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# FRESHWATER COMPLIANCE STATEMENT

## Portion 1 of Farm 182, Hoogekraal



Photo of the approximate site of a proposed off-stream dam. *Photo courtesy M. Mackay*

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For

Cape EAPrac

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**DECLARATION OF CONSULTANTS INDEPENDANCE**

I consider myself bound to the rules and ethics of the South African Council for Natural Scientific Professions (SACNASP);

- At the time of conducting the study and compiling this report I did not have any interest, hidden or otherwise, in the proposed development that this study has reference to, except for financial compensation for work done in a professional capacity;
- Work performed for this study was done in an objective manner. Even if this study results in views and findings that are not favourable to the client/applicant, I will not be affected in any manner by the outcome of any environmental process of which this report may form a part, other than being members of the general public;
- I declare that there are no circumstances that may compromise my objectivity in performing this specialist investigation. I do not necessarily object to or endorse any proposed developments, but aim to present facts, findings and recommendations based on relevant professional experience and scientific data;
- I do not have any influence over decisions made by the governing authorities;
- I undertake to disclose all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by a competent authority to such a relevant authority and the applicant;
- I have the necessary qualifications and guidance from professional experts in conducting specialist reports relevant to this application, including knowledge of the relevant Act, regulations and any guidelines that have relevance to the proposed activity;
- This document and all information contained herein is and will remain the intellectual property of Confluent Environmental. This document, in its entirety or any portion thereof, may not be altered in any manner or form, for any purpose without the specific and written consent of the specialist investigators.
- All the particulars furnished by me in this document are true and correct.



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## 1. INTRODUCTION

Confluent Environmental was appointed by Cape EAPrac to undertake a freshwater survey for a proposed off-stream dam development on Portion 1 of Farm 182, Hoogekraal, George in the Western Cape. The dam proposed would have a storage capacity of 106 000 m<sup>3</sup> which would comprise of storage transferred from four existing off-stream dams on the property, as well as additional storage to make up the difference (Figure 1). The water will be utilised for irrigation of recently established Macadamia nut and Avocado orchards. The site has been classified as having 'Very High' aquatic biodiversity by the Department of Forestry, Fisheries and the Environment (DFFE) screening tool.

The scope of work for this report is guided by the legislative requirements of the National Environmental Management Act (NEMA).

