

**SHABBY FUFU
LIFESTYLE FARM & RESTOURANT
Garden Route
Plettenberg Bay**

Freshwater Report
for the
Shabby Fufu Farm Stall

A requirement in terms of Section 24G of the National Environmental Management Act
April 2024



Executive Summary

Shabby Fufu is a lifestyle guest farm, restaurant and roadside stall directed at the tourist industry along the N2 Garden Route to the west of Plettenberg Bay. It is an established enterprise, evidently most successful and a prominent landmark. It obviously adds to the sense of place and the touristy aura on the southern part of the Western Cape.

Three small farm dams on the property attracted the attention of the conservation authorities. These dams were constructed long before the promulgation of contemporary legislation in 1998. Reportedly, the dams were upgraded and altered after this date, thereby drawing official attention.

A formal Pre-Compliance Notice was issued.

Subsequently, officers of the Department of Environmental Affairs and Development Planning as well as from the Breede Gouritz Catchment Management Agency visited the site along with the appointed WATSAN Africa consultant.

The Shabby Fufu management considered these as extremely important, if not stressful and threatening to their continued operation. Immediately, consultants were appointed with the required competencies to deal with the notice and to fulfil the legal requirements.

A natural mostly dry drainage line on the grounds was replaced with small farm dams. A natural dry environment is now permanently inundated. Shabby Fufu is left with the choice to restore the original aquatic condition or to keep the dams intact. They opted to keep the dams and follow due procedures, as prescribed in the National Environmental Management Act and its regulations.

Following repeated site visits and assessments, as prescribed, this Freshwater Report supports the notion that the dams should remain. It supports that Shabby Fufu should continue its operations.

One of the dams on the premises may serve as habitat for the endangered Knysna leaf folding frog. One of the conditions of continued operation must be that this habitat is protected and preserved.

Index

	Abbreviations	4
	List of Figures	5
	List of Tables	5
1	Introduction	6
2	Legal Framework	8
3	Location	9
4	Quaternary Catchment	9
5	The Property	10
6	The Dams	11
7	Conservation Status	15
7.1	DFFE Screening Tool	15
7.2	Vegetation	16
7.3	Western Cape Biodiversity Spatial Plan	16
8	Plettenberg Bay Rainfall	16
9	Present Ecological State	17
10	Ecological Importance	22
11	Ecological Sensitivity	23
12	EISC	23
13	Numerical Significance	24
14	Possible Impacts and Mitigating Measures	25
15	Impact Assessment	27
16	Risk Matrix	28
17	Resource Economics	30
18	Summary	32
19	Conclusions	33
20	References	34
21	Declaration	35
22	Résumé	36
23	Appendix	40
23.1	Numerical Significance Methodology	40
23.2	Methodology for determining significance of impacts	42
23.3	Risk Matrix Methodology	46

Abbreviations

Breede Gouritz Catchment Management Agency	BGCMA
Critical Biodiversity Area	CBA
Department of Fisheries, Forestry and the Environment	DFFE
Department of Water and Sanitation	DWS
Ecological Importance	EI
Ecological Importance and Sensitivity Class	EISC
Ecological Sensitivity	ES
Ecological Support Area	ESA
Environmental Impact Assessment	EIA
Electronic Water Use License Application (on-line)	eWULAAS
Government Notice	GN
Metres Above Sea Level	masl
National Environmental Management Act (107 of 1998)	NEMA
National Freshwater Environment Priority Area	NFEPA
National Water Act (36 of 1998)	NWA
Present Ecological State	PES
Section of an Act of Parliament	S
South Africa National Biodiversity Institute	SANBI
Water Use License Application	WULA

List of Figures

Figure 1	Public Participation	7
Figure 2	Location	9
Figure 3	Shabby Fufu Site	10
Figure 4	Dams	11
Figure 5	Dam No.1	12
Figure 6	Dam No.2	13
Figure 7	Dam No.3	13
Figure 8	Piesang River	14
Figure 9	Plettenberg Bay Climate	17
Figure 10	Resource Economy Footprint	31
Figure 11	Minimum Requirements for a S21(c) and (i) Application	33

List of Tables

Table 1	DFFE Screening Tool Results	15
Table 2	Habitat Integrity of palustrine wetlands	18
Table 3	Scoring Guidelines	18
Table 4	Assigned Categories	18
Table 5	PES Scores	18
Table 6	Habitat Integrity of drainage lines	19
Table 8	Ecological Importance	22
Table 9	EISC	23
Table 10	Significance score	24
Table 11	Impacts Assessment	28
Table 12	Risk Matrix	29
Table 13	Goods and Services	30
Table 14	Summary	32

1 Introduction

Shabby Fufu is a well-known venue for visitors and tourists along the Garden Route to the west of Plettenberg Bay and has been a landmark for many years, even before the promulgation of environmental legislation in 1997.

Several dams on the property add to the touristy shop and the view from the grounds and the restaurant. The dams are termed as “wetlands” and are viewed as legitimate water resources. These dams are an integral part of Shabby Fufu’s character and vibrancy. This Freshwater Report specifically deals with these dams and aquatic features of the site and surroundings.

The DFFE issued a Pre-Compliance Notice in terms of the NEMA for the development and operation of the entire Shabby Fufu undertaking on 17 November 2023. The notice states that the development was established without the required environmental authorisation. According to the NEMA and its regulations, landowners are left with the choice to rehabilitate the land to its original state, or at least to a state closer to what it was before the impact, or to continue with the operation under the condition to apply for official approval following due legislated procedures.

Shabby Fufu opted to carry on with the business and to follow due procedures.

Subsequently Mrs Irene Vermeulen of Shabby Fufu appointed Enviro Africa of Somerset West to follow the S24G procedures with the aim to obtain the required official approval and thus secure the Shabby Fufu’s continued operation.

Likewise, WATSAN Africa of Knysna was appointed to deal with the aquatic aspects of the S24G application.

A DFFE official visited the site during November 2023. He was accompanied by a BGCMA (the regional office of the DWS) official to specifically deal with the aquatic issues. Therefore, this Freshwater Report is focused on the requirements of the NWA as well, should it ever become necessary to apply for a WULA.

The Freshwater Report to support the WULA must contain adequate information to allow for informed decision-making. These decision-makers essentially are the DWS officials. The Freshwater report has developed in a set format and must contain specific information.

Moreover, it must contain a Risk Matrix as published on the DWS webpage and as specified in gazetted government notices. This Risk Matrix is the official mechanism that aids the decision if a letter of consent, a General Authorization or a License is required. The Risk Matrix must be compiled and signed by a registered specialist scientist.

SHABBY FUFU LIFESTYLE FARM **ENVIROAFRICA CC**

NEMA PUBLIC PARTICIPATION PROCESS

SECTION 24G APPLICATION FOR THE UNLAWFUL CONSTRUCTION OF A TOURIST FACILITY, FARM DAM AND ASSOCIATED INFRASTRUCTURE ON PORTION 4 OF THE FARM HARKERVILLE NO. 428, PLETTENBERG BAY

Notice is hereby given of the intention to submit an application, and the public participation, process in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended ("NEMA"), Environmental Impact Assessment Regulations 2014, as well as a Water Use License Application in terms of the National Water Act (Act 36 of 1998)(NWA) for the unlawful development on Portion 4 of the Farm Harkerville No. 428, Plettenberg Bay, Western Cape. The unlawful activities are in contravention of Section 24F of the NEMA, and includes activities listed in terms of the NEMA EIA Regulations, 2014.

EnviroAfrica cc has been appointed by Mrs Irene Vermeulen, to undertake the Section 24G Application for Environmental Authorisation process.

Application for environmental authorization to undertake the following activities*:
Government Notice R327 (Listing Notice 1 of 2014): Activities 12, 19, 27 and 28

Application in terms of NWA: Sections 21 (b)(c) and (i)*.

**Please note that should the listed activities above change or additional activities be identified during the course of the NEMA Application process, registered I&APs will be notified of any changes.*

Project Description & Location: The unlawful development in terms of NEMA includes the construction of tourist facilities (restaurant and farm store), parking area, main house (used as a guest house), kids play area, plant nursery, labourer's cottages and other associated infrastructure, and the development of a farm dam on Portion 4 of Farm Harkerville No. 428. The activity includes the commencement of the clearance of indigenous vegetation, construction of a dam within a watercourse, and the transformation of land without environmental authorisation.

The site is located at the Shabby Fufu Lifestyle Farm, on the southern side of the N2 and located approximately 8km west of Plettenberg Bay. Access to the site is from the N2.

Site co-ordinates: Farm store: 34° 02' 42.03" S, 23° 16' 36.48"E.
Farm dam: 34° 02' 44.90" S, 23° 16' 37.75"E.

Public Participation: Interested and Affected Parties (I&APs) are hereby notified of the application and invited to register (in writing) and/or provide initial comments and identify any issues, concerns or opportunities relating to this project to the contact details provided below, on or before **20 March 2024**. In order to register or submit comment, I&APs should refer to the project name, and provide their name, address & contact details (indicating your preferred method of notification) and an indication of any direct business, financial, personal, or other interest which they have in the application. Please note that future correspondence will only be sent to registered Interested and Affected Parties. You are also requested to pass this information to any person you feel should be notified.

