

**DRAFT**  
**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**

FOR THE

**CLEARING OF INDIGENOUS VEGETATION FOR CROP LANDS AND RELATED  
INFRASTRUCTURE ON THE FARM: ZWARTBERG 72 MR (REMAINING EXTENT &  
PORTION 1), WITHIN BLOUBERG LOCAL MUNICIPALITY, CAPRICORN DISTRICT,  
LIMPOPO PROVINCE**

**PROJECT REFERENCE : 12/1/9/2-C79**

**Blouberg Local Municipality  
Capricorn District**

LIMPOPO PROVINCE



February 2022

**TITLE:** ZWARTBERG PROJEK

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**ISSUE:** Draft Environmental Impact Assessment Report



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**TUA CONSERVA**  
**ENVIRONMENTAL & CONSERVATION SERVICES c.c**



### **Executive Summary**

Mr. J. Janse van Vuuren as applicant requested Tua Conserva Environmental & Conservation Services cc to undertake an Environmental Impact Assessment (EIA) for the proposed development. The Draft EIA Report fulfills 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 Zwartberg 72 MR (Remaining Extent & Portion 1) What must be evaluated and tested is the ability of the receiving environment to accommodate the development and to assess alternative sites or options. 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.

Sustainability is a direction rather than destination. First, we must agree on what is to be sustained, for whom, and for how long? If we degrade our natural resources and poison our natural environment, we will degrade the productivity of agriculture and ultimately destroy human life on earth. Thus, sustainable agriculture must be ecological sound, economically viable and socially responsible. Interested and affected parties can be divided in two categories, the first are those from surrounding farms located downriver, secondly organs of state. Issues and concerns raised by the first category were inclined towards water quantity and the possible effect on their farming production in terms of water. The second category was more inclined to the effect the development will have on the integrity of the receiving environment which includes the cultural heritage of the area and affected departments such as DFFE. 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).

There are three main identified grouping of issues that should be considered in this application. Firstly, is the area suitable for crop farming and what would the effect be on the receiving environment including impact on the heritage and paleontological integrity of the Heritage and Cultural Landscape acceptable e.g., can the receiving environment accommodate the croplands 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.

Holistically the above issues are collectively combined and measured against the pressures on the area's environmental and heritage resources. The above issues must be weighed against the need for developing agricultural land for socio-economic reasons and rural development as the Third strategic grouping of issues. The proposed development is based on sustainable farming (a farming strategy) that



*dates back five decades and can continue for another five decades (and longer) by sustainable farming principles. The setting is deep-rural and will supply permanent social and economic benefits for the local economy as well as for the provincial-, national- and export fiscus. Historically the area in specific and region in general has been subjected to various forms of human interference dating back to 1903. Threats such as climate change and water (quantity and quality) availability in the Limpopo River and the life-forms it supports coupled with development pressures upstream and needs downstream are realities.*

*In a nutshell, the proposed project can be best described as sustainable use of natural resources which will contribute to the socio-economic benefits and comply with to the intrinsic values of the receiving environment. It will never be an “easy” answer and should rather be the co-existence of land-uses which is managed in harmony. The proposed project can contribute to the preservation of biodiversity and cultural landscape with attainable mitigation measures as discussed in this report.*

*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 offset that can also benefit the ecological processes of the terrestrial habitat and ecological processes. The surveys and impact of the footprint areas have a limited impact on habitat, fauna, vegetation-and cultural resources most of which can be mitigated. **Mitigation considered in this report included the positive outcomes on the development with a critical look at what will transpire where natural and agricultural ecosystems are combined on the farm.***

*This project is indicative of land-use trajectories for sustainable land system transformation from a natural ecosystem to an agriculture ecosystem. Both the systems have been described and has definite policy in place on landuse (biodiversity and protected agriculture). Sustainable land-system transformation is necessary to avert biodiversity and ecosystem collapse. On the other hand, are agriculture productivity which provides social benefits and socio-economic stability. The leverage points for each were considered with an outcome that could benefit each without compromising the project (sustainable agriculture) or environment (biodiversity).*



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**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 establishment of new crop lands and dams as mentioned in the application, which was submitted on the 25th November 2021, for approval prior to authorization in terms of Environmental Impact Assessment Regulations, 2014 namely: Regulation 983, Regulation 984, Listing Notices 2 of the National Environmental Management Act, 1998 (Act no. 107 of 1998) as amended and in respect the assessment process applicable.

### **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 an decision on an environmental authorization.

### **1.3 Applicant and developer**

Mr. J. Janse van Vuuren  
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### **1.4 Information on EAP**

#### **1.4.1 Details of EAP**

EAPASA Registered: No. 2019/785  
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  
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#### **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.

**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"> <li>• long-term loss of natural vegetation;</li> <li>• soil erosion caused by wind/water, and</li> <li>• deterioration of the physical, chemical and biological or economic properties of soil.</li> </ul>
	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		





<b>CONSTITUTIONAL RIGHTS</b>	<p>The Constitution of South Africa (Act 108 of 1996).</p>	<p>Introduces a Constitutional framework for post 1974 South Africa. Chapter 2;</p> <p><b><u>Environment:</u></b></p> <p>Section 24: Everyone has the right-</p> <p>a. to an environment that is not harmful to their health or well-being; and</p> <p>b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:</p> <p>i. prevent pollution and ecological degradation</p> <p>ii. promote conservation; and</p> <p>iii. secure ecologically sustainable development a use of natural resources while promoting justifiable economic and soc development.</p> <p><b><u>Just Administrative Action</u></b></p> <p>Section 33</p>
<b>ENVIRONMENTAL , CONSERVATION AND NATURAL RESOURCES</b>	<p>National Environmental Management Act (Act No. 107 of 1998) (NEMA)</p>	<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"> <li>• sustainable development requires the integration of social, economic and environmental principles.</li> <li>• everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that –</li> <li>• prevent pollution and ecological degradation;</li> <li>• promote conservation.</li> </ul>
<p>National Environmental Management Waste Act, 2008 (Act No. 59 of 2008)</p>	<p>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.</p>	
<p>National Environmental Management: Biodiversity Act (Act No. 10 of 2004)</p>	<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"> <li>(i) the management and conservation of biological diversity;</li> <li>(ii) the use of indigenous biological resources in a sustainable manner; and</li> <li>(iii) the fair and equitable sharing among stakeholders of benefits arising.</li> </ul>
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	<ul style="list-style-type: none"> <li>❖ Waste disposal practices (S20)</li> <li>❖ National Noise Control Regulations (GN R154 dated 10 January 1992)</li> </ul>
National Heritage Resources Act 25 of 1999	<ul style="list-style-type: none"> <li>❖ Stipulates assessment criteria and categories of heritage resources according to their significance (S7)</li> <li>❖ Provides for the protection of all archaeological and palaeontological sites, and meteorites (S35)</li> <li>❖ Provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority (S36)</li> <li>❖ 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)</li> </ul> <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)	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).



		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.
	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"> <li>• Management of agricultural land.</li> <li>• Evaluation of agricultural land evaluation and classification.</li> <li>• Preparation purposes and content of provincial agriculture sector plans.</li> <li>• Declaration of protected agriculture areas.</li> <li>• Providing general objectives of agro-ecosystem management, agro-ecosystem authorisations.</li> </ul>
	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
<b>PROVINCIAL</b>		
<b>ENVIRONMENTAL &amp; CONSERVATION</b>	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:

- 2.1.2 DFFE: Section 29 Regulation 2: Cultivation of virgin soil of the Conservation of Agriculture Resources Act,1983.
- 2.1.3 DFFE: Section 15 (1) of the National Forest Act, 1998 as amended.

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

2.2 Relevant Provincial-and District Municipal planning documents

- 2.2.1 Capricorn District Spatial Development Plan (September 2017).
- 2.2.2 Limpopo Conservation Plan v2. Technical Report. (September 2013).

**3 LOCATION AND DESCRIPTION OF PROPOSED ACTIVITY**

**Project locality**

The project is situated approximately 120 kilometers north-west of Blouberg Local Municipality, in the district of Capricorn in the Limpopo Province.

It is accessed via district road D1522-010 that branches from R572 at Swartwater.

**Appendix A: Locality Map and Surrounding Land Uses**

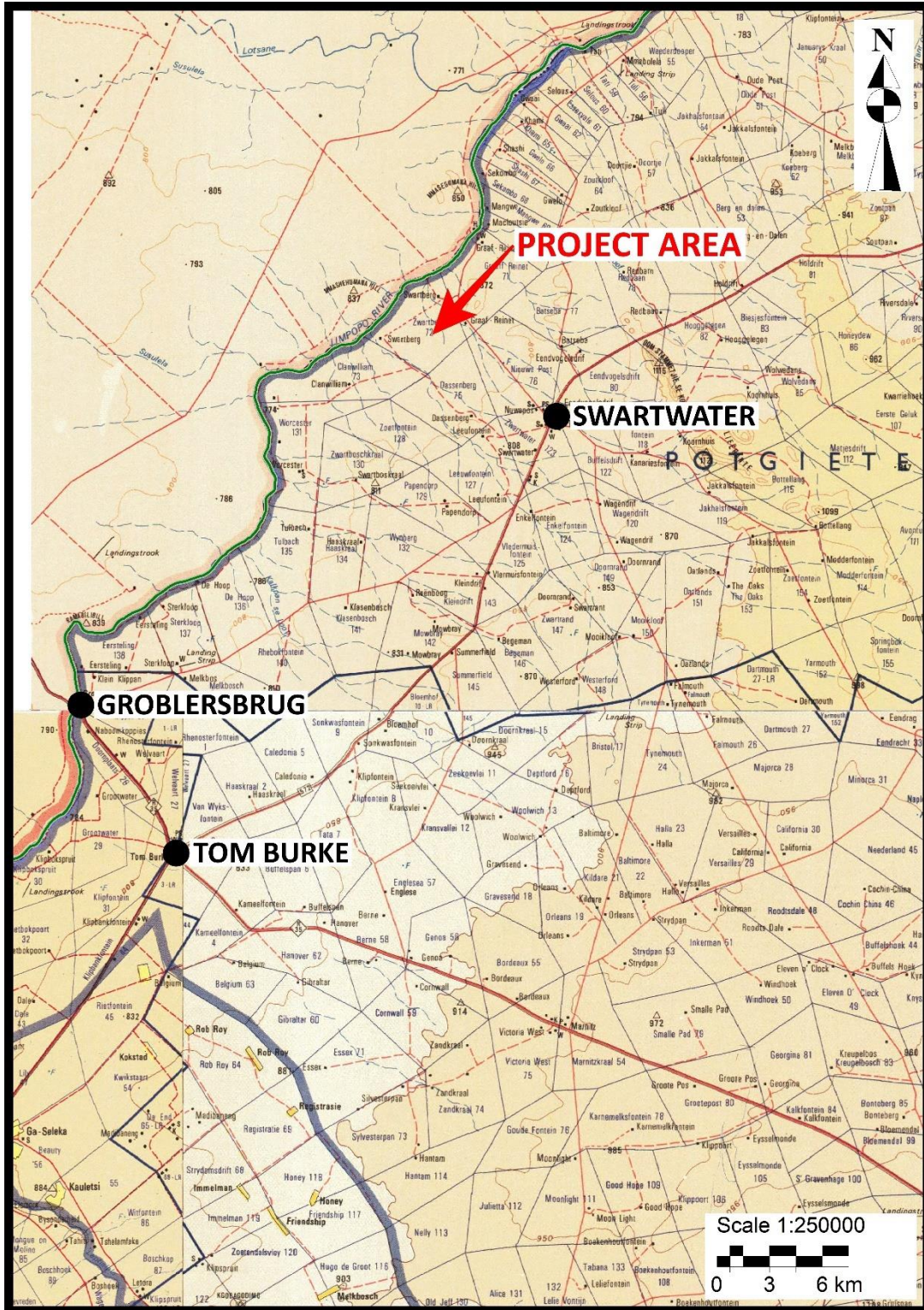
The co-ordinates (WGS84) of the proposed sites are supplied below. Map 2 provides the lay-out of the four sites for the project with Sites 1-3 being assessed in this report.

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

- Site Centre point: Latitude **22° 48' 35.25"** and Longitude **28° 7' 54.34"**.