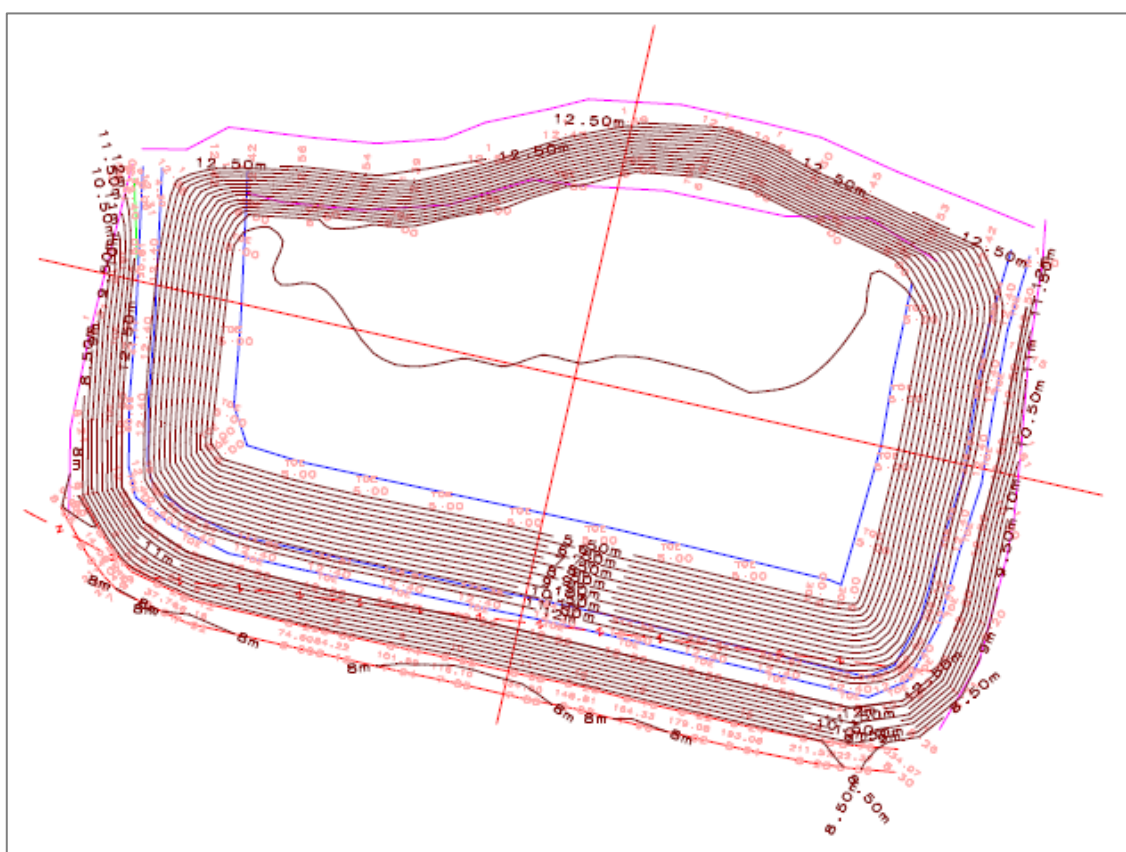


Figure 1. Diagrammatic layout of the proposed off-stream storage dam on 1/182 Hoogekraal (supplied by A. Atkinson).

### 1.1 National Environmental Management Act

According to the protocols specified in GN 1540 (Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in Terms of Sections 24(5)(A) and (H) and 44 of the National Environmental Management Act, 1998, when Applying for Environmental Authorisation), assessment and reporting requirements for aquatic biodiversity are associated with a level of environmental sensitivity identified by the national web-based environmental screening tool (screening tool). An applicant intending to undertake an activity identified in the scope of this protocol on a site identified by the screening tool as being of:



- **Very High** sensitivity for aquatic biodiversity, must submit an Aquatic Biodiversity Specialist Assessment; or
- **Low** sensitivity for aquatic biodiversity, must submit an Aquatic Biodiversity Compliance Statement.

The screening tool classified the site as being of **Very High** aquatic biodiversity due to its location within a Strategic Water Source Area (SWSA). According to the protocol, prior to commencing with a specialist assessment a site sensitivity verification must be undertaken to confirm the sensitivity of the site as indicated by the screening tool:

- Where the information gathered from the site sensitivity verification differs from the screening tool designation of Very High aquatic biodiversity sensitivity, and it is found to be of a Low sensitivity, an Aquatic Biodiversity Compliance Statement must be submitted.
- Similarly, where the information gathered from the site sensitivity verification differs from the screening tool designation of Low aquatic biodiversity sensitivity, and it is found to be of a Very High sensitivity, an Aquatic Biodiversity Specialist Assessment must be submitted.

## 1.2 Scope of Work

The objectives of this assessment included the following:

- To undertake a desktop analysis and site inspection to verify the sensitivity of aquatic biodiversity as **Very High** or **Low**; and,
- Compile an Aquatic Biodiversity Compliance Statement or Aquatic Biodiversity Specialist Assessment based on the verification of the sensitivity of the site.

### 1.2.1 Approach

The following rationale was adopted to determine the sensitivity of aquatic biodiversity within the footprint of the proposed dam:

- The location of the site within a Strategic Water Source Area flags the site as being of a Very High sensitivity. This is a precautionary approach and therefore requires that a site visit be undertaken to determine whether any watercourses that may not have been identified by widely available desktop mapping resources may in fact be present on the site;
- In the event that watercourses are confirmed to fall within the dam's development footprint and that these watercourses will be impacted by the development, then the site sensitivity is confirmed as **Very High** and a full specialist freshwater assessment is required; and

- In the event that no watercourses are identified within the dam's development footprint the site sensitivity is confirmed as **Low** and an Aquatic Compliance statement is required.

