



Freshwater Report
for the enlargement of the
Helpmekaar Dam
on the Farm Rietrivier 202 Ceres

A requirement of Section 21(c) and (i) of the National Water Act (36 of 1998)

October 2025



Executive Summary

The owners of the Portion 5 of the Farm Rietfontein 202, Ceres, the Gibson family, want to increase the holding capacity of a dam on the property by elevating the height of the dam wall. In conjunction, a balancing dam must be constructed on the neighbouring property. This property is owned and farmed by the Gibsons as well. The two dams must be connect to one another with a pipeline. The additional holding capacity must be integrated into the farming enterprise's overall irrigation system.

Mr Charl Bester of Bester Engineers in Ceres was appointed to produce drawings of the proposed dams.

In terms of the National Environmental Management Act (107 of 1998), an Environmental Impact Assessment must be submitted for official approval. Enviro Africa in Somerset West was appointed to undertake the assessment, draft the required documents and submit the application to the provincial government Department of Environmental Affairs and Development Planning.

Likewise, WATSAN Africa of Knysna was appointed to produce a Freshwater Report to support the legally required Water Use License Application in terms of the National Water Act (36 of 1998). This report must contain prescribed assessments such as an completed Risk Matrix, compiled and signed by a registered scientist. The report must contain adequate information for officials to make an informed decision.

The assessment indicated that the new water storage capacity can be authorised with a General Authorisation.

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Abbreviations

Basic Assessment Report	BAR
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 Assessment Practitioner	EAP
Environmental Control Officer	ECO
Environmental Impact Assessment	EIA
Environmental Management Programme	EMPr
Electronic Water Use License Application (on-line)	eWULAAS
Government Notice	GN
Metres Above Sea Level	masl
Interested and Affected Parties	I&AP's
International Union for the Conservation of Nature	IUCN
National Environmental Management Act (107 of 1998)	NEMA
National Freshwater Environment Priority Area	NFEPA
National Water Act (36 of 1998)	NWA
Mean Annual Runoff	MAR
Present Ecological State	PES
Section of an Act of Parliament	S
South African Council of Natural Scientific Professions	SACNASP
South Africa National Biodiversity Institute	SANBI
Water Use License Application	WULA

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1 Introduction

The owners of the Farm Rietfontein in the Koue Bokkeveld to the north of Ceres in the Western Cape, the Gibson family, plans to raise the dam wall of one of their dams on the property. This dam is named the Helpmekaar Dam. It would allow for the abstraction of an additional 410 000m³ of water from the upper reach of the Leeu River. This would enable the farming operation to develop 45 hectares of annual cash crops into permanent crops. In addition, a smaller dam is envisaged on the next-door property, the Farm Kromfontein. This is a balancing dam that would be an integral part of the irrigation system on the farming operation. The dams must be connected by a 1.7km long pipeline.

The main crops on the farm apples for the export and the local market. This is a state-of-the-art farming establishment on a mega scale, exceptionally well-managed to answer to the rigorous demands of the export market and its discerning clientele. The workforce of local people follows the production cycle, with many hundreds that found a livelihood on Rietfontein and its associated undertakings.

Mr Jonathan Gibson, a director of Sterkwater Farming, the operation arm of the farming operation of Rietfontein and adjacent properties, appointed Mr Charl Bester of Bester Consulting Engineers in Ceres to design the envisaged dams. A feasibility report was procured.

Enviro Africa of Somerset West was appointed to undertake the legally required EIA in terms of the NEMA. The public participation process as part of the EIA is currently underway (Figure 1).

Likewise, WATSAN Africa was appointed to produce the Freshwater Report that is required for the WULA in terms of the NWA.

The WULA must include a completed Risk Matrix, signed by a registered scientist. The outcome of the Risk Matrix assessment indicates if a General Authorisation or a License is the correct level of authorisation.

The values added to the Risk Matrix must be motivated and supported by this Freshwater Report. This report must contain standardised assessments and must follow a premeditated contents and lay-out. The Freshwater Report must contain adequate information for the DWS officials and decision-makers to make an informed decision.

This Freshwater Report contains specific information and assessments pertaining to the EIA as well.

THE PROPOSED ENLARGEMENT OF LANGRUG-BOONSTE NR1 DAM, ALSO KNOWN AS HELPMEKAAR DAM, CONSTRUCTION OF A NEW BUFFER DAM AND ASSOCIATED INFRASTRUCTURE, ON PORTION 5 OF FARM RIETRIVIER 202, CERES, WESTERN CAPE

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). The proposed enlargement of Langrug-Boonste Nr1 dam, also known as Helpmekeer Dam, and the construction of a new buffer dam and associated infrastructure includes activities listed in terms of the NEMA EIA Regulations 2014.

EnviroAfrica cc has been appointed by Sterkwater Boerdery to undertake the new NEMA application process for Environmental Authorisation.

Application for environmental authorisation to undertake the following activities:

- Government Notice R327 (Listing Notice 1): Activity No. 09, 12, 19, 27, 48, 66
- Government Notice R325 (Listing Notice 2): Activity No. 15, 16
- Government Notice R324 (Listing Notice 3): Activity No. 12, 14, 23

Application in terms of NWA: Sections 21 a, 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 proposed development entails the enlargement of Langrug-Boonste Nr1 dam, also known as Helpmekeer dam, from a storage capacity of about 390 000m³ to a total capacity of 800 000m³, and the construction of a new buffer dam and its accompanying approximately 2km connecting pipeline. An additional 410000m³ surface water will be extracted directly from the upper tributaries of the Leeu River. The proposed dam development will allow Sterkwater Boerdery to convert approximately 45ha annual cash crops into permanent fruit orchards. The site is located on Portion 5 of Farm Rietriver No. 202, Ceres, approximately 10km north of Die Dorp op die Berg along the R303. Approximate site co-ordinates:

Langrug-boonste Nr1 dam (Helpmekeer dam): 32° 55' 03.60" S, 19° 14' 12.90" E
 Buffer Dam: 32° 55' 39.10" S, 19° 15' 02.30" E
 Connecting pipeline: 32° 55' 03.17" S, 19° 14' 16.41" E (start) 32° 55' 37.87" S, 19° 14' 55.00" E (end)

Public Participation: Interested and Affected Parties (I&APs) are hereby notified of the applications and invited to register (in writing) and/or provide initial comments and identify any issues, concerns or opportunities relating to either, or all of, the projects to the contact details provided below, on or before **23 October 2025** in terms of the environmental aspects (NEMA Application) and on or before **24 November 2025** for water related issues (NWA application). In order to register or submit comment, I&APs should refer to the project name/s, 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. 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 that an appeal may be lodged against a decision; and will be notified of the applicant's intention to appeal the decision, and where and for what period the appeal submission will be available for inspection.

Consultant: EnviroAfrica cc / E-mail: bianca@enviroafrica.co.za / Tel: 021 8511616 / Postnet Suite 341, Private Bag X29 Somerset West, 7129

By registering as an I&AP, you hereby give EnviroAfrica cc the permission to circulate your name and contact details to the relevant stakeholders as stated, per statutory requirements, in line with the Protection of Personal Information (POPI) Act No. 4 of 2013 (as amended), unless otherwise informed, in writing to us. Note: A full list of registered I&APs, as well as all correspondence with I&APs, will be submitted to the competent authority.

THE PROPOSED ENLARGEMENT OF LANGRUG-BOONSTE NR1 DAM, ALSO KNOWN AS HELPMEKAAR DAM, CONSTRUCTION OF A NEW BUFFER DAM AND ASSOCIATED INFRASTRUCTURE, PORTION 5 ON FARM RIETRIVIER 202, CERES



SITE CO-ORDINATES: (approximate centre points)

Langrug-boonste Nr1 dam:
 32° 55' 03.60" S,
 19° 14' 12.90" E
 Buffer Dam:
 32° 55' 39.10" S,
 19° 15' 02.30" E
 Connecting pipeline:
 32° 55' 03.17" S,
 19° 14' 16.41" E
 (approximate start)
 32° 55' 37.87" S,
 19° 14' 55.00" E
 (approximate end)

- Langrug-boonste Nr1 dam
- Buffer Dam
- Connecting pipeline

ENVIROAFRICA
September 2025

Figure 1 Public Participation

2 Methodology

A site visit is mandatory. The site visit along with the estate manager was conducted on 9 October 2025.

This report contains a:

- Description of the project.
- Description of the aquatic habitat.
- Selected assessments such as:
 - Present Ecological Status
 - Ecological Importance
 - Ecological Sensitivity
 - Ecological Importance and Sensitivity Class (EISC)
 - Significance (dubbed Numerical Significance)
 - Impact Assessment
 - Risk Matrix
 - Resource Economics

The Significance assessment and the Impact Assessment are included for the benefit of the EIA and the requirements of the NEMA. The rest of the assessments are for the WULA and the requirements of the NWA.

The methodologies for these assessments are explained in the Appendix. These are conveniently but adequately explained in tables.

The methods solely rest on the knowledge and experience of the assessor. The values and classes assigned are the result of the assessor's insight. The values provide a basis for further discussion and adjustment, should it become necessary.