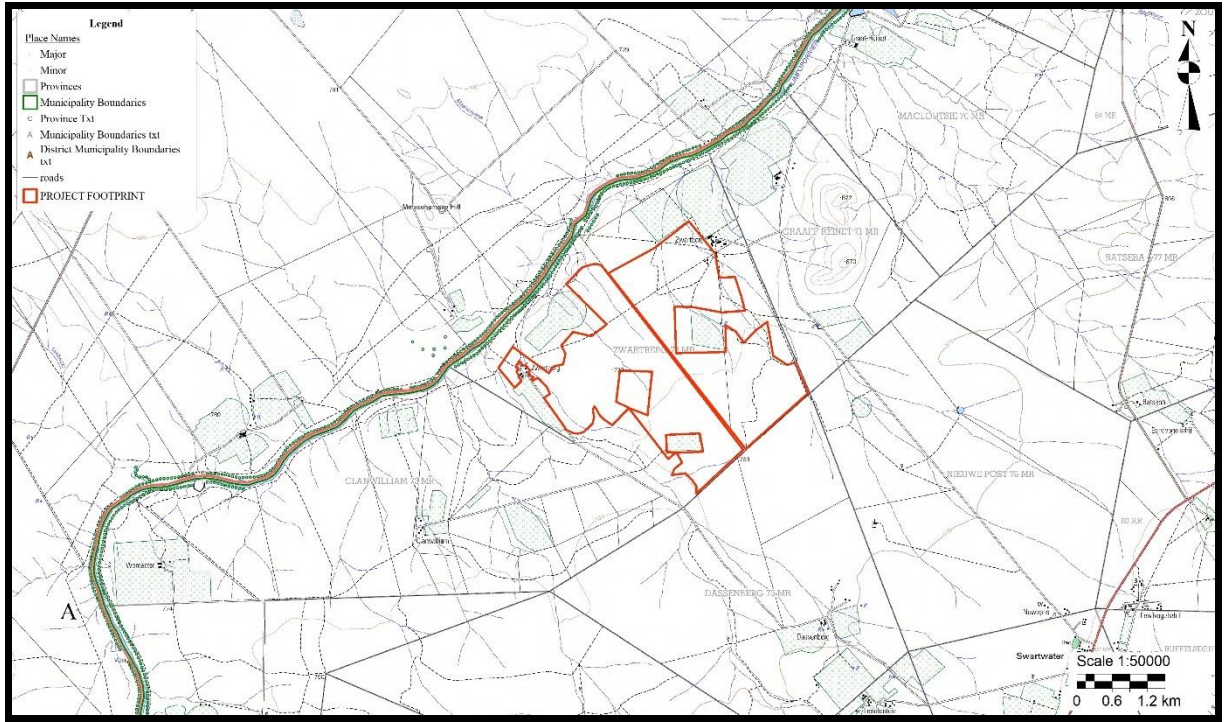
Map 1 below provides the location of the farm in a broader geographic context.





Map 1: Demographic location of project





**Map 2: Footprint location**

**Description of activity**

The proposed project is for clearing of indigenous vegetation for new croplands according to the strategic planning of ALZ Boerdery. The proposed sites were identified by the applicant representative after which the necessary surveys were conducted as well as the EIA process.

Water will be from boreholes in the Limpopo River aquifer and streamflow. There are an existing Water Use License (No 27021749 of 5 September 2018).

**Nature of Activity**

- The project is an agriculture development and will consist of clearance of indigenous vegetation for new croplands. The croplands will be incorporated in a rotation program for conservation farming practices.
- Storage dams will be constructed for pivot irrigation.
- An area of ±955 ha was identified for croplands.
- The existing infrastructure will be used and extended by new fences and pipelines from the directly adjoining croplands.

**Competent authority consultation**

- Pre-application meeting: 5<sup>th</sup> October 2021.

**Environmental Regulations**

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

- Regulation 983, 4 December 2014. Listing Notice 1:
  - Activity no 13; The development of facilities for off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic meters or more.



- Regulation 984, 4 December 2014. Listing Notice 2:
  - Activity no 13: The physical alteration of virgin soil to agriculture.
  - Activity no 15: The clearance of an area of 20 hectares or more of indigenous vegetation.
  - Activity no 16: The development of a 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 meters or higher or where the high-water mark of the dam covers an area of 10 hectares or more.

### **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**

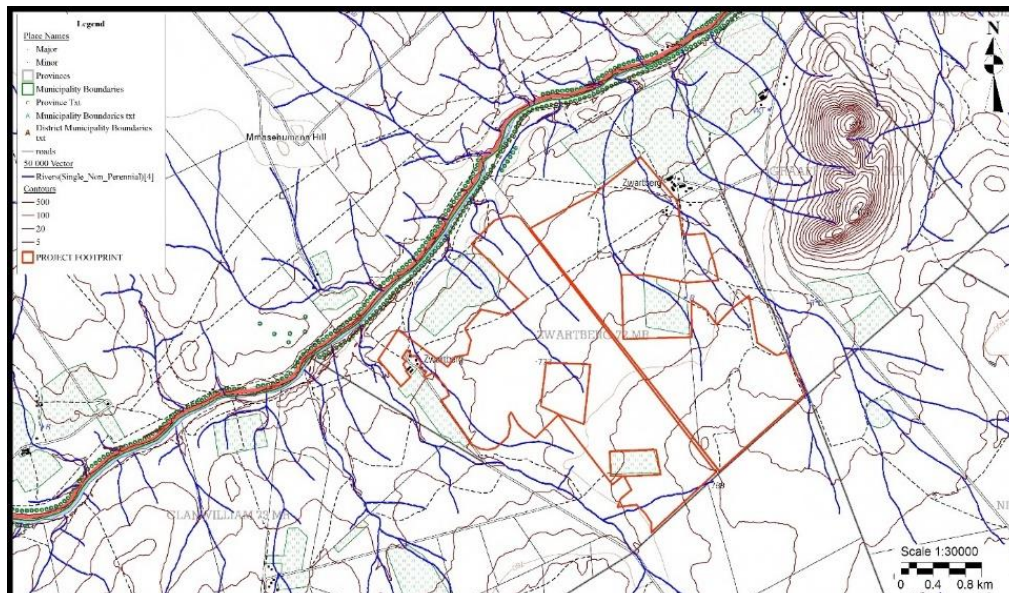
### **4.1 Present environment**

#### **4.1.1 Landuse**

Zwartberg 72 MR is agriculture land currently used for crops- cattle and game. Cropland activities commenced circa 1903 with first indications of croplands in the area is visible on 1956 aerial photographs. Adjoining land uses are croplands, cattle, and game farms, refer to Appendix A.

#### **4.1.2 Topography and drainage**

The development falls within the Physiographic region of the Limpopo River Central Valley. The topography is relatively flat with low dolerite hills and inland plateau parallel to the Limpopo River and drains the inland plateau. The site has a slope from south to north (475 – 510 m.a.s.l). Refer to Map 3.



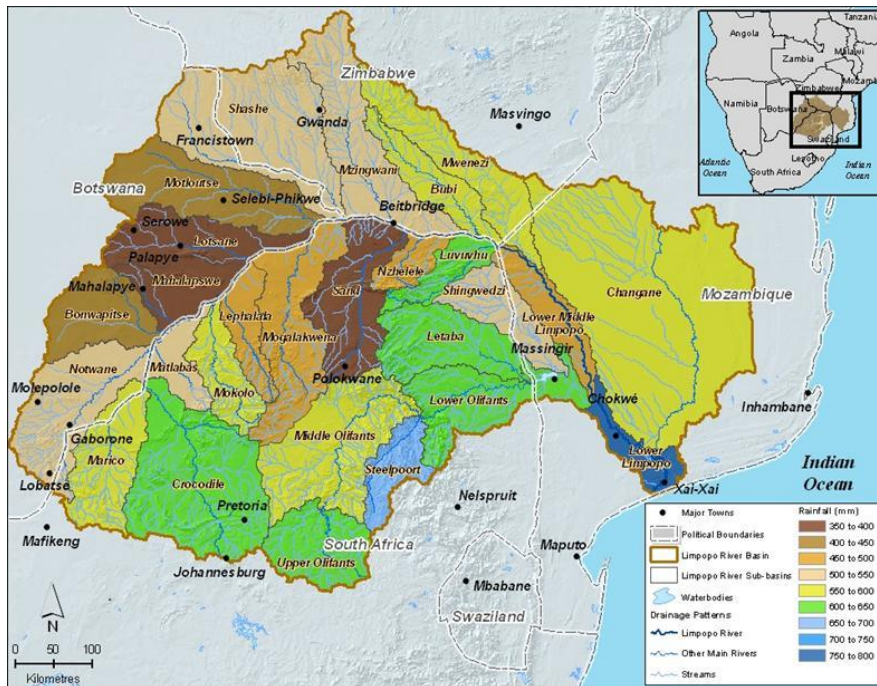
**Map 3: Contour and drainage for project footprints**



Map 4: Quarterly catchment area (DWS)

4.1.3 Climate

The project falls within the Northern Arid Climate Region. It is described as lower than average (300 – 500 mm p.a.) and somewhat erratic precipitation for the Savanna type regions, with semi-arid and hot conditions 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. The climate of the Limpopo River basin varies along the path of the river from the temperate climate of the western basin to semi-arid in the central basin and downstream as a subtropical environment at the river mouth in Mozambique. The map below shows the average annual precipitation patterns for the Limpopo River basin per sub-basin.



Map 5: Mean annual precipitation in the Limpopo River Basin

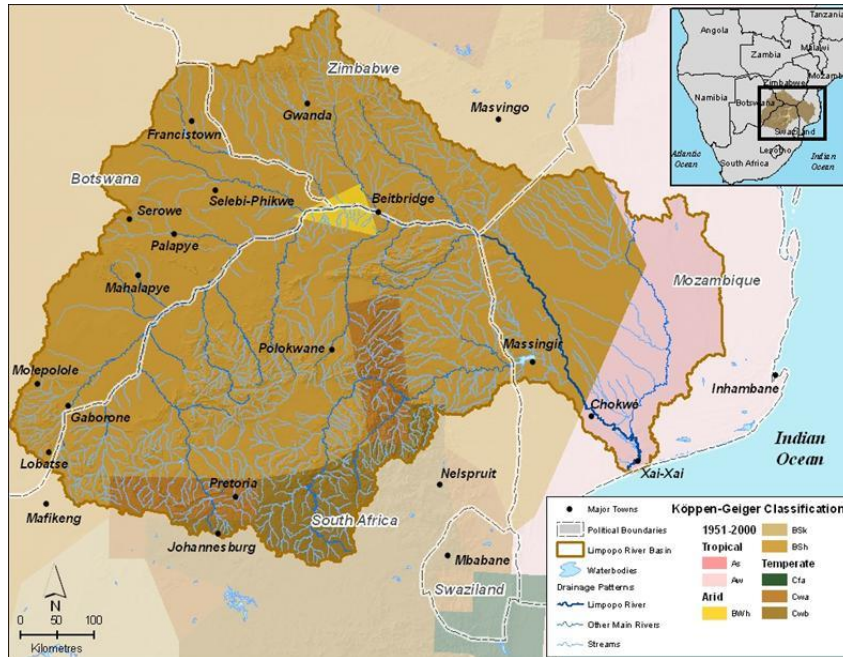




Temperature

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

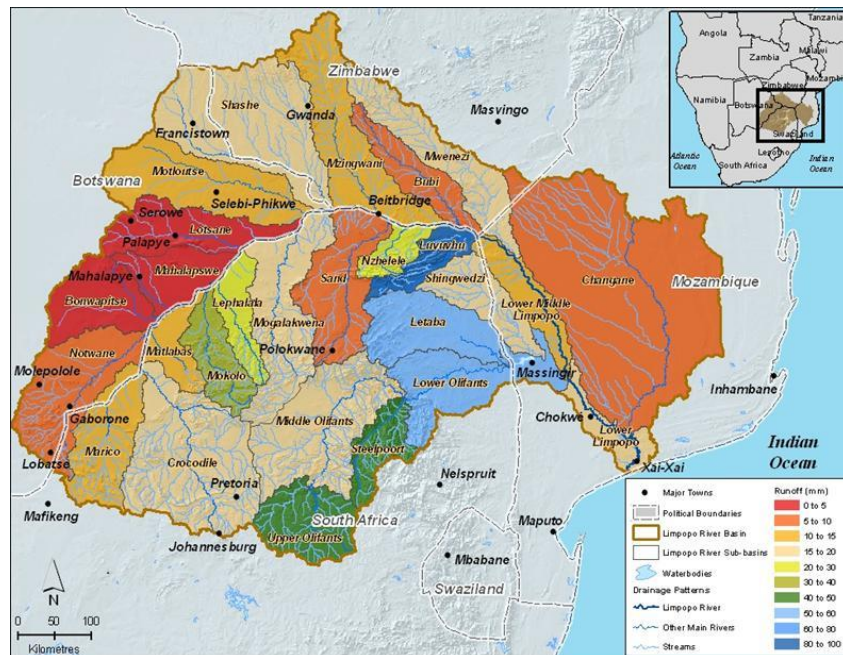
- The basin is classified as Tropical, Arid and Temperate.
- The western river valley, Arid, dry, and hot: The location for the project.