Please note that only Registered I&APs will be notified of the availability of reports and other written submissions made (or to be made) to the Department by the applicant, and be entitled to comment on these reports and submissions; will be notified of the outcome of the application, the reasons for the decision, and submission will be available for inspection.

Consultant: EnviroAfrica CC, P.O. Box 5367, Helderberg, 7135 / Fax: 08 6 512 0154 / Tel: 021 8511616 / E-mail: clinton@enviroafrica.co.za



Figure 1 Public participation

2 Legislative Framework

The proposed development “triggers” sections of the National Water Act. These are the following:

S21 (c) Impeding or diverting the flow of a water course.

The proposed site is adjacent to an alleged wetland that is identified in the NWA and its regulations as a legitimate water resource. The wetland could possibly be altered, should the development go ahead.

S21 (i) Altering the bed, bank, course of characteristics of a water course.

The proposed site may alter the characteristics of an alleged wetland.

Government Notice 267 of 24 March 2017

Government Notice 1180 of 2002. *Risk Matrix.*

The Risk Matrix as published on the DWS official webpage must be completed and submitted along with the Water Use Licence Application (WULA). The outcome of this risk assessment determines if a letter of consent, a General Authorization or a License is required.

Government Notice 509 of 26 August 2016

An extensive set of regulations that apply to any development in a water course is listed in this government notice in terms of Section 24 of the NWA. No development take place within the 1:100 year-flood line without the consent of the DWS. If the 1:100-year flood line flood line is not known, no development may take place within a 100m from a water course without the consent of the DWS. Likewise, no development may take place within 500m of a wetland without the consent of the DWS.

National Environmental Management Act (107 of 1998)

NEMA and regulations promulgated in terms of NEMA determines that no development without the consent and permission of the DFFE and its regional agencies may take place within 32m of a water course. The alleged wetland is perceived to be a legitimate water course.

S24F of NEMA Pre-Compliance Notice

The Pre-Compliance Notice was issued in terms of this section of the NEMA.

S24G of NEMA *Listed activities*.

The Shabby Fufu violated, according to the Pre-Compliance Notice, several of the “activities” listed under S24G of the NEMA.

3 Location



Figure 2 Location

Shabby Fufu is located 9.4km on the N2 trunk road to the west of the Plettenberg Bay seaboard (Figure 2).

Its coordinates are as follows:

$34^{\circ}22'48.61\text{S}; 23^{\circ}16'37.46\text{E}$

This site is regularly visited, as it is close to the WATSAN premises.

4 Quaternary Catchment

Shabby Fufu is in the K60G quaternary catchment.

5 The Property



Figure 3 Shabby Fufu site

This site is on the N2 along the Garden Route between Knysna and Plettenberg Bay. It is 16.5ha in size, approximately a rectangle to the south. There is a shopping complex and restaurant focussed on the tourist industry next to the N2 on the premises, as well as a small protea garden.

This site is regularly visited, as it is close to the WATSAN premises.

6 The Dams



Figure 4 Dams

The dams on the property are shown in Figure 4.

There are three dams on the site. The one closest to the N2 was overgrown with emerging and submerged vegetation, suggesting that this is ideal habitat for the SANBI listed aquatic species. This was during the site visit on 22 May 2023. The dam seemed to be dry on the Google Earth Image dated 28 November 2022. Many aquatic organisms can cope with temporary dry conditions. Dry conditions do not rule out viable aquatic habitat.

There is another small dam next to the N2. During the site visits, a number of geese made this dam their home. This dam does not constitute ideal aquatic habitat for the listed aquatic species.

Neither does the large dam on the property. This dam is there for the ambiance of the restaurant and surrounds as well as for irrigation. Dam No. 3 (Figure 7) is the largest of the three dams and is the one that triggered the Pre-Compliance Notice. It has a surface area of only 2100m² and a volume of 3150m³. This is an instream dam.

There was little emerging vegetation during the site visit and the varying water level probably leaves the habitat too aggressive for many aquatic organisms.

Nevertheless, if any part of the proposed charging station is less than 100m away from any of these dams, authorisation is required from the DWS.



Figure 5 Dam No.1



Figure 6 Dam No. 2



Figure 7 Dam No. 3

There is no pump on Dam No.3. The water is only there to create a sense of place, for the tourist industry, for recreational purposes. The garden is watered out of a borehole, not out of the dam.



Figure 8 Piesang River

The dams on the Shabby Fufu property get their water mostly from the N2 highway runoff. This runoff flows into Dam No. 2 (Figure 6). When it overflows, water runs down the decline into the larger dam (Dam No. 3, Figure 7). The original drainage line was radically modified when the N2 highway and the dams were constructed, with an entirely new flow path.

Overflow out of Dam No.3 flows further down the incline, mostly along a farm road, then into a valley and finally into the Piesang River 1.7km downstream.

There is no natural riparian vegetation left on the banks of the dams or along the flow path. There are still some natural elements between Dam No.1 and the N2 road reserve.

The Piesang River (Figure 8) is a small coastal river that rises in the Tsitsikamma Forest to the south of the N2 highway on an elevation of 268masl. This is one of several small rivers that rise to the south of the Tsitsikamma Mountains that end up in the Indian Ocean. The Piesang River is 19.2km long and enters the ocean through a small, mostly closed estuary at in Plettenberg Bay at the Beacon Isle Hotel, a very well-known landmark. The estuary is a centrepiece for tourism.

The Piesang River runs for most of its length over developed and partly developed land, with patches of the original forest still intact. Farm dams dot the area, with a bigger instream dam just to the west of Plettenberg Bay. The river is heavily impacted by rural development and by agriculture. Apart from the Tsitsikamma Forest on the high ground, the land is much disturbed. The riparian sone is mostly black wattle and other invasive vegetation.

7 Conservation Status

7.1 DFFE Screening Tool

Table 1 Screening Tool Results

Theme	Rating
Animal species	Medium
Aquatic biodiversity	Very High
Avian	Low
Plant species.	Low
Terrestrial biodiversity	Very High

Animal Species Theme

The Very High rating for the animal species theme can, among other, be attributed to the possible presence of the Knysna Leaf-folding frog, *Afrivalus knysnae*. It is listed as IUCN Endangered. Plettenberg Bay and surrounds are within its distribution area (De Lange, 2019).

<https://repository.nwu.ac.za/handle/10394/33848>).

Dam No.2, with its lush vegetation, may be a preferred habitat for this species of frog. It is doubtful if Dam No. 1 and Dam No.2 with its barren and aggressive aquatic habitat serve as preferred habitat.

Aquatic Biodiversity Theme

Shabby Fufu is listed as part of a Freshwater Ecosystem Priority Area quinary catchment.

Terrestrial Biodiversity Theme

The Shabby Fufu property is listed on the DFFE screening tool as a FEPA sub-catchment.

It is also listed as a strategic resource area, probably because it serves as a water resource for the city of Plettenberg Bay. It is not in the interest of Plettenberg Bay residents to have more small farm dams in the Piesang River catchment area, as it may deplete their water resource.

7.2 Vegetation

The vegetation on the property is listed as South Outeniqua Sandstone Fynbos. This vegetation type is listed as Vulnerable. None of this vegetation type was observed during the site visit. The land was entirely disturbed and altered.

7.3 Western Cape Biodiversity Spatial Development Plan

The dams and drainage lines on the property are not listed as NFEPA's on the Cape Farm Mapper, in contrast to that of the DFFE screening tool. Not even the Piesang River is listed, except for the dam to the west of Plettenberg Bay.

The drainage line that runs diagonally across the property from Dam No.2 to Dam No.3 and the out of the property down the valley to the Piesang River is listed as an Ecological Support Area, according to the Cape Farm Mapper.

8 Plettenberg Bay Rainfall

https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/plettenberg-bay_south-africa_964712

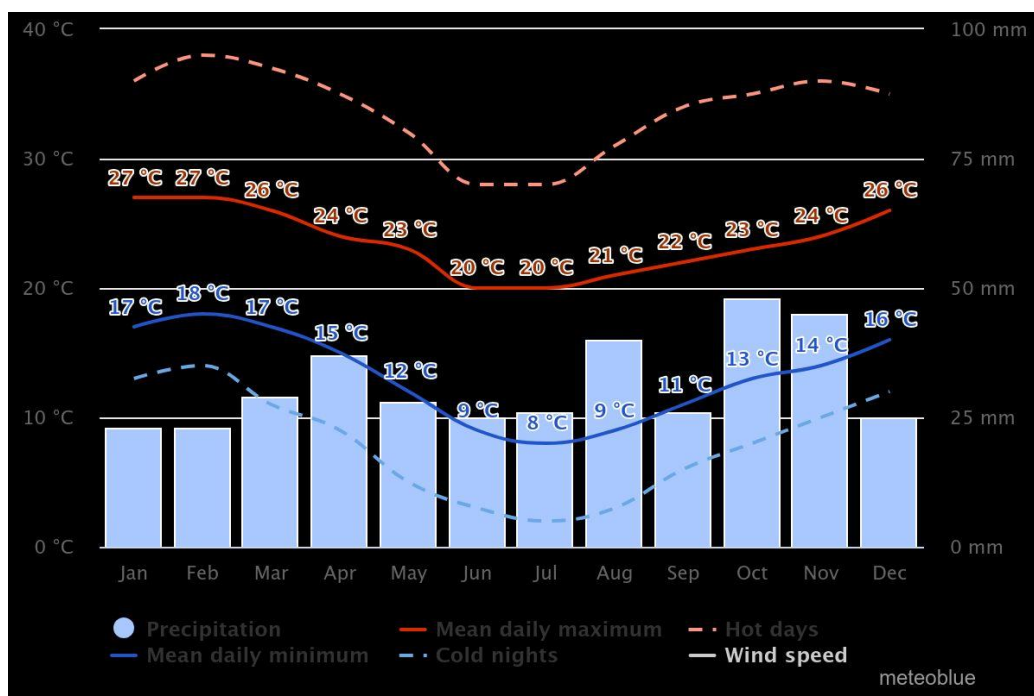


Figure 9 Plettenberg Bay Climate

Plettenberg Bay is the closest location for which online climate data is available. It rains throughout the year, with October and November the wettest months.