- Mitigating Measures. Essentially this report contains mitigating measures to address any deleterious impacts on the aquatic environment.
- Recommendations. Finally, the report must make recommendations if the proposed project should be officially authorised or not.

3 Legal Framework

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

S21 (a) Taking water from a water resource.

Water is taken from the Helpmekaar Dam for the irrigation of orchards. The existing authorisation must be adapted if more water is taken from the enlarged Helpmekaar Dam.

S21(b) Storing of water

The existing authorisation must be adapted if the storing capacity is enlarged.

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

The proposed development is on the banks of a river. The river may be altered, should the proposed activity go ahead.

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

The proposed development may alter the characteristics of the river, should it go ahead.

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, followed up and replaced by Government Notice 4167 of 8 December 2023.

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.

The proposed enlargement of the Helpmekaar Dam triggers the National Environmental Management Act, NEMA, 107 of 1998).

The EIA Regulations of 2014 No.1 Activity 12 states that no development may take place within 32m of a water course without the consent of the Department of Environmental Affairs and its provincial representatives.



4 Location

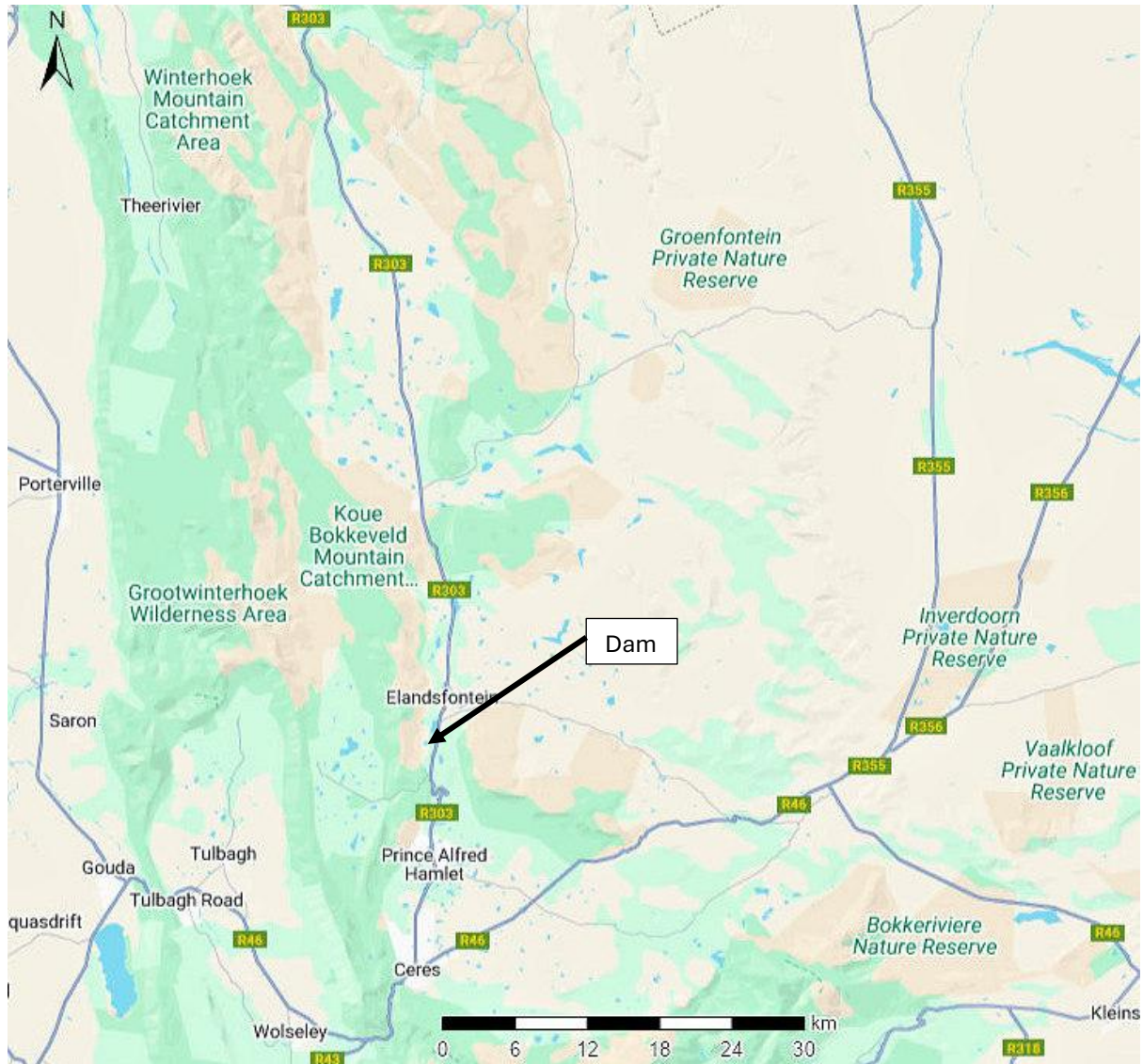


Figure 2 Helpmekaar Dam Location

Helpmekaar Dam is 50 km north of Ceres to the west of the R303 trunk road. From Ceres, drive north through Prince Alfred Hamlet and up the Gydo Pass to Dorp op die Berg. A small signpost indicates “Kliphuis” 8.5km north of Dorp op die Berg. Take the dirt road to the west. Where the road splits, take the left and carry on to the farmhouse. The turnoff from the R303 is at

32°56'31.78S and 19°17'56.44E.

The dam is at

32°55'04.47"S and 19°14'11.22"E

at an elevation of 864masl.

The dirt roads among the farms are intimidating, especially as the cell phone GPS service is not working properly away from the R303. It is best to call the farm manager for directions in case of difficulty finding the dam.

5 Quaternary Catchment

Helpmekaar Dam is in the E21G quaternary catchment

6 Dorp op die Berg Climate

https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/op-die-berg-south-africa_3363273

Op-die-Berg

33.02°S, 19.31°E (966 m asl).
Model: ERA5T.

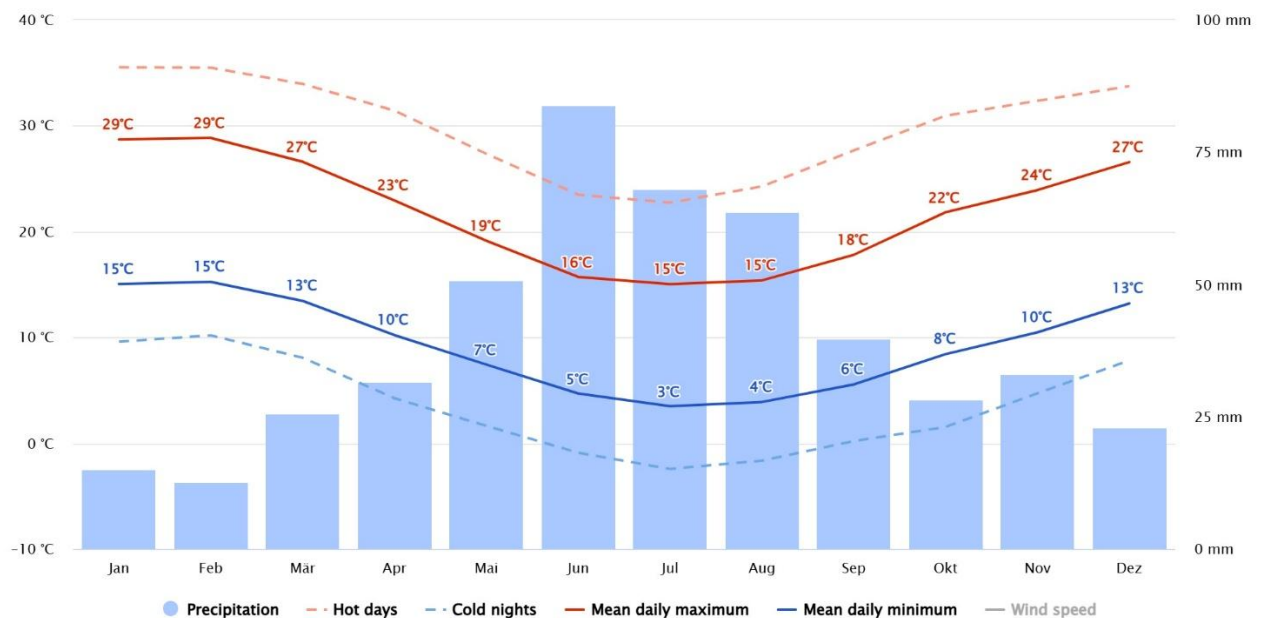


Figure 3 Rainfall Dorp op die Berg

The chart (Figure 3) shows that rain is spread throughout the year, but with much more rain during the winter rainy season. The annual average rainfall is not readily available online. Dorp op die Berg and surrounds is in the winter rainfall area, with long dry summers. The winters can be cold, with frost and snow on the mountains.

As rainfall is dependent on elevation, the surrounding mountains up to 1500m high, with still higher peaks, receive a lot more rain than the valleys below. Rainfall of between 1500 to 2000mm per year on the high ridges and peaks is not unheard of.