The determination of the site sensitivity relied upon the following approaches:

- Interrogation of available desktop resources including:
  - DWS spatial layers;
  - National Freshwater Ecosystem Priority Areas (NFEPA) spatial layers (Nel *et al.*, 2011);
  - National Wetland Map 5 and Confidence Map (CSIR, 2018) – the latest national wetland inventory map for South Africa;
  - Western Cape Biodiversity and Spatial Plan (WCBSP; CapeNature, 2017).
- A site visit was undertaken, during which time the following activities were undertaken:
  - Identification and classification of watercourses within the footprint of the site according to methods detailed in Ollis *et al.* (2013);
  - Soil augering to confirm the presence of soil indicators (DWAF, 2005) that may indicate the presence of a wetland (if applicable); and
  - Identification of hydrophilic plant species that may indicate the presence of wetland plant species (if applicable).

## 2. DESKTOP SURVEY

The farm property and proposed dam are located in quaternary catchment K40D (Table 1; Figure 2). Several watercourses flow through the property that drain into the western arm of Swartvlei Lake through the Diep (a.k.a. Wolwe) River and other smaller tributaries. The Diep River forms part of the western boundary of the property, and water stored in the proposed dam would be pumped from an existing instream dam on the Diep River. The mapped extent of Swartvlei Lake shown in Figure 2 corresponds with the 5 m. a.m.s.l. contour which defines the Estuarine Functional Zone (EFZ). The proposed dam site has a fairly uniform gentle slope which averages 4%.

Table 1. Summary of relevant catchment features for 1/182, Hoogekraal

Feature	Description
Water Management Area	Gouritz
Quaternary catchment	K40D
Mean Annual Runoff	254 mm
Mean Annual Precipitation	757 mm
Ecoregion Level II	22.02
NFEPA area	9027, Upstream Management Area
Vegetation Type	Garden Route Shale Fynbos