The average annual rainfall amounts to 680 mm.

<https://weather-and-climate.com/average-monthly-precipitation-Rainfall,plettenberg-bay,South-Africa>

In recent weeks high rainfall figures were recorded. The close-by Wilderness received 200mm in 48 hours. Knysna received 85mm in 24 hours. These are exceptional conditions with floods and storm damage. The Shabby Fufu site would have been wet, with most of the grounds under water and the dams overflowing.

Likewise, droughts are not uncommon. During dry years, the dam next to the N2 (Dam No.1) dries up. Rainfall is highly variable, with extreme conditions.

9 Present Ecological State

The PES is a protocol that have been produced by Dr Neels Kleynhans in 1999 of the then DWAF to assess river reaches. Another slightly different protocol has been devised for wetlands, very much along the same principles and contents than that of rivers.

The scores given are solely that of the practitioner and are based on expert opinion.

This assessment is meant for natural wetlands. It measures the modifications due to human impact. The three dams on the property are entirely artificial. The methodology must therefore be adapted to suit this new ecology.

Perhaps now it should measure the recovery that has occurred towards a natural state since the dams were constructed. In the case of Dams No. 1 and No.2, the now artificial flow from the N2 should be considered as the new “natural” flow.

The flow now comes mainly from the N2 highway. Only during exceptionally high rainfall events, water covers the property to move down area where the original drainage line use to be to replenish water in Dam No.3.

The swans and geese were rated as alien fauna. The se birds had a profound impact on the aquatic and riparian vegetation in Dam No.1 and 2. If these birds were to be removed, more vegetation would take toot. The scores would be elevated.

Mowing of lawns around the dams were taken as overgrazing.

Table 2 Habitat integrity assessment criteria for palustrine wetlands (DWA, 1999)

Criteria and attributes	Relevance	Dam No.1	Dam No.2	Dam No.3
Hydrology				
Flow modification.	Consequence of abstraction, regulation by impoundments or increased runoff from human settlements or agricultural land. Changes in flow regime (timing, duration, frequency), volumes, velocity which affect inundation of wetland habitats resulting in floristic changes or incorrect cues to biota. Abstraction of groundwater flows to the wetland.	3	2	2
Permanent Inundation	Consequence of impoundment resulting in destruction of natural wetland habitat and cues for wetland biota.	3	2	2
Water Quality				
Water Quality Modification	From point or diffuse sources. Measure directly by laboratory analysis or assessed indirectly from upstream agricultural activities, human settlements and industrial activities. Aggravated by volumetric decrease in flow delivered to the wetland.	2	2	2
Sediment load modification	Consequence of reduction due to entrapment by impoundments or increase due to land use practices such as overgrazing. Cause of unnatural rates of erosion, accretion or infilling of wetlands and change in habitats.	3	2	2
Hydraulic/ Geomorphic				
Canalization	Results in desiccation or changes to inundation patterns of wetland and thus changes in habitats. River diversions or drainage	4	4	4
Topographic Alteration	Consequence of infilling, ploughing, dykes, trampling, bridges, roads, railway lines and other substrate disruptive activity which reduces or changes wetland habitat directly or through changes in inundation patterns.	1	1	1
Biota				
Terrestrial Encroachment	Consequence of desiccation of wetland and encroachment of terrestrial plant species due to changes in hydrology or geomorphology. Change from wetland to terrestrial habitat and loss of wetland functions.	4	1	1
Indigenous Vegetation Removal	Direct destruction of habitat through farming activities, grazing or firewood collection affecting wildlife habitat and flow attenuation functions, organic matter inputs and increases potential for erosion.	3	1	1
Invasive plant encroachment	Affect habitat characteristics through changes in community structure and water quality changes (oxygen reduction and shading).	3	1	1
Alien fauna	Presence of alien fauna affecting faunal community structure.	4	1	1
Over utilisation of biota	Overgrazing, Over-fishing, etc.	4	1	1

Table 3 Scoring guidelines for the habitat integrity assessment for palustrine wetlands (DWAF, 1999).

Guideline	Score
Natural, unmodified	5
Largely natural	4
Moderately modified	3
Largely modified	2
Seriously modified	1
Critically Modified	0
Confidence	
Very high confidence	4
High confidence	3
Moderate confidence	2
Low confidence	1

Table 4 Category's assigned to the scores for wetland habitat assessment (Kleynhans, 1999; DWAF, 1999).

Category	Score	Description
A	>4	Unmodified or approximated natural condition.
B	>4 and ≤3	Largely natural with few modifications, but with some loss of natural habitats.
C	>2 and ≤3	Moderately modified, but with some loss of natural habitats.
D	2	Largely modified with a large loss of natural habitat and ecosystem function
E	>0 and ≤2	Seriously modified with extensive loss of habitat and ecosystem function
F	0	Critically modified with a near-complete loss of natural habitat

Table 5 PES Scores

	Dam No.1	Dam No.2	Dam No.3
Score Category	3 B Largely modified.	1.6 E Seriously modified	1.6 E Seriously modified

Apart from being entirely artificial, Dam No. 1 was assessed as Moderately Modified, with a good measure of ecological functioning.

Dams No.2 and 3 were assessed as seriously modified, with the aquatic and riparian ecological functioning impaired.

Table 6 Habitat Integrity according to Kleynhans, 1999 for the drainage line

Category	Description	% of maximum score
A	Unmodified, natural	90 – 100
B	Largely natural with few modifications. A small change in natural habitats and biota, but the ecosystem function is unchanged	80 – 89
C	Moderately modified. A loss and change of the natural habitat and biota, but the ecosystem function is predominantly unchanged	60 – 79
D	Largely modified. A significant loss of natural habitat, biota and ecosystem function.	40 – 59
E	Extensive modified with loss of habitat, biota and ecosystem function	20 – 39
F	Critically modified with almost complete loss of habitat, biota and ecosystem function. In worse cases ecosystem function has been destroyed and changes are irreversible	0 - 19

The drainage line instream habitat was assessed to be in Class E, critically modified with just about nothing left of the original aquatic ecological functioning.

The riparian vegetation was assessed to be in Class D, largely modified with very little of the original ecological functioning left.

Table 7 Present Ecological State of the Shabby Fufu drainage line

Instream				
	Score	Weight	Product	Maximum score
Water abstraction	5	14	70	350
Flow modification	4	13	52	325
Bed modification	3	13	39	325
Channel modification	4	13	52	325
Water quality	19	14	266	350
Inundation	5	10	50	250
Exotic macrophytes	10	9	90	225
Exotic fauna	8	8	64	200
Solid waste disposal	24	6	144	150
Total		100	827	2500
% of total			33.1	
Class			E	
Riparian				
Water abstraction	4	13	52	325
Inundation	3	11	33	275
Flow modification	4	12	48	300
Water quality	24	13	312	325
Indigenous vegetation removal	2	13	26	325
Exotic vegetation encroachment	8	12	96	300
Bank erosion	24	14	336	350
Channel modification	9	12	108	300
Total			1011	2500
% of total			40.4	
Class			D	

10 Ecological Importance

The Ecological Importance (EI) is based on the presence of especially fish species that are endangered on a local, regional or national level (Table 8).

Table 8 Ecological Importance according to endangered organisms (Kleynhans, 1999).

Category	Description
1	One species or taxon are endangered on a local scale
2	More than one species or taxon are rare or endangered on a local scale
3	More than one species or taxon are rare or endangered on a provincial or regional scale
4	One or more species or taxa are rare or endangered on a national scale (Red Data)

The drainage line was mostly dry in its original condition, like it is now. There were never any fish.

The Piesang River may still have some indigenous fish species. The river is beyond the scope of this WULA.

If there is any fish in the dams, it would probably be exotic fish species.

Dam No. 1, alongside the N2 highway, is important because it may serve as habitat for the endangered Knysna leaf folding frog. The other two dams are not ecologically of similar importance.

