

DRAFT
ENVIRONMENTAL IMPACT ASSESSMENT REPORT

FOR THE

CLEARING OF INDIGENOUS VEGETATION FOR THE CONSTRUCTION OF AN OFF-STORAGE DAM AND RELATED INFRASTRUCTURE FOR IRRIGATION PURPOSES ON THE FARM: KLEINE POS 420 MR, WITHIN BLOUBERG LOCAL MUNICIPALITY, CAPRICORN DISTRICT, LIMPOPO PROVINCE

PROJECT REFERENCE: 12/1/9/2-C85
NEAS Reference LIM/EIA/0001755/2023

Blouberg Local Municipality
Capricorn District

LIMPOPO PROVINCE

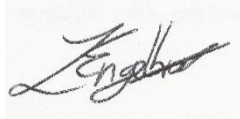


September 2023

TITLE: Die Berg Dam

ISSUE: Draft Environmental Impact Assessment Report

AUTHOR: ZN Claassens



.....
Zani Claassens

Registered Candidate Environmental Assessment Practitioner: No. 2022/5177

APPROVED: Johannes Claassens



.....
Johannes Claassens

Registered Environmental Assessment Practitioner: No. 2019/785



Executive Summary

Mr. I. Enslin as applicant requested Tua Conserva Environmental & Conservation Services cc to undertake an Environmental Impact Assessment (EIA) for the proposed development. The Draft EIA Report fulfils the principles and requirements of Integrated Environmental Management (IEM) and has been conducted in compliance with the latest environmental legislation. The intention is to satisfy the Environmental Authorities and to present an application and EIA document with relevant information to assist LEDET in their assessment of this project application. The project will be developed on the farm Kleine Pos 420 MR. What must be evaluated and tested is the ability of the receiving environment to accommodate the development.

This EIA report had to consider the application for Sustainable Agriculture development. To understand this the principles should be understood. It is based on five pillars:

- Maintaining and increasing biological productivity (organic products)*
- Decreasing the level of risk to ensure larger security (pollution, erosion, salination)*
- Protecting the quality of natural resources (soil, water, pollinators, ecosystems, biodiversity)*
- Ensuring agricultural production is economically viable; and*
- Ensuring agricultural production is socially acceptable and accepted.*

The Screening Tool identified the area as having a Very High Sensitivity rating, the Capricorn Spatial Development Plan (2021-2025) also indicate the area as identified and zoned as Protected Agricultural Areas (DAFF, 2021). Interested and affected parties can be divided in two categories, the first are those from surrounding-and farms located downriver, secondly organs of state. Issues and concerns raised by the first category were inclined towards water availability and the possible effect on their farming production in terms of water.

There are two main identified grouping of issues that should be considered in this application. Firstly, is the area suitable for construction of a dam and what would the effect be on the receiving environment e.g., can the receiving environment accommodate the dam without adverse negative impacts? Secondly is water resource adequate, and if so, is it legalised with an WUL and if so, what will the impact be on downstream water users.

Strategic cumulative issues that are also considered in this application: Firstly, is the using of water and arable agricultural land in a sustainable way ensuring sustainable food production. Secondly the process has an in-direct offset that can also benefit the ecological processes of the terrestrial habitat and ecological processes.



<i>Executive Summary</i>	2
1 INTRODUCTION	5
1.1 General.....	5
1.2 Application objective	5
1.3 Applicant and developer	5
1.4 Information on EAP	5
1.4.1 Details of EAP	5
2 LEGAL AND POLICY REQUIREMENTS	6
2.1 Other legal compliance for project	11
2.2 The POPI Act is also applicable to the EIA and associated processes.....	11
2.3 Relevant Provincial-and District Municipal planning documents	11
3 LOCATION AND DESCRIPTION OF PROPOSED ACTIVITY	11
4. DESCRIPTION OF THE ENVIRONMENT THAT MAY BE AFFECTED	14
4.1 Present environment.....	14
4.1.1 Land use	14
4.1.2 Topography and drainage	14
4.1.3 Climate.....	15
4.1.3 Regional Geology	18
4.1.5 Soil characteristics	18
4.1.6 Biological aspects	18
5. PUBLIC PARTICIPATION PROCESS.....	21
5.1 Objectives of public involvement program for Draft EIA.....	21
5.2 List of interested and affected parties	21
5.3 Interested party's process.....	22
5.4 Approach to Public Involvement Program	22
6. NEED AND DESIRABILITY OF ACTIVITY	23
7. CONSIDERATION OF ALTERNATIVES	27
7.1 Activity alternative.....	27
7.2 Design alternative	28
7.3 Location alternative	30
7.4 Process alternative.	31
7.5 No-Go alternative.....	32
7.6 Discussion	32
8. SPECIALIST REPORTS	33
8.1 Archaeological Report	33
8.2 Ecological-, Red Data and Biodiversity Report.....	34
8.3 Engineer Design Report.....	34
8.4 Environmental Management Program (EMPr).....	34
9. ADVANTAGES AND DISADVANTAGES OF THE PROPOSED ACTIVITY AND ALTERNATIVES ON THE ENVIRONMENT AND COMMUNITY	34
9.1 Advantages of the proposed activity and alternatives.....	34
9.2 Disadvantages of the proposed activity and alternatives	35
10. ENVIRONMENTAL IMPACT DETERMINATION AND EVALUATION	35
10.1 Assessment method.....	35
10.2 Aspects, related impacts, significance, and proposed mitigation measures	36
10.3 Potential significant impacts (after mitigation).....	76
10.4 Relevance of impacts for phases.....	76
11. DESCRIPTION OF ASSUMPTIONS.....	76
12. OPINION ON FACTS.....	76
13. ENVIRONMENTAL STATEMENT	77



14. AUTHORISATION OF ACTIVITY AND CONDITIONS 78

FIGURES

Figure 1: Demographic location of project 12
Figure 2: Locality & Surrounding Land Use 12
Figure 3: Protected Agriculture Areas 14
Figure 4: Contour and drainage for project footprint 15
Figure 5: Quarterly catchment area (DWS) 15
Figure 6: Climate Diagram for SVcb 19 Limpopo Sweet Bushveld 16
Figure 7: Köppen-Gieger Climate Classification for the Limpopo River basin. 16
Figure 8: Mean annual run-off (mm/yr) - an estimate of natural water resources in the Limpopo River Basin..... 17
Figure 9: Estimated general water balance for the Limpopo River basin. 17
Figure 10: Geology of region..... 18
Figure 11: Vegetation map 19
Figure 12: Critical Biodiversity Area Zoning 21
Figure 13: Minimum climate zones for South Africa 24
Figure 14: Preliminary Assessment of Environmental Water Requirements for the Limpopo River basin..... 26

TABLES

Table 1: Legislation List 6
Table 2: Public Participation Process 22

APPENDICES

Appendix A: Locality Map and Surrounding Land Uses 11
Appendix B: Public Participation Process 21
Appendix C: Specialist Declarations of Interest 33
Appendix D: Archaeological & Paleontological report 33
Appendix E: Ecological, Red Data and Biodiversity Report..... 34
Appendix F: Engineer Design Report 34
Appendix G: Environmental Management Program..... 34

ABBREVIATIONS

LEDET	Department of Economic Development, Environment and Tourism Limpopo province
CA	Competent Authority
DFFE	Department of Fisheries, Forestry and Environment
DALRRD	Department of Agriculture, Land Reform and Rural Development
DWS	Department of Water and Sanitation
EA	Environmental Authority
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Program Report
I&AP	Interested & Affected Parties



LIHRA	Limpopo Heritage Resources Agency
SAHRA	South African Heritage Association
SWP	Standing Working Procedure
WMP	Water Management Plan
WUL	Water Use License

1 INTRODUCTION

1.1 General

This Draft EIA report contains the results of an investigation and impact assessment report for the proposed clearing of indigenous vegetation for the construction of an off-stream storage dam as mentioned in the application, which was submitted on 15 June 2023, for approval prior to authorization in terms of Environmental Impact Assessment Regulations, 2014 namely: Listing Notice 1 Regulation 983, Listing Notice 2 Regulation 984, and Listing Notice 3 Regulation 985 of the National Environmental Management Act, 1998 (Act no. 107 of 1998) as amended and in respect the assessment process applicable.

This Draft will be submitted to the competent authority (who have 15 days to acknowledge the submission) and to evaluate the Draft. In the same period the Draft is distributed to registered I&AP's for comments in a 30 day period. Any comments received will be addressed and included in the Final EIA.

1.2 Application objective

The Draft Environmental Impact Report (EIR) was compiled to supply the Department of Economic Development, Environmental and Tourism (LEDET) and I&AP's with the necessary information to make recommendations and for the CA a decision regarding the EIR and the approval of the Draft EIA report and subsequent submission of the Final EIA report before making a decision on an environmental decision.

1.3 Applicant and developer

Ian & Hanneljie Beleggings (Edms) Bpk (Mr. I. Enslin)
P. O. Box 105, Petrus Steyn, 9640
Cell: 082 777 2898
E-mail: ian@enslintrust.co.za

1.4 Information on EAP

1.4.1 Details of EAP

EAPASA Registered EAP (J. Claassens): No. 2019/785
EAPASA Registered Candidate EAP (ZN Claassens): No. 2022/5177
Tua Conserva Environmental and Conservation Services cc
P. O. Box 960, FAUNA PARK
POLOKWANE, 0787
Represented by: Mr. J. Claassens
Contact: Cell: 082 885 9118
E-mail: tuaconserva@gmail.com



1.4.2 Experience of EAP

Mr. Claassens is a South African-based career nature conservationist (since 1975) with 47 years' experience in Southern Africa, e.g., South Africa, Botswana, Zambia, Namibia (Eastern-Caprivi) and Mozambique. He has two relevant tertiary- and one postgraduate qualification in Conservation-, Game and Veld Management as well as Public Administration.

Mr Claassens worked for 23 years in governmental Conservation, Environmental and Tourism institutions. His current and past scope of work includes conducting Scoping and Environmental Impact Assessments (Housing, Water supply, Electricity supply, Road structures, Industrial development, Land reform and farming projects for successful land claims), as well as State of the Environment Assessments (SoER), Environmental Spatial Development Framework, Strategic Environmental Assessments, Project Management and Ecological-and Conservation Management Surveys with management plans.

Mrs ZN Claassens obtained her BSc Honors degree in Dietetics in 2015 and has been working as a Dietitian in the private and public sector over a period of 8 years. She started working for Tua Conserva Environmental & Conservation services cc in 2022 and now has 1 year and 7 months experience working in the environmental & nature conservation sector. She applied and completed the Recognition of Prior Learning (RPL) process through EAPASA and obtained registration as a candidate EAP in March 2022.

2 LEGAL AND POLICY REQUIREMENTS

Table 1: Legislation List

LEGAL INSTRUMENTS		
ENVIRONMENT AND NATURAL RESOURCES	Convention to Combat Desertification (CCD)	The United Nations Convention on the Combating of Desertification defines land degradation as the: "reduction or loss of the biological or economic productivity and complexity of rain fed cropland, irrigated cropland or range, pasture, forest and woodlands in arid, semi-arid and dry sub-humid areas, resulting from land uses or from a process or combination of processes, including processes, arising from human activities and habitation pattern, such as the: <ul style="list-style-type: none"> • long-term loss of natural vegetation; • soil erosion caused by wind/water, and • deterioration of the physical, chemical and biological or economic properties of soil.
	Convention on Biological Diversity (CBD)	The CBD aims to effect international co-operation in the conservation of biological diversity and to promote the sustainable use of living natural resources worldwide. Membership of this convention has led to the publication of



		the White Paper on the Conservation, and Sustainable Use of South Africa's Biodiversity (DEAT 1997), which aims to ensure the sustainable use of biodiversity in all sectors, including industry (DEAT 1999).
	UNESCO	Control and Managing registered World Heritage Sites. In this report the Mapungubwe Cultural Landscape.
NATIONAL		
CONSTITUTIONAL RIGHTS	The Constitution of South Africa (Act 108 of 1996).	<p>Introduces a Constitutional framework for post 1974 South Africa. Chapter 2;</p> <p><u>Environment:</u></p> <p>Section 24: Everyone has the right-</p> <ul style="list-style-type: none"> a. to an environment that is not harmful to their health or well-being; and b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that: <ul style="list-style-type: none"> i. prevent pollution and ecological degradation ii. promote conservation; and iii. secure ecologically sustainable development a use of natural resources while promoting justifiable economic and soc development. <p><u>Just Administrative Action</u></p> <p>Section 33</p>



ENVIRONMENTAL, CONSERVATION AND NATURAL RESOURCES	National Environmental Management Act (Act No. 107 of 1998) (NEMA)	<p>The State must respect, protect, promote and fulfil the social, economic and Environmental rights of everyone and strive to meet the basic needs of previously disadvantaged communities;</p> <ul style="list-style-type: none"> • sustainable development requires the integration of social, economic and environmental principles. • everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that – • prevent pollution and ecological degradation; • promote conservation.
	National Environmental Management Waste Act, 2008 (Act No. 59 of 2008)	The Waste Act promote effective waste management practices through the promotion of the waste management hierarchy which prioritises waste avoidance, reuse, recycling, recovery and treatment, and disposal as a last resort.
	National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	<p>The objectives of this Act are –</p> <p>(a) within the framework of the National Environmental Management Act, to provide for –</p> <ul style="list-style-type: none"> (i) the management and conservation of biological diversity; (ii) the use of indigenous biological resources in a sustainable manner; and (iii) the fair and equitable sharing among stakeholders of benefits arising.
	NEMBA Threatened Ecosystems in South Africa	The objectives are to reduce the rate of ecosystem and species extinction. This includes further degradation and loss of structure, function and composition of threatened ecosystems. The purpose of listing protected ecosystems is primarily to preserve witness sites of exceptionally high conservation value.
	Environmental Conservation Act No 73 Of 1989	❖ Waste disposal practices (S20)



Kleine Pos 420 MR: Die Berg Dam

		<ul style="list-style-type: none"> ❖ National Noise Control Regulations (GN R154 dated 10 January 1992)
	National Heritage Resources Act 25 of 1999	<ul style="list-style-type: none"> ❖ Stipulates assessment criteria and categories of heritage resources according to their significance (S7) ❖ Provides for the protection of all archaeological and palaeontological sites, and meteorites (S35) ❖ Provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority (S36) ❖ Lists activities which require developers any person who intends to undertake to notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development (S38) <p>Requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites as part of tourism attraction (S44)</p>
	The National Water Act (Act No. 36 of 1998)	<p>The National Water Act is important because it provides a framework to protect the natural water resources against over exploitation and to ensure that there is water for social and economic development and water for the future (DWA).</p> <p>Water resources are water bodies such as rivers, streams, wetlands, estuaries and groundwater. The National Water Act aims to protect, use, develop, conserve, manage and control water resources as a whole. Rivers, dams, wetlands, the surrounding land, groundwater, as well as human activities that influence them, will be managed as one cycle. One of the principles of the Act is sustainability which includes ensuring that the environment is protected.</p>
	National Environmental Management: Protected Areas Act No. 57 of 2003 (NEM: PAA)	Regulates the control, protection and management of National Parks
	National Forests Act (Act No. 84 of 1998)	Natural forests and woodlands form an important part of that environment and need



		to be conserved and developed according to the principles of sustainable management; Parliament therefore enacts the following law: <i>Prohibition of destruction of natural forests and the destruction of indigenous trees in any natural forest.</i>
	National Veld and Forest Fire Act 101 of 1998	Regulates veld and forest fires
	Animal Diseases and Parasites Act No 35 of 1984	This act prescribes the controls to be implemented for diseases designated by the act or its amendments as “controlled” (e.g., Animal Disease Control disease), or any disease not currently present in South Africa. The Directorate of Veterinary Services of the Department of Agriculture is responsible for the implementation of the controls laid down in the act.
	Conservation of Agricultural Resources Act (Act No. 43 of 1983)	The objects of this Act are to provide for the conservation of the natural agricultural resources of the Republic by the maintenance of the production potential of land, by the combating and prevention of erosion and weakening or destruction of the water sources, and by the protection of the vegetation and the combating of weeds and invader plants.
	Preservation and development of Agricultural Land Bill (Gazette No 43723, 17 September 2020)	Provide principles for: <ul style="list-style-type: none"> • Management of agricultural land. • Evaluation of agricultural land evaluation and classification. • Preparation purposes and content of provincial agriculture sector plans. • Declaration of protected agriculture areas. • Providing general objectives of Agri-ecosystem management, Agri-ecosystem authorisations.
	Fencing Act, No 31 of 1963	Regulates all matters relating to fencing
	Mineral and Petroleum Resources Act	To make provision for equitable access to and sustainable development
PROVINCIAL		



ENVIRONMENTAL & CONSERVATION	Limpopo Environmental Management Act No 7 of 2003 (LEMA)	Regulates provincial conservation issues
---	--	--

2.1 Other legal compliance for project

Applications for the project includes the following Departments:

2.1.1 DFFE: Department of Fisheries, Forestry and Environment

2.1.2 DWS: Department of Water & Sanitation

2.2 The POPI Act is also applicable to the EIA and associated processes.

2.3 Relevant Provincial-and District Municipal planning documents

2.3.1 Capricorn District Spatial Development Plan (September 2017).

2.3.2 Limpopo Conservation Plan v2. Technical Report. (September 2013).

2.3.3 Capricorn Bio-Regional Plan (February 2019).

3 LOCATION AND DESCRIPTION OF PROPOSED ACTIVITY

Project locality

The project is situated ± 120 kilometres north-west of Blouberg Local Municipality, between the R527 and the Limpopo River and accessed via the district road along the river, in Capricorn District in the Limpopo Province.

Appendix A: Locality Map and Surrounding Land Uses

The co-ordinates (WGS84) of the proposed sites are supplied below. Figure 2 provides the locality of the site for the project.

