members. | DMC<br>Oviston Resort |
| | Information programmes to be implemented by DMC to educate local community about benefits of the Dam. | To increase community use of the Dam. | Co-funding opportunities with SwimSA to be researched.<br><br>Education programme to be rolled out in schools and churches. | DMC |
| | Discussions with FS DETEA, EC-DEDEAT, DWS and Yacht Club to take into account access for skills training and increased education with regards to invasive species. | Access to water for skills training is required as well as education about invasive species impacts | All agreements must allow skills training and educational programmes to take place. | FS DETEA<br>DWS<br>Yacht Club<br>EC-DEDEAT |
| | Picnic Area at Forever Resort.<br><br>A potential public access area near Bethulie should also be assessed | Unlock Economic potential of the Dam. | Feasibility Study to be undertaken;<br><br>PPP for Management of Resort and Picnic Areas. | DMC<br>DWS<br>Forever Resort |
| Management of Development | DMC to have dedicated agenda item regarding EIAs and developments in | To ensure DMC is aware of all developments | Agenda item regarding developments to be | DMC |

| Objective category/major objective | What | Why | How | Who |
|---|---|---|---|---|
| Pressure | the area | around the Dam. | included<br><br>DMC to discuss and comment on all EIA's in the area | |
| Improved Resource Management | Water Quality Monitoring protocol to be set up at the Dam. The potential for water quality monitoring data to be linked to the UPN system should be determined so that if water quality issues are noted they will activate the UPN system | To ensure water quality at the Dam does not deteriorate. The UPN system in its current form has a function whereby ecological issues at a Dam can be noted. It is suggested that this be developed so that water quality monitoring bodies such as DWS and members of industry such as Eskom and Sasol can activate the UPN System should any results indicate issues with the water quality | DWS to set up monitoring protocol. Discussions with CIWSP should be undertaken to determine feasibility. | DWS<br>CIWSP |
| | All recreational or tourism developments should assess the potential impact on water quality | The Dam is a strategic water source and secondary activities should not negatively impact water quality or the primary use of the Dam | The DMC to assess all proposed developments to ensure adequate attention has been paid to the management of effluent | DMC<br>DWS<br>FS DETEA |
| | Management of Alien Invasive Aquatic Species including education programmes regarding the impacts of alien invasive species should also be put in place. A Wash Bay System should be implemented to ensure no infestations occur. | There are a number of aquatic invasive species in the catchment. These species could have a negative impact on water quality, biodiversity, safety and recreational use. The use of a Wash Bay will prevent the spread of aquatic invasive species and contain any invasive species currently in the Dam (although at this point none have been identified)<br><br>Currently the Dam does not have an aquatic Invasive alien species problem. This needs to be maintained as Alien invasive species can | Wash Bay to be built<br><br>Agreements with DEA regarding Wash Bay Agent, herbicides etc to be put in place<br><br>Wash Bay agent to be appointed<br><br>Wash Bay Offices to be appointed<br><br>Agreements regarding access for invasive species skills and education programmes to | DMC<br>DWS<br>EC-DEDEAT<br>FS DETEA<br>CIWSP<br>DEA |

| Objective category/major objective | What | Why | How | Who |
|---|---|---|---|---|
| | | negatively impact biodiversity, water quality etc. | be put in place<br><br>An Alien Invasive Species Education programme including notice boards, information brochures etc. should be developed | |
| Sustainable Development to Facilitate Tourism and Recreational Use and Benefit the Local Community | Potential for meat processing from Hunting and Culling to be assessed | This would create employment opportunities in the local community | Assessment and research to be done | DMC |
| | Picnic Areas around Dam. | Unlock Economic potential of the Dam. | RMP has identified possible picnic areas;<br><br>WULA's to be acquired if necessary.<br><br>Agreements with recreational clubs to take into account management. | DMC<br>DWS<br>FS DETEA<br>EC-DEDEAT |
| | Linkage to Vanderkloof Dam and Gariep Dam | Linkage between both Dams should be explored as it could improve the economic aspect of both Dams | A feasible assessment should be done highlighting the benefits of the link | DWS<br>EC-DEDEAT<br>FS DETEA |
| | Improve Marketing and further tourism potential | Highlighting significant facts and advertising appropriately will enhance the economic value of the Dam, Potential recreational activities such as hiking, horse riding need to be assessed to improve tourism attraction | Establish/ compile a Marketing and Tourism Strategy and eventually implement | DMC<br>DWS |
| | Potential for PPPs for House Boats, Night Drives, Shoreline Development etc. to be explored | Small cap PPP for additional guided activities such as Horse-Riding, Game Drives, Hiking | A feasibility study for a PPP should be undertaken. | DWS |