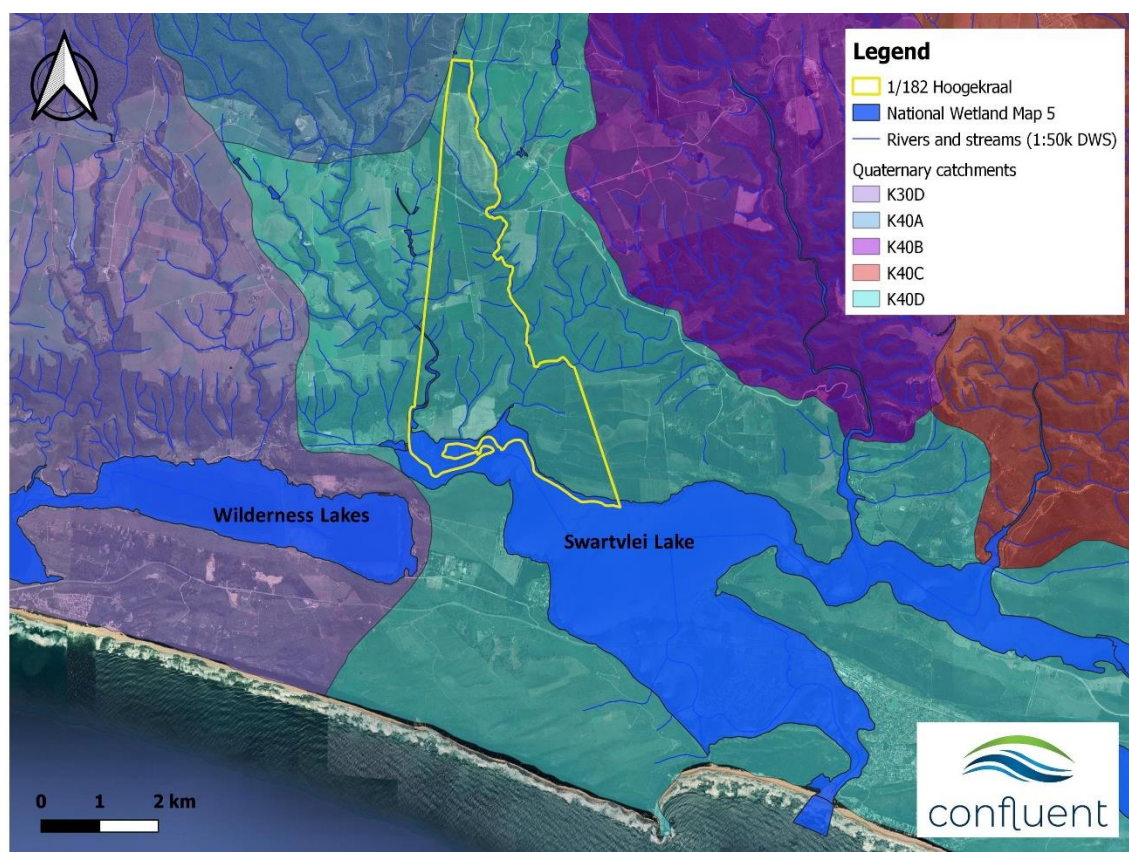


Figure 2. Location of Portion 1/182 Hoogekraal Farm in quaternary catchment K40D.

Although multiple watercourses are present on and adjacent to the property, there are no mapped aquatic features within the footprint of the proposed dam (Figure 3).

The proposed location of the dam is in historical fields which have been used for grazing pasture and hops prior to conversion to macadamia orchards (Figure 4). The southern edge of the proposed dam is approximately 250 m from the edge of Swartvlei Lake (Figure 3).

## 2.1 Conservation status

The property is in area 9027 according to the National Freshwater Ecosystem Priority Atlas (Nel *et al.*, 2011) which is classified as an Upstream Management Area with the following management objectives: “*These are sub-quaternary catchments in which human activities need to be managed to prevent the degradation of downstream Protected Areas and Fish Support Areas.*”

According to the Western Cape Biodiversity Spatial Plan (WCBSP, 2017) there are no Critical Biodiversity Areas or Ecological Support Areas located within the footprint of the proposed dam.

Vegetation within the proposed dam footprint is mapped as Garden Route Shale Fynbos, which has a Vulnerable conservation status (SANBI, 2018). The mapped vegetation type has been largely modified from its original state by farming which has taken place at the site for many decades.