The co-ordinates (WGS84) of the proposed site are approximate:

(i) Dam (Preliminary center position)

Latitude 22°47'23.36"S and Longitude 28° 9'34.04"E.

(ii) Pipeline (Preliminary positions)

From (Start point) **Latitude 22°46'38.38"S and Longitude 28° 8'32.55"E.**

To (Middle point) **Latitude 22°46'59.95"S and Longitude 28° 8'45.84"E.**

To (End point) **Latitude 22°47'23.32"S and Longitude 28° 9'28.76"E.**

Figure 1 below provides the location of the farm in a broader geographic context.



Kleine Pos 420 MR: Die Berg Dam

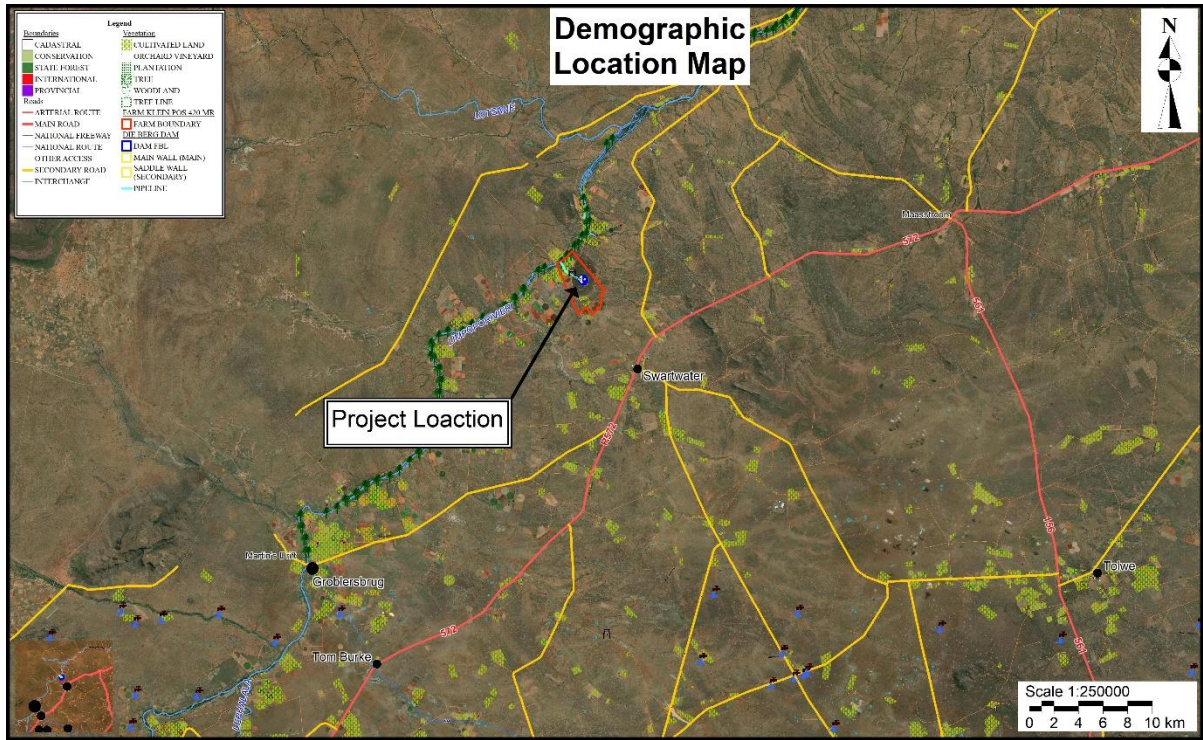


Figure 1: Demographic location of project

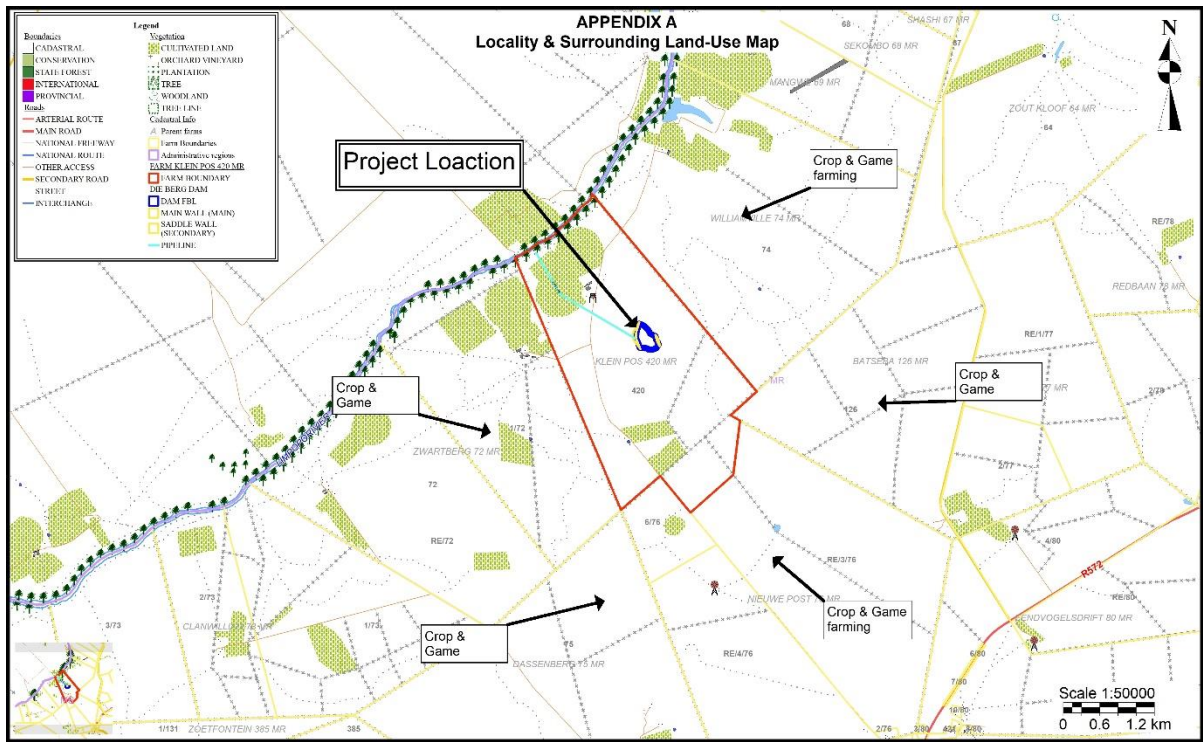


Figure 2: Locality & Surrounding Land Use



Description of activity

The proposed project is for clearing of indigenous vegetation for the construction of an off-stream storage dam and related infrastructure for storing water and for crop irrigation purposes. The proposed site was identified by the applicant representative after which the necessary surveys were conducted as well as the EIA process.

There is an ELU (Existing Lawful Use (No. 27/2/1/A42E/420MR/0-35) dated: 7 December 2018 from DWS. A *Water Storage Licence* still needs to be obtained as well as a *Licence to construct a dam* and a *Dam Safety Licence* which is in the process and facilitated by the dam engineers of the project.

Nature of Activity

- The project is an agriculture development and will consist of clearance of indigenous vegetation
- Storage dam will be constructed for storing water and for crop irrigation.
- Existing pipe infrastructure being used for pivot irrigation to be utilized. Where pivot pipelines end, the feeder pipeline will be extended up until the dam.
- An area of ±20 ha was identified for the project footprint area

Competent authority consultation

- Pre-application meeting: 8 June 2023

Environmental Regulations

The following listed activities have been identified and was discussed during pre-application meeting with LEDET:

- Regulation 983, 4 December 2014. Listing Notice 1:
Activity 9(i): The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water with an internal diameter of 0,36metres or more and **(ii)** with a peak throughput of 120 litres per second or more.
- Regulation 984, 4 December 2014. Listing Notice 2:
Activity 15: The clearance of an area of 20 hectares or more of indigenous vegetation.
Activity 16: The development of dam where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 metres or higher or where the high-water mark of the dam covers an area of 10 hectares or more.
- Regulation 985, 4 December 2014, Listing Notice 3:
Activity 12 (e): Clearance of an area of 300m² or more of indigenous vegetation:
(ii) within CBA 1 as per Capricorn Bioregional Plan.

Screening Tool

The Screening Tool was also sourced and used as reference in the planning of the project.

A Verification Report on the Screening Tool was submitted with the application.



4. DESCRIPTION OF THE ENVIRONMENT THAT MAY BE AFFECTED

4.1 Present environment

4.1.1 Land use

Kleine Pos 420 MR is agriculture land currently used for crops- cattle and game. Adjoining land uses are croplands, cattle, and game farms. Refer to Figure 3 which indicates the PAA.

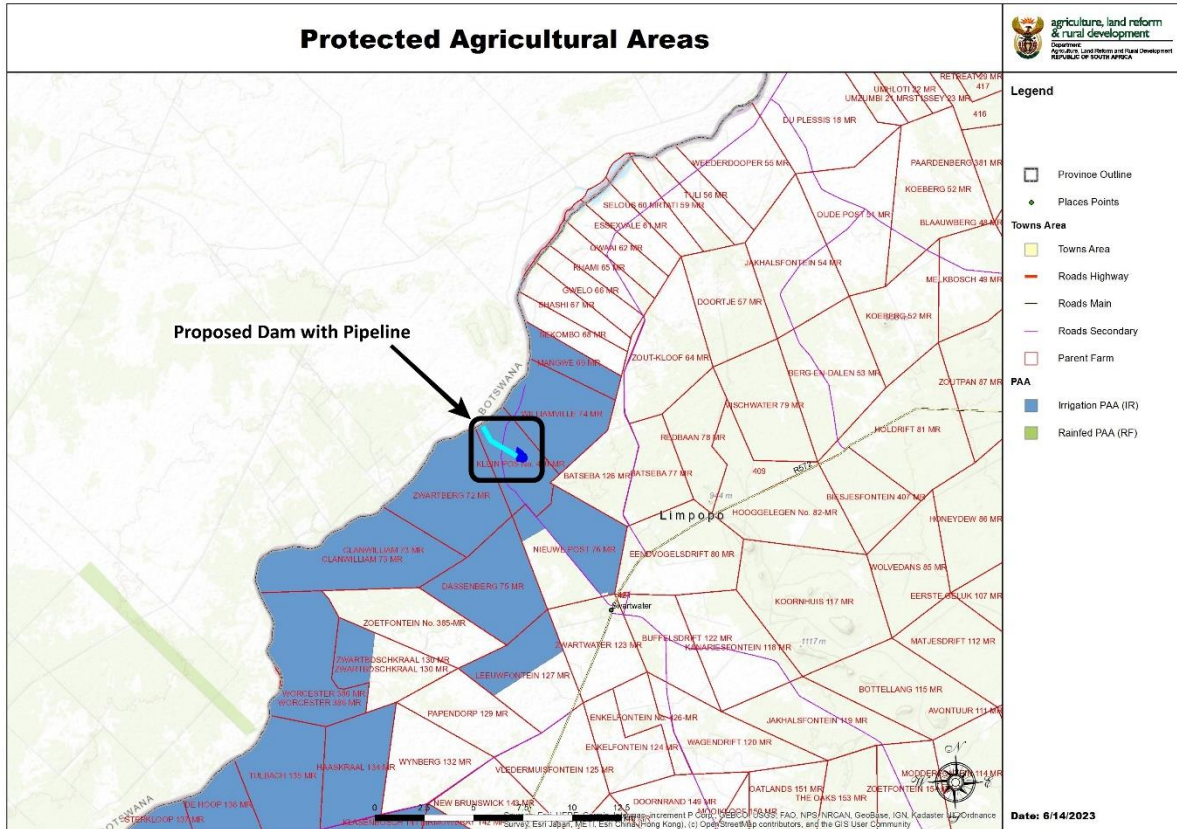


Figure 3: Protected Agriculture Areas

4.1.2 Topography and drainage

The general topography is in the Limpopo Plain Eco-region parallel to the western section of Limpopo Valley (western) and shallow valleys to the south and north that drains the inland plains towards the Limpopo River. The flow of the river is from west to east. The Limpopo River can be described as a non-perennial river with peaked flow in rainy period (December-March). Inland watercourses drain towards the Limpopo River and the catchment areas transformation has a marked influence on the quantity and quality of the rivers water. The catchment identified and delineated for the proposed Die Berg Dam, forms part of quaternary catchment A50J.



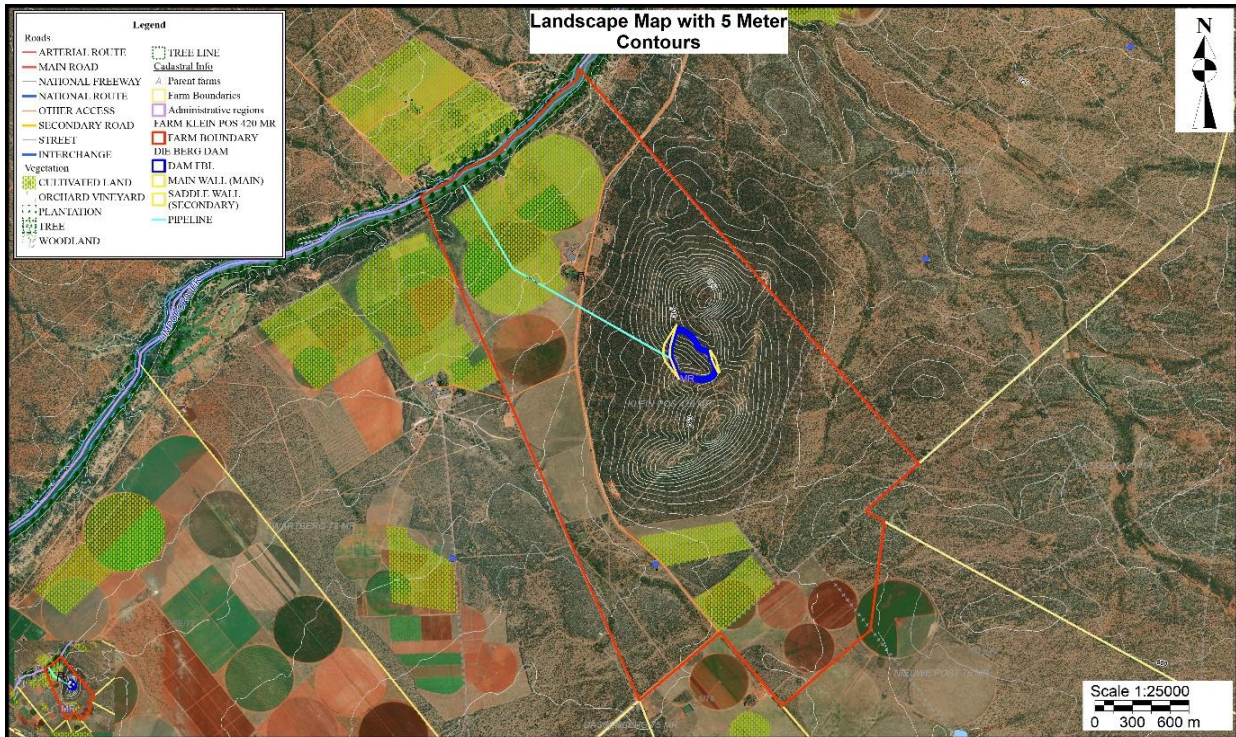


Figure 4: Contour and drainage for project footprint

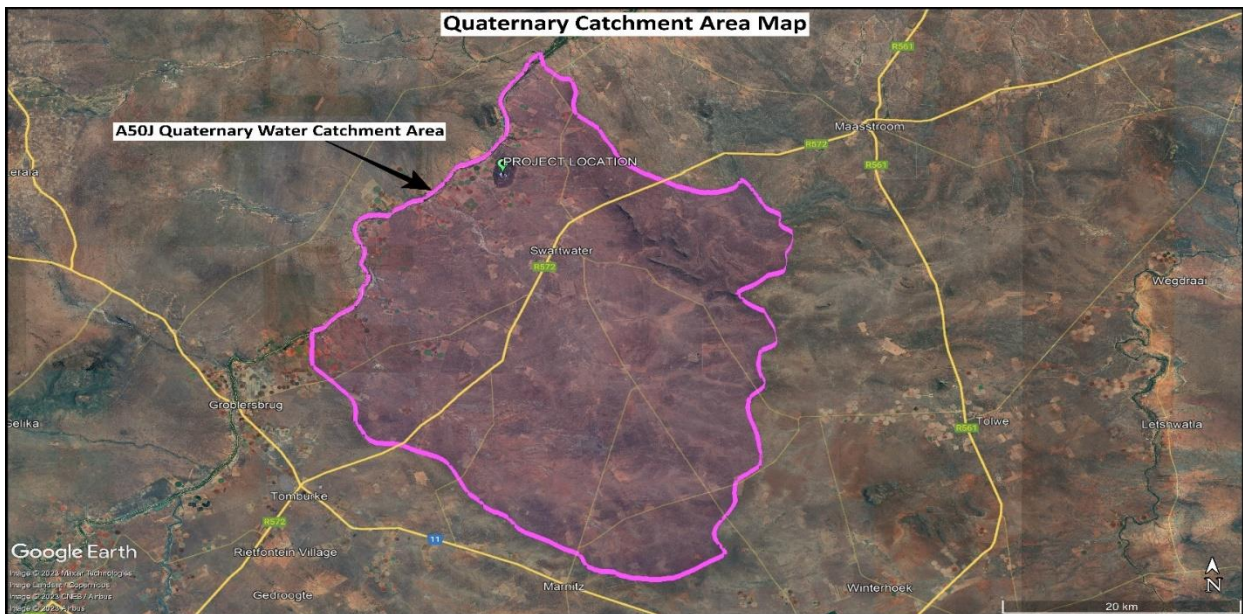


Figure 5: Quarterly catchment area (DWS)

4.1.3 Climate

The mean annual rainfall for the quaternary catchment A50J is given as **391mm** (with the average being 300 – 500 mm p.a.) and somewhat erratic precipitation for the Savanna type regions, with climate as semi-arid subtropical. The summer conditions are very hot in the Limpopo River basin. Rainy season lasts from about November to March, with the peak falling in January. Winds are light to moderate and blow mostly from the north-eastern sector. Almost frost free.