**Map 6: 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).



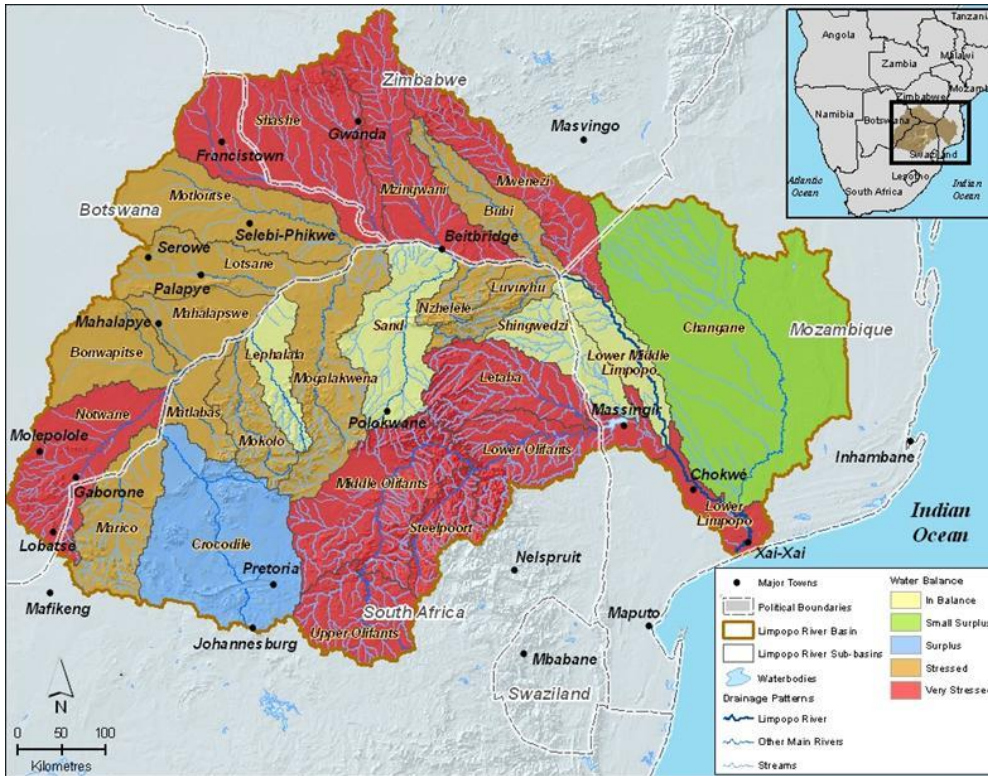
**Map 7: Mean annual run-off (mm/yr) - an estimate of natural water resources in the Limpopo River basin.**



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.**



**Map 8: Estimated general water balance for the Limpopo River basin.**

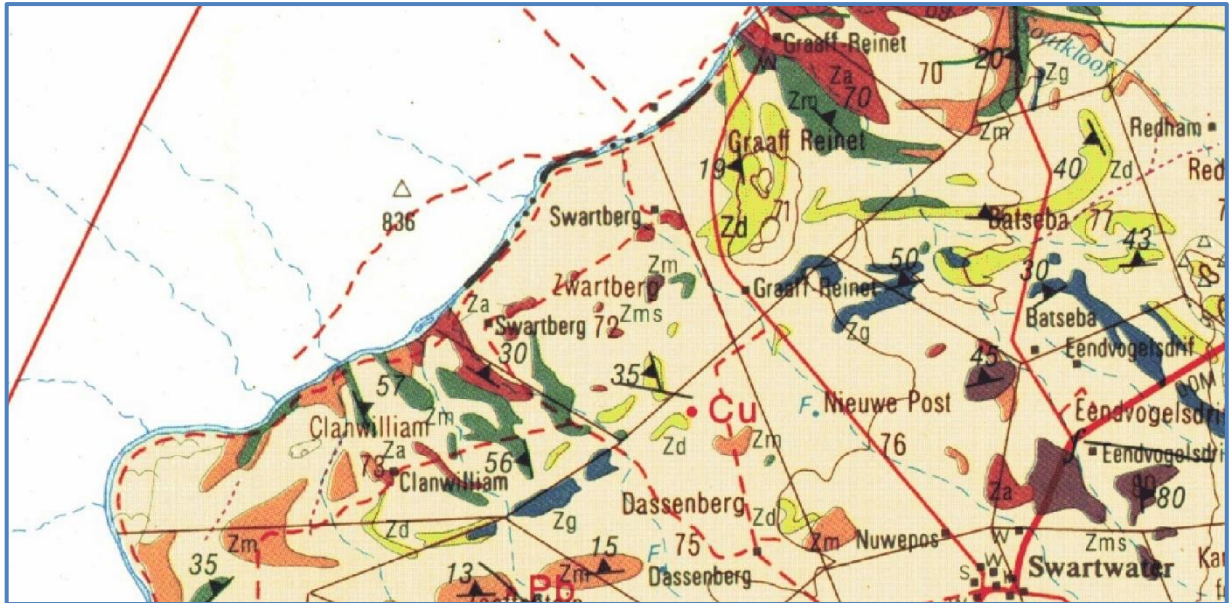
4.1.4 Regional Geology

Mainly a slightly undulating granite plain landscape with localized sandstone, shale and basalt north of the Soutpansberg. Limpopo Belt Supergroup (1:250 000 Geological Series), consisting of Archaean Granite and Gneiss. The Geology of the Limpopo River basin is characterised by a series of significant geological features:

- The Kalahari Craton;
- The Limpopo Belt;
- The Archaean Craton;
- The Karoo System; and
- The Bushveld Igneous Complex

The area is underlain by Sandstone and Shales of the Karoo Supergroup into which some diabase dykes, quartz and pegmatite veins have intruded. Geology is directly related to soil types and plant communities that may occur in a specific area (Van Rooyen & Theron, 1996). Soils in these areas vary from sandier in the north, east and west to shallow and calcareous in areas adjoining to east and west with loamy soils in the north nearer to the river.





Map 9: Geology of region

#### 4.1.5 Soil characteristics

Soil types are mainly Covelley (63%), Coega (15%), Hutton (12%) and Glenrosa (9%) with a loamy-sand structure and a 5-10% clay content. Soil analysis reports were compiled (July 2020) which provide detail outlay locations of the soil types and potential for agriculture.

#### 4.1.6 Biological aspects

##### 4.1.6.1 Vegetation

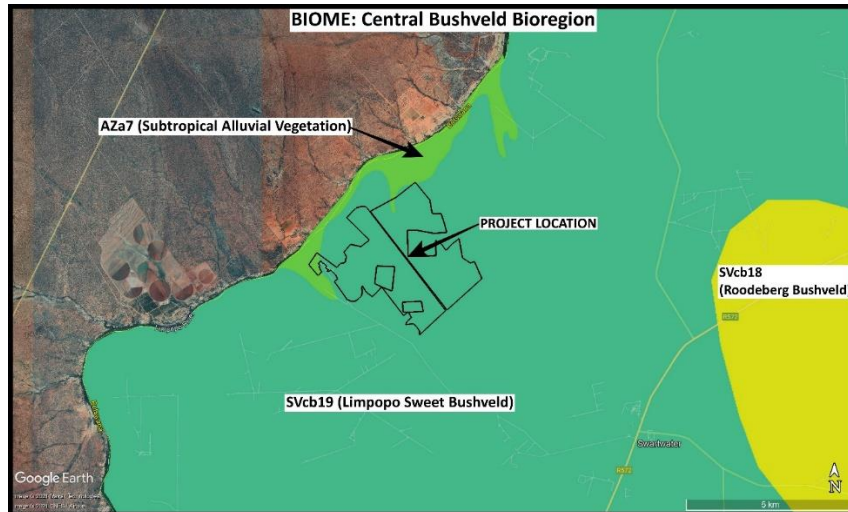
Biome: Savannah

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 Baobab, Marula, Apple Leaf, Leadwood and Shepherd's Tree.

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



Map 10: Vegetation map

#### 4.1.6.2 Fauna

The project area has in effect been utilised (human interference) over a period (since mid-1903) due to:

- Farming activities.
- Erection of cattle fences.
- Foot-and-Mouth Cattle Control Fence.
- Development of infrastructure.
- Human settlement.
- Military activities (border protection system).

This isolation (partly) resulted in the disruption of natural and historic migration (macro- and micro) of larger, medium, and smaller mammals. The small mammal species were 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), with spotted hyena occasional (vagrant) visiting from Botswana. Elephant has no access to the area from the north, but via properties to east, in August this year elephant visited the area, said elephants are from Botswana. Although it is suggested that cheetah and African Wild dogs are occasional visits this is a rare incident, animals are roaming from Botswana. 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 along 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 along 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, diminished crop yields. This is currently monitored by the Company Lowveld Agrochem who conducts ITEST reports (latest on 30 Septemebr 2021) for the water and is described as "Klassifikasie: Minimale gevaar van soutantoganisme (Sagte water)<sup>1</sup>.

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 (such as this application) 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 can 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. Soil monitoring is done by analysis surveys.

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 from towns and work opportunities is rare due the remoteness and land use focused on ecotourism with game-and cattle farms, agriculture crop/citrus production mainly along the river. As work provider in a deep-rural area the project will contributing and ensuring working opportunities. It is located in Protected Agriculture Zone which conforms with the existing landuse 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.

Viewshed

The project has a low visibility index due to flat topography. Not relevant for planning purposes.

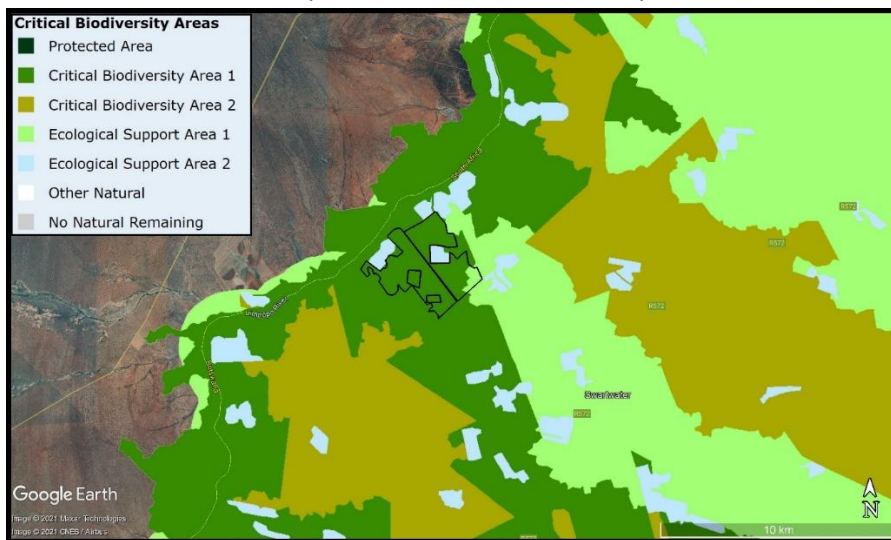
Biodiversity

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<sup>1</sup> Agri Technovation ITEST Water. 14 September 2021.



The crop land footprint is indicated as located in CBA 1 and ESA2<sup>2</sup>. The area has been surveyed and information verified as being Other Natural Areas and Ecological Support Area2 as more realistic<sup>3</sup>. Connectivity has been moderately altered by past human activities. The highest biodiversity is found along the Limpopo River and associated riparian vegetation, which is located ±1km to the north. The map below provides a sense of place of the proposed footprints in relation to the CBA areas where the highest proportion of biodiversity will be found. After development it will change to Ecological Support remaining. What is important is that corridors will be left in between the footprints. It was found that they function under current conditions.



Map 11: 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 to:

- 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.:

- 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.

<sup>2</sup> LEDET Conservation plan. 2013.

<sup>3</sup> Ecological, Red Data and Biodiversity Assessment Report.



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 3 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	15 October 2021	Original copies of advertisements are attached.
Advertisements: Notices (Appendix B2)	Posters placed at: <ul style="list-style-type: none"> <li>• Eastern entrance to farm.</li> <li>• South- Western entrance to farm.</li> <li>• At VKB Co-op Store at Swartwater.</li> </ul>	Attached on the 12 <sup>th</sup> October 2021	No response was received
Notifications to I&AP (Appendix B3)	Notifications were sent by e-mail. Register is kept.	8, 11, 20 & 25 October 2021	Three responses were received: I. Enslin: neighbour. L. J. Grobler: neighbour. T. B. Machete: DFFE
Site Visit and meeting LEDET: Screening Tool and Pre-Application	A site visit was conducted by visiting the project area and Desk-top study	30 September-1 October 2021	(i) Verify information from Screening Tool. (ii) Orientate development on farm and surroundings. (iii) Verification of Screening and Desk-top data
Invitation to Public Open Meeting (Appendix B4)	Invitations were sent by e-mail Reminders of the meeting was sent	8, 11, 20, 25 & 28 October 2021 9 November 2021	Response received: Mr. I. Enslin: neighbour No response was received.