11 Ecological Sensitivity

Ecological Sensitivity (ES) is often described as the ability of aquatic habitat to assimilate impacts. It is not sensitive if it remains the same despite of the onslaught of impacts. Put differently, sensitive habitat changes substantially, even under the pressure of slight impacts.

The Ecological Sensitivity also refers to the potential of aquatic habitat to bounce back to an ecological condition closer to the situation prior to human impact. If it recovers, it is not regarded as sensitive.

It is doubtful that the original fynbos would return if all human impacts were removed from Shabby Fufu and surrounds, even with a lot of rehabilitation. The current disturbed situation would remain as long as human habitation persists. From this angle, the ecological sensitivity of the area is rated as high.

12 EISC

Table 9 EISC

	Dam No.1	Dam No.2	Dam No.3	Drainage line
Rare and endangered species	5	0	0	1
Populations of unique species	2	0	0	1
Species / Taxon richness	3	1	1	2
Diversity of habitat	3	1	1	2
Migration Route/ Breeding and feeding site for wetland species.	1	1	1	3
Sensitivity to water quality changes	3	2	3	1
Flood storage, energy dissipation, particulate / element removal.	2	1	4	2
Protection status	3	1	1	3
Ecological integrity	3	1	2	1
Average	2.8	0.9	1.4	1.8
Score	Moderate	Low	Low	Low

Score guideline:
 Very High 4, High 3, Moderate 2, Low 1, None 0
 Confidence Rating
 Very High 4, High 3, Moderate 2, Low 1

The DWS demand that the pan be placed in a category according to the EISC methodology (Table 6). The EISC is one of the essential items that is required for the Risk Matrix.

If ever it is confirmed that the Knysna leaf folding frog indeed occurs at dam No.1, the EISC would immediately rise to Very High.

13 Numerical Significance

Decision-makers often press on a numerical score for Significance, in this event the significance of the impact that the sinking of the new borehole had on the local and regional aquatic environment. This evaluation is an attempt to put a numerical value to an Impact Assessment. The score takes into consideration both the environmental value of the site and the degree of impact.

Table 23.1, p40, Appendix provides a system for allocation values for each of the parameters Conservation Value, Extent, Duration, Severity and Likelihood with regard to possible impacts on the aquatic environment. These values are then entered into the equation on p47 to derive at a value for Significance. The value for Significance can subsequently be evaluated according to Table 23.1.2.

Table 23.1.2 provides a yardstick for decision-making to allow or disallow a development with its concomitant impact on the aquatic environment.

The scores that were given are entirely those of the specialist, based on his or her knowledge and experience. These scores form a bases for debate and consensus, should contemporaries and decision-makers wish to add to the process.

The scores apply under the assumption that mitigation measures will be in place.

Table 10 Significance Score

Parameter	Dam No.1	Dam No.2	Dam No.3	Drainage Line
Conservation value	3	1	1	2
Likelihood	1	1	1	1
Duration	5	5	5	5
Extent	1	1	1	1
Severity	1	1	1	1
Significance	24	8	8	16
	Low	Insignificant	Insignificant	Insignificant

Again, if the Knysna leaf folding frog is detected in Dam No.1, its score would be maximally elevated.

14 Possible Impacts and Mitigating Measures

Dickens *et al* (2003) lists several possible impacts on wetlands. This outline serves as a template for the discussion of the mitigating measures.

Flow modification.

The flow has already been modified with the construction of the N2 highway and the Shabby Fufu dams. This situation is not likely to change. Because of these dams, along with many other farm dams, less water ends up in the Piesang River.

Permanent inundation

The construction of the dams resulted in permanent inundation unless the dams dry out because of droughts. The drainage line and downstream habitat are less inundated because of the dams.

Water quality modification

The N2 highway's runoff is probably polluted with automotive substances. This must end up in the dams. It flows down the drainage line. The extend of this pollution is unknown.

Sediment load modification

It is important not to further disturb the soil in the flow path of what was previously the drainage line. Currently, the area is well vegetated. It must stay like that. Disturbance would lead to further silting up of the Piesang River and the estuary downstream.

Canalization

The opposite of canalisation has occurred on the Shabby Fufu property with the construction of the dams. There is no sign of a drainage line channel on the grounds.

Topographic alteration

The N2 highway and the Shabby Fufu dams have indeed altered topographical features. Where there was once a drainage line coming out of a forest are now farm dams filled with runoff from the N2 highway.

Terrestrial encroachment

The dams are surrounded by lawn and garden plants. The original vegetation has long been replaced. The drainage line at Dam No.2 and further away is heavily overgrown with black wattle and other invasive vegetation.

Indigenous vegetation removal

No indigenous vegetation of special note was noted on the property. It is not foreseen or recommended that a large restoration program must be implemented to regain fynbos on the property.

Invasive vegetation encroachment

The drainage lines in the area and in the district are heavily overgrown with black wattle and other invasive vegetation. It would take a major and coordinated effort to combat further infestation, such a national government funded program. It is recommended that further infestation on the property is prevented and that the existing infestation is removed.

Alien fauna

The alien fauna on the property are the domestic geese and swans on the dams. These serve as an attraction and a feature for the tourist industry. These birds must at all costs be kept out on Dam No.1 as this is viable aquatic habitat.

Over-utilization

The dams are utilised by geese and swans. These seem to be preventing any riparian and emerging vegetation from growing in Dam No.1 and 2. If these dams are going to be designated as aquatic habitat with an elevated importance rating, these birds will have to go. At this stage no such removal is on the cards.

Isolation / Migration

The drainage line is small. The migration route is blocked with alien trees. The dams are isolated ponds of water once part of a larger system. This is not about to change. It is not recommended that dams are returned to a drainage line.

Ground water table.

Dams usually allow water to penetrate the ground and thus to replenish ground water. No doubt that the Shabby Fufu dams elevate groundwater levels in the area, like the other small farm dams.

Waste

Shabby Fufu has ablutions directed at the tourist industry. There was no litter about the place during the site visit. The local authority supports the tourist industry by accepting waste for final disposal.

Some of the authorities, such as the DFFE and its provincial offices prescribe an impact assessment according to a premeditated methodology.

The main benefit of this exercise is that it allows for the evaluation of mitigation measures. Later follows a Risk Assessment. This is different from the Impact Assessment as it does not attempt to weigh the success of mitigation measures.

The methodology is set out in the Appendix.

The impact assessment follows the stages in the life cycle of a project. These stages include planning, construction, operation, decommissioning and rehabilitation.

The impact assessment follows the stages in the life cycle of a project. These stages include planning, construction, operation, decommissioning and rehabilitation.

The planning phase does not have any impact for which a Risk Matrix can be completed, as during this phase nothing is happening on the ground.

In this event, there is no construction phase either. The dams have already been construction.

The only phase that remains to be discussed and assessed is the operational phase.

The focus here, for as long as the tourist destination is in existence, from an aquatic habitat point of view, is to maintain the habitat integrity of Dam No.1 for the Knysna leaf folding frog, to maintain the integrity of the dam walls and to keep the previous flow path of the drainage line intact and not allow further degeneration.

No provision is made for the closure and rehabilitation because it is expected that Shabby Fufu will prevail in the foreseeable future and beyond.

Table 11 Impact Assessment

<p>Description of impact: Operational Phase. Aquatic habitat destruction</p> <p>Possible degradation of Dam No.1 aquatic habitat Possible further degradation of original flow path Possible degradation of dam wall integrity</p> <p>Mitigation measures</p> <p>Keep farm animals out of Dam No.1 Maintain emerging and riparian vegetation. Keep flow path intact. Repair dam walls and spillways when necessary.</p>								
Type Nature	Spatial Extent	Severity	Duration	Significance	Probability	Confidence	Reversibility	Irreplaceability
Without mitigation								
Indirect	Local	Medium	Long term	Medium	Definite	Certain	Reversible	Replaceable
With mitigation measures								
Negative	Local	Low	Long term	Low	Definite	Sure	Reversible	Replaceable

The mitigating measures can easily and readily be implemented. The chances of successful implementation are excellent. The impact assessment does not indicate any prohibition. The project should go ahead.

16 Risk Matrix

The purpose of the Risk Matrix is to determine if a General Authorisation of a License is applicable.

This assessment is based on the new version of the Risk Matrix that was published in February 2024.

The assessment was carried out according to the interactive Excel table that is available on the DWS webpage. Table 12 is a replica of the Excel spreadsheet that has been adapted to fit the format of this report. The numbers in Table 12 (continued) represent the same activities as in the Impact Assessment, with sub-activities added.

The methodology as published on the DWS webpage is duplicated in the Appendix.

Table 12 Risk Matrix

No.	Activity	Aspect	Impact	Significance	Risk Rating
1	Operation Possible degradation of Dam No.1 aquatic habitat Possible further degradation of original flow path Possible degradation of dam wall integrity	Loss of aquatic vegetation	Degradation of aquatic habitat	1.6	Low

Table 12 Continued Risk Matrix

No	Hydrology	Water Quality	Geomorphology	Biota	Vegetation	Fauna	Overall intensity
1	1	1	1	1	1	1	2
2	1	1	1	1	1	1	2

No	Spatial scale	Duration	Severity	Importance	Consequence	Likelihood %	Significance	Risk Rating
1	1	1	4	2	8	20	1.6	Low
2	1	5	8	2	16	20	3.2	Low

The possible environmental risks to the continued Shabby Fufu operation on the existing aquatic habitat are entirely insignificant, according to this Risk Matrix. The only aspect of concern is the aquatic vegetation's preservation in and around Dam No.1.