SVcb 19 Limpopo Sweet Bushveld

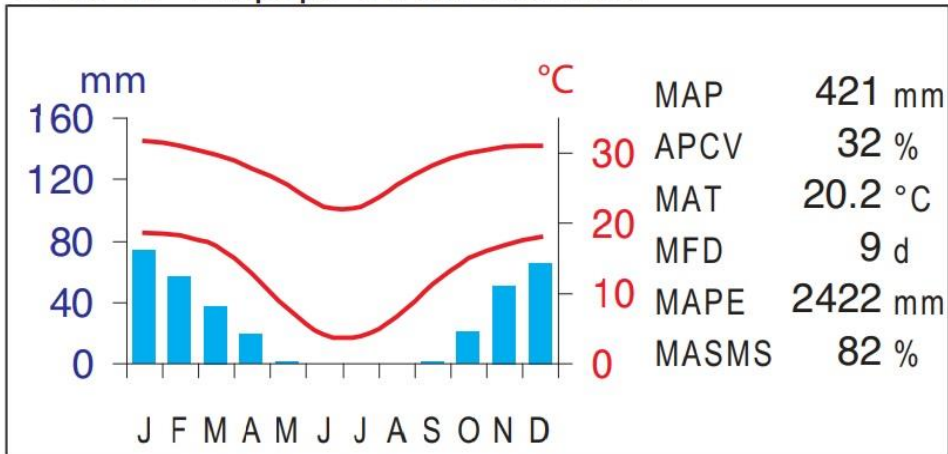


Figure 6: Climate Diagram for SVcb 19 Limpopo Sweet Bushveld

Temperature

In the Köppen climatic classification, the Limpopo River basin falls into several different classes (Köppen 1918; Rosenberg 1999; Rubel and Kottek 2010):

- The basin is classified as Tropical, Arid and Temperate.
- The western river valley, Arid, dry, and hot: **The location for the project.**

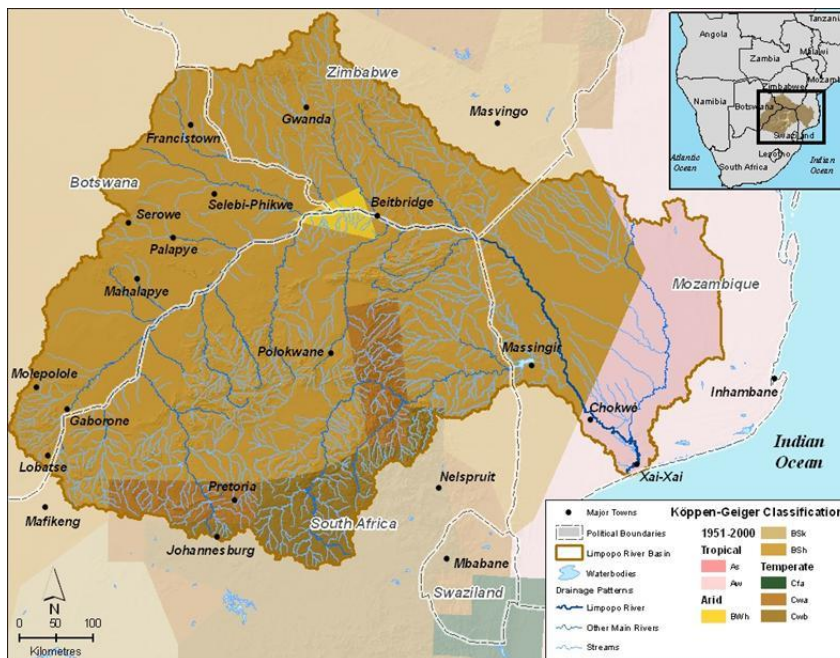


Figure 7: Köppen-Gieger Climate Classification for the Limpopo River basin.

Run-off

The map below, shows estimated general water balance for the Limpopo River basin. It shows water stress in terms of run-off as a ratio of water use. The project area is located on the margin of 15-20 mm (upstream) and 15-20mm run-off (downstream).



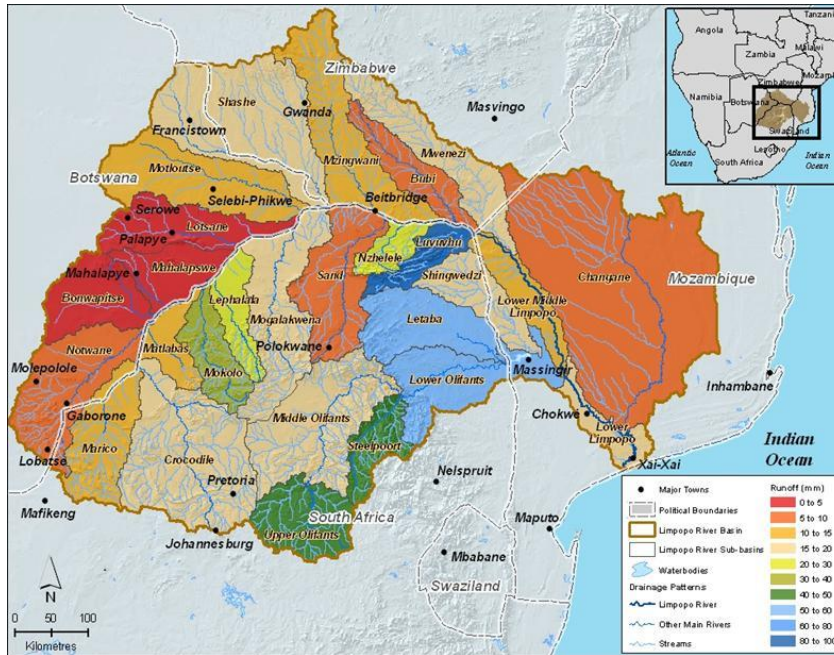


Figure 8: Mean annual run-off (mm/yr) - an estimate of natural water resources in the Limpopo River Basin

Water Balance

This concept is used to understand availability and the overall “state” of water resources in a hydrological system, considering all the inflows and outflows into and from the basin.

The map below shows the estimated general water balances for the Limpopo River basin, calculated as a ratio of run-off against water use per sub-basin. Four of the sub-basins are “in balance”, two which is in South Africa of which one is the sub-basin **in which the project is located**.

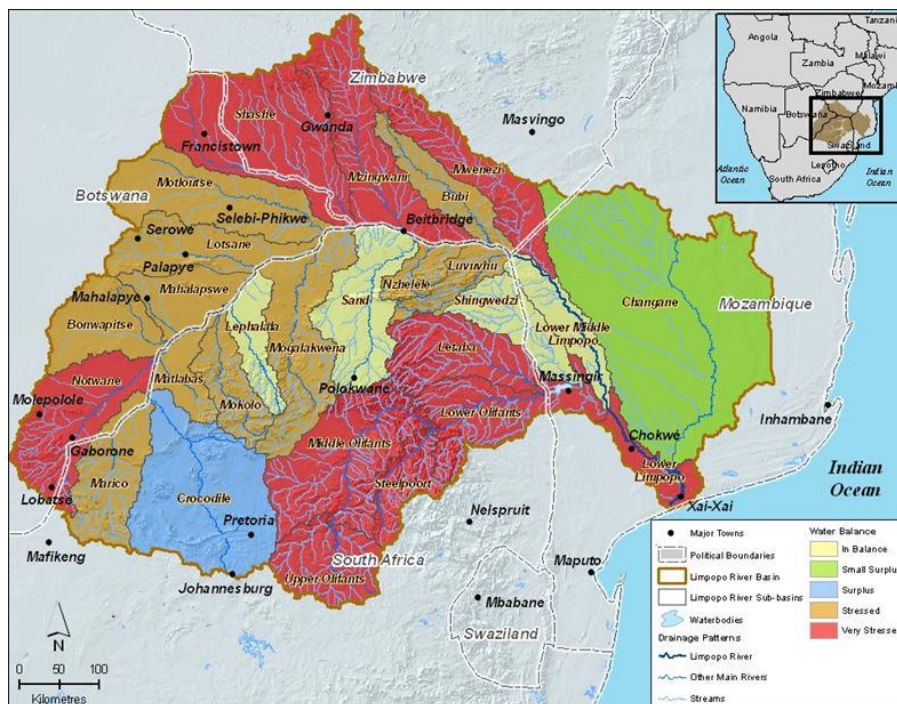


Figure 9: Estimated general water balance for the Limpopo River basin.



4.1.3 Regional Geology

According to PG consulting engineers (Engineer Design Report compiled by Mr M.F Joubert), the general geology in the specific area consists of sedimentary rock. From the GIS database the geology consists of leucogneiss with metaquartzite, hornblende granitoid gneiss, amphibolite, metapelite and calc-silicate rocks. At some places in the vicinity intrusive quartzite/gneiss bedrock daylights above ground level. It is expected that the underlying bedrock, at some places on the proposed centre lines, may be very shallow. This will allow for proper founding conditions, once opened, cleared, treated and voids grouted, where necessary. However, continuous (solid) bedrock founding conditions is not expected.

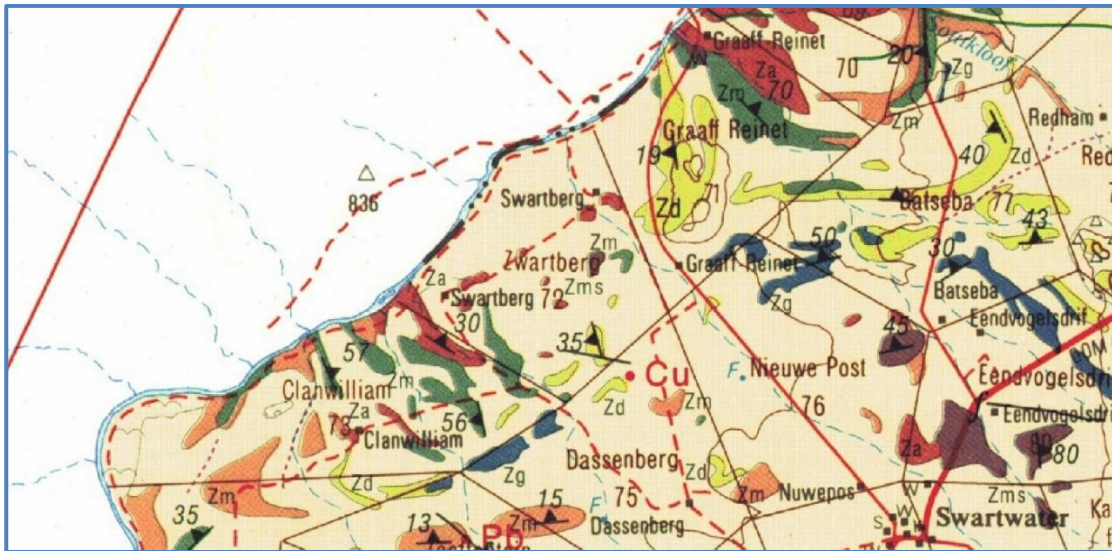


Figure 10: Geology of region

4.1.5 Soil characteristics

Soil types are mainly dark reddish brown poorly graded silty/clayey sand, dark brown clayey sand and light red orange poorly graded clayey sand. Soil properties were tested (by Tzaneen Lab) for preliminary foundation indicator and double hydrometer testing as well as Proctor MOD testing. Four samples within the basin area of the dam were sampled and the results are summarised in the Engineer Design Report.

4.1.6 Biological aspects

4.1.6.1 Vegetation

Biome: Savannah

Physiographic region: Limpopo valley

Veldtype: Acocks Veld Type no. 15, which is classified as Sweet Bushveld. This Veldtype is well represented in declared conservation areas as well as private game farms. According to Mucina & Rutherford (2006), the study area is situated in the Central Bushveld Bioregion with veldtypes Limpopo Sweet Bushveld (SVcb 19).

No Red Data species were identified or found during surveys. Protected trees do occur such as Marula and Shepherd's Tree.

This Veldtype is the largest in the Limpopo and its Ecosystem Status is Least Concerned

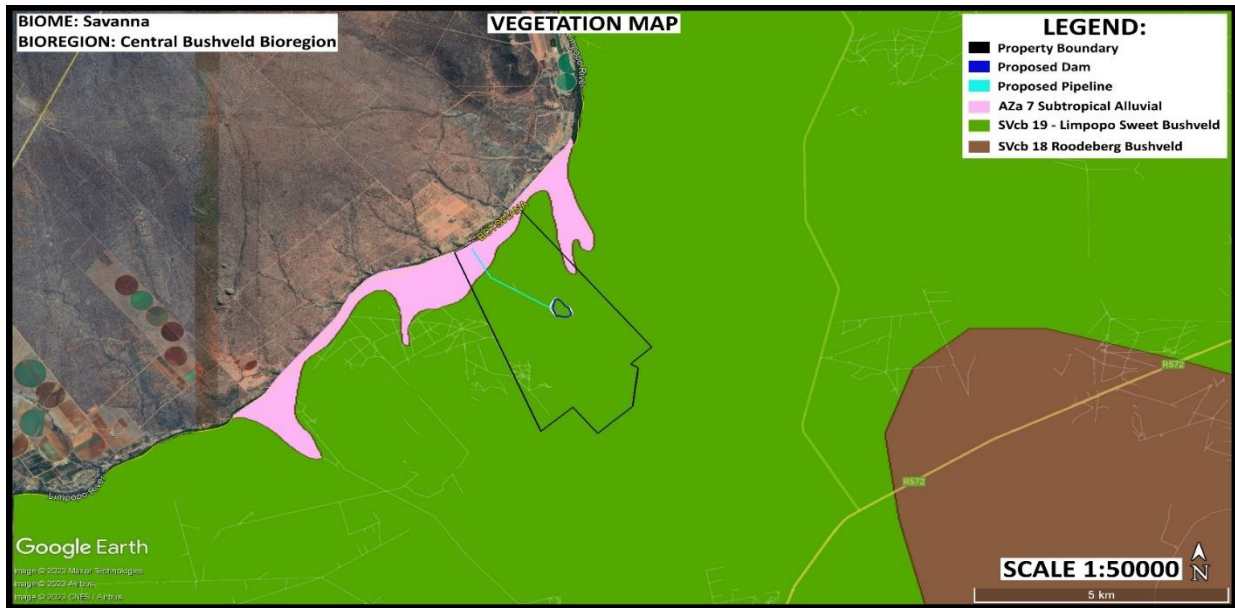


Figure 11: Vegetation map

4.1.6.2 Fauna

The project area has in effect been utilised (anthropogenic interference) over a period due to:

- Farming activities.
- Development of infrastructure.
- Human settlement.

Small mammal species are able to survive in quantities due to remaining habitat in relation to the available habitat and external impacts. The inclusive conservation measures implemented on the farm to protect wildlife also contributed to the current presence of indicator wildlife species of the area. Larger herbivores are present in the adjoining farms to the south, west and east; erection of game fences according to exemption specifications fenced the game into specific areas. Larger carnivores include leopard and brown hyena both as semi-permanent (part of home range from the south, east and west). No evidence was found of said sightings. The area has a low fauna biodiversity inland with higher levels along the Limpopo. No Red Data species were found on the project area.

4.1.6.3 Hydrology and drainage

The Limpopo River is the dominant hydrological feature. Groundwater is supplied from boreholes inland along the riverbank and from surface flow in the river. Two ephemeral watercourses (Stream Order 1) are located west and east outside of the project area and drains into the Limpopo River. Surface drainage is into this un-named ephemeral watercourse. Groundwater drainage is north-west wards. Drainage is mostly surface flow which collect in the ephemeral watercourse classified as an Order 1 Stream, which is the smallest, uppermost stream in a drainage system and is mostly surface flow.

Water Quality: Salinity



Salinity refers to the saltiness of water caused by the dissolution of minerals in rocks, soils and decomposing plant material. The level of salinity in a river, for instance, depends on the geological and climatic environments through which the river flows. Salinity increases on croplands, as salts are continuously added through natural and anthropogenic processes such as mining, industry, and agriculture, but are only minimally removed through technological interventions or diluted by precipitation (du Preez *et al.* 2000). High levels of salinity can lead to the salinisation of irrigated soils, diminishing crop yields.

Water quality in all reaches of the Limpopo River in Botswana and South Africa is dominated by high levels of sodium and chloride. Although naturally occurring geological characteristics contribute to salinity to some extent, poorly managed irrigation systems are the primary cause of high levels of soil and water salinity in the basin. Large-scale commercial irrigation systems utilise equipment and systems to manage salinity; however, smaller scale operations do not have access to this sophisticated equipment.

Sources of nitrates that influence water quality are fertilizers that has an input of nitrates which can lead to increase in growth of algae or aquatic plants and can lead to eutrophication. The (eutrophication) from return flow resulting from agriculture irrigation can result in an increase in nitrogen and phosphorous and is considered as pollution of the water resource resulting in (i) physical, (ii) chemical and (iii) biological changes in a water body, in this instance the Limpopo River. The water was tested as suitable for irrigation.

Salinity also influences water quality and is mostly a natural process of dissolution of minerals in rocks, soils, and decomposing plant material. Indiscriminate use of pesticides can also contaminate the soil – and water sources.