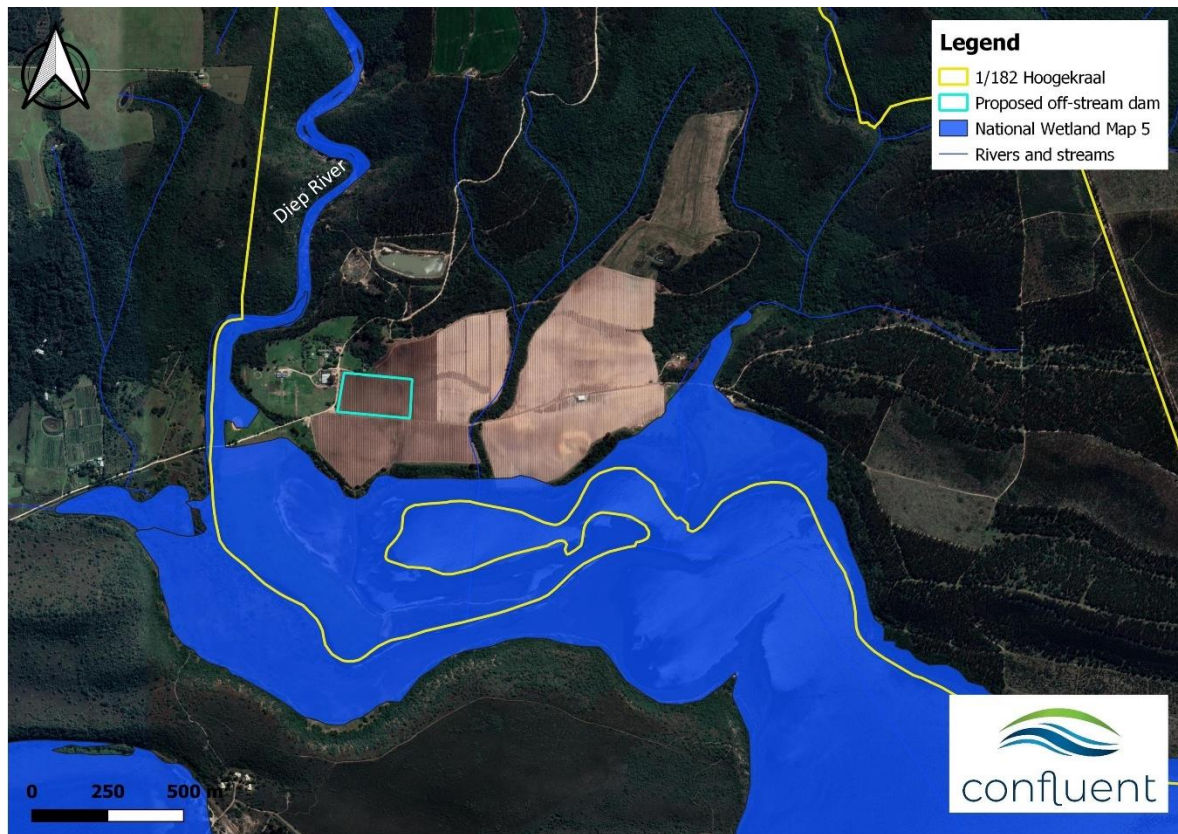


Figure 3. Map of the southern portion of 1/182 showing the proposed location of the off-stream dam in relation to mapped wetlands, rivers, and streams.



Figure 4. Drone photo of the site of the proposed off-stream dam (blue outline). *Photo courtesy M. Mackay, June 2021*



## 2.2 Strategic Water Source Area

Aquatic biodiversity within the site has been identified as Very High on the basis that the site falls within the Outeniqua Strategic Water Source Area for surface water (SWSA-sw; Figure 5). SWSAs are defined as areas of land that supply a disproportionate (ie. Relatively large) quantity of mean annual runoff in relation to their size and are therefore considered nationally relevant (Le Maitre *et al.*, 2018). A key objective in the management of SWSAs is to ensure the quantity and quality of water within and flowing from SWSAs is protected from developments that cause unacceptable and irreparable impacts. One of the relevant benefits identified with SWSAs is the provision of water for irrigation, particularly in low-lying areas below high relief features such as the Outeniqua Mountains. The property is located in the low-lying area of the SWSA, and as an agricultural operation (both historically and in the present) directly benefits from the supply of good quality and quantities of water from the catchment.