Of importance to this report, the Slangboskloof farm and the proposed agricultural development does not receive enough water especially during the fruiting season for successful fruit production. Water must be abstracted from rivers when the rivers are flowing strongly during winter and stored for irrigation in late summer when permanent crops such as fruit trees need it most.

Rivers in the region stop flowing in summer and can even be dry.

Rainfall is erratic, with some very wet years and with rivers coming down in flood. Floods can be fierce, with rivers bursting their banks. On the other hand, drought flow in the Leeu River is often experienced, lasting several years.

7 Conservation Status

The screening tool was applied to the farms Rietrivier and Kromfontein on the land where the development is about to take place.

Table 1 DFFE Screening Tool Results

Theme	Sensitivity
Animal species	Medium
Aquatic biodiversity	Very High
Plant species	Medium
Terrestrial biodiversity	Very High

Aquatic Biodiversity Theme

The Helpmekaar Dam is listed as an aquatic CBA, a NFEPA as well as a Groot Winterhoek wetland.

The area of the proposed Balancing Dam does not enjoy any of these listings.

Animal Species Theme

Two bird species are listed:

		IUCN status
Southern black korhaan	<i>Afrotis aftra</i>	Endemic, Vulnerable
Black harrier	<i>Circus maurus</i>	Endemic, Endangered

These birds have a wide distribution over the Western Cape. They prefer renosterveld, Karoo and Strandveld. Large parts of the Koue Bokkeveld offers little habitat for these birds, as agriculture transformed the landscape. It is not impossible but unlikely to spot these birds over the pasture where the buffer dam is going to be.

Plant Species Theme

The DFFE screening tool produced a long list of plants of a medium sensitivity, some of which are unnamed, numbered species of which the names may not be published because of conservation and protection reasons.

This is critically endangered Koue Bokkeveld Alluvium Fynbos and critically endangered Koue Bokkeveld Shale Fynbos.

Like the rest of the Western Cape, the Koue Bokkeveld is botanically a most sensitive and important region, with its endemic plant species and unique plant assemblages. Much of the landscape was transformed into agricultural land, with little left of this botanical treasure. Rietfontein Farm is blessed with a patch of Fynbos (Figure 4) that is preserved. The farm owner deeply appreciates the value of this land. It is strongly recommended that invasives, especially pine trees, be removed and kept out of this botanical gem. No more new roads and paths should be allowed. Unused paths should be restored, with Fynbos allowed to grow back, also over denuded and degraded parts.

Terrestrial Biodiversity Theme

This is a terrestrial CBA as well as an ESA.

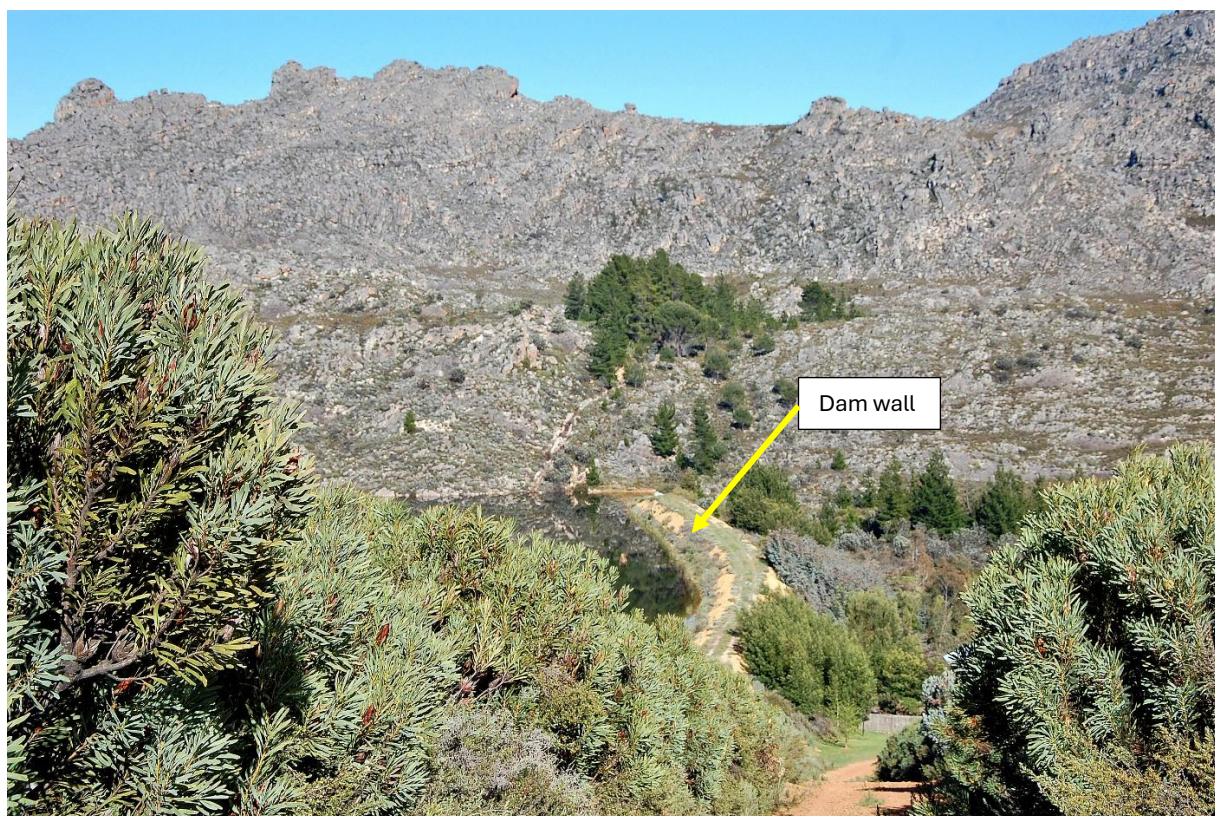


Figure 4 Fynbos and pine trees

The Helpmekaar Dam's sub-catchment area (Figure 5) is rather small, only 387ha (Bester, 2024). This corresponds to Mr Jonathan Gibson's account that this dam is difficult to fill. It only overflows perhaps once in 4 years, if it rains well. Compared to the wider region, this is a high rainfall area, with more rain on the mountain's high peaks and ridges. The highest point on the Winterhoek Mountain sub-catchment to the west feeding into the Helpmekaar Dam is over 1240masl. The Helpmekaar Dam does not have the benefit of the elevated rain on the higher peaks above 1700masl, as this runoff flows to the west into the Olifants River upper reaches. Helpmekaar Dam's elevation at 864masl is high enough to attract a high rainfall as well.

Runoff from the mountain's near vertical eastern slope into the dam must be extremely fast along the rather straight drainage lines. There are three of these drainage lines (Figure 5). The most northern one was altered to feed into the northwestern corner of Helpmekaar Dam above the dam wall. Previously, this runoff ends up in the Langrug Dam (Figure 5), another large farm dam adjacent and downstream of the Helpmekaar Dam.

The Helpmekaar Dam is to be expanded from its current 390 000m³ to a total design capacity of 800 000m³. The surface area (Figure 6) will increase to 22ha (Bester, 2024).

The rationale for this expansion is the possibility to add another 45ha of orchards to the current farming venture. Even though the dam fills up only during high rainfall years, perhaps once in 4 years, it allows for more storage to carry the orchards through dry years.