4.1.6.4 Sense of Place, Protected-and Cultural Areas, Viewshed and Biodiversity

Sense of place

The location of the project can be considered as deep-rural and demographically semi-remote access (Figure 1) from towns. Work opportunities are rare due to the remoteness and land use focused on ecotourism with game-and cattle farms and agriculture crop production mainly along the river. As work provider in a deep-rural area the project will contribute and ensure job opportunities. It is located in Protected Agriculture Zone which conforms with the existing land use in the surrounding area.

Protected Areas

No declared protected areas within a 10km radius.

Cultural Landscape

The project is not located near a Cultural Landscape World Heritage Site (MCLWHS). Archaeological Surveys and a desk-top Palaeontology Report was conducted. Refer to Appendix D.

Viewshed



The dam wall and water surface will not blend in with the surrounding area and will lessen the aesthetic quality of the area (visual intrusion). However, the location does not offer a high degree of visibility.

Biodiversity

The area footprint is indicated as located in CBA 1, ESA1¹ and ESA2. The area has been surveyed and information verified as being Other Natural Areas and Ecological Support Area2 as more realistic². Connectivity has been moderately altered by past human activities. The highest biodiversity is found along the Limpopo River and associated riparian vegetation. The map below provides a sense of place of the proposed footprint in relation to the CBA areas where the highest proportion of biodiversity will be found. After development it will change to Ecological Support Area 1. It will contribute to the connectivity role by the creation of an aquatic habitat.

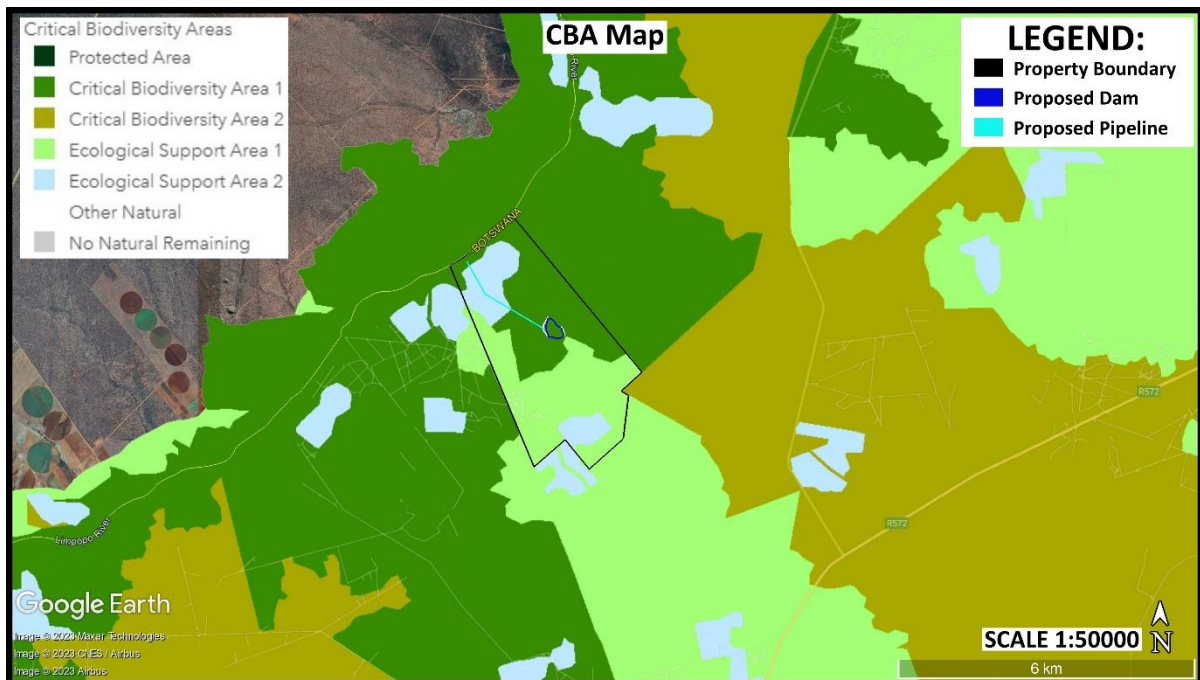


Figure 12: Critical Biodiversity Area Zoning

5. PUBLIC PARTICIPATION PROCESS

Documentation provided in:

Appendix B: Public Participation Process

5.1 Objectives of public involvement program for Draft EIA

The objectives of the Public Involvement Program were:

- Distribution of Draft EIA to registered I&APs and authorities to inform them of the proposed project and to obtain their (relevant) concerns and/or comments.
- Ensure that the I&APs concerns, attitudes, and perceptions are addressed in the Final EIA.

5.2 List of interested and affected parties

The interested parties can be categorized in the following groups e.g.:

¹ LEDET Conservation plan. 2013.

² Ecological, Red Data and Biodiversity Assessment Report.



- ❑ Blouberg Local Municipality – Environmental Management.
- ❑ Capricorn District Municipality – Environmental Section.
- ❑ Department of Water Affairs and Sanitation.
- ❑ Department of Agriculture, Land Reform and Rural Development.
- ❑ Farming neighbours and water users downstream.
- ❑ TLU Agriculture Union SA represented by Swartwater District Agriculture Union.
- ❑ Limpopo Department Economic Development, Environment and Tourism.
- ❑ SAHRA.

5.3 Interested party's process

The broad aim of the public involvement process is to provide interested and affected parties (I&AP), authorities and specialist interest groups the opportunity to identify issues and concerns regarding the development of new resort projects. The participation process also assists in the identification of ways in which concerns can be addressed and alternatives considered.

5.4 Approach to Public Involvement Program

The Public Involvement Programme was undertaken as illustrated in the following flow diagram in Table 2 below as submitted in the Final Scoping Report and Plan of Study:

Table 2: Public Participation Process

ACTION	METHOD	DATE & TIME	RESULTS
Advertisements: News Paper (Appendix B1)	A notice placed in the Observer	4 May 2023	Original copies of advertisements are attached. Responses: none was received
Advertisements: Notices (Appendix B2)	Posters placed at: 1. Entrance gate of project (Farm Kleine Pos 420 MR) Coordinates: 22°47'1.52"S 28°9'5.98"E 2. South-Western corner of project farm (Farm Kleine Pos 420 MR) Coordinates: 22°48'35.74"S 28°9'43.02"E 3. NTB (Farmers & General store) Swartwater Coordinates: 22°50'49.21"S 28°12'29.97"E 4. Entrance to Swartwater Farming union premises Coordinates: 22°51'23.22"S 28°12'20.57"E	Attached on the 26 th and 27 th April 2023	No response was received.
Notifications to I&AP (Appendix B3)	Nine Notifications were sent by e-mail. Refer to Register.	1 May 2021	Mr F. Terblanche sent an email on 01/05/2023, Mr T. Machate sent an email on 02/05/2023 and Mr C. Botha send



Kleine Pos 420 MR: Die Berg Dam

			an email on 12 June 2023.
Swartwater Boerevereniging meeting	Attended monthly SBV meeting to inform members of the application and EIA process	26 April 2023	The attendees at the meeting were informed of the application and were informed of the PPP.
Pre-application meeting with LEDET (Appendix B4)	Pre-application meeting held with LEDET to discuss project	8 June 2023	Refer to appendix B4 for discussion outcome
DRAFT Scoping-and Plan of Study (Appendix B5)	Distribution: <ul style="list-style-type: none"> • registered I&AP's; • LEDET 	22 June 2023 26 June 2023	Comments will be processed when received No comments were received
DRAFT EIA Report (Appendix B6)	Distribution: <ul style="list-style-type: none"> • registered I&AP's; • LEDET 	12 September 2023 13 September 2023	Comments will be processed when received

The correspondence for the Public Participation Process was included in the Scoping Report & Plan of Study. Comments received (and response by EAP) on Draft EIA report will be included in the Final EIA report.

5.5 Comments received (on Notices, Advertisement and Scoping Report)

- Advertisement: None
- Notice Board: None
- Notification of project: Mr F. Terblanche sent an email on 01/05/2023, Mr T. Machate sent an email on 02/05/2023 and Mr C. Botha send an email on 12 June 2023 (See Appendix B3).
- Scoping Report
No comments on the Scoping Report & Plan of Study were received from the I&AP's or from LEDET.
- Draft EIA Report
This report will be distributed to Registered I&AP's.
Comments received will be included in the Final EIA.

Refer to attached Register of Report distributed as well as Response Register. Appendix B.

6. **NEED AND DESIRABILITY OF ACTIVITY**

There are two strategic issues that should be considered in this application. Firstly, is the storing of water and using of water and land in a sustainable way contributing to **sustainable food production**. Secondly the process has an offset that can **benefit the ecological processes** and biodiversity and support the terrestrial biodiversity.

Measures taken by the conservation farming activities by farmer(s) is a positive contributing factor to sustainable use of water from the Limpopo River without placing further "stress" on the system and the



unique biodiversity it supports. This will be achieved by storing water in the storage dam and monitor water sources by water meters as per license condition.

Need:

Storage Dam

- The Area has been zoned as Protected Agriculture Areas by (former) DAFF in 2021 under *Preservation and Development of Agricultural Land Bill. 18 September 2020*; Capricorn Spatial Development Plan (2017) zoned the area for agriculture and the area has also been identified as a high priority agricultural area by the screening tool. Thus, three sources indicate suitable agricultural land and Croplands are inevitably present. Sufficient and constant water supply is needed and essential for cropland irrigation and will optimise the production of the land.
- Sufficient water supply (due to storage of water) in drier seasons to produce specific climate sensitive crops contributes to food security.
- Provide job opportunities and financial security (socio-economic benefits) for families in deep rural areas.

The minimum climate zone (>15), as indicated in figure 13 below, for the project area is conducive for crop farming for producing specific products “out of season” (autumn, winter and spring). This aspect is important as mentioned by Benhin (2008) that climate and water is important for sustainable crop production in Limpopo Province.

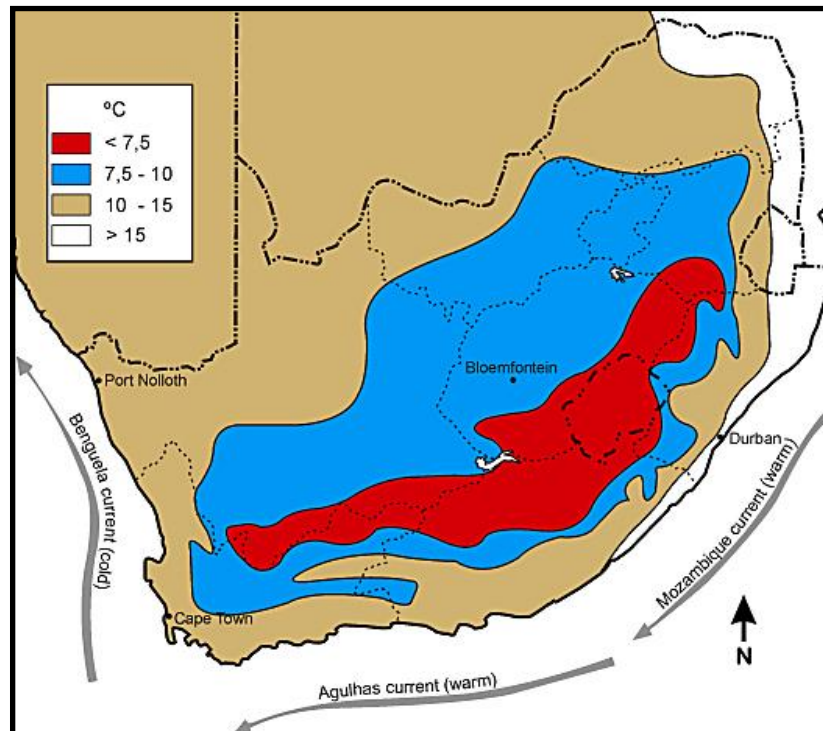


Figure 13: Minimum climate zones for South Africa

Desirability of activities:

Storage Dam



Kleine Pos 420 MR: Die Berg Dam

- Proper and timeous irrigation of croplands for production of crops will contribute to the demand capacity for food. It also supports the in-and output value chain (service providers and product receivers) related to the project, which is located throughout the province and South Africa.
- The existing croplands will make use of the allocated water and suitable land. This is a culmination of the strategic planning by the applicant for sustainable farming by using the resources available.
- The storage dam has the benefit to store water in a period when water recharge in aquifers is at its lowest, e.g., mid-to-late winter. The water quality is also better as no leaching of saline water into aquifers take place.

Downstream users

- The farm Kleine Pos 420 MR is one of 16 irrigation farms on the Limpopo River over ±35 km from Groblersbrug Port of Entry and downstream. Water is extracted due to concentration of farming activities along the Limpopo River. It was developed as an Agriculture Development Node by previous government.
- Downstream water users include mainly crop-, cattle-and game farming.
- Downstream users will not be affected as now new water allocation was required.

Biodiversity

- Ecological reserve: The quantity and quality of water required as ecological reserve is defined to satisfy basic human needs by securing a basic water supply, as prescribed under the Water Services Act, 1997 (DWAF, 2004). The reserve is also to protect aquatic ecosystems to secure ecologically sustainable development and use of the relevant water resource as indicated in the National Water Act, 1998.
- Assessment of Ecological Status of sub-basins of the Limpopo River Basin. The classes are Environmental Management Classes (EMC), ranging from A (close to natural, B (relatively un-impacted status), C (slightly modified) and D (highly modified).
- The project is in Ecological Status of D.



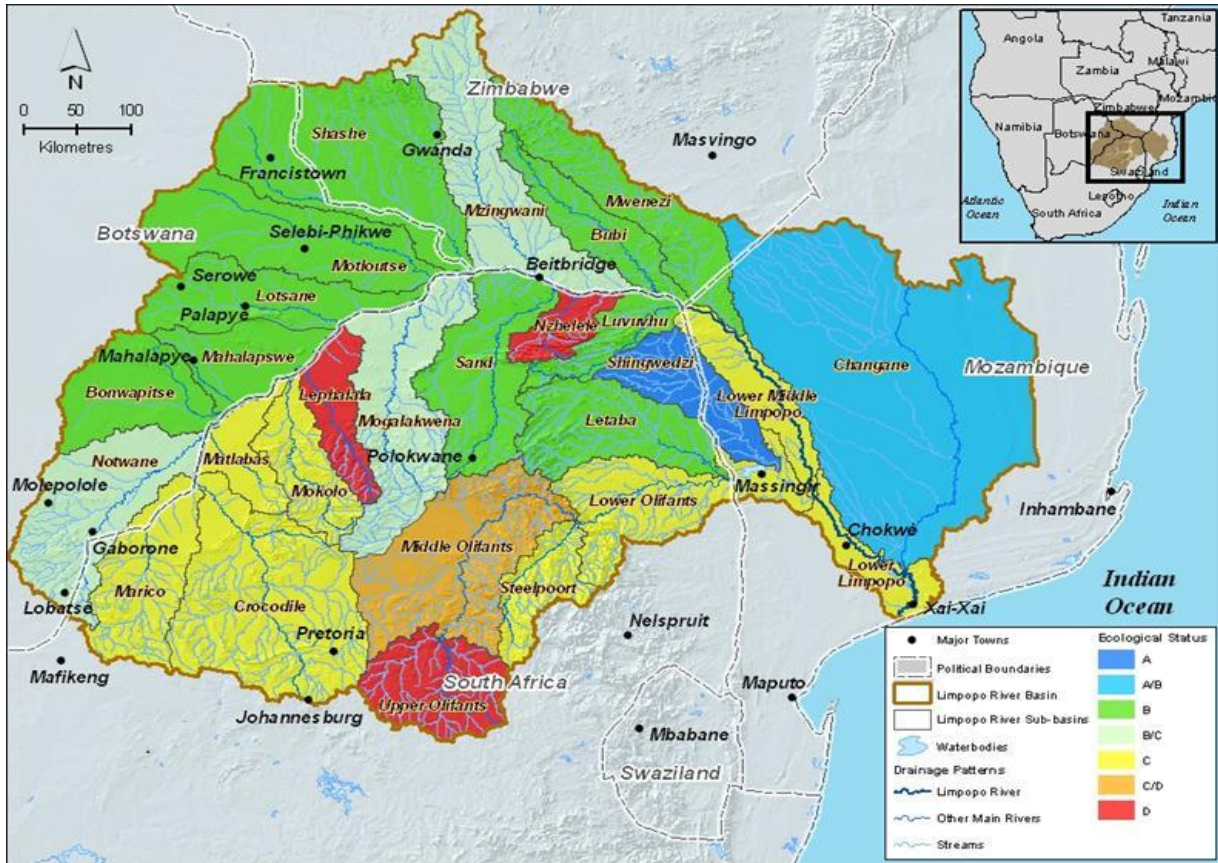
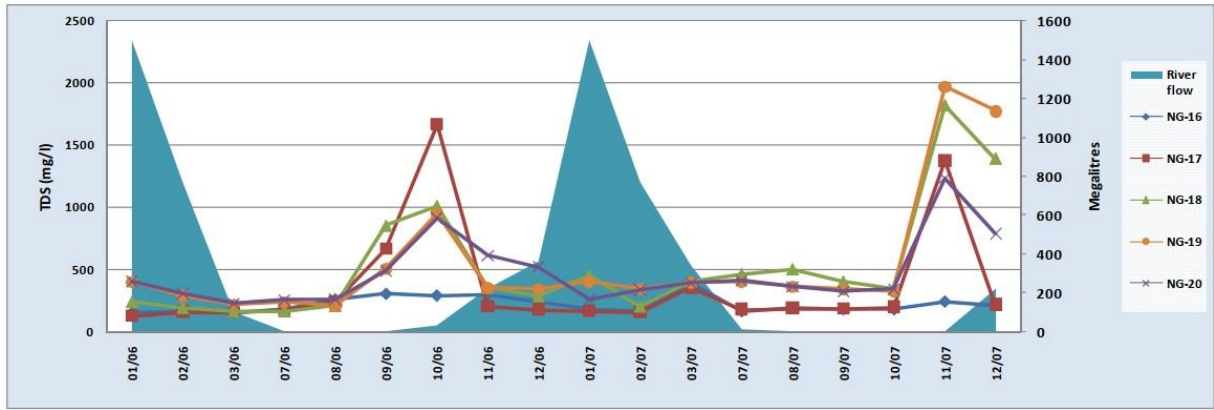


Figure 14: Preliminary Assessment of Environmental Water Requirements for the Limpopo River basin.