Public Open Meeting (Appendix B5)	Open meeting was held at the facilities of Tulbach farm.  Minutes was kept and distributed	19 November 2021	See Response register: Appendix B4  Minutes was kept. Attendance register was kept. Was distributed to I&AP's, refer to attached Register. No response.
DRAFT Scoping-and Plan of Study (Appendix B6)	Distribution: <ul style="list-style-type: none"> <li>• registered I&amp;AP's;</li> <li>• LEDET</li> </ul>	25 November 2021	Comments will be processed when received  No comments were received
DRAFT EIA Report (Appendix B7)	Distribution: <ul style="list-style-type: none"> <li>• registered I&amp;AP's;</li> <li>• LEDET</li> </ul>		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, Public Meeting and Scoping Report)

- Notices: None
- Advertisement: None
- Public Meeting: None
- 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.

#### 6. NEED AND DESIRABILITY OF ACTIVITY

There are three strategic issues that should be considered in this application. Firstly, is the using of water and land in a sustainable way ensuring **sustainable food production**. Secondly the process has an offset that can also **benefit the ecological processes** and biodiversity and support the terrestrial biodiversity by planning layout and farming practices. Thirdly, that water and arable soil will be used in a sustainable way by **conservation farming practices**. Holistically the above three strategic issues combine in a collective front against the pressures on the area's environmental resources and subsequent biodiversity.

It is important to take note that no minimum ecological flow has been determined by the competent authority (DWS). Measures taken by the conservation farming activities by farmer(s) is a positive





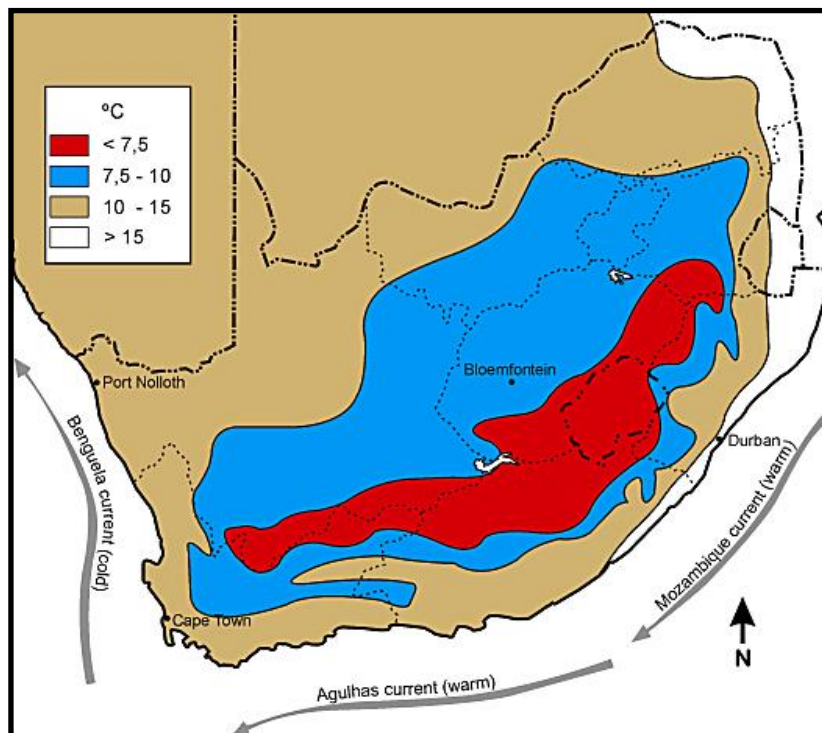
contributing factor to sustainable use of water from the Limpopo River without placing further “stress” on the system and the unique biodiversity it supports. This will be achieved by storing water in storage dams and monitored water sources by water meters as per license condition.

**Need:**

Crop-lands

- To make optimal use of arable agriculture land for farming; this development can be considered as a Strategic Infrastructure Project (SIP 11: Agri-logistics and rural infrastructure) on regional-, provincial-and national level; thus, Economic benefits.
- Capricorn Spatial Development Plan (2017) zoned the area for agriculture.
- 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.*
- Provide job opportunities and financial security (socio-economic benefits) for families in deep rural areas.
- To practice conservation farming practices by rotating program for planting crop lands is optimizing natural resources is a scientific way for continued food production.
- The rotation crop lands is planted with herbaceous mixtures which provides habitat, nutrients in soil and support nitrogen-, water-and carbon cycles. Thus, an agriculture ecosystem is maintained.
- To produce crops in a seasonal timeline when it is too cold in other farming areas to produce specific climate sensitive crops is food security. Refer to Map 12.

The minimum climate zone (>15), as indicated in map below, for the project area is conducive for crop- and citrus 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.



**Map 12: Minimum climate zones for South Africa**

**Desirability of activities:**

Croplands

- 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, also abroad.
- The proposed new croplands will make use of the available and suitable land and most importantly the allocated water. This is a culmination of the strategic planning by the applicant by planning for sustainable farming (rotation of planting crop lands) by using the resources available.
- The new croplands will be placed in a 3–4-year rotation program; this is a “rest” phase for each specific cropland during which it is seeded with indigenous grass mix or a monoculture crop with a high biomass production which serves as organic material plowed back into the soil. During drought periods the rotation is extended to 5 years.
- The rotation program results in soil health (microbiological) which in turn lower the need for fertilizers and foliage chemicals uses. The risk of leaching and pollution is thus drastically lowered. The process in the “rest” phase is again conforming back to a more natural ecosystem cycle process.
- The storage dams have 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.

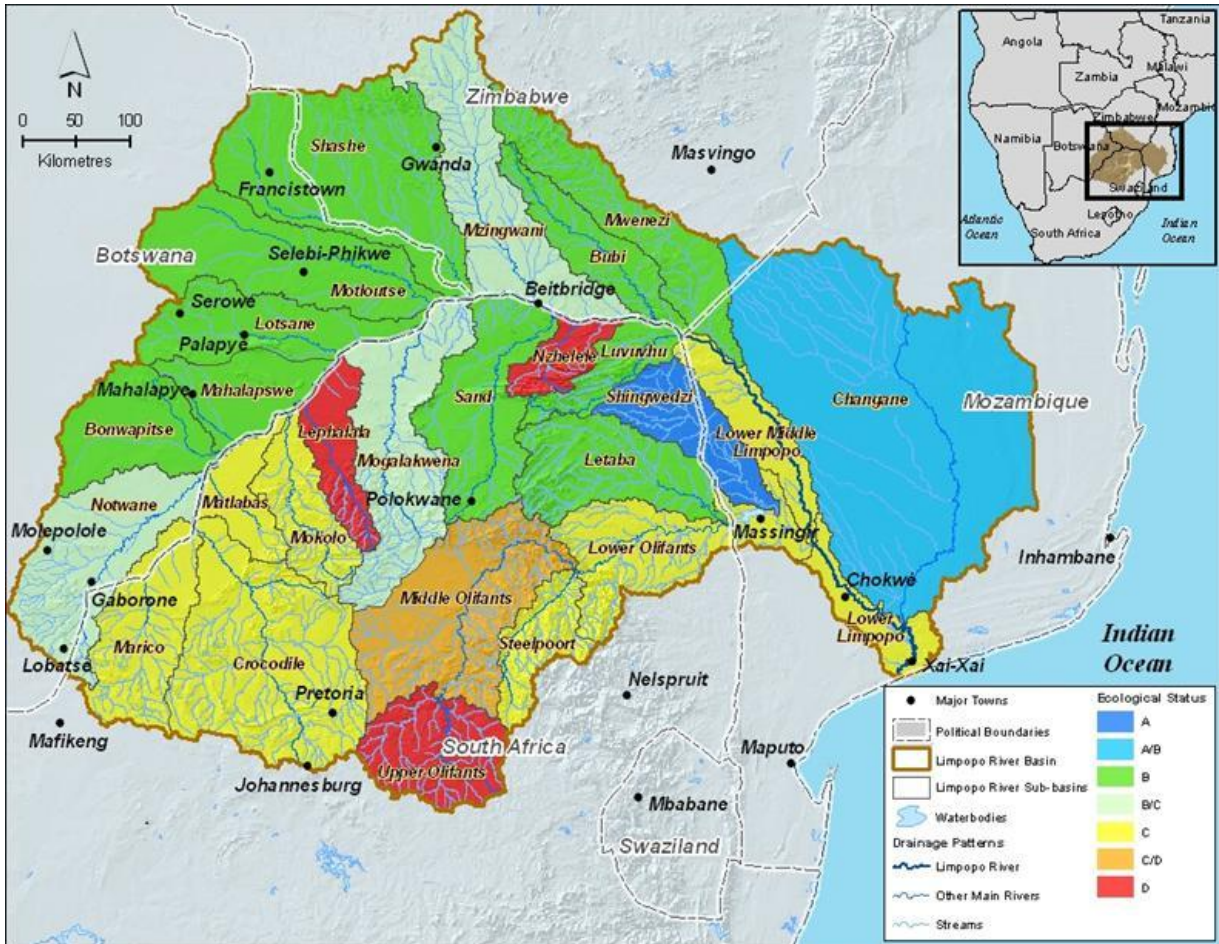
Downstream users

- The farm Zwartberg 72 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 on both sides (Botswana) of the Limpopo River. It was developed as an Agriculture Development Node by previous government. It is capture in Spatial Development Plans as Protected Agricultural Zones.
- Downstream water users include mainly farming, with Musina municipality ± 252downstream.

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 (DWA, 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. It has not yet been determined by DWS but control is by metered extraction points.
- 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.





**Map 13: 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. During site visits the riparian zone was visited and was found to be stable and in very good conservation condition.

C. Haupt<sup>4</sup> describe the groundwater flow and quality as follows:

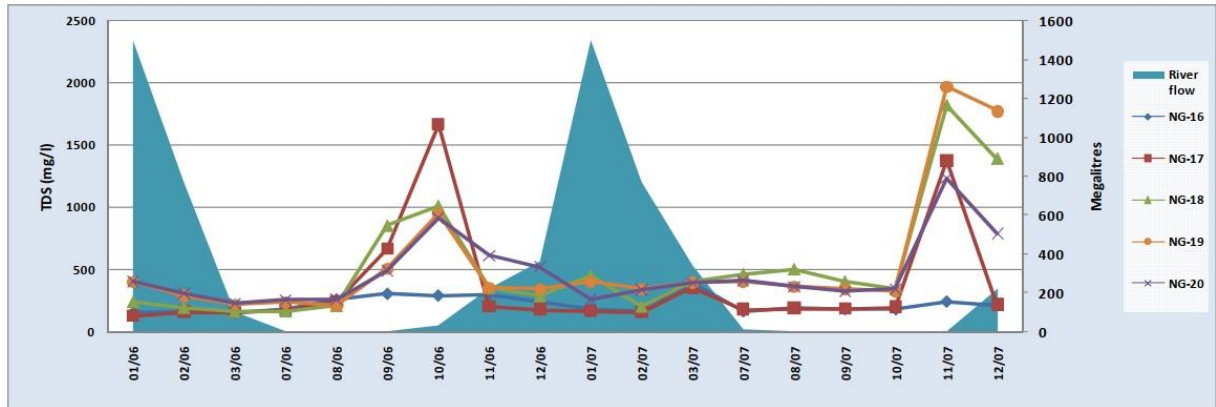
*Groundwater flow is orientated northwards towards the Limpopo River. Flow volumes are extremely low due to the low recharge and low permeabilities. Under natural conditions, groundwater drains via springs discharging from the basement aquifer, and evapotranspiration by riverine vegetation. Hence baseflow to the Limpopo is not*

<sup>4</sup> WSM Leshika (Pty) Ltd: Environmental Impact assessment on the Groundwater (Vele Colliery Project), April 2009.



generated. Evapotranspiration by riverine vegetation and the movement of saline groundwater, emanating from the basal marine deposits of the Karoo rocks, towards the Limpopo River causes a salt accumulation in the fringes of the alluvial aquifer, resulting in poor natural water quality. Irrigation by wellpoints in alluvial sands has altered the water and salt balance by induced fresh inflows from the Limpopo into the sands during periods of runoff.

The chart supplied below is from the same source.