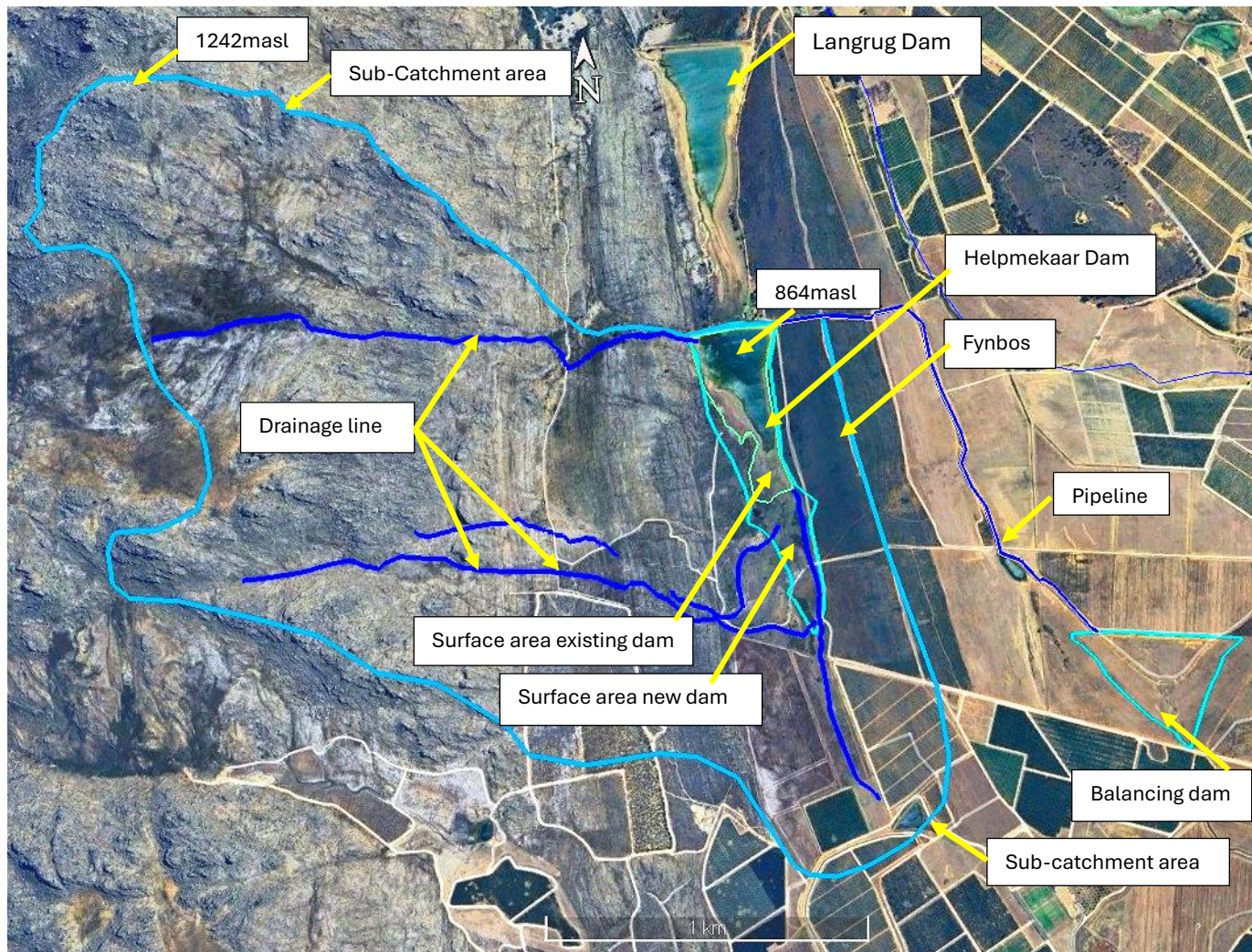


Figure 5 Dam, sub-catchment area and drainage lines

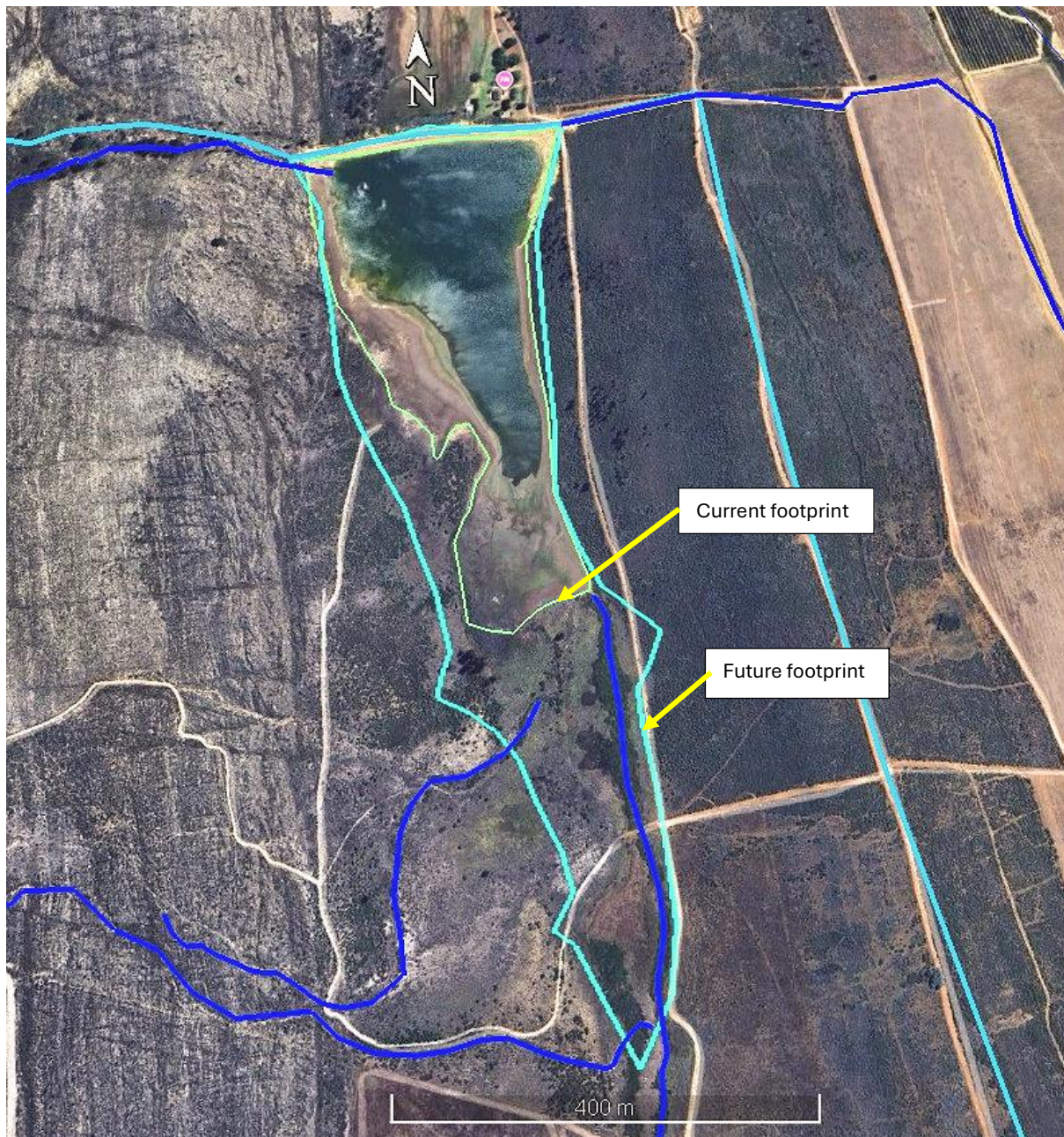


Figure 6 Helpmekaar Dam footprint

The Helpmekaar Dam floodplain (Figure 7), the additional area that will be flooded when the new addition to the dam fills up, it heavily impacted by runoff from the large-scale upstream agriculture. The vegetation on the floodplain is mostly *Typha* reeds. A secondary growth of low Fynbos shrub holds out on the verges of these reeds. There is very little if anything left of the alluvial vegetation. There is no channelled valley bottom wetland with a densely vegetated riparian zone, as can be expected in the region. It looks more like a wider seep that has been filled in with sediments out of the surrounding orchards.



Figure 7 Helpmekaar Dam Floodplain

9 The Balancing Dam

The proposed off-channel balancing will cover a surface area of only 8ha. It will have a design capacity of 570 000m³ (Bester, 2024). The dam wall will be 15m high and 550m long. It will be integrated into the overall irrigation system with pipelines and pumps.

It is located on land that has been farmed, ploughed over (Figure 9) , for several generations of farmers.

The slopes here are gentle, the valley shallow. The construction of the dam would need a lot of material carted in from elsewhere for this relatively large dam wall for a small farm dam.

This dam has very little catchment area. Runoff is intercepted by several upstream farm dams. Farm roads and several drainage trenches divert runoff away from the proposed dam. This dam will be filled only with water out of a pipeline.

There is no more natural vegetation, no more Fynbos, on the terrain where the balancing dam is to be constructed. It has all been transformed into pasture for farm animals, currently grazing for sheep.



Figure 8 Balancing Dam



Figure 9 Balancing Dam Terrain



Figure 10 Gleying (Photo JPP Fourie, Sterkwater Boerdery)

Wetness, landform, vegetation and the soil profile are the indicators for the demarcation of wetlands (Anonymous, DWS).

Wetness

The site of the proposed dam was dry, apart from the moist in the agricultural drainage channels along the farm road and the trenches along the pastures.

Vegetation

There were no wetland plant indicator species, apart from a sparse stand of sedge in the drainage channel.

Landform

The topography, the landform, indicated that the possibility of a wetland in this location exists. This could have been a seep in a shallow valley.

Hydromorphic soils

The farm manager dug a hole with a JCB digger-loader in the place where the proposed dam is going to be if approved to look for chroma mottles. The soil profile showed gleying of the upper sub-surface soil (Figure 10). This is an indication that prior to agriculture, this location must have been permanently wet, not drying out completely during the dry summer months.

This location probably was a wetland, with all the attributes of a wetland. Topography and soil profile supports the presence of a wetland. The absence of wetland vegetation and the dry nature of the site indicates that this historic wetland is no more. It is now drained, transformed into a pasture for grazing farm animals.