Development from the 1960's (using monochrome aerial photos), when farming commenced along the Limpopo River resulted in groundwater being used along the riverbank and from surface water from reservoirs created by weirs constructed in the river. "Over" pumping (by localized well-fields) firstly can result that water quality deteriorated due to rising salinity. Secondly the water table can lower in some instances where the primary riparian canopy trees as well as understory trees and shrubs where the available water level was lower than the root system. Collectively the two factors on availability and quality can be fatal to some of the riparian vegetation. A third factor was the placing of access points to the riverbank and riverbed for the extraction of water, this further weakened the stability of the riverbank and resulted in undercutting and erosion and localized collapsing of the riverbank and vegetation. By storing water in storage dams pumped when the Limpopo River is in spate will place less stress resulting from low flow pumping.



The chart shows the months of September and October experiencing rapid increases in salinity in certain boreholes and rapid reduction in salinity on commencement of river flow.

It is a combination of less water available for riparian vegetation which is aggravated by the increase of the salinity (pollution) of the primary aquifer source, the Limpopo River in the “water stress” months of winter and early summer.

7. **CONSIDERATION OF ALTERNATIVES**

PROCESS IMPLEMENTATION

Key criteria when identifying alternatives are that they should be “practicable”, “feasible”, “relevant”, “reasonable” and “valuable”.

The above was attained by and/or during:

- Pre-feasibility stage
- Map evaluation based on task parameters
- Site visits with team members
- Consultation with interested and affected parties
- Environmental field surveys
- Design options
- Economic/cost implications
- Measuring against attaining primary objective(s)

7.1 Activity alternative

ACTIVITY ALTERNATIVES	
KEY WORDS	Activity alternative is also known as project alternative
PROJECT TEAM INVOLVEMENT	
Professional	Role
Applicant/EAP	Objectives of: <ul style="list-style-type: none"> • Strategic agricultural plan of applicant • Sustainability
Applicant	<ul style="list-style-type: none"> • Propose footprint for strategic plan



	<ul style="list-style-type: none"> • Contribution to agriculture value chain
Environmental/Archaeology/Ecology and Biodiversity	<ul style="list-style-type: none"> • Compliance with heritage objectives • Compliance with water management objectives • Compliance with biodiversity objectives • NEMA/CARA legislation • Identify suitable footprint • Provide information on footprint location • Provide information on receiving environment
CONSIDERATIONS	
Specific considerations	Specific motivation
(i) Irrigation options	<ul style="list-style-type: none"> • Can storage dam be constructed on area identified? • Use specialist reports for defining footprint.
<p>Motivation Storage dam</p> <p>(i) Receiving environment is suitable</p> <p>(ii) Impacts on biodiversity can be mitigated by sustainability planning.</p> <p>Motivation Collective</p> <p>(i) Best sustainable options for preventing irreversible loss of biodiversity.</p> <p>(ii) Ecological process can still function and support ecosystems.</p> <p>(iii) Aquatic/fresh water ecosystem connectivity will be created with new open water habitat</p> <p>(iv) Sensitive areas are excluded from development footprint.</p> <p>(v) Thus, inclusive, and collective input in planning can provide positive outcomes.</p> <p>(vi) Has a high value for food security production and social benefits.</p>	

7.2 Design alternative

DESIGN ALTERNATIVES	
KEY WORDS	Considerations are construction materials, aesthetics and attempting to optimise on design to be included and accepted as part of the project description
PROJECT TEAM INVOLVEMENT	
Professional	Role
Owner and manager	To provide footprint which comply with legislation and department planning documents and best options. Environmental objective: Environmental acceptable and compliance with maintaining biodiversity objectives by



	layout/offsets/mitigation/farming & irrigation techniques/monitoring.
Client and EAP	Evaluate layout alternatives for best options as required for maximum effectiveness and attaining objectives and to mitigate impacts
Client	<p>Objectives</p> <p>(i) Strategic objectives</p> <ul style="list-style-type: none"> • Comply with international and national legislation/standards • Allow for compatible footprint layout • Sustainable use of natural resources <p>(ii) Operational objectives</p> <ul style="list-style-type: none"> • Maintenance of a soft footprint and system infrastructure • Water according to quantity and quality needs. Implement a Water Monitoring Program • Excluding sensitive areas from footprint • Implement mitigating management plans • Implement Water Monitoring Program according to receiving environment
EAP	<p>Consider the design outlay of croplands according to professional information and I&AP's input for:</p> <ul style="list-style-type: none"> • Spatial planning • Sensitive areas • Location • Biodiversity • Heritage sites • Sustainable use of renewable resources (especially water)
CONSIDERATIONS	
Specific considerations	Specific motivation
Design of facilities	<p><u>Environmental</u></p> <p>Prevent negative impacts on receiving environment:</p> <p>(i) Minimum removal of natural vegetation and <i>in-situ</i> preservation of <i>Ficus</i> tree which is considered as a “<i>tree-of-importance</i>”.</p> <p>(ii) Allow for preservation of sensitive plant communities (if present).</p> <p>(iii) Preventing conflict with wildlife by appropriate fencing</p> <p>(iv) Incorporate layout in habitats to allow for use by wildlife</p> <p>(v) Prevent pollution</p> <p>(vi) Implement integrated monitoring plans</p> <p><u>Heritage</u></p> <p>Mitigate impact on heritage issues</p>
Configuration of facilities	Can be implemented on footprint without any environmental constraints or parameters by agricultural-and engineering



	design/farming & irrigation activities/recommendations in specialist reports.
Prevention of erosion	Stormwater design in storage dam & cropland layout Retention measures for channelled water and energy breakers at all water outlets. Keeping natural watercourse with buffer zone. Divert water for natural water drainage patterns.

7.3 Location alternative

LOCATION ALTERNATIVES	
KEY WORDS	Considerations are location in area, receiving environment, construction materials, aesthetics, and attempting to optimise on design to be included and accepted as part of the project description
PROJECT TEAM INVOLVEMENT	
Professional	Role
Client	<ul style="list-style-type: none"> Compliance with legislation and standards for irrigation/water management (and farming) Water Management-and Monitoring Plan
Professional team	Assess receiving environment for correct placement of location in receiving environment with preventive/mitigation measures
EAP	Consider alternatives using specialist input
CONSIDERATIONS	
Specific considerations	Specific motivation: Environmental
Location: <ul style="list-style-type: none"> Storage Dam footprint 	Best area for dam will be used by using planning/indicators: <ol style="list-style-type: none"> Existing infrastructure Current location of croplands Location site for dam wall and full-board level has specific requirements that make location specific in placement
Location: Feeder pipeline for storage dam	Existing pipe infrastructure being used for pivot irrigation to be utilized. Where pivot pipelines end, the feeder pipeline will be extended up until the dam.
Location (Visual)	The planned location for the proposed footprint location and related development were considered as to having the least visual impact.
Location (receiving environment)	Storage dam and related infrastructure footprint is placed ± 800m away from existing crop area. No sensitive areas present. Design allows for corridors and connectivity. No negative influence on CBA requirements.
Land use	Project located in Protected Agricultural Areas (PAA) by DALRRD: Limpopo River Protected Area (2020). No change in land-use will take place. Remaining areas can still be used by game/cattle.



Management	Layout according to cropland and new development needs
Execution of proposal	Compliance with legislation for LEDET, DALRRD, DWS and DFFE Consideration. Accommodate environmental parameters of receiving environment.

7.4 Process alternative.

PROCESS ALTERNATIVES	
KEY WORDS	Best Practicable Environmental Option (BPEO) in considering alternatives for: <ul style="list-style-type: none"> • Technology • Equipment
PROJECT TEAM INVOLVEMENT	
Professional	Role
Client	Obtaining objectives
Environmental & Heritage	<u>Environmental objective:</u> <ul style="list-style-type: none"> • Environmental compliance • Conservation and biodiversity compliance • Best practices during construction phase <ul style="list-style-type: none"> - Meeting with developer and contractor to discuss EMP; - Request Method Statements from Contractor; - Conduct Site Handover; and - Induction to Contractor. • Best practices during operational phase (maintenance) • Ensuring environmental compliance by maintenance programme by implementing an environmental monitoring end compliance plan. <u>Heritage objectives:</u> Professional recommendations Implement a Management Plan
CONSIDERATIONS	
Specific considerations	Specific motivation
Specialist reports	Use reports as guidance and planning purposes. Implement and/or consider recommendations made by specialist reports. Reports and Technical Monitoring: <ul style="list-style-type: none"> • Water analysis • Irrigation plans • Ecological, Red Data and Biodiversity Report • Engineer Design Report • Archaeological Report • Integrated Monitoring Plan



Using technology	<ul style="list-style-type: none"> • Implement an Environmental Management Program with Water Monitoring program • Neutron Moisture Probes can be used in monitoring the: <ul style="list-style-type: none"> (i) Soil moisture content at various depth levels (ii) Soil temperature (iii) Salinity Using probes will serve as early warning signal for change in water quality on-site which could result in leaching to Limpopo River (and riparian vegetation) • Plant Moisture Stress can also be conducted along the riverbank to measure the stress that riparian trees experience because of over-extraction. • Monitoring water depth (quantity)-and quality (salinity) can also contribute to water quality-and quantity in the watercourses.
------------------	--

7.5 No-Go alternative

NO-GO ALTERNATIVES	
KEY WORDS	Also known as the “no-action” alternative. It assumes that the activity does not go ahead, implying a continuation of the current situation or status quo.
PROJECT TEAM INVOLVEMENT	
Professional	Role
Client	This is not an option as the objectives of construction of storage dam will not be attained.
Environmental	Objectives of applicant and I&AP’s will not be attained Mitigation is possible
CONSIDERATIONS	
Specific considerations	Specific motivation
Objectives	Compliance with legislation Attaining irrigation and farming objectives Sustainable use of natural resources for sustainable farming Including I&AP’s recommendations
Socio-economic	Provide security in socio-economic stability in rural setting Provide security for jobs in rural areas

7.6 Discussion

7.6.1 Activity discussion

The alternatives discussed indicate that the construction of a storage dam and its related infrastructure will be a positive contributor to the farming economy, sustainable use of natural resources and contribute to food security and rural job security on the farm. The total area of Kleine Pos 420 MR will not be developed and can still function as part of ecological systems. The area has been identified by



taking into consideration the location of the croplands. The landowner can use the land as it is zoned for agriculture, since a storage dam/irrigation plan is an essential part of farming. The assessment process uses the processes to integrate expectations of role-players into a development plan using the planning elements and relevant input and data to integrate ideas and expectations for a positive outcome.

7.6.2 Design alternative

Design had to accommodate the croplands lay-out onto the receiving environment. This was done by identifying the various aspects of the terrain and adapting the lay-out footprint taking into consideration the distance to lands and farming infrastructure.

7.6.3 Location alternatives

The proposed location is the best option for placing of the storage dam, also due to gravity irrigation that can take place during loadshedding periods due to the dam's elevation above ($\pm 50\text{m}$) the croplands. The placing was done by using the recommendations from the specialist reports and considering the mitigation measures. No sensitive areas are present. The site does not have a high visibility due to location of the receiving landscape.

7.6.4 Process alternatives

Collectively the new storage dam and croplands will be economically viable with the existing Lawful Water Use allocated. The developer can attain their strategic farming objectives by using the identified area for which the layout was planned according to various professional inputs monitoring programs that can identify future water quality impacts and plan preventative intervention management actions. Irrigation specialists will design and implement an effective irrigation plan as mentioned in subparagraph 7.4 above. Continuous monitoring of the receiving environment in respect of the water sources and its potential influences will be the benchmark's used for early detection of change and will be implemented after environmental assessment process has been completed.

7.6.5 No-go alternative

This option can only be considered if the assessment and/or the other professional studies revealed a fatal flaw in the proposal and process and or where no other planning guidelines could correct or mitigate identified issues and/or flaws.

8. SPECIALIST REPORTS

Below is a list of specialist Reports with abbreviated findings. These reports are attached as:

Appendix C: Specialist Declarations of Interest

8.1 Archaeological Report

Appendix D: Archaeological & Paleontological Reports

The Screening Tool does not indicate any sensitivity of the area, irrespective of this an Archaeological & Paleontological Study was conducted. The activities are not expected to manifest in impacts on heritage resources as no heritage resources were recorded in the Project area. The impact to heritage resources is low provided that the recommendations in this report are adhered to, based on the South



African Heritage Resource Authority (SAHRA) 's approval. A chance find procedure and protocol is contained within the EMP.

8.2 Ecological-, Red Data and Biodiversity Report

Appendix E: Ecological, Red Data and Biodiversity Report

The objective is to assess the receiving environment found on the footprint and to consider the impacts of the footprint. The survey findings will be used to describe and assess the placement of the footprint and to provide recommendations for mitigation in such a manner that will have the minimum impact.

Below is a summary of the findings and recommendations:

- (i) No Red Data species will be irreversibly lost.
- (ii) Terrestrial habitat and vegetation type (Least Threatened, Limpopo Conservation Plan) will be lost, the remaining habitats will keep functioning as corridors and as supporting ecological areas.
- (iii) A new aquatic habitat will be created by the open water which will be occupied by species associated with open water, this was proven in similar projects along the Limpopo River.
- (iv) Biodiversity loss will be minimal and will not influence fauna and flora community's survival.
- (v) Mitigation to prevent impacts can be implemented by an Environmental Management Monitoring Program during the development phase and a Water Monitoring Plan can provide information for the operational phase.
- (vi) The ecological reserve and biodiversity of the Limpopo River and other water bodies is not affected.
- (vii) No source of pollution was identified that could occur.

8.3 Engineer Design Report

Appendix F: Engineer Design Report

Serves as a design document for the construction of the Dam, to realistically estimate the quantities and costs of the proposed works, to make further decisions in this regard and to apply for approvals from DWS and LEDET in terms of the required licenses/authorizations.

8.4 Environmental Management Program (EMPr)

Appendix G: Environmental Management Program

Provides guidelines and parameters for construction and operational phases. The environmental compliance auditing will use the EMPr for compliance inspections. The EMPr will be replaced by a Monitoring-and Management Plan for the project in specific for conservation-and water quality-and quantity purposes.

9. **ADVANTAGES AND DISADVANTAGES OF THE PROPOSED ACTIVITY AND ALTERNATIVES ON THE ENVIRONMENT AND COMMUNITY**

9.1 Advantages of the proposed activity and alternatives

- i. The products (crops) produced and supplied to the agriculture industry value chain will ensure agriculture produce and related socio-economic benefits for related businesses. It is in line with National Strategic Infrastructure Projects 11: Agri-logistics and rural infrastructure.
- ii. The land use is in the Limpopo River Protected Area (Irrigation) as per national information.
- iii. The above contributes to the socio-economic aspects (creating work and opportunities, combatting poverty and crime) of the community(s) in a rural setting.
- iv. The remaining areas of the farm will still be used for game/cattle farming.



- v. Connectivity parallel will be towards/away from the aquatic ecosystem of the Limpopo River and will not influence its current functioning.
- vi. An integrated ecosystem is created and maintained consisting of an agriculture ecosystem, ecotone and a natural ecosystem.
- vii. The project will play a role in corridor functioning as water is an essential element for living biota in this arid landscape.
- viii. Water quantity and quality can be influenced positively and should be monitored and managed accordingly.

9.2 Disadvantages of the proposed activity and alternatives

- i. Natural terrestrial vegetation and habitat for species lost will be minimal, but a freshwater habitat will be created for species in its place which definitely adds value to the remaining natural vegetation and habitat. The permanent water will add diversity and resilience to the habitat.
- ii. Protected tree species will be destroyed in the footprint area.

10. ENVIRONMENTAL IMPACT DETERMINATION AND EVALUATION

10.1 Assessment method

The assessment of impacts will largely be based on DEA's (1998) Guideline Document: EIA Regulations. The assessment will consider impacts arising from the planning, construction, and operation phases of the proposed project both before and after the implementation of appropriate mitigation measures. Due to the inherent difficulties involved in attaching significance ratings to impacts, it is proposed that the evaluation of the significance of impacts be done according to the rating system described below. In any process of identifying and recognizing impacts, one must recognize that the determination of impact significance is inherently an anthropocentric concept. Duinker and Beanlands, (1986) in DEAT 2002.

Thompson (1988), (1990) in DEAT 2002 stated that the significance of an impact is an expression of the cost or value of an impact to society.

However, the tendency is always towards a system of quantifying the significance of the impacts so that it is a true representation of the existing situation on site. This will be done by using wherever possible, legal and scientific standards which are applicable. The significance of the aspects/impacts of the process will be rated by using a matrix derived from Plomp (2004) and adapted to some extent to fit this process. These matrixes use the consequence and the likelihood of the different aspects and associated impacts to determine the significance of the impacts.

The *consequence matrix* use parameters like *severity*, *duration*, and *extent* of impact as well as *compliance* to standards. Values of 1-5 are assigned to the parameters that are added and averaged to determine the overall consequence. The same process is followed with the *likelihood* that consists of two parameters namely *frequency* and *probability*. These values as shown in the following table are then used to rank the significance. It must be said however that in the end, a subjective judging of an impact can still be done, but the reasons for doing so must be qualified.