The Risk matrix indicates that a General Authorisation is the indicated level approval.

Moreover, if a Schedule 1 was possible for a S21(c) and S21(i) WULA was possible in terms of current legislation, the Shabby Fufu operation certainly qualifies. In this event, a WULA would be entirely superfluous. It remains for the DWS to decide if a WULA indeed is called for or if Shabby Fufu should be absconded.

The goods and services delivered by the environment, in this case the Shabby Fufu aquatic habitat, is a Resource Economics concept as adapted by Kotze *et al* (2009).

The diagram (Figure 10) is an accepted manner to visually illustrate the resource economic footprint the drainage line, from the data in Table 13.

Table 13. Goods and Services

Goods & Services	Dam No.1	Dam No.2	Dam No.3	Drainage line
Flood attenuation.	1	1	5	2
Stream flow regulation	1	1	5	2
Sediment trapping	2	2	3	2
Phosphate trapping	2	2	2	1
Nitrate removal.	2	2	2	1
Toxicant removal	2	2	2	1
Erosion control	1	1	5	1
Carbon storage	2	2	2	1
Biodiversity maintenance	3	1	1	1
Water supply for human use	0	0	0	0
Natural resources	0	0	0	0
Cultivated food.	0	0	0	0
Cultural significance	0	0	0	0
Tourism and recreation	5	0	5	0
Education and research	3	0	0	0

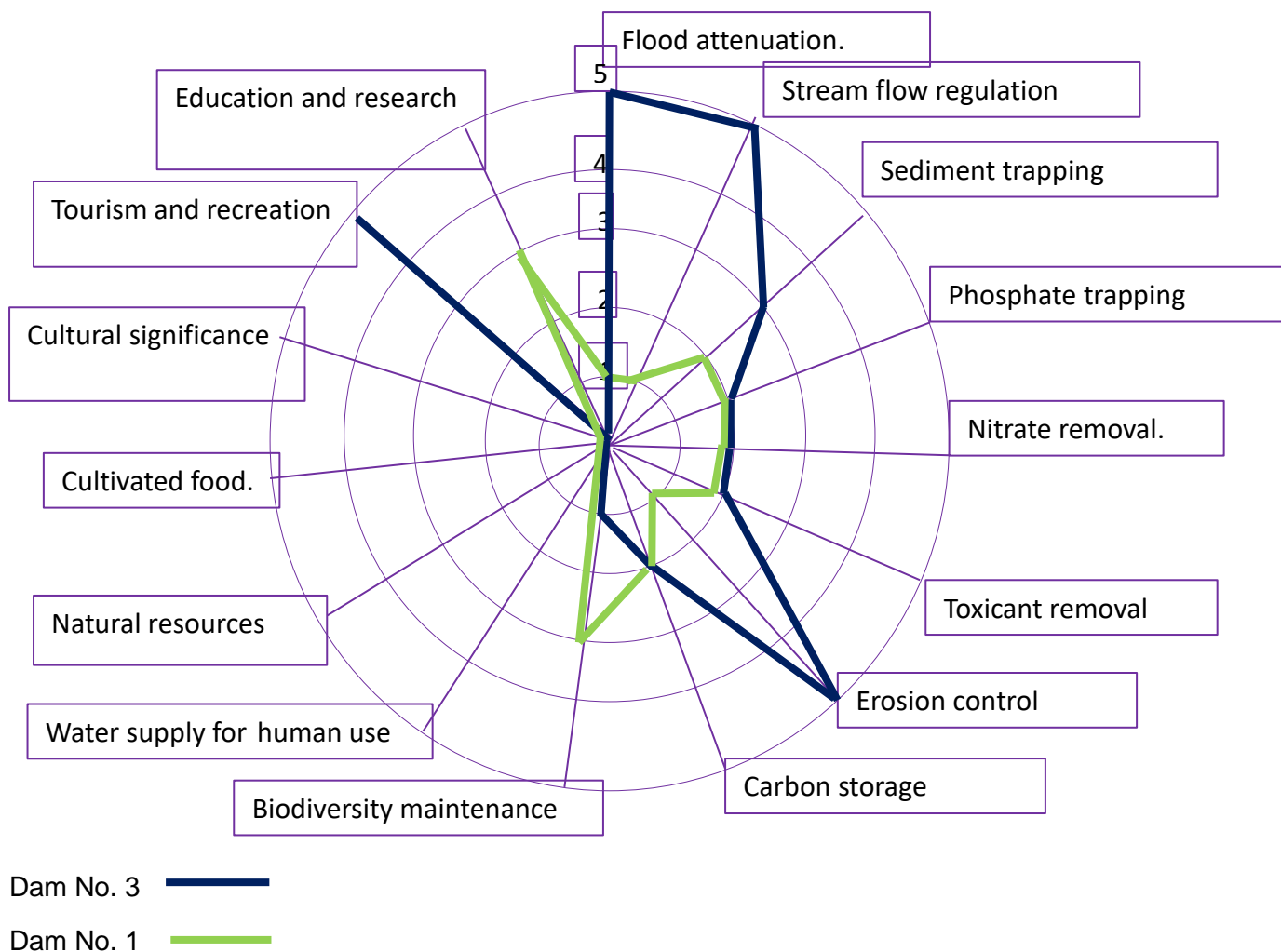


Figure 10. Resource Economics Footprint of Dam No.3

A large resource economics footprint would attract the decision-making authority’s attention.

Dam No. 3 displays a spikey star shape (spider diagram, Figure 10), with contributions towards stream flow regulation, sediment trapping and the tourist industry. The contribution towards the other parameters is insignificant.

Dam No.2 and the drainage line hardly contribute towards anything. The footprint is so small that the drafting of a spider diagram is superfluous.

The star shape for Dam No. 1 is small, insignificant. It draws attention because of its contribution towards biodiversity, because of the possible presence of the Knysna leaf folding frog, its dense stand of aquatic vegetation and the research opportunity it offers.

The footprints are small and would probably not draw much attention.

Shabby Fufu’s continued operation is not about to change any of this, provided that they look after the situation in Dam No.1.

Table 14 Summary of evaluations

Aspect	Status
DFFE Screening Tool Grounds Wetland Vegetation PES Ecological Importance Ecological Sensitivity EISC Impact assessment Risk Matrix Resource Economics	Sensitivity Low, Medium, Very High ESA Not NFEPA Vulnerable B, D, E Not important, apart from leaf folding frog. Sensitive Low Impacts can be mitigated. General Authorization / Schedule 1 Small footprint.

Table 14 gives an overall and much condensed view of the assessments and the methodologies.

The Very High rating in the DFFE screening tool is because of the strategic importance of the water resource to Plettenberg Bay and not because of ecological reasons.

Table 11 does not provide adequate reasons for Shabby Fufu’s operation to be disallowed.

'An anthropogenic activity can impact on any of the ecosystem drivers or responses and this can have a knock-on effect on all the other drivers and responses. This, in turn, will predictably impact on the ecosystem services (Figure 11). The WULA and the EIA must provide mitigation measured for these impacts.'

Figure 11 has been adapted from DWS policy documents.

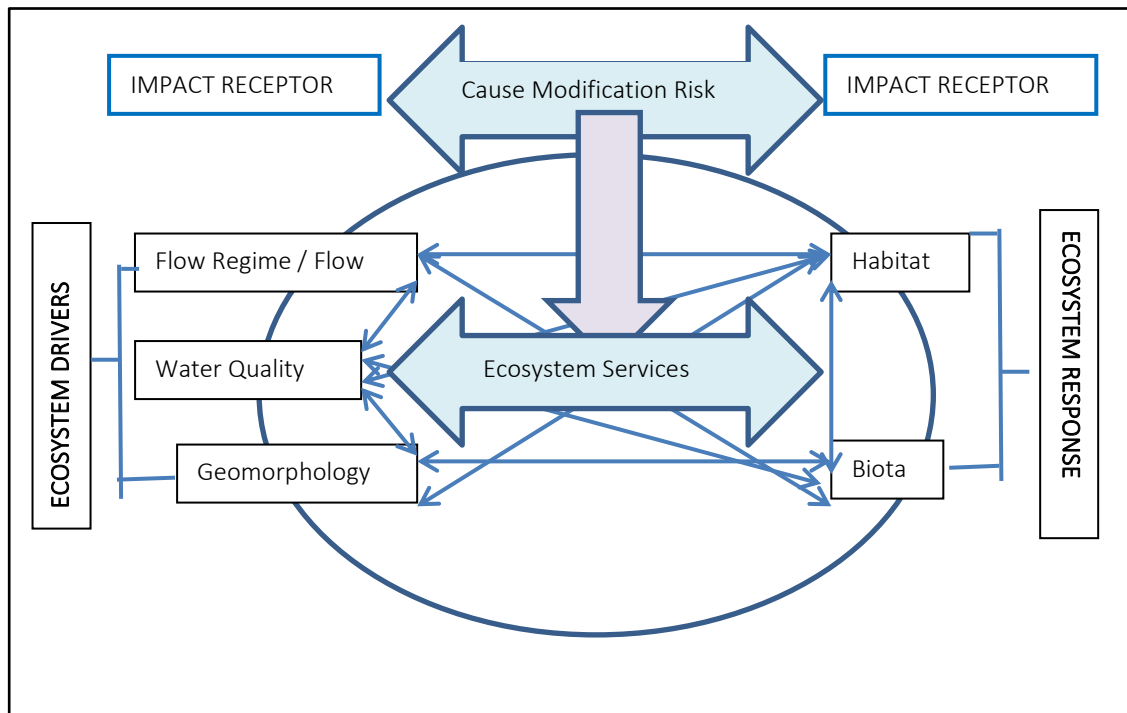


Figure 11 Minimum Requirements for a S21(c) and (i) Application.