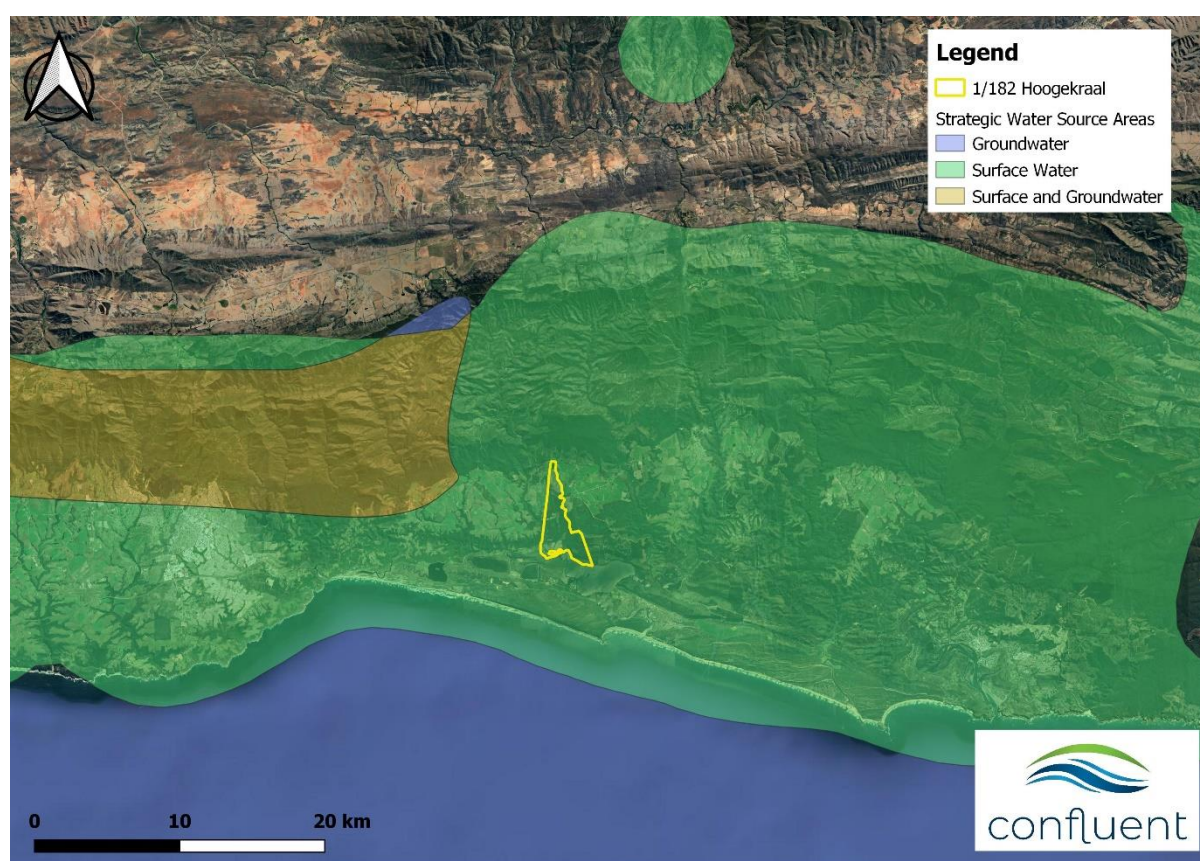


Figure 5. Location of 1/182 Hoogekraal within a Strategic Water Source Area – surface water.

## 2.3 Historical perspective

The location of the proposed off-stream dam is in a historical agricultural field that shows no indication of any watercourse within the footprint of the proposed dam (Figure 6). Prior to recent conversion of fields to Macadamia nuts, the fields were mainly irrigated pasture, and hops were cultivated at some stage in the past.



Figure 6. Historical aerial photo taken of 1/182 in 1991 showing the approximate location of the proposed dam.

### 3. SITE VISIT

The site was visited on 9 June 2021 to verify the findings of the desktop study. The site of the proposed off-stream dam currently has rows that were prepared for Macadamia nuts. There was no evidence of any hydrophilic wetland plants or visible wetness signatures in the proposed footprint of the dam. There are no drainage lines, channels, riparian vegetation, or any other aquatic feature associated with a watercourse in the site of the proposed off-stream dam.

The results of the site visit therefore support those of the desktop study, confirming that no watercourses or sensitive aquatic habitat occur within the footprint of the proposed off-stream dam (Figure 7).





Figure 7. Image of the historical agricultural field proposed as the site for the off-stream storage dam.

#### 4. CONCLUSIONS

As the site of the proposed off-stream dam is not physically located within any part of a watercourse, it cannot have any impact on the quantity or quality of water flowing from the SWSA. As this was the basis of the Very High aquatic biodiversity finding in the screening tool, it is concluded that the site-specific assessment does not support this finding. Aquatic biodiversity and sensitivity within the footprint of the dam is Very Low and no further aquatic studies would be recommended for construction of the off-stream dam.

The abstraction of water from the Diep (Wolwe) River to sustain the dam must be assessed according to the National Water Act to ensure that water abstracted does not compromise the quantity and quality of water in terms of the Ecological Reserve for both the river itself, and the Swartvlei Estuary. This type of information should be incorporated in the application for a Water Use License (WUL) which is currently in progress by the applicant. The recently determined Resource Quality Objectives (RQOs) for Swartvlei Estuary (quaternary catchment K40D) acknowledge that demands for freshwater supply will increase, but that these should be carefully managed to ensure that the estuary remains in a 'B' ecological category (DWS, 2018; Appendix 1). Should groundwater abstraction from a borehole be a consideration, then the RQOs for groundwater will also need to be considered (Appendix 1).

While not the direct subject of this assessment, it is recommended that all recently converted fields (from pasture to Macadamia nut trees) include a naturally vegetated buffer of at least 15 m from the edge of Swartvlei Lake to protect water quality from agricultural land use.



Although recently planted Macadamia trees are within the footprint of historical fields, these did not historically include an adequate riparian buffer to protect Swartvlei Lake. This is current best practice.

## 5. APPENDIX

### 5.1 Extract from Resource Quality Objectives

Table 2. RQOs and numerical limits Swartvlei estuary (DWS, 2018).