10 The Pipeline

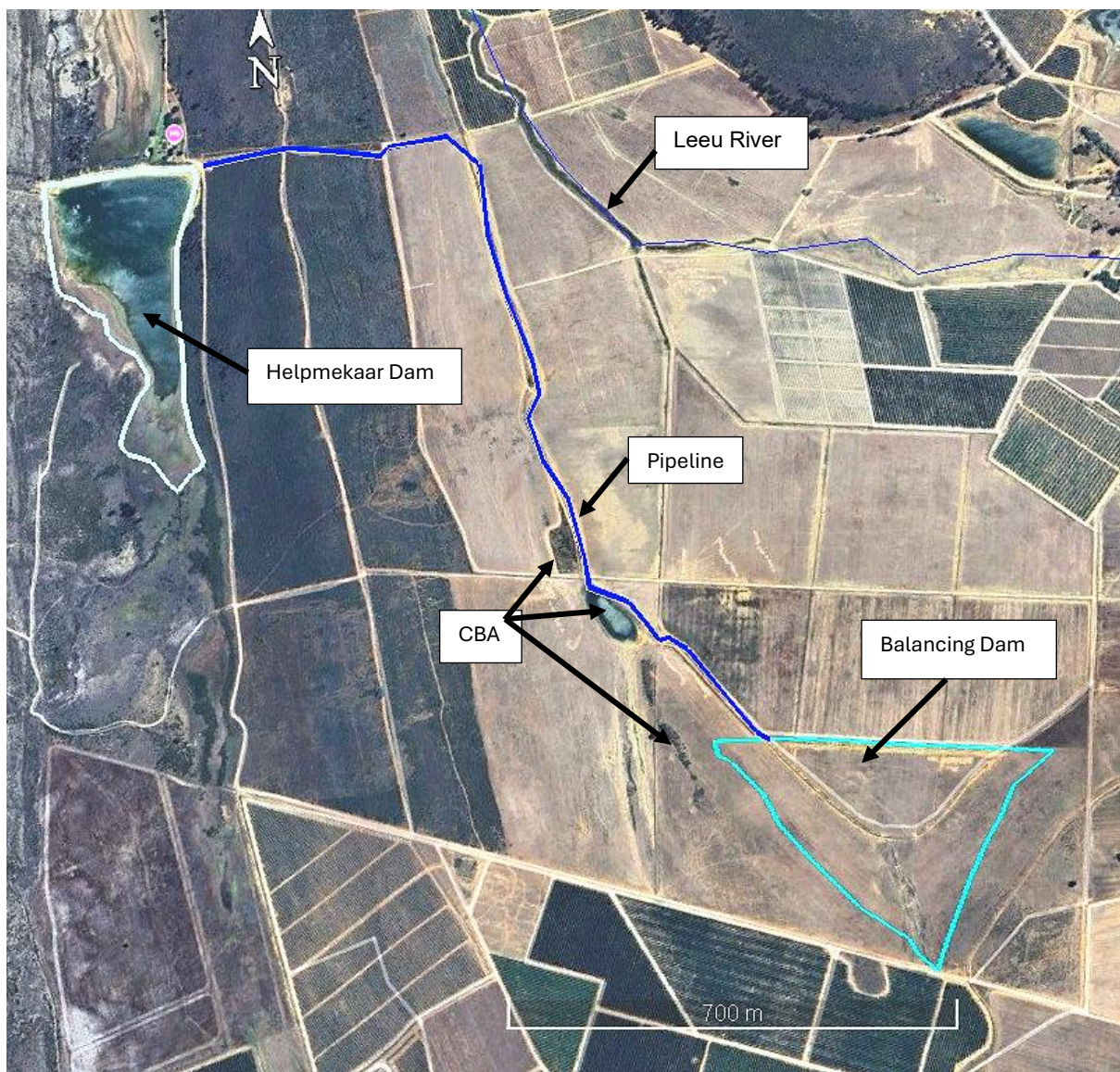


Figure 11 Pipeline



Figure 12 Typical drainage trench

A pipeline will connect the enlarged Helpmekaar Dam to the Balancing Dam (Figure 11). The pipeline will be dug into the ground from the Helpmekaar Dam over the hill through the farm's Fynbos reserve following an existing road to the east, then turn south over a grassy pasture and then towards the southeast into the new Balancing Dam. The pipeline will follow a drainage trench. This is an entirely artificial feature, dug into the ground with earth-moving machinery, for keeping the pastures from flooding during the rainy winter months. There are several such trenches on the property (Figure 12).

The trench has little if any aquatic habitat that can be deemed as functional, important or of any relevance. Therefore, the trench will not be discussed any further.

The southern part of the trench is marked by a small, isolated patch of CBA. The landowner is advised to cross the trench away from the CBA to avoid any further environmental approvals.

The pipeline cuts through the property to the south of the Leeu River, never crossing the river. The river here is highly canalised, straightened and entirely altered.

McFarlane *et al* (2009) published a methodology for assessing the PES of wetlands. This elaborate methodology was adapted and condensed to fit the demands of this run-of-the-mill WULA, with its time and budget constraints. An element of Kleynhans' (1999) assessment was incorporated to fit in with the WATSAN standardised assessments of river and wetlands.

The NWA defines a wetland as follow:

“land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which in normal circumstances supports or would support vegetation typically adapted to life in saturated soil”

McFarlane *et al* (2009) identifies the

- Hydrology,
- Geomorphology and
- Vegetation

as the three elements that must be assessed.

Present Ecological State of the upper Helpmekaar Dam wetland

The new land that is going to be submerged adjacent and upstream of the Helpmekaar Dam because of the heightening of the dam wall and the enlarging of the dam is the part that must be assessed. It is not the current dam that stands to be assessed. Only the land that will be impacted because of the addition to the dam.

This land, in its current state, answers to the NWA definition of a wetland. It must be assessed accordingly.

Hydrology

The upper reach of the Leeu River and its tributaries, where the Helpmekaar Dam is today, prior to human impact, during historic times, probably was a valley channelled bottom wetland, such as can be seen in some of the still unimpacted and near-pristine tributaries of the region's valleys. Such examples are increasingly hard to find. Such a state can be taken as the reference state for the evaluation of the current state.

This original state was never recorded. Therefore, much of this rests on assumptions. The accuracy of these assumptions can be argued. They are probably not far off the mark.

Originally, runoff from heavy downpours came rushing down the mountain side with ferocity and in great volumes. This would have flooded the valley floors and associated wetlands down below, where the thick riparian vegetation slowed the flood down. During the hot and dry summer months, runoff was reduced to a trickle. The upper tributaries stopped flowing. Some even dried up. The riparian vegetation survived on shallow ground water that kept on migrating subterraneous down the mountain sides.

Today, much if not most of the winter floods are captured in a myriad of farm dams in the highly developed fruit-producing region of the Koue Bokkeveld. The storage capacity of dams outstrips the MAR by far. The hydrological regime has entirely changed. Downstream, the Doring River's hydroperiod has been reduced, with more months of the year without any running water.

The wetland upstream of the Helpmekaar Dam is no exception. Its hydrology has been changed far away from its reference condition.

Rainfall is erratic. Droughts can last for years, with low flow and drought flow conditions in the rivers and stream. In contrast, floods can be sudden and serious, with river bursting their banks and overflowing dams, oblivious of their storage capacity, however large it may be.

Vegetation

The vegetation and its deviation from a pre-anthropological status have already been mentioned. Typical indicator species such as palmiet (*Prionium serratum*) and the restio *Elegia capensis* are entirely absent. The floodplain is overgrown with *Typha* reeds, fertilised by runoff from upstream orchards. The deviation from the reference position is vast, if assumptions are correct. The score for vegetation comes to 1.5 Table 1).

Geomorphology

The reference condition could have entailed a narrow channel over a rocky bottom. The slope here is not steep, so the valley bottom could have been wider, with more sand and soil covering the rocks, with a wider flow path. This is speculation, we will probably never know. Whatever it was, the valley bottom is now filled in with sediments carried along with flood water from the upstream orchards and pastures to transform the valley bottom into a wider floodplain without a channel. The score for geomorphology comes to 2.5 (Table 2), but with a Low score of 2 out of 5 for confidence

Table 2 Habitat Integrity according to Kleynhans, 1999

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

Table 3 Helpmekaar Dam scores for the Hydrology elements

Hydrology	Score
Water inputs volume	2
Pattern of the water inputs	2
Roughness	3
Channel	2
Mean	2.25

Table 4 Present Ecological State of the wetland upstream of the Helpmekaar Dam

Parameter	Score	Weight	Weighted Score	Maximum Score
Hydrology	2.25	3	6.75	15
Geomorphology	2.5	2	5	10
Vegetation	1.5	2	3.0	10
Total			14.75	35
% of total			42.1	
Class			D	

Scoring system

0 -1	Critically impacted with little if any ecological functioning
1- 2	Heavily impacted with loss of ecosystem functioning
2-3	Impacts are obvious but most ecological functioning still intact
3-4	Some impact discernible with ecological functioning intact
4-5	Pristine or near pristine with no discernible impact

The wetland upstream of the Helpmekaar Dam is in Class D, largely modified, with a vast deviation from the original ecological functioning.

Having adapted the methodology to the local conditions and to the familiar version of assessment, the outcome seems to reflect conditions on the ground, based on the assessor's knowledge and experience. This leaves at least some level of confidence in the assessment method and its application.