The conclusions can be structured along the outline that is provided by Figure 11.

The driver of the original drainage line, the condition prior to human impact, was the rain that fell throughout the year, flowed through the forest and through the fynbos and eventually into the Piesang River. Human impact has changed the flow regime with obliterating the drainage line and with many small farm dams.

A new and altered ecology replaced the original situation. The driving force became human impact. It has been like this for the past millennia. Ecosystem services changed from nature and ecological directed ones to anthropological directed services. Gardening and tourists became the most important issues. Runoff from the N2 highway now is the dominant driver of the aquatic system.

Among these changes, the Knysna leaf folding frog and its remaining habitat must draw attention from the conservation authorities and from landowners alike.

Shabby Fufu is an integral part of the local economy. It is a well-known landmark along the N2. It is here to stay. Its intention to keep the dams intact and not to rehabilitate as per choice left by the Pre-Compliance Notice, is supported. Removal of the dams in a highly altered environment would probably do more damage than doing any good.

The small scale of the current water use does not warrant a WULA and the associated Freshwater Report. If it was allowed under current legislation, a Schedule 1 water use would have been in order, without the need for any further form of official approval. This report is nevertheless necessary to answer to the requirements of the Pre-Compliance Notice and whatever conditions it may produce in future.

It is recommended that the dams on the property remain intact and that Shabby Fufu is allowed to continue its operation.

20 References

Dickens, CWS & PM Graham. 2002. *The South African Scoring System (SASS) Version 5 Rapid Bioassessment*. African Journal of Aquatic Science 2002, 27: 1–10.

Kleynhans, C.J. 1999. *Assessment of Ecological Importance and Sensitivity*. Department of Water Affairs and Forestry. Pretoria.

Kotze, G., G. Marneweck, A. Batchelor, D. Lindley & Nacelle Collins. 2009. *A technique for rapidly assessing ecosystem services supplied by wetlands*. Water Research Commission, Pretoria.

Mucina, L. & M.C Rutherford. 2006. *The vegetation of South Africa, Lesotho and Swaziland*. SANBI, Pretoria.

Rountree, M., A. L. Batchelor, J. MacKenzie and D. Hoare. 2008. *Updated Manual for the Identification and Delineation of Wetlands and Riparian Areas*. Department of Water Affairs and Forestry, Pretoria.

21 Declaration of Independence

I, Dirk van Driel, as the appointed independent specialist hereby declare that I:

- Act/ed as the independent specialist in this application
- Regard the information contained in this report as it relates to my specialist input/study to be true and correct and;
- Do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management act;
- Have and will not have vested interest in the proposed activity;
- Have disclosed to the applicant, EAP and competent authority any material information have or may have to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the environmental Impact Assessment Regulations, 2010 and any specific environmental management act.
- Am fully aware and meet the responsibilities in terms of the NEMA, the Environmental Impacts Assessment Regulations, 2010 (specifically in terms of regulation 17 of GN No. R543) and any specific environmental management act and that failure to comply with these requirements may constitute and result in disqualification;
- Have ensured that information containing all relevant facts on respect of the specialist input / study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties facilitated in such a manner that all interested and affected parties were provided with reasonable opportunity to participate and to provide comments on the specialist input / study;
- Have ensured that all the comments of all the interested and affected parties on the specialist input were considered, recorded and submitted to the competent authority in respect of the application;
- Have ensured that the names of all the interested and affected parties that participated in terms of the specialist input / study were recorded in the register of interested and affected parties who participated in the public participation process;
- Have provided the competent authority with access to all information at my disposal regarding the application, weather such information is favourable or not and;
- Am aware that a false declaration is an offence in terms of regulation 71 of GN No. R543.

Signature of the specialist:



26 April 202

Dr Dirk van Driel
 PhD, MBA, PrSciNat, MWISA
Water Scientist

PO Box 681
 Melkbosstrand 7437
saligna2030@gmail.com
 079 333 5800 / 022 492 2102

Experience

- | | |
|--|--------------------|
| USAID/RTI, ICMA & Chemonics. Iraq & Afghanistan
Program manager. | 2007 -2011 |
| City of Cape Town
Acting Head: Scientific Services, Manager: Hydrobiology. | 1999-2007 |
| Department of Water & Sanitation, South Africa
Senior Scientist | 1989 – 1999 |
| Tshwane University of Technology, Pretoria
Head of Department | 1979 – 1998 |
| University of Western Cape and Stellenbosch University 1994 - 1998 part-time | |
| - Lectured post-graduate courses in Water Management and Environmental Management to under-graduate civil engineering students | |
| - Served as external dissertation and thesis examiner | |

Service Positions

- Project Leader, initiator, member and participator: Water Research Commission (WRC), Pretoria.
 - Director: UNESCO West Coast Biosphere, South Africa
- Director (Past Deputy Chairperson): Grotto Bay Homeowner's Association
 - Past Member Dassen Island Protected Area Association (PAAC)

Membership of Professional Societies

- South African Council for Scientific Professions. Registered Scientist No. 400041/96
 - Water Institute of South Africa. Member

Reports

- Process Review Kathu Wastewater Treatment Works
- Effluent Irrigation Report Tydstroom Abattoir Durbanville
- River Rehabilitation Report Slangkop Farm, Yzerfontein
- Fresh Water and Estuary Report Erf 77 Elands Bay
- Ground Water Revision, Moorreesburg Cemetery
- Fresh Water Report Delaire Graff Estate, Stellenbosch
- Fresh Water Report Quantum Foods (Pty) Ltd. Moredou Poultry Farm, Tulbagh
- Fresh Water Report Revision, De Hoop Development, Malmesbury
- Fresh Water Report, Idas Valley Development Erf 10866, Stellenbosch
- Wetland Delineation Idas Valley Development Erf 10866, Stellenbosch
- Fresh Water Report, Idas Valley Development Erf 11330, Stellenbosch
- Fresh Water Report, La Motte Development, Franschhoek
- Ground Water Peer Review, Elandsfontein Exploration & Mining
- Fresh Water Report Woodlands Sand Mine Malmesbury
- Fresh Water Report Brakke Kuyl Sand Mine, Cape Town
- Wetland Delineation, Ingwe Housing Development, Somerset West
- Fresh Water Report, Suurbraak Wastewater Treatment Works, Swellendam
- Wetland Delineation, Zandbergfontein Sand Mine, Robertson
- Storm Water Management Plan, Smalblaar Quarry, Rawsonville
- Storm Water Management Plan, Riverside Quarry
- Water Quality Irrigation Dams Report, Langebaan Country Estate
- Wetland Delineation Farm Eenzaamheid, Langebaan
- Wetland Delineation Erf 599, Betty's Bay
- Technical Report Bloodhound Land Speed Record, Hakskeenpan
- Technical Report Harkerville Sand Mine, Plettenberg Bay
- Technical Report Doring Rivier Sand Mine, Vanrhynsdorp
- Rehabilitation Plan Roedfontein Dam, Plettenberg Bay
- Technical Report Groenvlei Crusher, Worcester
- Technical Report Wiedouw Sand Mine, Vanrhynsdorp
- Technical Report Lair Trust Farm, Augrabies
- Technical Report Schouwtoneel Sand Mine, Vredenburg
- Technical Report Waboomsrivier Weir Wolseley
- Technical Report Doornkraal Sand Mine Malmesbury
- Technical Report Berg-en-Dal Sand Mine Malmesbury
- Wetland Demarcation, Osdrif Farm, Worcester
- Technical Report Driefontein Dam, Farm Agterfontein, Ceres
- Technical Report Oewerzicht Farm Dam, Greyton
- Technical Report Glen Lossie Sand Mine, Malmesbury
- Preliminary Report Stellenbosch Cemeteries
- Technical Report Toeka & Harmony Dams, Houdenbek Farm, Koue Bokkeveld
- Technical Report Kluitjieskraal Sand & Gravel Mine, Swellendam
- Fresh Water Report Urban Development Witteklip Vredenburg
- Fresh Water Report Groblershoop Resort, Northern Cape
- Fresh Water Report CA Bruwer Quarry Kakamas, Northern Cape
- Fresh Water Report, CA Bruwer Sand Mine, Kakamas, Northern Cape
- Fresh Water Report, Triple D Farms, Agri Development, Kakamas
- Fresh Water Report, Keren Energy Photovoltaic Plant Kakamas
- Fresh Water Report, Keren Energy Photovoltaic Plant Hopetown
- Fresh Water Report Hopetown Sewer
- Fresh Water Report Hoogland Farm Agricultural Development, Touws River