The chart shows the months of September and October experienced 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

<b>ACTIVITY ALTERNATIVES</b>	
KEY WORDS	Activity alternative is also known as project alternative
<b>PROJECT TEAM INVOLVEMENT</b>	



Professional	Role
Applicant/EAP (Crops)	Objectives of: <ul style="list-style-type: none"> <li>Strategic agricultural plan of applicant</li> <li>Sustainability</li> </ul>
Applicant	<ul style="list-style-type: none"> <li>Propose footprints for strategic plan</li> <li>Contribution to agriculture value chain</li> </ul>
Environmental/Archaeology/Ecology and Biodiversity	<ul style="list-style-type: none"> <li>Compliance with heritage objectives</li> <li>Compliance with biodiversity objectives</li> <li>NEMA legislation</li> <li>Identify suitable footprints</li> <li>Provide information on footprint locations</li> <li>Provide information on receiving environment</li> </ul>
CONSIDERATIONS	
Specific considerations	Specific motivation
(i) Farming options	<ul style="list-style-type: none"> <li>Can crops be farmed on areas identified?</li> <li>Use specialist reports for defining footprint.</li> </ul>
<p>Motivation Crops</p> <p>(i) Soil is suitable</p> <p>(ii) Climate is suitable</p> <p>(iii) Existing infrastructure footprints can be used</p> <p>(iv) 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) Agriculture ecosystems will be created by rotation crop farming.</p> <p>(iv) Sensitive areas are excluded from development footprints.</p> <p>(v) Thus, inclusive, and collective input in planning can provide positive outcomes.</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



<b>PROJECT TEAM INVOLVEMENT</b>	
<b>Professional</b>	<b>Role</b>
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 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"> <li>• Comply with international and national legislation/standards</li> <li>• Allow for compatible footprint layout</li> <li>• Sustainable use of natural resources</li> </ul> <p>(ii) Operational objectives</p> <ul style="list-style-type: none"> <li>• Maintenance of a soft footprint and system infrastructure</li> <li>• Water according to quantity and quality needs. Implement a Water Monitoring Program</li> <li>• Best crop/citrus placing</li> <li>• Excluding sensitive areas from footprint</li> <li>• Implement mitigating management plans</li> <li>• Implement Water Monitoring Program according to receiving environment</li> </ul>
EAP	<p>Consider the design outlay of croplands according to professional information and I&amp;AP's input for:</p> <ul style="list-style-type: none"> <li>• Spatial planning</li> <li>• Sensitive areas</li> <li>• Location</li> <li>• Biodiversity</li> <li>• Heritage sites</li> <li>• Sustainable use of renewable resources</li> </ul>
<b>CONSIDERATIONS</b>	
<b>Specific considerations</b>	<b>Specific motivation</b>
Design of facilities	<p><b><u>Environmental</u></b></p> <p>Prevent negative impacts on receiving environment:</p> <p>(i) Minimum removal of natural vegetation</p> <p>(ii) Allow for preservation of sensitive plant communities (if present).</p> <p>(iii) Compliance with game health (carrying capacity)</p> <p>(iv) Preventing conflict with wildlife by appropriate fencing</p> <p>(v) Incorporate layout in habitats to allow for use by wildlife</p> <p>(vi) Prevent pollution</p>



	(vii) Implement integrated monitoring plans <b>Heritage</b> Mitigate impact on heritage issues
Configuration of facilities	Can be implemented on footprints without any environmental constraints or parameters by agricultural-and engineering design/farming activities/crop layouts/recommendations in specialist reports.
Prevention of erosion	Stormwater design in croplands 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

<b>LOCATION ALTERNATIVES</b>	
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
<b>PROJECT TEAM INVOLVEMENT</b>	
<b>Professional</b>	<b>Role</b>
Client	<ul style="list-style-type: none"> <li>• Compliance with legislation and standards for farming</li> <li>• Productive use of agriculture land</li> <li>• Water Management-and Monitoring Plan</li> </ul>
Professional team	Assess receiving environment for correct placement of location in receiving environment with preventive/mitigation measures
EAP	Consider alternatives using specialist input
<b>CONSIDERATIONS</b>	
<b>Specific considerations</b>	<b>Specific motivation: Environmental</b>
Location: • Cropland footprints	Best areas for crops will be used by using planning/indicators: (i) Existing infrastructure (ii) Prevention of sterilising areas (iii) Using soil analysis recommendations
Location (Visual)	The planned locations for the proposed footprint locations and related development were considered as to having the least visual impact.
Location (receiving environment)	Cropland footprint is in Other Natural Areas placed directly adjoining onto existing crop area. Footprints have a buffer between development and watercourses. No sensitive areas present. Design allows for corridors and connectivity.
Landuse	Project located in Protected Agricultural Areas (PAA) by DALRRD: Limpopo River Protected Area (2020).



	No change in land use. Remaining areas can still be used by game/cattle.
Management	Layout according to existing infrastructure, new development needs and receiving environment
Execution of proposal	Compliance with legislation for LEDET, DALRRD and DFFE Consideration. Accommodate environmental parameters of receiving environment. Accommodate existing infrastructure.

7.4 Process alternative.

<b>PROCESS ALTERNATIVES</b>	
KEY WORDS	Best Practicable Environmental Option (BPEO) in considering alternatives for: <ul style="list-style-type: none"> <li>• Technology</li> <li>• Equipment</li> </ul>
<b>PROJECT TEAM INVOLVEMENT</b>	
<b>Professional</b>	<b>Role</b>
Client	Obtaining objectives
Environmental & Heritage	<u>Environmental objective:</u> <ul style="list-style-type: none"> <li>• Environmental compliance</li> <li>• Conservation and biodiversity compliance</li> <li>• Best practices during construction phase</li> <li>• Best practices during operational phase (maintenance)</li> <li>• Ensuring environmental compliance by maintenance programme by implementing an environmental monitoring end compliance plan.</li> </ul> <u>Heritage objectives:</u> Professional recommendations Implement a Management Plan
<b>CONSIDERATIONS</b>	
<b>Specific considerations</b>	<b>Specific motivation</b>
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"> <li>• Climate analysis.</li> <li>• Soil surveys.</li> <li>• Soil analysis.</li> <li>• Water analysis.</li> <li>• Irrigation plans.</li> <li>• Ecological, Red Data and Biodiversity Report.</li> <li>• Archaeological Report.</li> </ul>





	<ul style="list-style-type: none"> <li>• Integrated Monitoring Plan.</li> <li>• Global Gap Compliance.</li> </ul>
Using technology	<ul style="list-style-type: none"> <li>• Implement an Environmental Management Program with Water Monitoring program</li> <li>• Neutron Moisture Probes is already used in monitoring the:             <ul style="list-style-type: none"> <li>(i) Soil moisture content at various depth levels</li> <li>(ii) Soil temperature</li> <li>(iii) Salinity</li> </ul>             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)           </li> <li>• Plant Moisture Stress can also be conducted along the riverbank to measure the stress that riparian trees experience because of over-extraction.</li> <li>• Monitoring water depth (quantity)-and quality (salinity) can also contribute to water quality-and quantity in the watercourses.</li> </ul>

7.5 No-Go alternative

<b>NO-GO ALTERNATIVES</b>	
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.
<b>PROJECT TEAM INVOLVEMENT</b>	
Professional	Role
Client	This is not an option as the objectives of crop farming will not be attained. Cropland expansion for conservation agricultural plan cannot be obtained: Strategic Planning
Environmental	Objectives of applicant and I&AP’s will not be attained Mitigation is possible
<b>CONSIDERATIONS</b>	
Specific considerations	Specific motivation
Objectives	Compliance with legislation Attaining farming objectives Sustainable use of natural resources for sustainable farming Include 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 expansion of croplands will be a positive contributor to the farming economy, sustainable land use-, natural resources and rural job security on farm(s). The total area of Zwartberg 72 MR will not be developed and can still function as part of ecological systems. The area has been identified by taking into consideration the existing infrastructure. The landowner can use the land as it is zoned for agriculture, also is it not possible to utilise (meaning transforming) the total areas due to suitability of soil and availability of water. 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. After all, farmers are not against conservation and conservationists are not against farmers. It is a matter of logical co-existence and development as envisaged in the Spatial Development Plans.

#### 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 existing linking to lands and farming infrastructure. Consideration was given to using existing footprint (roads/fences/pipes).

#### 7.6.3 Location alternatives

The proposed locations are the best options for placing of the cropland footprints to prevent biodiversity impacts. The placing was done by using the recommendations from the specialist reports and considering the mitigation measures. No sensitive areas are present.

#### 7.6.4 Process alternatives

Collectively the new croplands will be economically viable with the existing Lawful Water Use allocated, the developer can attain their strategic objectives. Using only identified areas for which the layout was planned according to various professional inputs resulted in agricultural land to be farmed sustainably and with 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 report**



The Screening Tool does not indicate any sensitivity of the area, irrespective of this an Archaeological Study was conducted as human occupation dates to late 1800's early 1900's. A Management and Monitoring Plan will be compiled for administrative record and management purposes.

Below is a summary of the findings and recommendations.

Archaeology:

**Extract from Archaeological Report**

*"...The overall impact of the project is considered to be low and residual impacts can be managed to an acceptable level through implementation of the recommendations made in this report. The socio-economic benefits also outweigh the possible impacts of the development if the correct mitigation measures are implemented for the project."* (Paragraph 10.3 page 39).

**Recommendations:** (Paragraph 10, page 38)

- Implementation of a chance find procedure for the project (as outlined below).
- It is recommended that if any artefacts (e.g., bone, ceramics) is uncovered in the area where SB004 is located all operations must be stopped, and an archaeologist must be contacted to assess the find.

**Monitoring Requirements** as supplied in Sub-paragraph 10.5 (page 40) should form part of the EMP'r.

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 footprints and to consider the impacts of the footprints. The survey findings will be used to describe and assess the placement of the footprints and to provide recommendations for mitigation in such a manner as the 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) Biodiversity loss will be minimal and will not influence fauna and flora community's survival.
- (iv) 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.
- (v) The ecological reserve and biodiversity of the Limpopo River and other water bodies is not affected.
- (vi) The croplands in a rotation rest period provided habitat to various biota and created an agricultural ecosystem linked by an ecotone to the natural ecosystem not developed.
- (vii) No form of pollution was found.

8.3 Environmental Management Program (EMPr)

**Appendix F: 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 landuse is in the Limpopo River Protected Area (Irrigation) as per national information.
- iii. The above contribute 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 and tourism activities.
- v. With the lay-out of the cropland's consideration was placed on the natural environment such as using good soils, location of large baobabs-, plant communities of importance-, archaeological sites, and drainage to watercourses.
- vi. Connectivity parallel will be towards/away from the aquatic ecosystem of the Limpopo River and will not be influenced its current functioning.
- vii. An integrated ecosystem is created and maintained consisting of an agriculture ecosystem, and ecotone and a natural ecosystem.
- viii. Water quantity and quality (including soil) 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 will be lost.
- ii. Connectivity between terrestrial and aquatic ecosystems will be partly influenced but will be able to survive and be restored.
- iii. Protected tree species will be destroyed and/or relocated from 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	Soil	Nature of soils suitable for croplands	4	2	1	2	14	Low (+)	High (+)	<ul style="list-style-type: none"> <li>• Site specific layout of croplands based on soil analysis report.</li> <li>• No-go areas will be marked before construction commences.</li> <li>• The EMP must be implemented.</li> </ul>
A1.2	Erosion	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 (+)	<p>(i) Roads</p> <ol style="list-style-type: none"> <li>a. The management roads related to the cropland's areas must be designed to prevent erosion.</li> <li>b. Any altered water flow influencing the management roads should be designed to allow for water flow connectivity.</li> <li>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.</li> </ol> <p>(ii) Croplands Water will drain via the cropland's layout in contours/channels.</p>





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										The channelled outlets must be designed to prevent scouring and erosion.
<b>A1.3</b>	Existing physical degradation of the local environment	Previous human activities did leave a distinct linear footprints and degraded areas	5	2	1	1	8	Low (-)	Moderate (+)	<ul style="list-style-type: none"> <li>No development will be placed in proximity of legal parameters of watercourses.</li> <li>A stormwater plan should direct water with energy dissipaters with a lay-out plan.</li> </ul> <p><b>Collectively</b> The Zoning Map provided with EMPr must be developed further to incorporate all the mitigating measures and proposals to prevent impacts on the remaining environment.</p>
<b>A1.4</b>	Prominent landscape features	One watercourse could be affected (access). Rocky outcrops present and could be affected	3	2	2	3	21	Low (-)	Low (+)	<p>Buffer zones must be implemented between development and any watercourses.</p> <p>Only existing crossings should be used for access.</p> <p>Vegetation must be left intact in the buffer zones.</p> <p>Dolorite outcrops will be left intact with buffers.</p>