Present Ecological State of the Balancing Dam Wetland

To add that already was mentioned, the valley here has a ditch in the middle that eliminates most of the roughness (flow resistance). The ditch replaces the natural channel. What once was a valley bottom seep now is a drained wetland.

The wetland elements were scored as follows:

Table 5 Balancing Dam scores for the Hydrology elements

Hydrology	Score
Water inputs volume	1
Pattern of the water inputs	2
Roughness	1
Channel	1
Mean	1.25

Table 6 Present Ecological State of the Balancing Dam Wetland

Parameter	Score	Weight	Weighted Score	Maximum Score
Hydrology	1.25	3	3.75	15
Geomorphology	1.5	2	3	10
Vegetation	0.5	2	1.0	10
Total			7.75	35
% of total			22.1	
Class			E	

This wetland is no more. It is now replaced with a pasture for sheep. It is placed on Class E, with almost all its wetland ecosystem functioning lost.

12 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).

There are no fish in the wetlands, as there is no permanent water. According to this assessment, which is prescribed for WULA's, the wetlands are not important.

Table 7 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)

However, several species of fish occur in the Olifants Doring River system:

Cape galaxias (three undescribed species)	<i>Galaxias zebratus</i>
Clanwilliam rock catfish	<i>Austroglanis gilli</i>
Spotted rock catfish	<i>Austroglanis barnardi</i>
Clanwilliam sandfish	<i>Labeo seeberi</i>
Clanwilliam yellowfish	<i>Labeobarbus seeberi</i>
Clanwilliam sawfin	<i>Cheilobarbus serra</i>
Clanwilliam redfin	<i>Sedercypris calidus</i>
Twee River redfin	<i>Barbus erubescens</i>
Fiery redfin	<i>Pseudobarbus phlegethon</i>
Doring fiery redfin	<i>Pseudobarbus phlegethon</i>
Chubbyhead barb	<i>Enteromius anoplus</i>

There is a high degree of endemism. Some of these are endangered and critically endangered. This renders the river system and its tributaries ecologically important. Likewise, the Leeu River and its tributaries are ecologically important, despite it being seriously altered, as it remains potential habitat for some of these fishes.

Indigenous fish is seriously threatened by predation and competition by exotic invasive fish such as:

Carp	<i>Cyprinus carpio</i>
Smallmouth bass	<i>Micropterus dolomieu</i>
Rainbow trout	<i>Oncorhynchus mykiss</i>
Bluegill sunfish	<i>Lepomis macrochirus</i>

These may occur in the Leeu River as well. The landowner acknowledged the presence of smallmouth bass in Helpmekaar Dam. It does not subtract from the river's ecological importance.

13 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.

Wetlands are ecologically resilient. If all human impacts were to be removed, wetlands would probably bounce back to a situation closer to its original ecological condition. In the Koue Bokkeveld, this is an unthinkable situation. As long as human habitation persists, impacts will remain and the wetlands will stay in their current state, some degraded more than others. If, for whatever reason, wetlands don't bounce back, they are ecologically sensitive, as are the wetlands on Rietfontein Farm and surrounds.

14 EISC

Table 8 EISC

Determinant	Helpmekaar Dam Wetland	Balancing Dam Wetland
Rare and endangered species	1	0
Populations of unique species	1	0
Species / Taxon richness	2	2
Diversity of habitat	2	1
Migration Route/ Breeding and feeding site for wetland species	3	2
Sensitivity to water quality changes	2	2
Flood storage, energy dissipation, particulate / element removal	2	1
Protection status	3	0
Ecological integrity	2	2
Average	2.0	1.1
Score	Moderate	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 dam be placed in a category according to the EISC methodology. The EISC is one of the essential items that is required for the Risk Matrix.

15 Numerical Significance

Decision-makers often press on a numerical score for Significance. The score takes into consideration both the environmental value of the site and the degree of impact.

Table 25.1, p48, Appendix provides a system for allocation values for each of the parameters Conservation Value, Extent, Duration, Severity and Likelihood about possible impacts. These values are then entered into the equation on p49 to derive at a value for Significance. The value for Significance can subsequently be evaluated according to Table 25.1.2.

Table 25.1.2 provides a yardstick for decision-making to allow or disallow a development with its concomitant impact on the environment.

The scores that were given are entirely those of the specialist (Table 9), 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 9 Significance Score

Parameter	Helpmekaar Dam Wetland	Balancing Dam Wetland
Conservation value	3	1
Likelihood	5	5
Duration	5	5
Extent	1	1
Severity	4	4
Significance	45	15
	Medium	Insignificant

The score for the Helpmekaar Dam Wetland is Medium but one point short of the next category (Medium / High). When the wetland is flooded because of the expansion of the dam, the changes will be severe, with a significant change in ecological functioning. It is doubtful if this change, from a *Typha* overgrown wetland to a submerged habitat can be branded as “undesirable”.

The score for the Balancing Dam Wetland is “Insignificant” because of the low conservation value of the site.

16 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 for the purpose of the prescribed impact assessment.

Flow Modification

The addition of dam storage capacity will reduce the downstream flow, down the catchment and eventually into the Leeu River, were it not for the many downstream dams in the catchment. The flow contribution out of new storage capacity is only going to happen during high rainfall years, in which event the flow can be so great that it overtops all of storage by far. No doubt, the authorities have taken the flow requirement for rivers into account when deciding about addition storage capacity.

Permanent inundation

What is now wetland, albeit heavily degraded, is going to be under water, at least when the dams are full, if the project is to go ahead. From a wetland conservation point of view, this does not make much difference to the wetland's ecological status, as degradation has advanced, with little change of a turn-around.

Water quality modification

The runoff from orchards and pastures is already compromised. The addition of more storage capacity won't make any difference. Perhaps it would serve as a sink that allows for recovery of water quality before it flows further down the catchment.

Sediment load modification

During the construction phase, loose sand and mud may wash down the catchment along with stormwater. This must be prevented. It would be advantageous if construction could be completed before the onset of the next rainy season.

The sediment load from runoff from orchards and pastures is already compromised. The addition of more storage capacity won't make any difference. Perhaps it would serve as a sink that allows for the trapping of sediments before it flows further down the catchment.

Canalization

Trenches, swales and roads already serve as preferential flow paths. The new dam walls won't add to this.

During construction, no new roads must be constructed. Rather use the existing ones only. Prevent erosion of these roads and of the road shoulders by adding adequate stormwater management infrastructure.

Topographic alteration

The new dam wall will change the immediate topographical features.

Terrestrial encroachment

The Helpmekaar Dam and surrounds is overgrown in places with invasive pine trees. This invasion must be controlled and eradicated.

The Balancing Dam terrain currently is a pasture for farm animals, covered with grasses which naturally don't belong there. The new dam is not going to change any of this.

Indigenous vegetation removal

The original vegetation has already been replaced with less wanted and even exotic vegetation. The new dams won't change any of this, other than a call for control of invasive vegetation.

Invasive vegetation encroachment

The original vegetation has already been replaced with less wanted and even exotic vegetation. The new dams won't change any of this, other than a call for control of invasive vegetation.

Alien fauna

Farm animals are regarded as alien fauna. The land around the proposed Balancing Dam will remain a pasture for grazing farm animals.

Over-utilization

The land was lush and green during the site visit, at the end of the rainy season. The landowner intimated that this radically changes during the dry season, when the land turns barren and brown, which is a natural in these parts. The land did not seem to be overgrazed. To the contrary.

Isolation / Migration

The new dam walls won't interrupt the landscape to such an extent that it would interfere with mobile migratory fauna. When overflowing during heavy rainfall, fish and other aquatic fauna will keep on moving down the catchment along with the flow, as always. In this setting, it is not expected that the new dams would have a material effect in migratory patterns.

Ground water table

The ground water table may rise because of the enlarged volume of water penetrating the ground out of the dams. Shallow unconfined groundwater migrating down the mountain sides probably exceeds groundwater that may arise from localities further down the catchment.

Waste

During the site visit, there was no indication of any waste on the grounds.

17 Impact Assessment

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 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. It is nevertheless worth mentioning, regarding the aquatic environment, that plans must be drafted to:

- Keep debris and sediment out of the aquatic habitat during construction.
- Keep litter and rubbish out of the aquatic habitat during operation.
- Maintain stormwater management infrastructure.

These aspects must be kept onto the budget for as long as the dams are operational for the irrigation of orchard on the estate.

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

The impacts assessment shows that mitigating measures can readily be implemented. The current level of management on the estate is very high, organised, precise and focussed. This is an upmarket establishment for discerning clients. This is not about to change. The water system is managed on the same high level.

Table 10 Impact Assessment

Description of impact: Construction Phase. Heightening of a dam wall, addition of a new dam Construction of a new dam walls, bringing in construction material from elsewhere, construction of a new spillway, shaping and landscaping the new dam, cleaning up, rehabilitation, vegetate disturbed areas, Mitigation measures Prevent loose soil and sediments from moving down the catchment Limit footprint. Maintain access roads. Do not create new roads Appoint an ECO.								
Type Nature	Spatial Extent	Severity	Duration	Significance	Probability	Confidence	Reversibility	Replaceability
Without mitigation								
Direct	Local	Low	Temporary	Low	Definite	Certain	Irreversible	Irreplaceable
With mitigation measures								
Negative	Local	Very low	Temporary	Very low	Definite	Sure	Irreversible	Irreplaceable

The construction of two new dam walls is a formidable civil engineering undertaking to which an impact assessment table cannot do justice. The EMPr can fill this void, along with associated documents, which explains the construction process in detail, along with measures to protect the aquatic environment.