- Fresh Water Report Klaarstroom Wastewater Treatment Works
- Fresh Water Report Calvinia Sports Grounds Irrigation
- Fresh Water Report CA Bruwer Agricultural Development Kakamas
- Fresh Water Report Zwartfontein Farm Dam, Hermon
- Statement Delsma Farm Wetland, Hermon
- Fresh Water Report Lemoenshoek Farms Pipelines Bonnyvale
- Fresh Water Report Water Provision Pipeline Brandvlei
- Fresh Water Report Erf 19992 Upington
- Botanical Report Zwartejongensfontein Sand Mine, Stilbaai
- Fresh Water Report CA Bruwer Feldspath Mine, Kakamas
- Sediment Yield Calculation, Kenhardt Sand Mine
- Wetland Demarcation, Grabouw Traffic Center
- Fresh Water Report, Osdrift Sand Mine, Worcester
- Fresh Water Report, Muggievlak Storm Water Canal, Vredenburg
- Fresh Water Report, Marksman's Nest Rifle Range, Malmesbury
- Biodiversity Report, Muggievlak Storm Water Canal, Vredenburg
- Strategic Planning Report, Sanitation, Afghanistan Government, New Delhi, India
- Fresh Water Report, Potable Water Pipeline, Komaggas
- Fresh Water Report, Wastewater Treatment Works, Kamieskroon
- Fresh Water Report, Turksvy Farm Dam, Upington
- Fresh Water Report, Groblershoop Urban Development, IKheis Municipality
- Fresh Water Report, Boegoeberg Urban Development, IKheis Municipality
- Fresh Water Report, Opwag Urban Development, IKheis Municipality
- Fresh Water Report, Wegdraai Urban Development, IKheis Municipality
- Fresh Water Report, Topline Urban Development, IKheis Municipality
- Fresh Water Report, Grootdrink Urban Development, IKheis Municipality
- Fresh Water Report, Gariiep Urban Development, IKheis Municipality
- Fresh Water Report, Bonathaba Farm Dam, Hermon
- Botanical Report, Sand Mine Greystone Trading, Vredendal
- Botanical Report Namakwa Klei Stene, Klawer
- Fresh Water Report Buffelsdrift Quarry, George
- Fresh Water Report Styerkraal Agricultural Development, Onseepkans.
- Technical Report Arabella Country Estate Wastewater Treatment Works, Kleinmond
- Fresh Water Report Calvinia Bulk Water Supply
- Fresh Water Report Swartdam Farm Dams, Riebeeck Kasteel
- Fresh Water Report Erf 46959, Gordon's Bay
- Fresh Water Report Melkboom Farm Dam, Trawal
- Stormwater Management Plan, Bot River Bricks
- Freshwater Report, Bot River Bricks
- Freshwater Report Sanddrif Farm, Joubertina
- Freshwater Report Zouterivier Cell phone tower, Atlantis
- Biodiversity Report Birdfield Sandmine, Klawer
- Freshwater Report New Wave Dam, Klawer
- Freshwater Report Harvard Solar Energy Plant, Bloemfontein
- Freshwater Report Doorn River Solar Energy Plant, Virginia
- Freshwater Report Kleingeluk Farm, De Rust
- Freshwater Report, Solar Energy Plant, Klein Brak River
- Site Verification Report Laaiplek Desalination Plant
- Freshwater Report, CA Bruwer Quarry, Kakamas
- Freshwater Report, Orren Managanese Mine, Swellendam
- Wetland Delineation, Klipheuvel ZCC Solar Energy
- Freshwater Report Delville Park, George
- Freshwater Report Wolseley bulk water pipeline
- Freshwater Report Urban Settlement No.1 Pababello Upington

- Freshwater Report Urban Settlement No.2 Pababello Upington
- Freshwater Report Pringle Rock Distillery, Rooiels
- Freshwater Report De Kuilen Resort, Kamiesberg
- Wetland Delineation, Klipheuvel ZCC Solar Energy
- Freshwater Report Delville Park, George
- Freshwater Report ZCC Akkerboom electric vehicle charging station, Keimoes
- Freshwater Report ZCC Piketberg electric automobile charging station
- Freshwater Report ZCC electric truck charging station Piketberg
- Freshwater Report ZCC electric truck charging station Prince Albert Weg
- Freshwater Report Vleesbaai Wastewater Treatment Works
- Freshwater Report ZCC Brandvlei electric vehicle charging station.
- Site Sensitivity Report desalination plant Velddrif
- Technical Report desalination plant Velddrif
- Freshwater Report Abbotsdale High Voltage Power Line
- Freshwater Report Darling Solar Energy Plan
- Freshwater Report Malmesbury Klipkoppie Solar Energy Plant
- River Rehabilitation Plan Louterwater, Langkloof
- River Rehabilitation Plan Kloof Please Krakeelrivier
- Freshwater Report ZCC Potchefstroom electric automobile charging station.
- Freshwater Report ZCC Kohler electric automobile charging station.
- Freshwater Report SKA Information Centre Carnavon

Table 23.1 Numerical Significance

Table 23.1.1 Conservation Value

<p>Conservation Value</p> <p>Refers to the intrinsic value of the area or its relative importance towards the conservation of an ecosystem or species or even natural aesthetics. Conservation status is based on habitat function, its vulnerability to loss and fragmentation or its value in terms of the protection of habitat or species</p>	<p>Low 1</p> <p>Medium / Low 2</p> <p>Medium 3</p> <p>Medium / High 4</p> <p>High 5</p>	<p>The area is transformed, degraded not sensitive (e.g. Least threatened), with unlikely possibility of species loss.</p> <p>The area is in good condition but not sensitive (e.g. Least threatened), with unlikely possibility of species loss.</p> <p>The area is in good condition, considered vulnerable (threatened), or falls within an ecological support area or a critical biodiversity area, but with unlikely possibility of species loss.</p> <p>The area is considered endangered or, falls within an ecological support area or a critical biodiversity area, or provides core habitat for endemic or rare & endangered species.</p> <p>The area is considered critically endangered or is part of a proclaimed provincial or national protected area.</p>
--	---	---

Table 23.1.2 Significance

Significance	Score	Description
Insignificant	4 - 22	There is no impact or the impact is insignificant in scale or magnitude as a result of low sensitivity to change or low intrinsic value of the site.
Low	23 - 36	An impact barely noticeable in scale or magnitude as a result of low sensitivity to change or low intrinsic value of the site, or will be of very short-term or is unlikely to occur. Impact is unlikely to have any real effect and no or little mitigation is required.
Medium / Low	37 - 45	Impact is of a low order and therefore likely to have little real effect. Mitigation is either easily achieved. Impacts may have medium to short term effects on the natural environment within site boundaries.
Medium	46 - 55	Impact is real, but not substantial. Mitigation is both feasible and fairly easily possible, but may require modification of the project design or layout. These impacts will usually result in medium to long term effect on the natural environment, within site boundary.
Medium High	56 - 63	Impact is real, substantial and undesirable, but mitigation is feasible. Modification of the project design or layout may be required. These impacts will usually result in medium to long-term effect on the natural environment, beyond site boundary within local area.
High	64 - 79	An impact of high order. Mitigation is difficult, expensive, time-consuming or some combination of these. These impacts will usually result in long-term change to the natural environment, beyond site boundaries, regional or widespread.
Unacceptable	80 - 100	An impact of the highest order possible. There is no possible mitigation that could offset the impact. The impact will result in permanent change. Very often these impacts cannot be mitigated and usually result in very severe effects, beyond site boundaries, national or international.