IUA	Quat #	Estuary	Node	Component	Sub-component	Indicator	RQO Narrative	RQO Numeric															
G15 Coastal	K40D	Swartvlei Estuary	Bx110	Quantity	Flow	MMR/MAR (% Nat)	Maintain a flow regime to create the required habitat for birds, fish, macrophytes, microalgae and water quality	Months	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual		
								MMR/MAR (% Nat)	89.5	87.6	80.9	78.7	81.3	86.8	86.8	88.5	85.9	88.4	90.9	90.2	86.6		
				Quality	Nutrients	DIN	Inorganic nutrient concentrations not to exceed TPCs for macrophytes and microalgae	River inflow, NO <sub>x</sub> -N not to exceed 50 µg/ℓ over two consecutive months, NH <sub>3</sub> -N not to exceed 10 µg/ℓ over two consecutive months; Estuary: Average NO <sub>x</sub> -N <50 µg/ℓ, no single measure >100 µg/ℓ, average NH <sub>3</sub> -N <10 µg/ℓ, no single measure >100 µg/ℓ; Lake: average NO <sub>x</sub> -N <50 µg/ℓ, no single measure >100 µg/ℓ, average NH <sub>3</sub> -N <20 µg/ℓ															
						DIP		River inflow, PO <sub>4</sub> -P not to exceed 10 µg/ℓ over two consecutive months; Estuary: average PO <sub>4</sub> -P <10 µg/ℓ, no single sample >50 µg/ℓ; Lakes: average PO <sub>4</sub> -P <20 µg/ℓ															
					Salinity	Salinity	Salinity distribution not to exceed TPCs for fish, invertebrates, macrophytes and microalgae	Estuary in the closed state: average salinity <12; Lake average salinity +2 from baseline (2013)															
					System variables	Turbidity	System variables (temperature, pH, turbidity, dissolved oxygen, suspended solids and turbidity) not to exceed TPCs for biota	Average <5 NTU (low flow) throughout															
				Oxygen		>5 mg/l throughout																	
				Pathogens	pH	Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation	River inflow: 6.0 < pH < 7.0, Estuary: 6.0 < pH < 8.5, Lake: 7.0 < pH < 8.5																
					Enterococci		≤185 Enterococci/100 ml) (90th percentile)																
				Habitat	Hydrodynamics	Escherichia coli	Maintain connectivity with marine environment at a level that ensures water quality and habitat remains suitable for biota typically found in the estuary	≤500 E. coli/100 ml (90th percentile)															
						Mouth state		Closed mouth state should not increase by >10% from established baseline															
				Biota	Microalgae	Sediment characteristics, Channel shape/size	Flood regime is sufficient to maintain natural bathymetry and sediment characteristics	Channel shape/size, sediment grain size and organic matter must not change by >30% from established baseline															
Biomass and community composition of phytoplankton and benthic microalgae community	Maintain the composition and richness of phytoplankton and benthic microalgae groups and medium-low biomass	Maintain low/median phytoplankton/benthic microalgae biomass: phytoplankton not to exceed 3.5 µg/ℓ (median), phytoplankton not to exceed 20 µg/ℓ and/or cell density not to exceed 10 000 cells/ml (once-off); benthic microalgae not to exceed 23 mg/m2 (median); prevent formation of phytoplankton blooms																					

Table 3. Supplementary information for Swartvlei Estuary RQOs (DWS, 2018).