| Objective category/major objective | What | Why | How | Who |
|---|---|---|---|---|
| | | Trails and formalised Kayak Tours linking Gariep Dam to Vanderkloof Dam | | |
| | The Lake !Gariep Initiative should be revived including determining the feasibility of linking the three games reserves around the Dam into one cohesive unit. | The Lake !Gariep Initiative was born from the need to coordinate between provincial authorities and to increase economic and tourism development in the area using Gariep Dam as a centre point. The initiative has not been successful in recent years however there is an opportunity to revive the concept . In addition, one of the main concepts of the initiative was the potential to link all three game reserves around the Dam into one unit. The feasibility of this should be assessed | Discussions with Lake !Gariep Initiative representatives<br><br>Document successes, failures and lessons learnt<br><br>Ensure marketing and tourism strategy takes into account existing projects, successes, failures and lessons learnt<br><br>Feasibility study to determine the potential for linking all three nature reserves into one unit. | DWS<br>DMC<br>FS DETEA<br>EC-DEDEAT<br>District Municipalities<br>Local Municipalities |
| Management of Fishing | Status of current commercial fishing or small scale fisheries programme to be determined. Lessons learnt and issues encountered should be noted.<br><br>Potential for commercial fishing or small scale fisheries programme to be assessed and revival of Commercial Fisheries should take place if required | Gariep Dam is known as a good fishing area. This could be used for potential small scale fisheries programmes which would provide economic benefit to the local community.<br><br>The feasibility study should take into account the impact on indigenous fish species, local community members who are dependent on subsistence fishing as well as the studies documenting low fish stocks at the Dam. | Population study required to determine population status in Gariep Dam<br><br>Status of current commercial programmes to be determined<br><br>A feasibility study for the small scale fisheries programme should be compiled | DAFF<br>DWS<br>DEDEAT<br>FS DETEA |

| Objective category/major objective | What | Why | How | Who |
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| | A Containment Plan for Invasive Fish Species such as Bass and Carp should be developed and implemented so that the economic benefits of recreational angling can be achieved without the further spread of these species to other valuable water resources | Both Carp and Bass are Category I(b) invasive species. Both of these species can provide economic benefits through recreational angling. Based on new draft legislation, a containment plan for these species should be compiled | A Containment Plan for Bass and Carp should be compiled | DMC<br>DEA<br>DWS<br>EC-DEDEAT<br>FS DETEA |
| Increased education and skills training | Discussions with FS DETEA, EC-DEDEAT, DWS and Yacht Club to take into account access for skills training and increased education with regards to invasive species | Access to water for skills training is required as well as education about invasive species impacts | All agreements must allow skills training and educational programmes to take place. | FS DETEA<br>DWS<br>Yacht Club<br>EC-DEDEAT |
| | Discussions between DWS, DAFF and FS DETEA to be undertaken regarding the China-South Africa Agricultural and technology demonstration centre | The centre has been developed as a modern research, demonstration, aquaculture promotion and training facility for freshwater fish and farming technologies. Discussions between DWS, FS DETEA and DAFF are required to ensure that community training takes place as part of this | DWS, FS DETEA and DAFF to meet to discuss community training<br><br>Access agreements to be put in place if required<br><br>DAFF to undertake community training | DWS<br>FS DETEA<br>DAFF |
| | FS DETEA Education Facility should be completed | FS DETEA has an education centre at the Dam which they are currently in the process of upgrading. The upgrade consists of additional accommodation facilities so to allow schools to stay at the Centre as part of school tours.<br><br>Although the Dam does not feature as the main part of this education programme there is an opportunity for extending the programme | Discussions with FS DETEA regarding use of the Dam as part of educational programmes to be undertaken<br><br>Potential funds for the competition of the facility to be determined | DWS<br>DMC<br>FS DETEA |

| Objective category/major objective | What | Why | How | Who |
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| | | to include activities at the Dam. | | |
| | Coordination between Yacht Club and local schools and SAS to introduce youth sailing programme at local schools | The FSYC is nationally affiliated to SAS. The Dam offers good sailing conditions and thus there is an opportunity to increase community participation at the Dam and to increase sailing in South Africa through youth sailing programmes with local schools | Yacht Club, SAS and local schools to discuss potential for youth sailing programme<br><br>Agreements regarding access for training to be put in place<br><br>Funding sources to be assessed | DMC<br>FSYC<br>SAS<br>SASCOC |

# 5. WAY FORWARD

## 5.1. Compilation of Business Plans

Based on the strategic objectives identified for Gariep Dam, a suite of BPs were developed. The BP describes the financial management and operational requirements to implement the Objectives of the RMP. The Financial Plan will facilitate the implementation of listed and recommended activities in the RMP.

The Business Plans are approached in the following manner:

- Identify Strategic Objective – informed by RMP;
- Determine Interventions – Each objective was divided into practical interventions;
- List Detailed Activities – Interventions were further divided into activities, in order to establish timeframes and provide guidance to the entity who implements the business plan;
- Establish Key Performance Indicators per intervention – Key Performance Indicators allow for monitoring and evaluation; and
- Establish timeframes per activity;
- Establish a budget per activity; and
- Determine Funding sources – Innovative mechanisms to obtain funding were identified.

## 5.2. Review of RMPs

The RMP presents a twenty-year vision for the Dam. This vision will be implemented through the RMP which will be revised and updated every five years, according to changing priorities, constraints and achievements. Within a five-year cycle of the RMP, the BPs will identify key objectives in line with a changing status quo and potential change in circumstances. After five years the RMP will be reviewed and updated so to identify new objectives in line with the vision for the Dam.

The BPs are updated annually.

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