Table 10 Continued

Description of impact: Operational Phase, drawing water from the dams for irrigation Fluctuating water levels, altering lentic aquatic habitat Mitigation measures Do no empty dam, leave enough water for ecological functioning. Prevent pollutants entering the dam, prevent over irrigation Maintain storm water management infrastructure such as swales and trenches. Maintain access road Control invasive vegetation								
Type Nature	Spatial Extent	Severity	Duration	Significance	Probability	Confidence	Reversibility	Replaceability
Without mitigation								
Direct	Local	Low	Permanent	Low	Definite	Certain	Irreversible	Irreplaceable
With mitigation measures								
Negative	Local	Very low	Permanent	Very low	Definite	Sure	Irreversible	Irreplaceable

18 Risk Matrix

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

The assessment was carried out according to the interactive Excel table that is available on the DWS webpage (Table 9)

The methodology is tabled in the Appendix.

The Risk Matrix indicates that a General Authorisation is the correct level of approval. A License is not called for.

Table 11 Risk Matrix

Phase	Activity	Impact	Potentially affected watercourses		
			Name/s	PES	Overall Watercourse Importance
CONSTRUCTION	Helpmekaar Dam: Heighten existing dam wall. Transporting building material from elsewhere, adding, shaping and compacting new material onto the dam wall. Landscaping the new dam, cleaning up, rehabilitation, vegetate disturbed areas.	Disturbance of existing dam, Mud and sand the down the catchment, alteration of aquatic habitat.	Wetland above the Helpmekaar Dam in tributary of the upper Leeu River	D	Low / Very low
	Balancing Dam: Construction of a new dam wall, excavating material from the new dam floor, brining in construction material from elsewhere, placing of construction material onto the dam wall, compacting and shaping the new dam wall, Cleaning up, rehabilitation, vegetate denuded areas.	Disturbance and blocking of a drainage canal, Mud and sand washing down the drainage canal and down the catchment along with storm water.	Seasonal wetland on Rietfontein Farm	E	Low / Very low
OPERATIONAL	Operating both dams, abstracting water from these dams with pumps and pipelines	Abstraction water from the dam, varying water levels, altering aquatic habitat	Helpmekaar Dam, Balancing Dam	D/E	Low / Very low

Intensity of Impact on Resource Quality					Overall Intensity (max = 10)	Spatial scale (max = 5)	Duration (max = 5)	Severity (max = 20)	Importance rating (max = 5)	Consequence (max = 100)	Likelihood (Probability) of impact	Significance (max = 100)	Risk Rating	Confidence level
Abiotic Habitat (Drivers)			Biota (Responses)											
Hydrology	Water Quality	Geomorph	Vegetation	Fauna										
3	1	1	3	1	6	1	1	8	2	16	100%	16	L	High
4	1	4	4	4	8	1	1	10	2	20	100%	20	L	High
3	1	0	0	1	6	1	5	12	2	24	100%	24	L	High

The goods and services delivered by the environment, in this case the wetlands associated with an existing dam that is about to be doubled in size, as well as another dam dubbed the Balancing Dam, is a Resource Economics concept as adapted by Kotze *et al* (2009). This evaluation is about the current wetlands, before submerged by dams.

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

Table 12 Goods and Services

Goods & Services	Helpmekaar Dam Wetland	Balancing Dam Wetland
Flood attenuation	3	2
Stream flow regulation	3	2
Sediment trapping	3	2
Phosphate trapping	2	1
Nitrate removal	2	1
Toxicant removal	3	1
Erosion control	3	2
Carbon storage	2	1
Biodiversity maintenance	2	2
Water supply for human use	4	0
Natural resources	0	0
Cultivated food	4	0
Cultural significance	1	0
Tourism and recreation	4	0
Education and research	1	1

0 Low
5 High

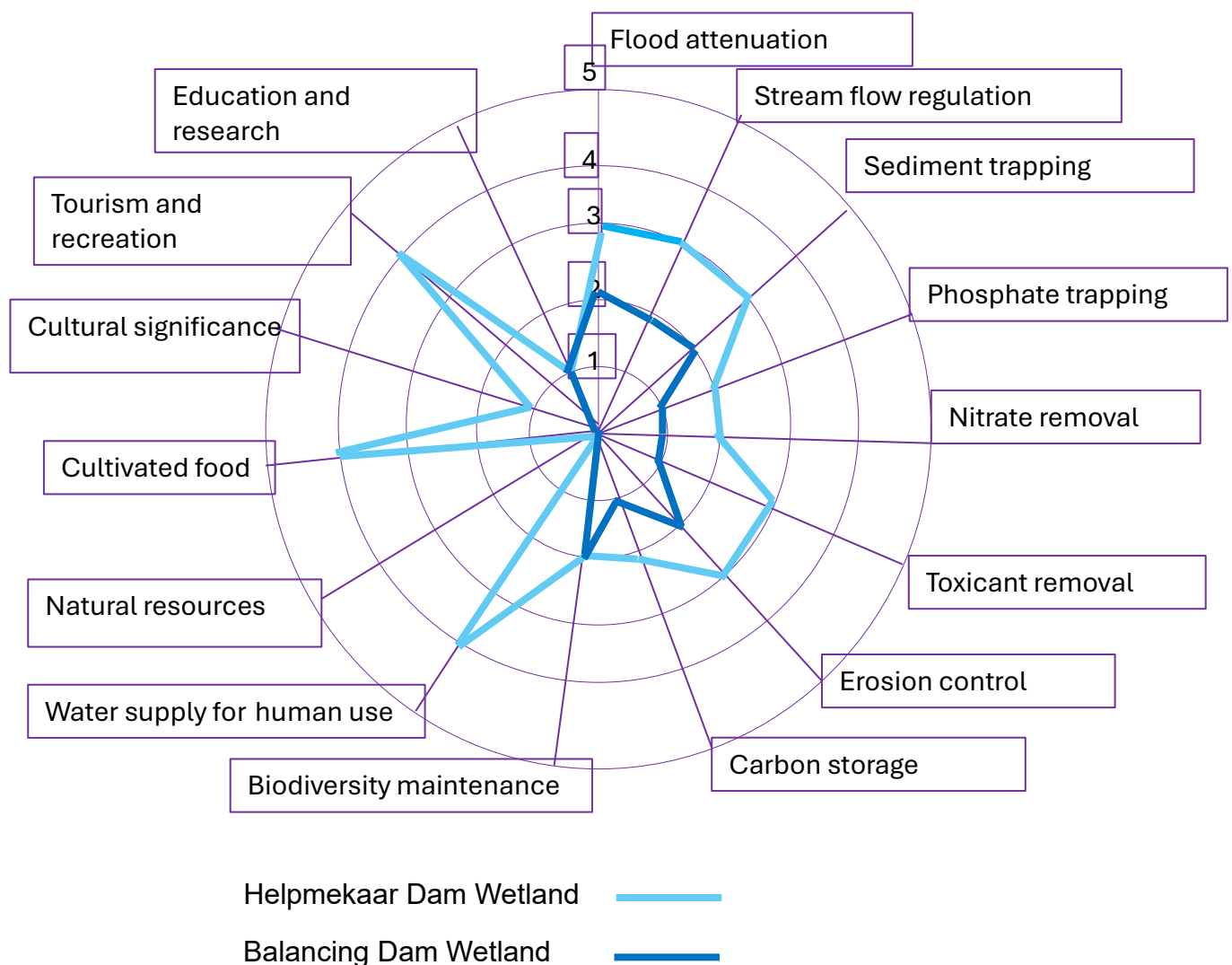


Figure 13. Resource Economics Footprint

The star shape of the spider diagram for the Helpmekaar Dam wetland is spiky, with medium strong resource economic contribution for some of the parameters.

The star shape of the spider diagram for the Balancing Dam wetland is small, diminutive, with not much contribution to any of the parameters.

The star shapes are too small to attract the attention of decision-makers. If a new development were to shrink the star shapes even smaller, there is not much too loose in terms of resource economic value. Submerging the wetlands under new dams is not about to raise concern.

Table 13 Assessments Summary

Assessment	Outcome
DFFE Screening Tool	Sensitivity, Medium and Very High
Protection status Helpmekaar Dam Wetland	CBA, ESA, wetland, NFEPA
Protection status Balancing Dam Wetland	Not a CBA, not an ESA, not a NFEPA
Vegetation	Critically Endangered
PES Helpmekaar Dam Wetland	Loss of ecosystem functioning
PES Balancing Dam Wetland	Loss of most ecosystem functioning
Ecological sensitivity both wetlands	Sensitive
Ecological importance both wetland	Not important
EISC Helpmekaar Dam Wetland	Moderate
EISC Balancing Dam Wetland	Low
Significance Helpmekaar Dam Wetland	Moderate
Significance Balancing Dam Wetland	Insignificant
Impact assessment	Mitigation can be implemented
Risk Matrix	General Authorization
Resource Economics Helpmekaar	Spiky footprint, footprint small
Resource Economics Balancing Dam	Diminutive footprint

Even though the Helpmekaar Dam Wetland is listed as a CBA and ESA, it is so much altered and degraded that it can safely be developed without losing value. The Balancing Dam Wetland is even less of value as a functional aquatic ecological entity.