10.2 Aspects, related impacts, significance, and proposed mitigation measures

The assessment ordained the issues into main grouping characteristics where after they were assessed. Below is a chronological list of the groupings with the number of issues under each listed which was assessed.

- A. Biophysical Characteristics
- B. Ecological Characteristics
- C. Current and Potential Land-use Characteristics
- D. Archaeological-and Heritage Characteristics
- E. Socio-economic Characteristics
- F. Infrastructure Services
- G. Social and Community Services and Facilities
- H. Nature and level of present and future environmental pollution
- I. Risk and Hazard Characteristics
- J. Health and Safety Characteristics
- K. Cumulative and Synergistic Characteristics



Description	Definition	Ranking
Duration (D)	In order to accurately describe the impact, it is necessary to understand the duration and persistence of an impact in the receiving environment	5- Permanent 4- Long-term 3- Medium-term (5-15 years) 2- Short-term (0-5 years) 1-Immediate
Magnitude (M)	A description must be given as to whether an impact is destructive, or benign. It determines whatever the intensity of the impact on the natural environment or society is permanently, significantly changes its functionality or slightly alters it.	5- Very high 4- High 3- Moderate 2- Low 1-Minor
Extent (E)	The extent of the impact refers to the spatial dimension to which an impact will be felt (i.e. site, study area, local, regional, or national scale).	5- International 4- National 3- Regional 2- Local 1-Site only
Probability (P)	The criteria used for rating the likelihood of impact occurrence	5- Definite 4- High probability 3- Medium probability 2- Low probability 1-Improbable



FORMULA

Environmental Significance of each potential impact was assessed using the following formula:

$$\text{Significance Points (SP)} = (\text{Duration} + \text{Magnitude} + \text{Extent}) \times \text{Probability}$$

Maximum value is 75 Significance points (SP)

SP > 50	Indicates high environmental significance	The impact could influence the decision regardless of any possible mitigation An impact which could influence the decision about whether to proceed with the project or not
SP 25-49	Indicate Moderate environmental significance	The impact could have an influence on the decision unless it is mitigated. An impact or benefit which is sufficiently important to require management. Of moderate significance-could influence the decisions about the project if left unmanaged
SP < 24	Indicates Low environmental significance	The impact will not have an influence on the decision. Impacts will have little real effect, which should not have an influence on or require modification of the project design or alternative mitigation.
Confidence of outcome		Positive indicated as (+) Negative indicated as (-)



A BIOPHYSICAL CHARACTERISTICS										
A 1 LAND										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
A1.1	Erosion <u>Phase applicability:</u> <ul style="list-style-type: none"> • Construction • Operational 	Erosion will degrade the receiving environment and cause secondary-and tertiary impacts. Water channelled from the croplands can cause erosion. Roads and surface flow from altered landscape can cause erosion.	2	2	1	2	10	Low (-)	Low (+)	(i) Roads <ul style="list-style-type: none"> a. The existing farm management roads related to the storage dam areas must be upgraded by design to prevent erosion. b. Any altered water flow influencing the management roads should be designed to allow for water flow connectivity. c. During construction roads must be kept to the footprint. Any deviations on this instruction by the contractor will be penalised; refer to EMP for design. (ii) Land Water will drain via the land's layout in contours/drainage channels. The channelled outlets must be designed to prevent scouring and erosion.



Kleine Pos 420 MR: Die Berg Dam

<p>A1.2</p>	<p>Existing physical degradation of the local environment <u>Phase applicability:</u></p> <ul style="list-style-type: none"> • Construction 	<p>Previous human activities did leave distinct footprints and degraded areas</p>	<p>5</p>	<p>2</p>	<p>1</p>	<p>1</p>	<p>8</p>	<p>Low (-)</p>	<p>Low (+)</p>	<ul style="list-style-type: none"> • Development only on the cleared footprint • A buffer zone should be placed between the storage dam and croplands and remaining vegetation <p><u>Collectively</u> The Zoning Map provided with EMPr incorporates all the mitigating measures and proposals to prevent impacts on the remaining environment.</p>
--------------------	---	---	----------	----------	----------	----------	----------	----------------	----------------	---



2 FRESHWATER SYSTEMS										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
A2.1	Natural drainage patterns <u>Phase applicability:</u> <ul style="list-style-type: none"> • Planning • Design • Construction • Operational 	Altering natural drainage patterns can alter connectivity of hydrological systems	2	3	1	2	12	Low (+)	Low (+)	<ul style="list-style-type: none"> • The natural drainage patterns must be incorporated, by specific site design and Zoning Plan. • Erosion structures should be placed where necessary.
A2.3	Engineered drainage patterns <u>Phase applicability:</u> <ul style="list-style-type: none"> • Planning • Design • Construction • Operational 	Increased run-off due to stormwater outlets can result in erosion. Overflow outlet will create new drainage	1	2	1	2	8	Low (-)	Low (+)	<ul style="list-style-type: none"> • The stormwater planning for the project will be done to incorporate drainage from the storage dam (dam wall), pipelines and roads. • The <u>final design</u> includes stormwater and contour planning and will be controlled by the ECO and form part of the environmental management plan and Zoning Plan.
A2.4	Run-off because of hardening of surfaces or loss of the sponge effect of vegetation	Increased run-off from hard surfaces can result in erosion.	1	2	1	2	8	Low (-)	Low (+)	<ul style="list-style-type: none"> • The stormwater design must include water energy damping design measures at water diverters- and energy dissipaters.



	<u>Phase applicability:</u> <ul style="list-style-type: none"> • Planning • Design • Construction • Operational 									<ul style="list-style-type: none"> • This will be controlled by the ECO and included in the environmental management plan. • It must be included in the Zoning Plan.
--	---	--	--	--	--	--	--	--	--	--

3 CLIMATE

NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
A3.1	Rainfall patterns <u>Phase applicability:</u> <ul style="list-style-type: none"> • Planning • Design • Operational 	Effects on the development and receiving environment in which the footprint is located	3	2	1	3	18	Low (+)	Low (+)	The design and layout make provision for surface drainage from rain.

4 SENSE OF PLACE IN RECEIVING ENVIRONMENT

NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	



Kleine Pos 420 MR: Die Berg Dam

<p>A4.1</p>	<p>Wrong land use Wrong placing</p> <p><u>Phase applicability:</u></p> <ul style="list-style-type: none"> • Planning • Design • Construction • Operational 	<p>Effects of the development on the receiving environment</p>	<p>5</p>	<p>2</p>	<p>1</p>	<p>3</p>	<p>24</p>	<p>Low (+)</p>	<p>Low (+)</p>	<p>The location is good agricultural land, thus right land use.</p> <p>The design and location of the storage dam is specific according to specialist (engineer) recommendations and in an ideal setting with no visual intrusion for neighbouring farms.</p> <p>No development or incidental supporting development in sensitive areas is envisaged/planned.</p> <p>The development will contribute to connectivity, corridors and create new aquatic habitat.</p> <p>The project can serve as “stepping-stone” in ecological functioning.</p>
--------------------	--	--	----------	----------	----------	----------	-----------	----------------	----------------	---

Rational:

Land use

The farm is located in a Protected Agriculture Zone.

Background information:

The proposed area and existing infrastructure have been planned and designed to be integrated. The areas have been subjected to various degrees of human interference. This can be seen on monochrome aerial photos dating back to 1955.

Status before new development:

The vegetation is described as in moderate condition.

The vegetation type is described as Least Concerned in the Conservation Plan by LEDET.

What was found:

- (i) The environmental landscape has already been transformed in various degrees since 1955.
- (ii) The footprint area was subjected (low intensity) to human influence over time.
- (iii) Pollution built-up and/or signs of pollutions of significance were not found.
- (iv) No exotic plant species was found



(v) The activity is in line with the land use.										
B ECOLOGICAL CHARACTERISTICS OF THE SITE AND ITS SURROUNDINGS										
B 1 VEGETATION										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
B1.1	Survival of rare/endangered plant species <u>Phase applicability:</u> <ul style="list-style-type: none"> • Planning • Design • Construction • Operational 	The development can result in the destruction of rare/endangered plant species.	4	2	1	2	14	Low (-)	Low (+)	<ul style="list-style-type: none"> • Permit will be obtained from DFFE for removing of protected tree(s) (<i>Boscia albitrunca</i>). • Large tree(s)/trees of interest, in specific the large leaved rock fig, will be left in-situ for habitat support of species and is indicated on zoning plan • No Red Data and/or endangered species were found. • Plants with any conservation and or aesthetical value will be removed before construction commences. These measures will be controlled by the ECO. • The impact can be described as minimal due to the past human influence on the natural vegetation communities since 1960's by farming activities, uncontrolled fires, road construction etc.



Kleine Pos 420 MR: Die Berg Dam

<p>B1.2</p>	<p>Vegetation communities of conservation/scientific importance <u>Phase applicability:</u></p> <ul style="list-style-type: none"> • Planning • Design • Construction • Operational 	<p>Terrestrial habitat</p>	<p>5</p>	<p>3</p>	<p>1</p>	<p>2</p>	<p>18</p>	<p>Low (-)</p>	<p>Low (+)</p>	<ul style="list-style-type: none"> • Any indigenous vegetation on the project area will be considered as valuable to the project. Therefore, it has been described in the environmental management plan that before construction commences any indigenous plants will only be removed after approval by the environmental control officer with a legal permit from DFFE. • Trees-of-Importance are large species or species with a unique nish function. The species area Knobthorns, Weeping willow and the single <i>Ficus</i> tree. The last tree has to be specifically demarcated from harm during construction. • No sensitive vegetation communities will be affected by the storage dam development. • DFFE permits to be applied for before construction commences.
<p>B1.3</p>	<p>The introduction/spread of invasive alien seeds and plants <u>Phase applicability:</u></p> <ul style="list-style-type: none"> • Planning • Operational 	<p>Invasive species (common water hyacinth) will end up in the dam and block inlet/outlet pipes as well as lead to water eutrophication; decreasing oxygen levels in the water which will lead to decreased water life</p>	<p>3</p>	<p>2</p>	<p>1</p>	<p>2</p>	<p>12</p>	<p>Low (-)</p>	<p>Low (+)</p>	<ul style="list-style-type: none"> • Water hyacinth must be removed by the hand at least once per week or as needed. No chemical treatment advised. • This must be executed by the environmental control officer during development and thereafter by the farming structures. • This issue must be incorporated in the environmental management plan to prevent eutrophication of water and ensure good quality open water habitat for species.



Kleine Pos 420 MR: Die Berg Dam

		and poor water habitat for species								
B1.4	Frequency of veld fires <u>Phase applicability:</u> • Planning • Operational	Uncontrolled fires that can impact on ground cover and/or cause financial losses.	4	4	1	4	36	Moderate (-)	Moderate (+)	<ul style="list-style-type: none"> No open fires must be allowed on construction site. Above must form part of the environmental management plan and enforced by the environmental control officer.
B1.5	Amount of trampling on special areas of vegetation <u>Phase applicability:</u> • Planning • Operational	Overgrazing can occur causing erosion	4	2	1	2	14	Low (-)	Low (+)	<ul style="list-style-type: none"> The area is in moderate condition and the number of grazers such as Waterbuck, Kudu and Impala will continued to be managed to allow for the veld to be in a good ecological status for the herbaceous species.
Rational:										
(i) This issue is also described collectively under Cumulative impacts.										
(ii) This impact has high importance for the developer as well as for conservation and collectively for biodiversity.										
(iii) A stable environment can support the system. The most important component of the environment is the vegetation which will benefit any water seepage.										
B1.6	Overgrazing <u>Phase applicability:</u> • Planning	Erosion due to poor basal cover and die-off of vegetation	4	2	1	2	14	Low (-)	Low (+)	Management of game numbers not necessary



Kleine Pos 420 MR: Die Berg Dam

	<ul style="list-style-type: none"> Operational 									
B1.7	Browser impact <u>Phase applicability:</u> <ul style="list-style-type: none"> Planning Design Operational 	Damage and destruction of specific plant species	4	3	1	3	24	Moderate (-)	Moderate (+)	Less selective browsing needs to occur as more browse material must be available due to seepage water to support preferred browsed tree species.

B 2 FAUNA										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
B2.1	Survival of rare/endangered animals <u>Phase applicability:</u> <ul style="list-style-type: none"> Planning Construction Operational 	Species can be destroyed by construction activities.	2	2	1	3	15	Low (-)	Low (+)	<ul style="list-style-type: none"> Recommendations made in Ecological, Red Data and Biodiversity Report for implementation during development. Before construction commences the environmental control officer should survey the area again to remove possible species that moved in since the surveys. Reptiles found on the rocky outcrops is mobile and will be able to move away to the larger remainder of the outcrop areas.



Kleine Pos 420 MR: Die Berg Dam

B2.2	Natural migration of species <u>Phase applicability:</u> • Construction • Operational	Severing of natural existing migration routes can negatively impact on population survival rates. New natural patterns can be created	3	2	2	3	21	Low (-)	Low (+)	<ul style="list-style-type: none"> The migration routes for species can temporarily be restricted during development phase. It will be restored given time after development has been completed. Existing corridors is already used by resident game and other smaller mammal species The aquatic habitat will provide localised expansion of species presence. Monitoring bird species is important.
B2.3	Free roaming predators/ primates <u>Phase applicability:</u> • Construction • Operational	Conflict with predators and primates with construction and farming activities	5	5	2	3	36	Moderate (-)	Moderate (+)	<ul style="list-style-type: none"> The presence of predators and primates has been integrated with farming activities. With the low presence of predators, no conflict is foreseen as movement is during night. The free roaming species should not unnecessarily be disturbed by workers. Primate preventative measures apply during construction phase.

B 3 NATURAL AND SEMI-NATURAL COMMUNITIES										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
B3.1	Local, regional or national importance of	The project is situated at its nearest ± 2km to the Limpopo	5	3	3	3	33	Moderate (-)	Moderate (+)	<ul style="list-style-type: none"> The transformed footprint area can function as an Ecological Support Areas 1 (rational: new open water habitat) and the rest of the



	<p>the natural communities as CBA's (e.g. scientific, conservation)</p> <p><u>Phase applicability:</u></p> <ul style="list-style-type: none"> • Planning • Design • Operational 	<p>River ecosystem which supports both fauna and flora natural communities which can be indirectly impacted.</p>								<p>untransformed areas can still function and is achieved by leaving a corridor of natural vegetation from inland to the river for arboreal species and smaller mammals.</p> <ul style="list-style-type: none"> • The development will result in minimum impact on both fauna and flora natural communities by proper zoning of sensitive areas. • A proper water monitoring program will also help to identify possible change in water quality which could influence vegetation
B3.2	<p>Compatibility of development and the natural communities</p> <p><u>Phase applicability:</u></p> <ul style="list-style-type: none"> • Planning • Design • Construction • Operational 	<p>Impact on stability of natural communities by past development and lack of maintenance.</p>	5	3	1	3	27	Moderate (-)	Moderate (+)	<ul style="list-style-type: none"> • To prevent impacts during construction phase <ul style="list-style-type: none"> (i) Appointment of environmental control officer/practitioner who has experience (working knowledge of the terrestrial environment) of the ecological region of the Limpopo River Valley. (ii) Implement specific design measures as recommended in specialist reports as well as in this document. • To prevent impacts during operational phase <ul style="list-style-type: none"> (i) A proper <u>Monitoring Program</u> must be implemented on the dam and the receiving environment to identify any issues that may arise seasonally. This monitoring should be conducted by an environmental practitioner who has experience and working knowledge.



Kleine Pos 420 MR: Die Berg Dam

										<ul style="list-style-type: none"> (ii) This Monitoring Program must include the bordering farmers along the delineation of the system along the Limpopo River. To prevent impacts by maintenance phase <ul style="list-style-type: none"> (i) The environmental practitioner who has experience (working knowledge of the Limpopo Terrestrial and River environment) must be appointed for the Monitoring Program.
B3.3	Appropriateness of the conservation of ecosystems, habitat, corridors and connectivity <u>Phase applicability:</u> <ul style="list-style-type: none"> • Planning • Design • Construction • Operational 	No specialist guidelines presently available to manage and control impacts	4	4	1	3	27	Moderate (-)	Moderate (+)	<ul style="list-style-type: none"> • The specialist reports with recommendations for the site must be used in the design and layout of the site. • The EMP must be implemented on a monthly inspection schedule during the construction/development phase. • A rehabilitation plan will be implemented where necessary during development.
B3.4	Ecological functioning of natural communities due to:									



Kleine Pos 420 MR: Die Berg Dam

	<p>Physical destruction of the habitat/ Creation of new habitat <u>Phase applicability:</u></p> <ul style="list-style-type: none"> • Planning • Design • Construction • Operational 	<p>Habitat, or elements thereof, result in species loss.</p>	5	3	1	4	36	Moderate (-)	Moderate (+)	<ul style="list-style-type: none"> • By keeping to the existing footprint, the minimum destruction of habitat will take place and can be controlled so that the storage dam does not influence species of conservation status. Roads of existing farm infrastructure will also be used for the pipeline layout to minimize unnecessary destruction of habitat. • New aquatic open water habitat will be created that can support local ecosystem and ecological processes.
	<ul style="list-style-type: none"> • Levels of dust, pollution and deposition <p><u>Phase applicability:</u></p> <ul style="list-style-type: none"> • Planning • Construction 	<p>Dust pollution will be present during construction phase and especially in the dryer winter months.</p>	1	2	1	4	16	Low (+)	Low (+)	<ul style="list-style-type: none"> • Dust will be minimal and special measures need not be conducted during construction phase as the area is remote form human settlements. • This action should form part of the EMP. • Will be controlled by the ECO.
	<ul style="list-style-type: none"> • Rehabilitation potential <p><u>Phase applicability:</u></p> <ul style="list-style-type: none"> • Construction • Operational 	<p>Rehabilitation is a pro-active and continuous action before-and during construction to prevent degrading of</p>	3	2	1	3	18	Low (-)	Low (+)	<ul style="list-style-type: none"> • Preventative action is to zone the construction area beforehand in no-go area on site by the ECO. • Plants/trees must be removed before construction commences. • These no-go areas should form part of the adapted EMP for construction phase.