Table 23.1.3 Scoring system

Parameter	1	2	3	4	5
Conservation value	Low	Medium /Low	Medium	Medium / High	High
Likelihood	Unlikely	Possible	More possible	Probable	Definite
Duration	Temporary	Short term	Medium term	Long term	Permanent
Extent	Site specific	Local	Regional	National	International
Severity	Zero	Very low	Low	Medium	High

Significance = Conservation value (Likelihood + Duration + Extent + Severity)

23.2 Methodology used in determining significance of impacts.

The methodology to be used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives is provided in the following tables:

Table 23.2.1 Nature and type of impact

Nature and type of impact	Description
Positive	An impact that is considered to represent an improvement to the baseline conditions or represents a positive change
Negative	An impact that is considered to represent an adverse change from the baseline or introduces a new negative factor
Direct	Impacts that result from the direct interaction between a planned project activity and the receiving environment / receptors
Indirect	Impacts that result from other activities that could take place as a consequence of the project (e.g. an influx of work seekers)
Cumulative	Impacts that act together with other impacts (including those from concurrent or planned future activities) to affect the same resources and / or receptors as the project

Table 23.2.2 Criteria for the assessment of impacts

Criteria	Rating	Description
Spatial extent of impact	National	Impacts that affect nationally important environmental resources or affect an area that is nationally important or have macro-economic consequences.
	Regional	Impacts that affect regionally important environmental resources or are experienced on a regional scale as determined by administrative boundaries or habitat type / ecosystems.
	Local	Within 2 km of the site
	Site specific	On site or within 100m of the site boundary
Consequence of impact/ Magnitude/ Severity	High	Natural and / or social functions and / or processes are severely altered.
	Medium	Natural and / or social functions and / or processes are notably altered.
	Low	Natural and / or social functions and / or processes are slightly altered.
	Very Low	Natural and / or social functions and / or processes are negligibly altered.
	Zero	Natural and / or social functions and / or processes remain unaltered.
Duration of impact	Temporary	Impacts of short duration and /or occasional
	Short term	During the construction period
	Medium term	During part or all of the operational phase
	Long term	Beyond the operational phase, but not permanently
	Permanent	Mitigation will not occur in such a way or in such a time span that the impact can be considered transient (irreversible)

Table 26.2.3 Significance Rating

Significance Rating	Description
High	<p>High consequence with a regional extent and long-term duration</p> <p>High consequence with either a regional extent and medium-term duration or a local extent and long-term duration</p> <p>Medium consequence with a regional extent and a long-term duration</p>
Medium	<p>High with a local extent and medium-term duration</p> <p>High consequence with a regional extent and short-term duration or a site-specific extent and long-term duration</p> <p>High consequence with either local extent and short-term duration or a site-specific extent with a medium-term duration</p> <p>Medium consequence with any combination of extent and duration except site-specific and short-term or regional and long term</p> <p>Low consequence with a regional extent and long-term duration</p>
Low	<p>High consequence with a site-specific extent and short-term duration</p> <p>Medium consequence with a site-specific extent and short-term duration</p> <p>Low consequence with any combination of extent and duration except site-specific and short-term</p> <p>Very low consequence with a regional extent and long-term duration</p>
Very low	<p>Low consequence with a site-specific extent and short-term duration</p> <p>Very low consequence with any combination of extent and duration except regional and long term</p>
Neutral	<p>Zero consequence with any combination of extent and duration</p>

Table 26.2.4 Probability, confidence, reversibility and irreplaceability

Criteria	Rating	Description
Probability	Definite	>90% likelihood of the impact occurring
	Probable	70 – 90% likelihood of the impact occurring
	Possible	40 – 70% likelihood of the impact occurring
	Unlikely	<40% likelihood of the impact occurring
Confidence	Certain	Wealth of information on and sound understanding of the environmental factors potentially affecting the impact
	Sure	Reasonable amount of useful information on and relatively sound understanding of the environmental factors potentially influencing the impact
	Unsure	Limited useful information on and understanding of the environmental factors potentially influencing this impact.
Reversibility	Reversible	The impact is reversible within 2 years after the cause or stress is removed.
	Irreversible	The activity will lead to an impact that is in all practical terms permanent.
Irreplaceability	Replaceable	The resources lost can be replaced to a certain degree.
	Irreplaceable	The activity will lead to a permanent loss of resources.

23.3 Risk Matrix Methodology

TABLE 1 – IMPORTANCE OF AFFECTED WATERCOURSE/S	
What is the overall importance of the watercourse/s, based on the criteria and guidelines provided below?*	
(If no formal assessment of EI / EIS / Wetland Importance has been completed, assign rating according to criterion below that results in the highest score)	
<p>Low or Very Low EI / EIS / Wetland Importance rating; QR. If EI/EIS has not been determined, Low rating based on presence of: - no areas identified to be of conservation importance (i.e. OESA at most); and/or - only species/habitats of Least Concern on the IUCN Red List or on a regional/national Red List (including freshwater ecosystem types of Least Concern in terms of the NBA); and/or - only species which are common and widespread and/or habitats of low conservation interest; and/or - highly degraded habitat of extremely small size</p>	Low / Very low = 2
<p>Medium EI / EIS / Wetland Importance rating; QR. If EI/EIS has not been determined, Moderate rating based on presence of: - CESAs; and/or - species/habitats listed as VU or NT on the IUCN Red List or on a regional/national Red List (including VU/NT freshwater ecosystem types in terms of the NBA); and/or - functionality as an important ecological corridor or buffer area</p>	Moderate = 3
<p>High EI / EIS / Wetland Importance rating; QR. If EI/EIS has not been determined, High rating based on presence of: - CBA2; and/or - species or degraded habitats (in poor condition) listed as EN or CR on the IUCN Red List or on a regional/national Red List (including EN/CR freshwater ecosystem types in terms of the NBA)</p>	High = 4
<p>Very high EI / EIS / Wetland Importance rating; QR. If EI/EIS has not been determined, Very high rating based on presence of: -CBA1; and/or - FEPA; and/or - species or intact habitats (in fair or good condition) listed as EN or CR on the IUCN Red List or on a regional/national Red List (including EN/CR freshwater ecosystem types in terms of the NBA); and/or - KBA or IBA or Ramsar site</p>	Very high = 5
<p>* EI=Ecological Importance; EIS=Ecological Importance & Sensitivity; OESA=Other Ecological Support Areas; IUCN=International Union for Conservation of Nature; CESA=Critical Ecological Support Area; NBA=National Biodiversity Assessment; VU=Vulnerable; NT=Near Threatened; EN=Endangered; CR=Critically Endangered; CBA=Critical Biodiversity Area; FEPA=Freshwater Ecosystem Priority Area; KBA=Key Biodiversity Area; IBA=Important Bird Area.</p>	

TABLE 2- INTENSITY OF IMPACT	
What is the intensity of the impact on the resource quality (hydrology, water quality, geomorphology, biota)?	
Negative Impacts	
Negligible / non-harmful; no change in PES	0
Very low / potentially harmful; negligible deterioration in PES (<5% change)	+1
Low / slightly harmful; minor deterioration in PES (<10% change)	+2
Medium / moderately harmful; moderate deterioration in PES (>10% change)	+3
High / severely harmful; large deterioration in PES (by one class or more)	+4
Very high / critically harmful; critical deterioration in PES (to E/F or F class)	+5
Positive Impacts	
Negligible; no change in PES	0
Very low / potentially beneficial; negligible improvement in PES (<5% change)	-1
Low / slightly beneficial; minor improvement in PES (<10% change)	-2
Medium / moderately beneficial; moderate improvement in PES (>10% change)	-3
Highly beneficial; large improvement in PES (by one class or more) and/or increase in protection status	-4
Very highly beneficial; improvement to near-natural state (A or A/B class) and/or major increase in protection status	-5
NOTE: Positive Impacts must be given a negative Intensity Score	
*PES of affected watercourses must be considered when scoring Impact Intensity	

TABLE 3 – SPATIAL SCALE (EXTENT) OF IMPACT	
How big is the area that the activity is impacting on, relative to the size of the impacted watercourses?	
Very small portion of watercourse/s impacted (<10% of extent)	1
Moderate portion of watercourse/s impacted (10-60% of extent)	2
Large portion of watercourse/s impacted (60-80%)	3
Most or all of watercourse/s impacted (>80%)	4
Impacts extend into watercourses located well beyond the footprint of the activities	5

TABLE 4 – DURATION OF IMPACT	
How long does the activity impact on the resource quality?	
Transient (One day to one month)	1
Short-term (a few months to 5 years) OR repeated infrequently (e.g. annually) for one day to one month	2
Medium-term (5 – 15 years)	3
Long-term (ceases with operational life)	4
Permanent	5

TABLE 5 – LIKELIHOOD OF THE IMPACT	
What is the probability that the activity will impact on the resource quality?	
Improbable / Unlikely	20%
Low probability	40%
Medium probability	60%
Highly probable	80%
Definite / Unknown	100%

TABLE 6: RISK RATING CLASSES		
RATING	CLASS	MANAGEMENT DESCRIPTION
1 – 29	(L) Low Risk OR (+) Positive (+ +) Highly positive	Acceptable as is or with proposed mitigation measures. Impact to watercourses and resource quality small and easily mitigated, or positive.
30 – 60	(M) Moderate Risk	Risk and impact on watercourses are notable and require mitigation measures on a higher level, which costs more and require specialist input. Licence required.
61 – 100	(H) High Risk	Watercourse(s) impacts by the activity are such that they impose a long-term threat on a large scale and lowering of the Reserve. Licence required.

A low risk class must be obtained for all activities to be considered for a GA

TABLE 7: CALCULATIONS AND MAXIMUM VALUES	
Intensity = Maximum Intensity Score (negative value for positive impact) X 2	MAX = 10
Severity = Intensity + Spatial Scale + Duration (<Intensity - Spatial Scale - Duration> for positive impact)	MAX = 20 (MIN = -20 for +ve impacts)
Consequence = Severity X Importance rating	MAX = 100
Significance/Risk = Consequence X (Likelihood / 100)	MAX = 100