## 2 FRESHWATER SYSTEMS

NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
A2.1	Watercourses	Preventing or altering natural flow of river channels or watercourses. Two watercourse was identified (outside footprint)	2	2	1	2	10	Low (-)	Low (+)	<p><u>Croplands</u></p> <p>The watercourses outside the footprint must have a buffer zone as recommended in ecological report. Drainage from new croplands will augment water supply in watercourses which will benefit vegetation.</p> <p>Croplands to be completely fenced to prevent spill-over disturbances.</p>
<p><u>Rational for A2.1:</u></p> <p>(i) The activity conducted by development where water is channelled should have energy dissipaters.</p> <p>(ii) The watercourses are ephemeral with terrestrial vegetation and are not considered as critical but still has connectivity importance for arboreal species.</p> <p>(iii) The watercourses drain into the Limpopo riparian vegetation and must not be impeded or diverted and can function as corridors.</p> <p>(iv) The above activities are controlled by legislation with a 32-meter no-development restriction.</p> <p>(v) The Zoning Plan which indicates no-go areas, buffer-zones and farming infrastructure must be compiled and submitted to competent authority before construction commence and a final Zoning Plan submitted before the operational phase commence.</p>										
A2.2	Natural drainage patterns	Altering natural drainage patterns can alter connectivity of hydrological systems	2	3	1	2	12	Low (-)	Low (+)	<ul style="list-style-type: none"> <li>The natural drainage patterns must be incorporated, by specific site design and Zoning Plan for the cropland footprints.</li> <li>At watercourse crossings the existing width will be used and not be enlarged.</li> <li>Erosion structures should be placed where necessary.</li> </ul>



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										<ul style="list-style-type: none"> <li>No trees will be removed on the banks of the watercourse crossings.</li> </ul>
A2.3	Engineered drainage patterns	Increased run-off due to stormwater outlets can result in erosion	1	2	1	2	8	Low (-)	Low (+)	<ul style="list-style-type: none"> <li>The stormwater planning for the project will be done according to incorporate drainage from the cropland areas.</li> <li>The <u>final design</u> should include stormwater and cropland contour planning and will be controlled by the ECO and as soon as the designs has been received it will be included as part of the environmental management plan and Zoning Plan.</li> </ul>
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"> <li>The stormwater design must include water energy damping design measures.</li> <li>This will be controlled by the ECO and included in the environmental management plan.</li> <li>Roads should be planted with grass with water diverters- and energy dissipaters.</li> <li>It must be included in the Zoning Plan.</li> </ul>
A2.5	Water quality	Change of water quality	3	4	2	3	27	Moderate (-)	High (+)	<ul style="list-style-type: none"> <li>It is recommended that a monitoring programme is made a condition and initiated when construction has been completed. A copy should be forwarded to competent authority for record keeping.</li> <li>The monitoring should include areas upstream and inland from the cropland areas as well as downstream.</li> </ul>



## 3 CLIMATE

NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
A3.1	Rainfall patterns	Effects on the development and receiving environment in which the footprints are located	3	2	1	3	18	Low (+)	Low (+)	The design and layout make provision for surface drainage from rain. The natural watercourses are left intact with a buffer of vegetation on both sides.
A3.2	Surface from new croplands	Can cause damage to infrastructure and cause erosion/siltation	4	1	1	2	16	Moderate (-)	Low (+)	Design measures of croplands will direct surface flow via contours and will channel water into natural watercourse. Flow will eventually follow natural drainage flow patterns.
A3.3	Climate	Influence of drought cycles.	5	3	3	2	26	Moderate (-)	Positive (+)	The strategic plan of rotation crop planting on lands is based on: <ul style="list-style-type: none"> <li>• Soil “health” condition.</li> <li>• Availability of water and quality (condition).</li> <li>• Farming techniques.</li> <li>• Adaptability of the strategic farming plan based on above conditions.</li> </ul>



4 SENSE OF PLACE IN RECEIVING ENVIRONMENT										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
A4.1	Wrong land use Wrong placing	Effects of the development on the receiving environment	3	2	1	3	18	Low (-)	Moderate (+)	<p>The cropland footprints are placed directly adjoining onto the existing croplands, this will prevent sterilising productive land.</p> <p>The un-developed areas will not be internally fenced to prevent movement of species.</p> <p>The cropland areas must be enclosed by fencing against primates and mammal species causing damage to crops.</p> <p>Lay-out is such as to use only arable land and not isolate and/or fragmentise the remaining veld.</p> <p>No development or incidental supporting development in sensitive areas is envisage/planned.</p>

Rational :

Landuse

The farm is located in a Protected Agriculture Zone.

Background information:

The proposed areas and associated farming infrastructure has 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 1967.

Status before new development:

The vegetation cannot be considered as pristine due to the above as was confirmed with field surveys.

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:



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- (i) The environmental landscape has already been transformed in various degrees since 1903.
- (ii) The footprint areas were 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 in excess.
- (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	The development can result in the destruction of rare/ endangered plant species.	4	3	1	2	16	Low (-)	Low (+)	<ul style="list-style-type: none"> <li>• Protected large baobab tree(s) will be left in-situ.</li> <li>• Protected Leadwood, Shepherd's trees and Apple-Leaf trees will be identified when final layout is done and decision made for need of a destruction permit from DFFE.</li> <li>• Smaller baobab trees will be transplanted.</li> <li>• Shepherd's trees that need to be removed need a destruction permit from DFFE.</li> <li>• No Red Data and/or endangered species were found.</li> <li>• Other plants with any conservation and or aesthetical value will be removed before construction commences. These measures will be controlled by the ECO.</li> <li>• Said measures have been discussed in the environmental management plan for the project.</li> </ul>



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										<ul style="list-style-type: none"> <li>The impact can be described as minimal due to the past human influence (read negative impact) on the natural vegetation communities since 1960's by farming activities, uncontrolled fires, road construction etc.</li> </ul>
<b>B1.2</b>	Vegetation communities of conservation/scientific importance	Terrestrial habitat	4	3	1	2	16	Low (-)	Moderate (+)	<ul style="list-style-type: none"> <li>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 and re-established on the demarcated green-and/or rehabilitation space areas with a legal permit from DFFE.</li> <li>No sensitive vegetation communities will be affected by the croplands developments.</li> <li>DFFE permits to be applied for before construction commences.</li> </ul>
<b>B1.3</b>	The introduction/spread of invasive alien seeds and plants	The exotic species can benefit by new development activities and result in further spread of species	3	2	1	2	12	Low (-)	Low (+)	<ul style="list-style-type: none"> <li>Any new or existing exotic species identified must be removed before construction commences.</li> <li>This must be executed by the environmental control officer during development and thereafter by the farming structures.</li> <li>This issue must be incorporated in the environmental management plan.</li> </ul>



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<b>B1.4</b>	Frequency of veldt fires	Uncontrolled fires that can impact on ground cover and/or cause financial losses.	4	4	1	4	36	Moderate (-)	Low (+)	<ul style="list-style-type: none"> <li>No open fires must be allowed on construction site.</li> <li>Above must form part of the environmental management plan and enforced by the environmental control officer.</li> </ul>
<b>B1.5</b>	Amount of trampling on special areas of vegetation	Overgrazing can occur causing erosion	4	4	2	5	50	Moderate (-)	Low (+)	<ul style="list-style-type: none"> <li>The area is in moderate condition, therefore the number of grazers such as waterbuck, blue wildebeest and impala should be adapted downwards to allow for the veld to recover to a better ecological status for the herbaceous species.</li> </ul>
<p><b>Rational:</b></p> <p>(i) This issue is also described collectively under Cumulative impacts.</p> <p>(ii) This impact has high importance for the developer as well as for conservation and collectively for biodiversity in respect of the two mentioned plant communities on the remaining portion of the farm.</p> <p>(iii) A stable environment can support the system. The most important component of the environment is the vegetation which will benefit any water seepage.</p> <p>(iv) Offset recommendation: The creation of a tree ecotone to support the ecotone transition will create connectivity and corridors.</p>										
<b>B1.6</b>	Overgrazing	Erosion due poor basal cover and die-off of vegetation	5	5	2	5	60	High (-)	Moderate (+)	Adapt game numbers downwards.
<b>B1.7</b>	Browser impact	Damage and destruction of specific plant species	5	10	1	4	64	High (-)	Low (+)	Less selective browsing will occur as more browse material will be available due to seepage water to support preferred browsed tree species. Lowering of browser game numbers will also benefit alleviating browser pressure.





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	Species will be destroyed (unnecessary) by construction activities.	2	2	1	3	15	Low (-)	Low (+)	<ul style="list-style-type: none"> <li>• Recommendations made in Ecological, Red Data and Biodiversity Report made recommendations for implementation during development.</li> <li>• Before construction commences the environmental control officer should survey the area again to remove possible species that moved in since the surveys.</li> <li>• Reptiles found on the rocky outcrops is mobile and will be able to move away to the larger remainder of the outcrop areas.</li> </ul>
B2.2	Natural migration of species	Severing of natural existing migration routes can negatively impact on population survival rates.	5	4	3	5	60	Low (-)	Moderate (+)	<ul style="list-style-type: none"> <li>• The remaining migration routes for species will temporarily be restricted during development phase. It will be restored and functional given time after development has been completed.</li> <li>• The croplands can be fenced “out” of the remaining farm areas where the watercourse is found.</li> <li>• Existing corridors is already used by resident game and other smaller mammal species (confirmed by surveys).</li> </ul>



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<b>B2.3</b>	Free roaming predators/ primates	Conflict with predators and primates with construction and farming activities	5	5	2	3	36	Moderate (-)	Low (+)	<ul style="list-style-type: none"> <li>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.</li> <li>The free roaming species should not unnecessarily disturb by workers.</li> <li>Primate preventative measures apply during construction phase.</li> </ul>
<b>B2.4</b>	Elephant presence/impact	Damage to infrastructure (currently occurring) Human conflict (current occurring) Damage to crops (expected new impact)	5	10	1	4	64	High (-)	Moderate (+)	<ul style="list-style-type: none"> <li>Elephant movement from Botswana over the Limpopo River to the east of the project area is currently occurring more often.</li> <li>This can be mitigated by farm fences (electrified)</li> <li>Human conflict can be prevented by proper fences.</li> <li>Crop areas will be fenced.</li> </ul>

<b>B 3 NATURAL AND SEMI-NATURAL COMMUNITIES</b>										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
<b>B3.1</b>	Local, regional or national importance of the natural communities as	The project is situated at its nearest ± 300m to the Limpopo River ecosystem which	5	4	3	4	48	Moderate (-)	High (+)	<ul style="list-style-type: none"> <li>The transformed footprint areas can still function as an Ecological Support Areas 2 (by leaving “islands” around the baobab trees in footprints, and the rest of the un-transformed areas can still function and is achieved by</li> </ul>



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	CBA's (e.g. scientific, conservation)	supports both fauna and flora natural communities which can be indirectly impacted.									<ul style="list-style-type: none"> <li>leaving a corridor of natural vegetation from inland to the river for arboreal species and smaller mammals.</li> <li>The development will result in minimum impact on both fauna and flora natural communities by proper zoning of sensitive areas.</li> <li>A proper water monitoring program will also help to identify possible change in water quality which could influence vegetation</li> </ul>
B3.2	Compatibility of development and the natural communities	Impact on stability of natural communities by past development and lack of maintenance.	5	4	1	4	40	Moderate (-)	High (+)	<ul style="list-style-type: none"> <li>To prevent impacts during construction phase                             <ul style="list-style-type: none"> <li>(i) Appointment of environmental practitioner who has experienced (working knowledge of the terrestrial environment) of the ecological region of the Limpopo River Valley.</li> <li>(ii) Implement specific design measures as recommended in specialist reports as well as in this document.</li> </ul> </li> <li>To prevent impacts during operational phase                             <ul style="list-style-type: none"> <li>(i) A proper <b>Monitoring Program</b> must be implemented on the drainage system and the receiving environment to identify any issues that may arise seasonally. This monitoring should be conducted by an environmental practitioner who has experienced and working knowledge.</li> </ul> </li> </ul>	



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										<ul style="list-style-type: none"> <li>(ii) This <b>Monitoring Program</b> must include the bordering farmers along the delineation of the system along the Limpopo River.</li> <li>To prevent impacts by maintenance phase               <ul style="list-style-type: none"> <li>(i) The environmental practitioner who has experienced (working knowledge of the Limpopo Terrestrial and River environment) must be appointed for the Monitoring Program.</li> </ul> </li> </ul>
<b>B3.3</b>	Appropriateness of the conservation of ecosystems, habitat, corridors and connectivity	No specialist guidelines presently available to manage and control impacts	4	6	1	3	33	Moderate (-)	High (+)	<ul style="list-style-type: none"> <li>The specialist reports made recommendations for the sites that were used in the design and lay-out of the sites.</li> <li>The monitoring programme will help to manage the areas water quality that could be influenced by chemicals used in crop management.</li> <li>The EMP must be implemented on a monthly inspection schedule during the construction/development phase.</li> <li>A rehabilitation plan will be implemented where necessary during development.</li> </ul>
<b>B3.4</b>	Ecological functioning of natural communities due to:									
	Physical destruction of the habitat	Habitat, or elements thereof, will result in species loss.	5	4	2	4	44	Moderate (-)	Low (+)	<ul style="list-style-type: none"> <li>By keeping to the existing footprints, the destruction of habitat will take place and can be controlled so that croplands does not influence species conservation status. Roads of existing farm infrastructure will be used.</li> </ul>