IUA	Class	Estuary	Node	Quat.	REC	Current	Target	Context of the RQO	References
G15-Coastal	II	Swartvlei	gxi10	K40D	EC: B %nMAR: 90.9	PES: B %nMAR: 90.9	EC: B %nMAR: 77.8	<p>Motivation for achieving REC/TEC</p> <ul style="list-style-type: none"> <li>The Swartvlei estuary is rated as “highly important” from a biodiversity conservation perspective (ranked 7th out of 273 estuaries in South Africa), and is included in the Garden Route National Park MPA. The REC, PES and TEC for the system are all the same (B category), however future demands for freshwater in the Swartvlei catchment mean that flows are likely to drop slightly in future (from 90.9 to 77.8% of natural) and that thus there is a very real threat that the health of this system may decline in future. Thus, it is imperative that DWS and other stakeholders (local, provincial and other national government agencies) assist in addressing other pressures on this system to ensure that this highly important system remains in a B category. Key threats to the system include reduction in freshwater runoff (due to afforestation and alien invasive plants), loss of connectivity in the system, sedimentation, loss and degradation of floodplain habitats, overfishing, impaired water quality and disturbance caused by recreational activities.</li> </ul> <p>Additional (non-flow related) interventions to achieve the REC:</p> <ul style="list-style-type: none"> <li>To achieve and maintain the REC, the mouth must be allowed to remain closed up 3.5 m above MSL. This is difficult due to housing developments at elevations lower than 3.5 m MSL, thus a compromise as close to 3.5 m MSL must be agreed with all stakeholders.</li> <li>In addition, barriers to flow and movement of fauna in the system should be eliminated as far as possible. This includes eliminating or at least reducing blockages caused by the N2 and railway line that extend right cross the estuary</li> <li>Strict control should be maintained over recreational activities on the estuary to ensure that these do not impact negatively on sensitive fauna such as water fowl.</li> </ul>	DWA (2009) RDM report for the Swartvlei estuary

Table 4. RQOs for groundwater quality and quantity in priority catchments of GC-2 (DWS, 2018).

IUA	GRU	Quat(s)	Aquifer	Component	Sub-Component	Indicator	RQO Narrative	RQO Numeric
G15 Coastal	GC-2	K40D	Cenozoic coastal deposits	Quantity	Abstraction	Seasonal abstraction: water level recovers from abstraction impact during wet season, under consideration of climate change and drought cycles. Permanent abstraction: water level decline stabilises under consideration of aquifer response time.	Groundwater use should be sustainable for all users and the environment	n/a
					Groundwater level	Water level	Minimum water level in abstraction boreholes within 2.5km from the ocean to avoid saline intrusion	>0.5 mamsl
					Discharge	Relative water levels between groundwater and surface water (in mamsl)	The natural gradient between groundwater and surface water should be maintained	n/a
					Discharge	Buffer zones	No groundwater abstraction around wetland and river FEPAs in accordance with the implementation manual for FEPAs.	250m
				Quality	Nutrients	NO <sub>3</sub> (as N)	Groundwater should be fit for domestic use after treatment; and groundwater quality shall	<11.0 mg/l
					Salts	EC	not show a deteriorating trend from natural background	<170 mS/m
					Pathogens	E-coli		0 counts / 100 ml
					Pathogens	Total Coliform		10 counts / 100ml



## 6. REFERENCES

DWAF (Department of Water Affairs and Forestry; 2005). A practical field procedure for identification and delineation of wetland and riparian areas.

DEPARTMENT OF WATER AND SANITATION (2018). Determination of Water Resources Classes and Resource Quality Objectives in the Breede-Gouritz Water Management Area: Outline of Resource Quality Objectives Report. Report No: RDM/WMA8/00/CON/CLA/0717

LE MAITRE, D., SEYLER, H., HOLLAND, M., SMITH-ADAO, L., NEL, J., MAHERRY, A. & WITTHUSER, K. (2018). Identification, delineation and importance of the strategic water source areas of South Africa, Lesotho, and Swaziland for surface water and groundwater. Water Research Commission Report No. TT 754/1/18.

OLLIS, D.J., SNADDON, C.D., JOB, N.M. & MBONA, N. 2013. Classification System for Wetlands and other Aquatic Ecosystems in South Africa. User Manual: Inland Systems. *SANBI Biodiversity Series 22*. South African National Biodiversity Institute, Pretoria.

NEL, J.L., DRIVER, A., STRYDOM, W.F., MAHERRY, A., PETERSON, C., HILL, L., ROUX, D.J., NIENABER, S., VAN DEVENTER, H., SWARTZ, E. AND SMITH-ADAO, L.B. (2011) Atlas of freshwater ecosystem priority areas in South Africa: Maps to support sustainable development of water resources. Water Research Commission Report No. TT 500/11.

SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE (2006-2018). The Vegetation Map of South Africa, Lesotho and Swaziland, Mucina, L., Rutherford, M.C. and Powrie, L.W. (Editors), Online, <http://bgis.sanbi.org/Projects/Detail/186>, Version 2018.