Kleine Pos 420 MR: Die Berg Dam

		the aesthetic quality of the area.								<ul style="list-style-type: none">• A rehabilitation plan should also form part of the adapted EMP for the construction phase. It should be site specific.• The rehabilitation plan should be implemented once construction commences by the ECO.
--	--	------------------------------------	--	--	--	--	--	--	--	--



C CURRENT AND POTENTIAL LAND USE AND LANDSCAPE CHARACTER
C 1 GENERAL AND POTENTIAL LAND USE AND LANDSCAPE CHARACTER

NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
C1.1	Compatibility of land uses within the area <u>Phase applicability:</u> <ul style="list-style-type: none"> • Planning • Operational 	Incompatible land-uses will lead to fractured development.	5	2	1	1	8	Low (-)	Low (+)	<ul style="list-style-type: none"> • The area is farmed since the mid-1960's. • The proposed development is compatible with the land use. • No fragmentation of land will take place
C1.2	Aesthetic quality of the landscape: Visual Intrusion <u>Phase applicability:</u> <ul style="list-style-type: none"> • Planning • Design • Construction 	The development can alter the landscape.	5	2	2	4	36	Moderate (-)	Low (+)	<ul style="list-style-type: none"> • The landscape has already been altered. By keeping to the footprint, the minimum alteration will be attained. • Environmental landscaping as part of the Rehabilitation Program will commence as soon as the operational phase commences. • The dam location has a low visual footprint and will have a low visual impact due to design.



Kleine Pos 420 MR: Die Berg Dam

C1.3	<p>Sense of place within the area</p> <p><u>Phase applicability:</u></p> <ul style="list-style-type: none"> • Planning • Design 	<p>Is the development correctly placed in line with land-use planning: agriculture versus protected areas</p>	4	2	1	4	28	Moderate (-)	Low (+)	<ul style="list-style-type: none"> • Mitigating measures can be implemented to ensure protection of undeveloped adjoining areas. • Sensitive areas will receive specific management action to preserve the vegetation along the watercourse. • A Management Plan can provide guidance in protecting the remaining undeveloped part of the farm. This Management Plan should be compiled for conservation of species.
C1.4	<p>Compatibility with the scale of development in the area</p> <p><u>Phase applicability:</u></p> <ul style="list-style-type: none"> • Planning • Operational 	<p>Is there need for such a development: agriculture versus protected areas/other land uses and/or products</p>	5	2	1	3	24	Low (+)	Low (+)	<ul style="list-style-type: none"> • The main development for the area is agriculture. • Agriculture is a sustainable use of natural resources when correctly applied and is the reason for the EIA. • The project area is in declared protected agricultural zone and is more “favourable” than e.g., mining option as comparison for future generations. Food is essential and irreplaceable as a human need, whereas energy



Kleine Pos 420 MR: Die Berg Dam

										from coal can be replaced by solar.
C1.5	Landscaping plans and/or site restoration proposals <u>Phase applicability:</u> <ul style="list-style-type: none"> • Planning • Design • Construction • Operational 	Can landscaping play a constructive role to lessen negative impacts.	5	4	1	3	30	Moderate (-)	Low (+)	<ul style="list-style-type: none"> • The larger tree species left in-situ will contribute to the landscape. • Leaving buffer zones along the watercourses and between the storage dam and croplands footprint will also contribute to landscaping.
C1.6	Need for buffer zones to allow for natural processes such as erosion, vegetation and changes in river channels <u>Phase applicability:</u> <ul style="list-style-type: none"> • Planning • Design • Construction • Operational 	Sterilisation and destruction of areas which will create barren landscapes which can cause erosion and further environmental damage.	5	4	1	3	30	Moderate (-)	Low (+)	<ul style="list-style-type: none"> • Buffer zones are incorporated along the dam footprint and remaining rocky outcrops are also excluded and controlled by ECO. • Exclusion no-go zones will be identified and excluded from project development. • Existing corridors will not be affected.



Kleine Pos 420 MR: Die Berg Dam

C1.7	<p>Legal considerations: servitudes and rights of way for existing (and future) development</p> <p><u>Phase applicability:</u></p> <ul style="list-style-type: none"> • Planning • Operational • Construction • Operational • 	<p>This can negatively influence existing rights and services.</p>	5	5	1	3	33	Moderate (-)	Moderate (+)	<ul style="list-style-type: none"> • No rights of neighbours are affected by storing of water under existing WUL. • The servitude on the road to the farm is not affected. • Eskom servitudes are not affected.
C1.8	<p>Human Activities Resulting in Biodiversity Loss</p> <p><u>Phase applicability:</u></p> <ul style="list-style-type: none"> • Planning • Operational 	<p>Agriculture has a series of known impacts on biodiversity:</p> <ul style="list-style-type: none"> • Water quality from agricultural effluents (arable agriculture) can modify the nutrient cycle of aquatic and terrestrial ecosystems. • Change of land cover, modifying hydrological and runoff regimes. 	5	5	2	3	36	Moderate (-)	Moderate (+)	<p>Mitigation is possible by implementing mostly conservation farming practices and to place the specific development footprint in such a way as to integrate it with the existing developed farming footprint and the receiving environment.</p> <ul style="list-style-type: none"> • A Water Monitoring Plan must be implemented to monitor the quality in the Limpopo River upstream from where unnamed watercourse drains into Limpopo and at the same point should a monitoring point be placed. A monitoring point



											must be placed in watercourse upstream from development. <ul style="list-style-type: none"> The existing farming practices conform with conservation farming practices.
--	--	--	--	--	--	--	--	--	--	--	--

C 2 URBAN OPEN SPACE, PROTECTION AND RECREATION AREAS										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
C2.1	Potential to harbouring vagrants and criminals <u>Phase applicability:</u> <ul style="list-style-type: none"> Planning Construction Operational 	Movement of illegal immigrants through farm and area	4	1	1	1	6	Low (-)	Low (+)	<ul style="list-style-type: none"> The farm is fenced and electrified. The farm has its own security control on vehicle movement. The client has his own security and area patrol system. There is also access security measures to the farm on the servitude road. The farming protocol is applicable on this farm



C 3 RESIDENTIAL AREAS										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
C3.1	None									

C 4 COMMERCIAL AREAS										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
C4.1	None									

C 5 AGRICULTURE AND SYLVICULTURAL AREAS										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
C5.1	Use of high potential farmland <u>Phase applicability:</u> <ul style="list-style-type: none"> • Planning • Design • Operational 	Sterilise and-or transforming farmland can have production-and financial implications	4	4	1	3	27	Moderate (-)	Low (+)	<ul style="list-style-type: none"> • The project is located in declared zoned Protected Agriculture area by DALRRD. • No productive farming land will be sterilised. • The remaining land will still serve as habitat (with ecological processes) and used by wildlife.



Kleine Pos 420 MR: Die Berg Dam

C5.2	Damaged land to overgrazing or bad farming methods <u>Phase applicability:</u> • Planning • Operational	Farms have little grass cover; causing erosion.	3	3	1	3	21	Low (-)	Low (+)	• Supplementary feeding is a consideration in periods of drought
C5.3	Chemical pollution of water, sensitive vegetation and farmland <u>Phase applicability:</u> • Planning • Operational	Surface –and/or groundwater quality deterioration	4	4	3	2	22	Low (-)	Low (+)	• A Water Monitoring Program will be implemented to monitor water quantity and quality. • An irrigation plan can provide preventative measures in applying correct measures of water, chemicals etc.

D CULTURAL RESOURCES										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	



Kleine Pos 420 MR: Die Berg Dam

D1.1	Sites of archaeological or palaeontological importance <u>Phase applicability:</u> <ul style="list-style-type: none"> • Planning • Design • Construction • Operational 	Disturbance and/or destruction of identified sites should only be considered where the necessary information has been assessed.	5	5	2	2	24	Moderate (-)	Low (+)	<ul style="list-style-type: none"> • Implementation of a chance find procedure for the project is included in the EMPr. • Induction will be conducted by the ECO. • The lay-out of the footprint was planned to accommodate the site with minimum disturbances.
-------------	--	---	---	---	---	---	----	--------------	---------	--

E SOCIO-ECONOMIC CHARACTERISTICS OF THE AFFECTED PUBLIC										
E 1 DEMOGRAPHIC ASPECTS										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
E1.1	Location and distribution of population <u>Phase applicability:</u> <ul style="list-style-type: none"> • Operational 	The border is populated exclusively by farmers in an area considered as deep-rural.	4	4	3	3	33	Moderate (-)	Moderate (+)	<ul style="list-style-type: none"> • The project will benefit the working expectations of local people. • The project has a lifetime expectancy of three decades and more.



E2 ECONOMIC AND EMPLOYMENT STATUS OF THE AFFECTED SOCIAL GROUPS										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
E2.1	Economic base of the area <u>Phase applicability:</u> • Construction • Operational	Farming worker stability	4	3	2	4	36	Moderate (+)	Moderate (+)	<ul style="list-style-type: none"> The project supplies working opportunities; as it did for the previous decades and it can extend the opportunities for the future.
E 3 WELFARE PROFILE										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
E3.1	Job creation <u>Phase applicability:</u> • Construction • Operational	Is there an effect that will be triggered by the project that can be positive or negative	4	3	2	4	36	Moderate (+)	Moderate (+)	<ul style="list-style-type: none"> The project will provide both permanent (±2) and seasonal (±30) working opportunities. It will also be an incentive for the value chain and support industry.



E 4 ECONOMIC IMPLICATIONS										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
4.1	Influence on local economics <u>Phase applicability:</u> • Operational	Contribution to agriculture	4	3	2	4	36	Moderate (-)	Moderate (+)	<ul style="list-style-type: none"> • Practicing sustainable farming practices. • The in-put and out-put value chains related to farming will be conducive for the rural economy of Swartwater businesses.
4.2	Influence on regional-and national economics <u>Phase applicability:</u> • Operational	Contribution to agriculture and value chain of both the in-put and out-put supporting agriculture activities	4	3	2	4	36	Moderate (-)	Moderate (+)	<ul style="list-style-type: none"> • Practicing sustainable farming practices. • Use regional-and national suppliers/businesses in the value-chain. • Products is sold on national markets providing income and contributing to SARS Tax Basis.

E 5 CULTURAL IMPLICATIONS										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	



Kleine Pos 420 MR: Die Berg Dam

E5.1	Heritage resources	Impacts on heritage resources, resources could be destroyed.	4	2	1	2	14	Low (-)	Low (+)	<ul style="list-style-type: none"> • Change Find Procedures is contained in EMP • Induction done before construction
-------------	--------------------	--	---	---	---	---	----	---------	---------	--

F INFRASTRUCTURE SERVICES										
F 1 ENERGY-, WATER SUPPLY & ELECTRICITY										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
F1.1	Eskom lines <u>Phase applicability:</u> <ul style="list-style-type: none"> • Planning • Operational 	Destruction of vegetation, also sterilising land, has visual impact	1	2	1	1	4	Low (-)	Low (+)	<ul style="list-style-type: none"> • The existing Eskom line will be used.
F1.2	Load shedding <u>Phase applicability:</u> <ul style="list-style-type: none"> • Planning • Construction • Operational 	Impact on irrigation plan for crop production	4	4	3	4	44	Moderate (-)	High (+)	<ul style="list-style-type: none"> • Irrigation from dam as intended will negate the effect of load shedding. • Irrigation plans for crop production can be maintained. • This process places less stress on existing power delivery capacity.



F 2 a WASTE MANAGEMENT										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
F2a	Due care to agriculture land <u>Phase applicability:</u> • Construction • Operational	Pollution of agriculture areas and resources (soil/water/air)	3	2	2	2	14	Low (-)	Low (+)	Monitoring of water and soil is in place and conducted. The farm is compliant with: • Global-Gap guidelines.
F 2 B SEWAGE WASTE MANAGEMENT										
F2b	Suitable facilities during construction phase <u>Phase applicability:</u> • Construction	Sewage pollution	1	2	1	2	8	Low (+)	Low (+)	• Chemical toilets made available on construction site. • Permanent ablution sites for operation phase according to environmental guidelines for farming.
F 3 TRANSPORT NETWORK										
			Du rat	Ma gni	Ext ent	Pr ob	Poi nts	Significance		



Kleine Pos 420 MR: Die Berg Dam

NO	ISSUES	NATURE OF IMPACTS							Without Mitigation	With Mitigation	MITIGATION MEASURES
F3.1	Access road to site <u>Phase applicability:</u> • Planning • Construction • Operational	Sufficient access is needed to farm	4	3	1	2	16		Low (+)	Low (+)	<ul style="list-style-type: none"> Existing access road can be used. The internal farm roads will also be used by extending it to the new storage dam and related infrastructure
F 4 FINANCIAL IMPLICATIONS											
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES	
								Without Mitigation	With Mitigation		
F4.1	Enhancement of applicant's self-sufficiency <u>Phase applicability:</u> • Construction	The proposed development is part of strategic farming strategy ensuring financial security.	4	4	3	4	44	Moderate (-)	High (+)	<ul style="list-style-type: none"> Farming can produce income by using appropriate practices. 	



Kleine Pos 420 MR: Die Berg Dam

H1.1	Chemical applications in croplands <u>Phase applicability:</u> • Operational	<ul style="list-style-type: none"> • Pollution of surface- and groundwater • Impact on water sources (groundwater/surface flow) availability and sustainability 	4	2	1	2	14	Low (-)	Low (+)	<ul style="list-style-type: none"> • Applications are done according to agriculture specialist recommendations. • A Water Monitoring Plan that monitors the water quality and abstraction (quantity) must be implemented and must include monitoring of irrigation against crop needs and climatic conditions. • Objectives must be measured against quality and quantity. It should have a sustainability process outcome.
-------------	--	---	---	---	---	---	----	---------	---------	--

H 2 NOISE, VIBRATION AND LIGHTING

NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
H2.1	Increase on ambient noise <u>Phase applicability:</u> • Construction	During construction phase noise can be present in proximity to homesteads	2	2	1	3	15	Low (-)	Low (+)	<ul style="list-style-type: none"> • Keep to working hours • Effective exhaust baffles on construction machinery • This is a transient issue and will be ceased after construction

I RISK AND HAZARD

NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	



Kleine Pos 420 MR: Die Berg Dam

I1.1	<p>Flooding Phase applicability:</p> <ul style="list-style-type: none"> • Planning • Design • Construction • Operational 	The possibility of flood damage	4	4	2	3	30	Moderate (-)	Moderate (+)	<ul style="list-style-type: none"> • Channelled water outlets must have energy dissipaters. • Open side channel spillway will be formed as part of the dam's structure and design.
J HEALTH AND SAFETY										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
J1.1	<p>Risk during construction Phase applicability:</p> <ul style="list-style-type: none"> • Construction 	Human safety	1	4	1	2	12	Low (+)	Low (+)	<ul style="list-style-type: none"> • Farm Manager will apply safety measures • Implement EMPr
J1.2	<p>Effect of dust on surrounding areas Phase applicability:</p> <ul style="list-style-type: none"> • Planning • Construction 	Health issues for workers	1	2	1	4	16	Low (+)	Low (+)	<ul style="list-style-type: none"> • Dampening of working areas • Buffers zones incorporated in layout to filter dust.



Kleine Pos 420 MR: Die Berg Dam

J1.3	Effect of noise on surrounding areas <u>Phase applicability:</u> • Planning • Construction	Disturbance and ambience noise levels	1	2	1	4	16	Low (+)	Low (+)	<ul style="list-style-type: none"> • Construction machines have low noise mufflers • Working only during day-light hours. • Noise will be a transient intrusion. • Buffers zones incorporated in layout to filter/dampen noise.
-------------	---	---------------------------------------	---	---	---	---	----	---------	---------	---

K1 CUMULATIVE AND SYNERGISTIC EFFECTS										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
								K1.1	Ability of the natural environment to assimilate cumulative stresses placed on it. <u>Phase applicability:</u> • Planning • Design • Operational	



Kleine Pos 420 MR: Die Berg Dam

K1.2	Threat analysis and negative synergistic effects <u>Phase applicability:</u> <ul style="list-style-type: none"> Planning Operational 	The receiving environment must be able to accommodate the development	4	2	1	2	14	Low (-)	Low (+)	<u>Collective measures</u> <ul style="list-style-type: none"> The remaining areas not developed will continue to be managed as a game farm with vegetation communities also preserved and managed accordingly. Management and monitoring for pollution can identify problems that can be rectified.
K1.3	Water Monitoring Plan <u>Phase applicability:</u> <ul style="list-style-type: none"> Planning Operational 	To provide a “tool” to manage the farm preventing impacts accumulation by water quantity and quality on the receiving environment which includes the Limpopo River and associated biodiversity.	4	3	2	3	27	Moderate (-)	Moderate (+)	A Water Monitoring Plan (WMP) is recommended as high priority to enhance co-existence in the receiving environment which includes: <ul style="list-style-type: none"> (i) The farm can function as ecological support areas; and (ii) Supporting connectivity. (iii) That sensitive vegetation communities can be preserved. (iv) That a Water Management Plan is used which supply the necessary information that can be used with the Water Irrigation Plan for the farm. (v) New water habitats created from seepage from storage dam and irrigated croplands.
K1.4	Soil Monitoring Plan <u>Phase applicability:</u> <ul style="list-style-type: none"> Operational 	Ensure a ‘healthy’ soil medium.	4	3	3	3	30	Moderate (-)	Moderate (+)	An Integrated Soil Monitoring Plan (ISMP) is recommended as high priority to enhance co-existence in the receiving environment which includes: <ul style="list-style-type: none"> (i) Soil “health” management actions. (ii) Supporting biota of the agriculture ecosystem.