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										<ul style="list-style-type: none"> <li>• Game numbers can be adapted according to new carrying capacity.</li> <li>• Ecotone support by creating a tree ecotone zone.</li> </ul>
	<ul style="list-style-type: none"> <li>• Levels of dust pollution and deposition</li> </ul>	Dust pollution will be present during construction phase and especially in the dryer winter months.	1	2	1	4	16	Low (+)	Low (+)	<ul style="list-style-type: none"> <li>• Dust will be minimal and special measures need not be conducted during construction phase as the areas is remote form human settlements.</li> <li>• This action should form part of the EMP.</li> <li>• Will be controlled by the ECO.</li> </ul>
	<ul style="list-style-type: none"> <li>• Rehabilitation potential</li> </ul>	Rehabilitation is a pro-active and continuous action before-and during construction to prevent degrading of the aesthetic quality of the area.	3	2	1	3	18	Low (-)	Low (+)	<ul style="list-style-type: none"> <li>• Preventative action is to zone the construction area beforehand in no-go areas on site by the ECO.</li> <li>• Plants/trees must be removed before construction commences.</li> <li>• These no-go areas (watercourse/banks) should form part of the adapted EMP for construction phase.</li> <li>• A rehabilitation plan should also form part of the adapted EMP for the construction phase. It should be site specific.</li> <li>• The rehabilitation plan should be implemented once construction commences by the ECO.</li> </ul>



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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	Incompatible land-uses will lead to fractured development.	5	2	1	3	24	Low (-)	Moderate (+)	<ul style="list-style-type: none"> <li>The area is farmed since the mid-1960's.</li> <li>The proposed development is compatible with the land use.</li> <li>No fragmentation of land will take place</li> </ul>
C1.2	Aesthetic quality the landscape: Visual Intrusion	The development can alter the landscape.	5	3	2	3	30	Moderate (-)	Low (+)	<ul style="list-style-type: none"> <li>The landscape has already been altered. By keeping to the footprints, the minimum alteration will be attained.</li> <li>Environmental landscaping as part of the Rehabilitation Program will commence as soon as the operational phase commences.</li> <li>Large trees (baobab) will be left intact.</li> </ul>
C1.3	Sense of place within the area	Is the development correctly placed in line with land-use planning: agriculture versus protected areas	4	4	1	4	36	Moderate (-)	High (+)	<ul style="list-style-type: none"> <li>Mitigating measures can be implemented to ensure protection of undeveloped adjoining areas.</li> <li>The sites are located on areas identified for agriculture and the rest of the farm will be managed as a game farm.</li> <li>Sensitive areas will receive specific management action to preserve the vegetation along the watercourse.</li> <li>A Management Plan can provide guidance in protecting the remaining undeveloped part</li> </ul>



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										of the farm. This Management Plan should be compiled for conservation of species.
<b>C1.4</b>	Compatibility with the scale of development in the area	Is there need for such a development: agriculture versus protected areas/other land uses and/or products	5	2	1	3	24	Low (+)	High (+)	<ul style="list-style-type: none"> <li>The main development for the area is agriculture and is located outside protected areas expansion program.</li> <li>Agriculture is a sustainable use of natural resources when correctly applied and is the reason for the EIA.</li> <li>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 from coal can be replaced by solar.</li> </ul>
<b>C1.5</b>	Landscaping plans and/or site restoration proposals	Can landscaping play a constructive role to lessen negative impacts.	5	6	1	3	36	Moderate (-)	Moderate (+)	<ul style="list-style-type: none"> <li>The larger protected tree species left in-situ will contribute to the landscape.</li> <li>Leaving buffer zones along the watercourses and between cropland footprints will also contribute to landscaping.</li> </ul>
<b>C1.6</b>	Need for buffer zones to allow for natural processes such as erosion, vegetation and changes in river channels	Sterilisation and destruction of areas which will create barren landscapes which can cause erosion and further environmental damage.	5	6	1	3	36	Moderate (-)	Low (+)	<ul style="list-style-type: none"> <li>Buffer zones are incorporated along the watercourse and the watercourse and rocky outcrops are also excluded and controlled by ECO.</li> <li>Exclusion no-go zones will be left around the large baobab trees in the croplands.</li> <li>Existing corridors will not be affected.</li> </ul>



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C1.7	Legal considerations: servitudes and rights of way for existing (and future) development	This can negatively influence existing rights and services.	5	8	1	4	56	High (-)	Moderate (+)	<ul style="list-style-type: none"> <li>• No rights of neighbours are affected.</li> <li>• The servitude on the road to the farm(s) is not affected.</li> <li>• Eskom servitudes are not affected.</li> </ul>
C1.8	Human Activities Resulting in Biodiversity Loss	<p>Agriculture has a series of known impacts on biodiversity:</p> <ul style="list-style-type: none"> <li>• Water quality from agricultural effluents (arable agriculture) can modify the nutrient cycle of aquatic and terrestrial ecosystems.</li> <li>• Change of land cover, modifying hydrological and runoff regimes.</li> <li>• Introduction of alien species into ecosystems that can out compete indigenous species.</li> <li>• Pesticides and insecticides can damage adjacent plant communities and the chemical composition of these substances can be toxic to biota.</li> </ul>	5	8	2	4	60	High (-)	Moderate (+)	<p>Mitigation is possible by implementing mostly conservation farming practices and to place the specific development footprints 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"> <li>• 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 placed. A monitoring point must be placed in watercourse upstream from development.</li> <li>• The croplands will be contoured with designed outlets to prevent scouring and erosion.</li> <li>• Crops is non-aggressive and alien plants are controlled in croplands as part of existing farming practices.</li> <li>• The existing farming use of pesticides conform with conservation farming</li> </ul>







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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	Sterilise and-or transforming farmland can have production-and financial implications	4	5	1	4	40	Moderate (-)	Moderate (+)	<ul style="list-style-type: none"> <li>The project is located in declared zoned Protected Agriculture area by DALRRD.</li> <li>No productive farming land will be sterilised.</li> <li>The remaining land will still serve as habitat (with ecological processes) and used by wildlife.</li> </ul>
C5.2	Damaged land to overgrazing or bad farming methods	Farms have little grass cover; causing erosion.	3	3	2	4	32	Moderate (-)	Low (+)	<ul style="list-style-type: none"> <li>Supplementary feeding is a consideration in periods of drought</li> <li>Game numbers should be reduced.</li> </ul> <p>Note: The prevailing drought and no game management plan influenced veld conditions and carrying capacity in the region.</p>
C5.3	Chemical pollution of water, sensitive vegetation and farmland	Surface –and/or groundwater quality deterioration	4	4	3	2	22	Low (-)	Low (+)	<ul style="list-style-type: none"> <li>A Water Monitoring Program will be implemented to monitor water quantity and quality.</li> <li>An irrigation plan can provide preventative measures in applying correct measures of chemicals.</li> </ul>



D CULTURAL RESOURCES										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
D1.1	Sites of archaeological or palaeontological importance	Disturbance and/or destruction of identified sites should only be considered where the necessary information has been assessed.	5	6	2	3	39	Moderate (-)	Low (-)	<ul style="list-style-type: none"> <li>Implementation of a chance find procedure for the project is included in the EMP'r.</li> <li>Induction will be conducted by the ECO.</li> <li>The lay-out of the three footprints was altered to accommodate the sites with minimum disturbances.</li> </ul>

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	The border is populated exclusively by farmers in an area considered as deep-rural.	4	6	4	4	56	High (-)	High (+)	<ul style="list-style-type: none"> <li>The project will benefit the working expectations of local people.</li> <li>The project has a lifetime expectancy of three decades and more.</li> </ul>



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	Farming worker stability	5	4	2	4	44	Moderate (+)	High (+)	<ul style="list-style-type: none"> <li>The project supplies working opportunities; as it did for the previous decades (since 1968) and it can extend the opportunities for the future.</li> </ul>
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	Is there an effect that will be triggered by the project that can be positive or negative	5	6	3	4	56	High +	High +	<ul style="list-style-type: none"> <li>The project will provide both permanent (± 15) and seasonal (200) working opportunities.</li> <li>It will also be an incentive for the value chain and support industry.</li> </ul>
E 4 ECONOMIC IMPLICATIONS										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	



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4.1	Influence on local economics	Contribution to agriculture	4	6	1	4	44	Moderate (-)	High (+)	<ul style="list-style-type: none"> <li>Practicing sustainable farming practices.</li> <li>The in-put and out-put value chains related to farming will be conducive for the rural economy of Musina businesses.</li> </ul>
4.2	Influence on regional-and national economics	Contribution to agriculture and value chain of both the in-put and out-put supporting agriculture activities	4	8	5	4	68	Moderate (-)	High (+)	<ul style="list-style-type: none"> <li>Practicing sustainable farming practices.</li> <li>Use regional-and national suppliers/businesses in the value-chain.</li> <li>Products is sold on national and inter-national markets providing foreign income and contributing to SARS Tax Basis.</li> </ul>

E 5 CULTURAL IMPLICATIONS										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
E5.1	None									



<b>F INFRASTRUCTURE SERVICES</b>										
<b>F 1 ENERGY-, WATER SUPPLY &amp; ELECTRICITY</b>										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
<b>F1.1</b>	Eskom lines	Destruction of vegetation, also sterilising land, has visual impact	1	2	1	1	4	Low (-)	Low (+)	<ul style="list-style-type: none"> <li>The existing Eskom line will be used.</li> </ul>
<b>F 2 a WASTE MANAGEMENT</b>										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
<b>F2a</b>	Due care to agriculture land	Pollution of agriculture areas and resources (soil/water/air)	3	3	2	2	20	Low (-)	High (+)	Monitoring of water and soil is in place and conducted. The farm is compliant with: <ul style="list-style-type: none"> <li>Farming for Future Program.</li> <li>Global-Gap guidelines.</li> </ul>
<b>F 2 B SEWAGE WASTE MANAGEMENT</b>										



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<b>F2b</b>	Suitable facilities during construction phase	Sewage pollution	1	2	1	2	8	Low (+)	Low (+)	<ul style="list-style-type: none"> <li>• Chemical toilets made available on construction site.</li> <li>• Permanent ablution sites for operation phase according the Global-GAP Specifications and environmental guidelines for farming.</li> </ul>
<b>F 3 TRANSPORT NETWORK</b>										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
<b>F3.1</b>	Access road to sites	Sufficient access is needed to farm	4	3	1	2	16	Low (+)	Low (+)	<ul style="list-style-type: none"> <li>• Two existing access roads can be used.</li> <li>• The internal farm roads will be used by extending it to the new croplands.</li> </ul>
<b>F 4 FINANCIAL IMPLICATIONS</b>										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
<b>F4.1</b>	Enhancement of applicant's self-sufficiency	The proposed development is part of strategic farming strategy ensuring financial security.	5	4	3	4	48	Moderate (-)	High (+)	<ul style="list-style-type: none"> <li>• Farming can produce income by using appropriate practices.</li> <li>• The project forms part of the Musina/Weipe Farming Node and can be seen as part of the National SIP Program.</li> </ul>



G SOCIAL AND COMMUNITY SERVICES AND FACILITIES										
G 1 EMERGENCY SERVICES										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
G1.1	None									•

H NATURE AND LEVEL OF PRESENT AND FUTURE ENVIRONMENTAL POLLUTION										
H 1 WATER POLLUTION										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
H1.1	Chemical applications in croplands	<ul style="list-style-type: none"> <li>• Pollution of surface- and groundwater</li> <li>• Impact on water sources (groundwater/surface flow) availability and sustainability</li> </ul>	4	2	1	2	14	Low (-)	Moderate (+)	<ul style="list-style-type: none"> <li>• Applications are done according to agriculture specialist recommendations.</li> <li>• 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.</li> <li>• Objectives must be measured against quality and quantity. It should have a sustainability process outcome.</li> <li>• Implement a Plant Moisture Stress process to correlate data collected with objectives of Water Monitoring Plan.</li> </ul>





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											<ul style="list-style-type: none"> <li>• Neutron Moisture Probes must be used in monitoring the:             <ul style="list-style-type: none"> <li>- Soil moisture content at various depth levels</li> <li>- Soil temperature</li> <li>- Salinity</li> </ul> </li> <li>• The above two bullets will be able to model the irrigation regime to determine evapotranspiration and to irrigate to crop needs which in turn results in effective irrigation and water conservation.</li> </ul>
<b>H 2 NOISE, VIBRATION AND LIGHTING</b>											
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES	
								Without Mitigation	With Mitigation		
H2.1	Increase on ambient noise	During construction phase noise can be present in proximity to homesteads	2	2	2	3	18	Low (-)	Low (+)	<ul style="list-style-type: none"> <li>• Keep to working hours</li> <li>• Effective exhaust baffles on construction machinery</li> <li>• This is a transient issue and will be ceased after construction</li> </ul>	