There is nothing in the assessment summary that call for the project should be stalled. The project should go ahead as it poses no material threat to the current aquatic environment.

21 Conclusion

The Koue Bokkeveld is very cold during winter, with lots of rain, with even more rain on the high ridges of the mountains. During wet years, the rivers come down in force, bursting their banks. The summers are hot and dry. Rivers may stop flowing, with the high tributaries drying out. Drought seasons may last for several years, posing a threat to the large-scale fruit-producing region. This flow regime drives the aquatic ecology. Organisms are adapted to floods, followed by long period of desiccation.

The farming community relies on storage of water. Even though the dam's storage capacity in the region exceeds the MAR, farmers still pursue more dams and more storage capacity. The peak flows down the river during high rainfall periods is vast, overtopping dam walls in excessively large volumes. It is this water that still can be stored for the following years when the rains do not arrive.

The situation on Rietfontein farm is not any different. The landowner wishes to enlarge an existing dam and add another smaller dam to integrate into the overall irrigation system. Both these ventures involve submerging wetlands under the water of the new storage capacity. These wetlands are ecologically and resource economically of little value, according to the prescribed assessments of this report.

It is there for recommended that the proposed dams be approved in terms of General Authorisations.

This recommendation is under the assumption the Ecological Reserve, as defined in the NWA, is not compromised. The determination of the Ecological reserve is the premise of the NWS and is not within the scope of this WULA and the Freshwater Report.

22 References

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23 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, whether 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:



23 October 2025

Dr Dirk van Driel

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Brenton-on-Lake 6571saligna2030@gmail.com**079 333 5800****Experience**

USAID/RTI, ICMA & Chemonics. Iraq & Afghanistan **2007 -2011**
Program manager.

City of Cape Town **1999-2007**
Acting Head: Scientific Services, Manager: Hydrobiology.

Department of Water & Sanitation, South Africa **1989 – 1999**
Senior Scientist

Tshwane University of Technology, Pretoria **1979 – 1998**
Head of Department

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 Roodefontein 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, Houdenberg 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
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- 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
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- Fresh Water Report, Marksman's Nest Rifle Range, Malmesbury
- Biodiversity Report, Muggievlak Storm Water Canal, Vredenburg
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- Fresh Water Report, Potable Water Pipeline, Komaggas
- Fresh Water Report, Wastewater Treatment Works, Kamieskroon
- Fresh Water Report, Turksvy Farm Dam, Upington
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- Fresh Water Report, Boegoeberg Urban Development, IKheis Municipality
- Fresh Water Report, Opwag Urban Development, IKheis Municipality
- Fresh Water Report, Wegdraai Urban Development, IKheis Municipality
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- 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, Klaver
- Freshwater Report New Wave Dam, Klaver
- 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 ZKA Information Centre Carnavon
- Freshwater Report ZCC Estcourt electric vehicle charging station
- Freshwater Report ZCC Kohler electric vehicle charging station
- Freshwater Report ZCC Harrismith electric vehicle charging station
- Wetland demarcation, Farm Gustrouw 918, Somerset West
- Freshwater Report, New vineyard, Plot 1181, Kakamas
- Freshwater Report, Farm 91, Riversdale.
- Freshwater Report Harmony Agriculture, Koue Bokkeveld, Ceres
- Freshwater Report Toeka Agriculture, Koue Bokkeveld, Ceres
- DFFE Site Verification Report, Diemersfontein Cell Phone Tower.
- Wetland Demarcation Portion 81 Farm Gustrouw, Somerset West
- Freshwater Report Farm 9 George
- Freshwater Report Farm Platteklouf 90 Riversdale
- Freshwater Report Franschoek Pedestrian Bridges
- Freshwater Report Gwaing Landfill, George
- Freshwater Report Erf 977 Val de Vie
- Fresh Water Report Eerste River Bus Depot
- Freshwater Report Farm Krugerskop onion field, Merweville
- Freshwater Report, Farm Oudebosch, Riversdale
- Freshwater Report Kakamas Wastewater Treatment Works, Kakamas
- Freshwater Report Alheit Wastewater Treatment Works, Alheit, Kakamas
- Freshwater Report Farm Hottentots Bosch 80, Riversdale
- Freshwater Report Augrabies Wastewater Treatment Works, Kakamas
- Freshwater Report Cillie Wastewater Treatment Works, Kakamas
- Freshwater Report Eastbrooke Farm, Karatara, Sedgefield
- Freshwater Report Kantkraal Farm, Beaufort West
- Freshwater Report Welgevallen Solar Energy, Stellenbosch University
- Freshwater Report Buffelsrivier Sand Mine, Springbok
- Freshwater Report Mesklip Farm Springbok
- Assessment N2 Trunk Road Junction, Goose Valley, Plettenberg Bay
- Freshwater Report Croydon Vineyard Estate, Somerset West

Table 25.1 Numerical Significance**Table 25.1.1** Conservation Value

Conservation Value 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	Low 1	The area is transformed, degraded not sensitive (e.g. Least threatened), with unlikely possibility of species loss.
	Medium / Low 2	The area is in good condition but not sensitive (e.g. Least threatened), with unlikely possibility of species loss.
	Medium 3	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.
	Medium / High 4	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.
	High 5	The area is considered critically endangered or is part of a proclaimed provincial or national protected area.

Table 25.1.2 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 25.1.3 Scoring system

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

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

25.2 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 25.2.1 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 25.2.2 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 25.2.3 Significance Rating

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

Table 25.2.4 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.

25.3 Risk Matrix Methodology

RISK ASSESSMENT KEY (Referenced from DWA RISK-BASED WATER USE AUTHORISATION APPROACH AND DELEGATION GUIDELINES)

Negative Rating

TABLE 1- SEVERITY

How severe does the aspects impact on the environment and resource quality characteristics (flow regime, water quality, geomorphology, biota, habitat)

Insignificant / non-harmful	1
Small / potentially harmful	2
Significant / slightly harmful	3
Great / harmful	4
Disastrous / extremely harmful and/or wetland(s) involved	5
Where "or wetland(s) are involved" it means	

TABLE 2 – SPATIAL SCALE

How big is the area that the aspect is impacting on?

Area specific (at impact site)	1
Whole site (entire surface right)	2
Regional / neighbouring areas (downstream within quaternary catchment)	3
National (impacting beyond secondary catchment or provinces)	4
Global (impacting beyond SA boundary)	5

TABLE 3 – DURATION

How long does the aspect impact on the environment and resource quality?

One day to one month, PES, EIS and/or REC not impacted
One month to one year, PES, EIS and/or REC impacted but no change in status
One year to 10 years, PES, EIS and/or REC impacted to a lower status but can be improved over this period through mitigation
Life of the activity, PES, EIS and/or REC permanently lowered
More than life of the organisation/facility, PES and EIS scores, a E or F

TABLE 4 – FREQUENCY OF THE ACTIVITY

How often do you do the specific activity?

Annually or less	1
6 monthly	2
Monthly	3
Weekly	4
Daily	5

TABLE 5 – FREQUENCY OF THE INCIDENT/IMPACT

How often does the activity impact on the environment?

Almost never / almost impossible / >20%	1
Very seldom / highly unlikely / >40%	2
Infrequent / unlikely / seldom / >60%	3
Often / regularly / likely / possible / >80%	4
Daily / highly likely / definitely / >100%	5

TABLE 6 – LEGAL ISSUES

How is the activity governed by legislation?

No legislation
Fully covered by legislation (wetlands are legally governed)
Located within the regulated areas

TABLE 7 – DETECTION	
How quickly can the impacts/risks of the activity be observed on the environment (water resource)	
Immediately	
Without much effort	
Need some effort	
Remote and difficult to observe	
Covered	

TABLE 8: RATING CLASSES		
RATING	CLASS	MANAGEMENT DESCRIPTION
1 – 55	(L) Low Risk	Acceptable as is or consider requirement for mitigation. Impact to watercourses and resource quality small and easily mitigated. Wetlands may be excluded.
56 – 169	M) Moderate Risk	Risk and impact on watercourses are notably and require mitigation measures on a higher level, which costs more and
170 – 300	(H) High Risk	Always involves wetlands. Watercourse(s) impacts by the activity are such that they impose a long-term threat on a large scale
A low risk class must be obtained for all activities to be considered for a GA		

TABLE 9: CALCULATIONS

Consequence = Severity + Spatial Scale + Duration
Likelihood=Frequency of Activity + Frequency of Incident +Legal Issues + Detection
Significance \Risk= Consequence X Likelihood