										(iii) Collectively support biodiversity.
--	--	--	--	--	--	--	--	--	--	--

K2 GENERAL ENVIRONMENTAL & WATER QUALITY CUMULATIVE MANAGEMENT CONSIDERATIONS										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
K2.1.	Implementation of the mitigation and management measures <u>Phase applicability:</u> <ul style="list-style-type: none"> Planning Operational 	To comply with legal considerations and conditions and all relevant legislation.	4	3	3	3	30	Moderate (-)	Moderate (+)	<ul style="list-style-type: none"> Environmental awareness training before construction commences. An environmental control officer (ECO) must be appointed before the construction commences to ensure that the environmental management plan is adhered to. Necessary compliance record keeping, and inspections must be conducted and provided to LEDET and DFFE.
K2.2	Water quality monitoring and control <u>Phase applicability:</u> <ul style="list-style-type: none"> Operational 	A water monitoring plan can identify issues for correction. Independence and unbiased control have to be conducted by independent environmental-and water specialists	4	3	1	3	24	Moderate (-)	Moderate (+)	<ul style="list-style-type: none"> Applicant must appoint an independent specialist to conduct due-diligence monitoring on the extraction of water from the aquafer system for quantity and quality. Monitoring results made available to affected party(s). A Water Monitoring Plan is non-negotiable and must be submitted to competent authority before completion of the project.



K3 GENERAL DESIGN CUMULATIVE CONSIDERATIONS										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without	With	
								Mitigation	Mitigation	
K3.1	Specific design measures for storage dam and related infrastructure and farm in general <u>Phase applicability:</u> <ul style="list-style-type: none"> • Planning • Design • Construction • Operational 	Delineation and/or re-design of lay-outs	4	3	1	4	32	Moderate (-)	Moderate (+)	A. <u>Lay-out</u> <u>Lay-out Map</u> A footprint map is supplied with the EIA application and before construction commences. <u>Infrastructure</u> Existing access-and farm roads will be used. Feeder water pipelines will be used and will follow existing farm roads east of the district road, and the irrigation plan should be developed in conjunction with the EAP. Implementation control will be by ECO. The ECO for the project will up-date the EMP and control environmental compliance and auditing. All new data/information will be forwarded to competent authorities. <u>Bush clearing</u> Process for bush clearing: (i) A permit for clearing of virgin soil and destruction of trees must be applied for from DFFE before activities commence. A site visit also needs to be conducted.



										<p>(ii) The footprint will be demarcated and marked by ECO and farm manager before bush clearing commences.</p> <p>(iii) No-go zones will be demarcated and marked by ECO and farm manager before bush clearing commences.</p> <p><u>Protected trees and plants</u></p> <p>(i) Buffer zones are incorporated in the layout.</p> <p>(ii) A permit for destruction of protected trees will be applied for from DFFE</p> <p><u>Archaeological Sites</u></p> <p>(i) The sites will be clearly marked and demarcated to prevent incidental damage during construction and operational phases.</p> <p>(ii) The responsible specialist must be notified of commencement.</p> <p>(iii) The SOP supplied with EMP must be applied.</p>
--	--	--	--	--	--	--	--	--	--	---

K4 GENERAL CUMULATIVE SOCIO-ECONOMIC and SUSTAINABLE DEVELOPMENT										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without	With	
								Mitigation	Mitigation	
K4.1	Attaining Sustainable development <u>Phase applicability:</u> • Planning	Enviro-economics	4	4	3	4	44	Moderate (-)	Moderate (+)	<p><u>Soil:</u> No land is sterilised in the layout.</p> <p><u>Water:</u> The water which will be used is subtracted from the aquifer. It is stored as quality water.</p> <p><u>Biodiversity:</u></p>



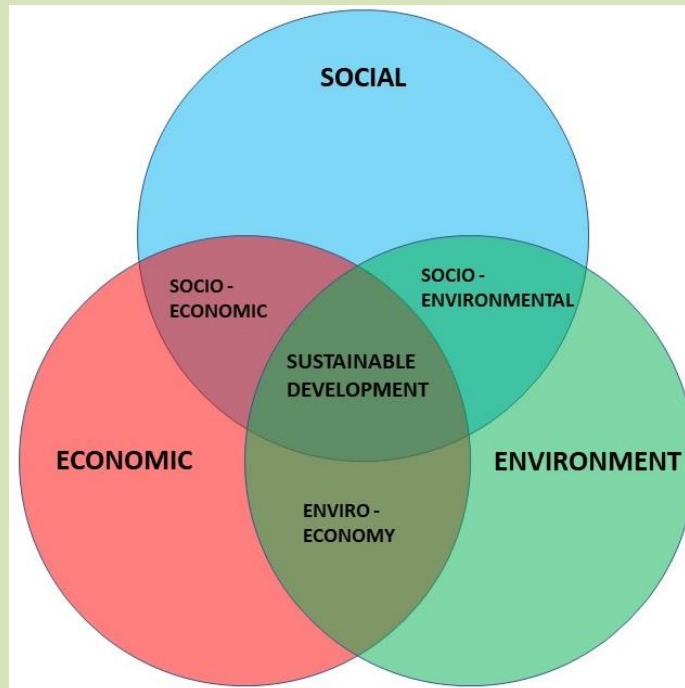
Kleine Pos 420 MR: Die Berg Dam

	<ul style="list-style-type: none"> Operational 									<p>Corridors-and connectivity is included in the total layout.</p> <p><u>Sustainable period:</u> The potential economic period expectation is for three decades and more.</p>
K4.2	<p>Attaining Sustainable development</p> <p><u>Phase applicability:</u></p> <ul style="list-style-type: none"> Operational 	Socio-economic	4	3	3	4	40	Moderate (-)	Moderate (+)	<p><u>Sustainable period:</u> The project provides work in a deep-rural area. The potential economic period expectation is for three decades and more.</p>
K4.3	<p>Attaining Sustainable development</p> <p><u>Phase applicability:</u></p> <ul style="list-style-type: none"> Operational 	Socio-environmental	4	3	3	4	40	Moderate (-)	Moderate (+)	<p><u>Sustainable option:</u> The farming activities commenced in the period 1960-70's. It expanded exponentially over time and provides working opportunities. This application will contribute to social benefits by using resources over time on arable designated agricultural land. Conservation farming developed exponentially over time and will together with the conservation farming practices contribute to the continued economic input and continued responsible use of water and natural resources.</p>



Rational:

Rational: Arable agricultural soil and good quality water together with a work force can continue farming by an integrated approach to be economically viable and supporting the social and economic drivers for the Tom Burke/Swartwater Farming Node, Limpopo Province, RSA and the markets they provide for.



10.3 Potential significant impacts (after mitigation)

Total of impacts assessed=62

- 0 were regarded as high (-) and 2 as high (+)
- 29 were regarded as moderate (-) and 25 as moderate (+)
- 23 were regarded as low (-) and 47 as low (+)

Impacts can mostly be mitigated with a high degree of certainty.

10.4 Relevance of impacts for phases

The phase applicability is included at each impact/issue discussed so that it is clear in which phase each issue is relevant so that phase specific recommendations can be made. The phases relevant include the planning phase, design phase, construction phase, operational phase and decommissioning phase.

11. DESCRIPTION OF ASSUMPTIONS

In this report it is assumed that:

- i) The developer will always act responsible with regards to the environment.
- ii) That the recommendations made in this report and other specialist reports are implemented and followed.
- iii) That the developer will abide by the ethical standards of development and will stay within the parameters and design specifications of the development and follow a best practise approach.

12. OPINION ON FACTS

- 12.1 The proposed project has its origin in the planning for sustainable farming by the wise use of water resources and use optimal agricultural land for conservation farming practices.
- 12.2 The type of development is in line with the land use as promulgated as Protected Agriculture Land.
- 12.3 The location of the preferred site was surveyed for biodiversity and had a low ecological sensitivity. No critical issues were identified.
- 12.4 No pollution was found at the footprint or adjoining areas or could be a source thereof.
- 12.5 No Archaeological sites were found on the footprint. No direct impact is expected on any significant heritage resources.
- 12.6 The proposed project will benefit the ecosystem and will create a new water habitat for species, in addition to the Limpopo River serving as water habitat already near to the project area.
- 12.7 A Water Monitoring Plan must be implemented for water quality and quantity.
- 12.8 The current land use for agriculture activities can proceed and will contribute to the local-and regional socio-economic communities.
- 12.9 In this EIR no issues were of such a nature that it could not be mitigated, an indication of the long-term sustainability of the project for the socio-economic sphere and receiving environment in which this project will function.



13. ENVIRONMENTAL STATEMENT

13.1 Summary of key findings

- 13.1.1 The development site is suitable for sustainable agriculture and activities incidental to farming, and is promulgated as Protected Agriculture Land.
- 13.1.2 No specific evidence was found of any biota at individual or community level that will be threatened to such an extent that it will have a negative impact on the survival of species and/or communities will not be adversely affected.
- 13.1.3 The biodiversity of the Limpopo Sweet Bushveld is not threatened directly or in-directly.
- 13.1.4 The farming practices indicates a high level of conservation farming as no historical or current environmental pollution or erosion is evident.

13.2 Positive and negative implications

13.2.1 Positive

- (i) The development will not have a significant negative effect on the environment or for specific species or communities.
- (ii) The remaining terrestrial area can still function as habitat as well as ecosystem.
- (iii) No sensitive plant communities were identified.
- (iv) Habitat is still suitable for various wildlife and ecological processes.
- (v) Can still serve as ESA1 by contributing to connectivity and corridors by the design of the project.
- (vi) Protected tree species such as Shepherd's Trees can be incorporated in the lay-out plan. Loss will be local and controlled.
- (vii) Water quality and availability will be maintained in the storage dam (water ecosystem) and river ecosystem for sustaining riparian vegetation and associated biodiversity.

13.2.2 Negative

- (i) Vegetation will be removed; mostly terrestrial species are associated with terrestrial landscapes.
- (ii) Protected trees will be removed.

13.3 Comparative assessment of advantages and disadvantages

The **advantages** can be summarized as follows:

- The development will address a critical issue of sustainable farming (the availability of water for irrigation of croplands).
- It will positively contribute to the socio-economic profile of Blouberg district community(s).
- Mitigation measures are possible for issues.
- The developer has accreditation by *Global G. A. P.*

The **disadvantages** can be summarized as follows:

- Natural vegetation (Least Threatened) and habitat (not threatened) for terrestrial (not threatened) species will be partly destroyed and/or altered.

13.4 Previous related legal approvals.

- An ELU by DWS was issued for farming activities (No. 27/2/1/A42E/420MR/0-35) dated: 7 December 2018).



13.5 Final statement

No evidence, nor any information presented, indicated that the development on the footprint should not be considered. Issues could be sufficiently mitigated with a high degree of confidence. The strategic gain collectively is for firstly sustainable and strategic food production, secondly for socio-economic reasons and thirdly for practising sustainable agriculture activities which recognises conservation and cultural resource areas as well as implementing mitigation measures to protect and manage the conservation of sensitive vegetation communities. Compliance with Chapter 1: National Environmental Management Principles, Section 2(1), Section 2 (2), Section 2(3), Section 2(4) of NEMA (Act 107 of 1998) was addressed in the assessment.

The Candidate EAP recommends the application and the EAP supports the contents of this application and the recommendation.

14. AUTHORISATION OF ACTIVITY AND CONDITIONS

The purpose of this report is to provide information in a compiled format with regards to the potential impacts of the proposed development so that the relevant authority can make an informed decision regarding the approval/non-approval of the Environmental Impact Assessment Report.

14.1 Recommendations

14.1.1 That the mitigation measures mentioned for each discussed issue must be implemented.

14.1.2 That recommendations mentioned in the EIA report and the specialist reports attached to the EIAr is implemented.

In specific the:

- Footprint of the dam;
- The location of the feeder supply pipeline along the existing farm road;
- The *in-situ* protection of the *Ficus* tree;
- The monitoring and control of the exotic hyacinth plant.

14.1.3 The appointment of an environmental control officer (ECO) before the project commences. That the ECO appointed has sufficient experience to the specific region's ecology and farming activities. That the appointment is for the full duration of the project, starting with the pre-construction phase and ending with the rehabilitation phase.

14.1.4 That a Water Monitoring Plan (WMP) is compiled and implemented. The WMP must be supplied to the competent authority.

14.1.5 That Archaeological & Paleontological chance find monitoring is implemented by the ECO.

14.1.6 That the EMPr is updated (and supplied to CA) with new information as the project progresses.

14.1.7 That Bi-Annual audit reports be submitted to LEDET: Compliance Monitoring for compliance of authorisation conditions.

14.1.8 That necessary authorisations from DFFE are applied for before construction commence. Copies must be included in a documentation file on-site during construction.





.....

ZN Claassens
Candidate Environmental Assessment Practitioner



J. Claassens
Environmental Assessment Practitioner
TUA CONSERVA ENVIRONMENTAL & CONSERVATION SERVICES cc



REFERENCES

- Acocks, J.P.H. 1988. Veld Types of South Africa. Memoirs of the Botanical Survey of South Africa N. 57. Botanical Research Institute
- Barnes, K.N. (ed.) 2000. The Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland. Bird Life South Africa, Johannesburg
- Branch, W.R. 1998. Field Guide to Snakes and other reptiles of Southern Africa. Struik Publishers, Cape Town
- Branch, W.R. 1988 (ed.) South African Red Data Book – Reptiles and Amphibians, S.A. National Scientific Programmes Report No 151
- Bromilow, C. 1995. Problem Plants of South Africa. Briza Publications, Pretoria
- Carruthers, V. 2001. Frogs and Frogging in Southern Africa. Struik Publishers. ISBN 1-86872-607-X.
- Colvin, C., D. le Maitre, I. Saayman, S. Hughes. July 2007. WRC Report No 301/07.
- Freeman N. M. and K. Rowntree. 2005. Our Changing Rivers. An introduction to the science and practice of Fluvial Geomorphology. Water Research Commission. Report No TT238/05.
- Friedman, Y. and Daly B. (editors), 2004. Red Data Book of the Mammals of South Africa: A conservation Assessment : CBSG Southern Africa, Conservation Breeding Specialist Group (SSC/IUCN), Endangered Wildlife Trust South Africa.
- Golding, J. Editor. 2002. Southern African Plant red Data List. Southern African Botanical Diversity Network Report No. 14. SABONET, Pretoria.
- Harrison, J.A., Allan, D.G., Underhill, L.G., Herremans, M., Tree, A.J., Parker, V. & Brown, C.J. (eds.) 1997. The Atlas of Southern African Birds, Vol. 1 & 2. Bird Life South Africa, Johannesburg
- Pienaar, U. de V. 1990. Neem uit die Verlede. Nasionale Parkeraad.
- Maclean, G.L. 1993. Roberts' Birds of Southern Africa. John Voelcker Bird Book Fund, Cape Town.
- Mills, G. & Hes, L. 1997. The complete book of Southern African Mammals. Struik Winchester, Cape Town, RSA
- McLachlan, G. R. 1978. South African Red Data Book: Reptiles and Amphibians. SANC Programmes Report No. 23.
- Mucina, L. & Rutherford, M.C. (eds.) 2006. The Vegetation of South Africa, Lesotho and Swaziland, *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.
- Onderstall, J. 1984. South African Wild Flower Guide: Transvaal, Lowveld and Escarpment including the Kruger National Park, Botanical Society of South Africa, Cape Town
- Passmore, N.I. & Carruthers, V.C. 1995. South African Frogs a Complete Guide. Southern Book Publishers, Witwatersand University Press, Johannesburg
- Raimondo, D., L. von Staden, W. Foden, J. E. Victor, N. A. Helme, R. C. Turner, D.A. Kamundi, P. A. Manyama. 2009. Red List of South African Plants, 2009. SANBI.
- Rutherford, M.C. and Westfall, R.H. 1994. Biomes of Southern Africa: an objective categorization. National Botanical Institute, Pretoria.
- SCHULZE, B.R. 1994 Climate of South Africa: General Survey. Department of Environmental Affairs, Pretoria.
- Skinner, J.D. & Smithers, R.H.N. 1990. The Mammals of the Southern African Subregion. University of Pretoria, Pretoria, RSA.
- Smithers, R.H.N. 1986. South African Red Data Book – Terrestrial Mammals. S.A. National Scientific Programmes Report no 125. Pretoria



Kleine Pos 420 MR: Die Berg Dam

- Transvaal Provincial Administration: Nature Conservation Division. 1985. Atlas of the Threatened Plant Species of the Transvaal.
- Transvaal Provincial Administration: Nature Conservation Division. 1993. A Herpetological Survey of the Transvaal Provincial Reserves.
- Van der Walt, R. 2009. Wild Flowers of the Limpopo Valley. Retha van der Walt, Ludwiglust Game Farms. ISBN 978-0-620-43949-7.
- Van der Walt, R. 2020. J. Dames and G. Hawley-McMaster. Fungi and Lichens of the Limpopo Valley & Mapungubwe National Park.
- Van Oudtshoorn, F. 1999. Guide to Grasses of Southern Africa. Briza Publications, Pretoria
- Van Wyk, B., Van Oudtshoorn, B. & Gericke, N. 1997. Medicinal Plants of South Africa. Briza. Pretoria
- Van Wyk, B. and Van Wyk, P. 1998. Field Guide to the Trees of Southern Africa. Struik Publishers, Cape Town
- Vegter, J. R. 2001. Hydrology of Groundwater. Region 3: Limpopo Granulite-Gneiss Belt. WRC Report No TT 136/00.
- WATER RESEARCH COMMISSION 2001. Groundwater Development in South Africa. Report No. TT 134/00.