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I RISK AND HAZARD										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
I1.1	Flooding	The possibility of flood damage	5	6	2	3	39	Moderate (+)	High (+)	<ul style="list-style-type: none"> <li>The crop footprints are located outside the 1:100 flood line.</li> <li>Channelled water outlets must have energy dissipaters.</li> </ul>
J HEALTH AND SAFETY										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
J1.1	Risk during construction	Human safety	1	4	1	3	18	Low (+)	Low (+)	<ul style="list-style-type: none"> <li>Farm Manager will apply safety measures</li> <li>Implement EMPr</li> </ul>
J1.2	Effect of dust on surrounding areas	Health issues for workers Dust on crops	1	2	1	5	20	Low (+)	Low (+)	<ul style="list-style-type: none"> <li>Dampening of working areas</li> <li>Main wind direction: east</li> <li>Buffers zones were incorporated in layouts along crop lands to filter dust.</li> </ul>
J1.3	Effect of noise on surrounding areas	Disturbance and ambience noise levels	1	2	1	5	20	Low (+)	Low (+)	<ul style="list-style-type: none"> <li>Construction machines have low noise mufflers</li> <li>Working only during day-light hours.</li> <li>Noise will be a transient intrusion.</li> <li>Buffers zones were incorporated in layouts along crop lands to filter/dampen noise.</li> </ul>



K1 CUMULATIVE AND SYNERGISTIC EFFECTS										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without	With	
								Mitigation	Mitigation	
K1.1	Ability of the natural environment to assimilate cumulative stresses placed on it.	The receiving environment after the initial impact of the three sites will influence the natural environment leading to an ecological "implosion"	5	6	2	2	26	Moderate (-)	Low (+)	<ul style="list-style-type: none"> <li>The sensitive areas associated with the CBA's in close proximity to the Limpopo River is left intact.</li> <li>The remaining areas of the farm can still be used for game and supporting habitat.</li> <li>Game numbers must be adapted downwards.</li> <li>The buffer zones along the watercourse were included in the layout plan for the footprints.</li> <li>The existing internal farm roads can be incorporated in master lay-out plan to prevent further impacts.</li> <li>The farm will be fenced to prevent wildlife access and resultant conflict. The croplands will also be fenced.</li> <li>A Water Monitoring (and Management) Plan can identify and rectify possible pollution. The water stress on the riparian vegetation should also be monitored by measuring quantity and method of water extraction.</li> <li>As offset trees that will serve in support of the ecotone will be planted at specified sites as identified in the layout plan.</li> </ul>



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<p><b>K1.2</b></p>	<p>Threat analysis and negative synergistic effects</p>	<p>The receiving environment must be able to accommodate the development, and is currently under strain by (i) nature and natural events, and (ii) mankind induced stress collectively</p>	<p>3</p>	<p>6</p>	<p>4</p>	<p>5</p>	<p>65</p>	<p>High (-)</p>	<p>Low (+)</p>	<p><u>Collective measures</u></p> <ul style="list-style-type: none"> <li>• The remaining areas not developed will continued to be managed as a game farm with vegetation communities also preserved and managed accordingly.</li> <li>• A lower-and higher carrying capacity model for game must be developed.</li> <li>• Baobab trees are left intact and can still serve an ecological role.</li> <li>• Management and monitoring for pollution of water from irrigation can identify problems that can be rectified.</li> <li>• Soil analysis monitoring is done annually.</li> </ul>
<p><b>K1.3</b></p>	<p>Water Monitoring Plan</p>	<p>To provide a “tool” to manage the farm preventing impacts accumulation by water quantity and quality on the receiving environment which included the Limpopo River and associated biodiversity.</p>	<p>5</p>	<p>5</p>	<p>2</p>	<p>3</p>	<p>30</p>	<p>Moderate (-)</p>	<p>High (+)</p>	<p>A Water Monitoring Plan (WMP) is recommended as high priority to enhance co-existence in the receiving environment which includes:</p> <ol style="list-style-type: none"> <li>The farm can function as ecological support areas; and</li> <li>Supporting connectivity.</li> <li>That sensitive vegetation communities can be preserved.</li> <li>That a Water Management Plan is used which supply the necessary information that can be used with the Water Irrigation Plan for the farm.</li> <li>New water habitats created from seepage from storage dam and irrigated croplands.</li> </ol>



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<b>K1.4</b>	Soil Monitoring Plan	Ensure a 'healthy' soil medium.	5	5	5	4	38	Moderate (-)	High (+)	An Integrated Soil Monitoring Plan (ISMP) is recommended as high priority to enhance co-existence in the receiving environment which includes: (i) Soil "health" management actions. (ii) Supporting biota of the agriculture ecosystem. (iii) Collectively support biodiversity.
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<b>K2 GENERAL ENVIRONMENTAL &amp; WATER QUALITY CUMULATIVE MANAGEMENT CONSIDERATIONS</b>										
NO	ISSUES	NATURE OF IMPACTS	Duration	Magnitude	Extent	Probability	Points	Significance		MITIGATION MEASURES
								Without Mitigation	With Mitigation	
<b>K2.1.</b>	Implementation of the mitigation and management measures	To comply with legal considerations and conditions and all relevant legislation.	5	4	3	3	36	Moderate (-)	High (+)	<ul style="list-style-type: none"> <li>Environmental awareness training before construction commences.</li> <li>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.</li> </ul>
<b>K2.2</b>	Water quality monitoring and control	A water monitoring plan can identify issues for correction.	5	3	3	2	22	Moderate (-)	High (+)	<ul style="list-style-type: none"> <li>Applicant must appoint an independent specialist to conduct due-diligence monitoring on the extraction of water from the aquifer system for quantity and quality.</li> </ul>



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		Independence and unbiased control have to be conducted by independent environmental-and water specialists								<ul style="list-style-type: none"> <li>Monitoring results made available to affected party(s).</li> <li>A Water Monitoring Plan is non-negotiable and must be submitted to competent authority before completion of the projects three sites.</li> </ul>
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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 croplands and farm in general	Delineation and/or re-design of lay-outs	5	4	2	4	44	Moderate (-)	High (+)	<p><b>A. Lay-out</b>  <u>Lay-out Map</u>                      A footprint map will be supplied after the EIA application and before construction commences.</p> <p><u>Infrastructure</u>                      Existing access-and farm roads will be used, any new farm road will be approved by the ECO to ensure no visual intrusion and/or environmental impact and/or non-compliance with related legislation to the environment.</p> <p>Feeder water pipelines will be used, and the irrigation plan should be developed in conjunction with the EAP. Implementation control will be by ECO.</p>



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										<p>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.</p> <p><u>Bush clearing</u></p> <p>Process for bush clearing:</p> <ul style="list-style-type: none"> <li>(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.</li> <li>(ii) The footprint of each site will be demarcated and marked by ECO and farm manager before bush clearing commence.</li> <li>(iii) No-go zones will be demarcated and marked by ECO and farm manager before bush clearing commence. This includes areas around baobab trees.</li> <li>(iv) Protected plants will be removed and relocated by ECO and farm manager before bush clearing commence.</li> </ul> <p><u>Protected trees and plants</u></p> <ul style="list-style-type: none"> <li>(i) The croplands placement has been delineation so that the footprint does not impede the flow and functioning of the watercourse. Buffer zones are incorporated in the layout. The baobab trees will be included in the lay-out of the orchards. Shepherd's trees will be transplanted where possible.</li> </ul>
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										(ii) Ecotone tree line be planted as indicated on proposed project layout plan. Refer to list. <u>Archaeological Sites</u> (i) The sites will be clearly marked and demarcated to prevent incidental damage during construction and operational phases. (ii) The responsible specialist must be notified of commencement. (iii) The SOP supplied with EMP must be applied.
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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	Enviro economics	5	8	5	5	90	High (-)	High (+)	<u>Soil:</u> The cropland footprints are located on arable soil areas. No land is sterilised in the layout. <u>Water:</u> The water which will be used is subtracted from the aquafer. It is stored as quality water. <u>Biodiversity:</u> Corridors-and connectivity is included in the total layout. <u>Sustainable period:</u> The potential economic period expectation is for three decades.





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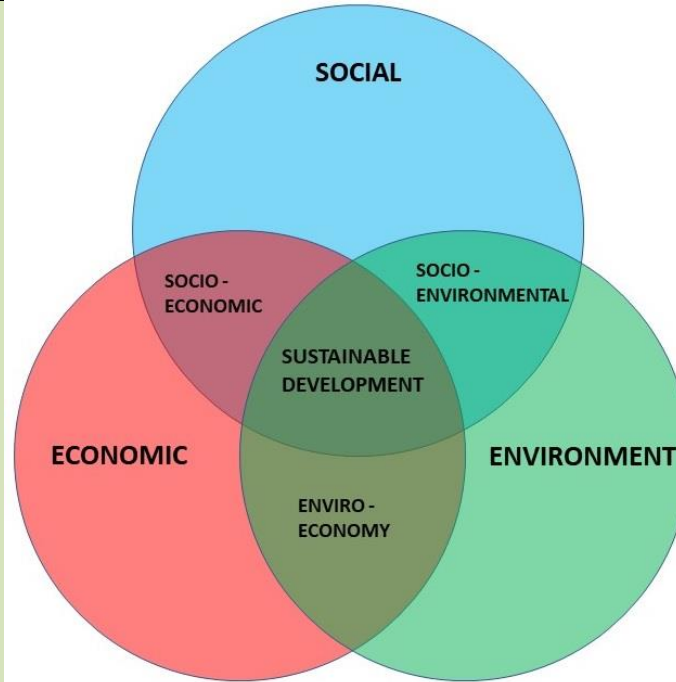
K4.2	Attaining Sustainable development	Socio-economic	4	8	3	4	60	High (-)	High (+)	<p><u>Sustainable period:</u> The project provides work in a deep-rural area. The potential economic period expectation is for three decades.</p>
K4.3	Attaining Sustainable development	Socio-environmental	5	8	5	5	90	High (-)	High (+)	<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>
<p><b>Rational:</b></p>										



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**Rational:**

Arable agricultural soil, good quality water available farming by an integrated approach to be economic drivers for the Tom Burke/Swartwater producers and the markets they provide for.



seasonal together with a work force can continue economically viable and supporting the social and Farming Node, Limpopo Province, RSA and for export



10.3 Potential significant impacts (after mitigation)

Total of impacts assessed=65

- 0 were regarded as high (-) and 22 as high (+)
- 0 were regarded as moderate (-) and 10 as moderate (+)
- 1 were regarded as low (-) and 33 as low (+)

Impacts could mostly be mitigated.

**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 that 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 landuse as promulgated as Protected Agriculture Land.
- 12.3 The locations of the preferred sites were surveyed for biodiversity and had a low ecological sensitivity. No critical issues were identified.
- 12.4 No pollution was found at existing croplands or adjoining areas.
- 12.5 The conservation practices of farming practices have been integrated with the environment and ecological processes was found to function and was supported by the croplands in the (3-4 during normal conditions and 5 years in drought conditions) rest program.
- 12.6 Archaeological sites were found on the footprints. No direct impact is expected on any significant heritage resources.
- 12.7 The proposed project will benefit the watercourse ecosystem (connectivity) by the preservation actions (fences around the croplands) which will benefit from seepage water.
- 12.8 A Water Monitoring Plan must be implemented for water quality and quantity.
- 12.9 An Integrated Soil Monitoring Plan is compiled for collecting data to improve soil "health"
- 12.10 The current landuse for agriculture activities can proceed and will contribute to the local-and regional socio-economic communities.
- 12.11 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 sites are suitable for sustainable agriculture 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 be adversely affected.
- 13.1.3 The biodiversity of the Limpopo Arid Bushveld is not threatened directly or in-directly.
- 13.1.4 The farming practices indicated a high level of conservation farming over decades as no historical or current environmental pollution or erosion was 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 ESA2 by contributing to connectivity and corridors by the design of the project.
- (vi) Protected tree species such as Baobab and 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 aquifers for the 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.
- It will positively contribute to the socio-economic profile of Blouberg-and Waterberg district community(s) in specific.
- 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.

- A WUL by DWS and Section21 are issued for farming activities (No. 27021749 dated: 5 September 2018).

### 13.5 Final statement

No evidence, nor any information presented, indicated that the development on the footprints should not be considered. Issues could be sufficiently mitigated. 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 EAP recommends the application.

#### **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.

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 an Archaeological 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.



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