



AFRICAN REALTY TRUST

CONSULTATIVE ENVIRONMENTAL SCOPING REPORT:
PROPOSED ESTABLISHMENT OF TWO BALANCING DAMS ON THE FARM
LETABA ESTATES 525-LT NEARTZANEEN, LIMPOPO PROVINCE



NOVEMBER 2017



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ACRONYMS AND ABBREVIATIONS:

DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPR	Environmental Management Programme
ESR	Environmental Scoping Report
GTM	Greater Tzaneen Municipality
IBA	Important Bird Area
Ha	Hectare
HIA	Heritage Impact Assessment
I&AP	Interested and/or Affected Party
LDEDET	Limpopo Department of Economic Development and Environmental Tourism
LEMA	Limpopo Environmental Management Act (2003)
MAE	Mean Annual Evaporation
MAMSL	Metres Above Mean Sea Level
MAP	Mean Average Precipitation
NEMA	National Environmental Management Act (1998)
NWA	National Water Act (1998)
WUL	Water Use Licence
WULA	Water Use Licence Application

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1. INTRODUCTION

Polygon Environmental Planning has been appointed by African Realty Trust (Pty) Ltd to conduct an Environmental Impact Assessment (EIA) for the proposed establishment of two balancing dams on the Remaining Extent of the farm Letaba Estates 525- LT near Tarentaalrand, in the Greater Tzaneen Municipality, Limpopo Province.

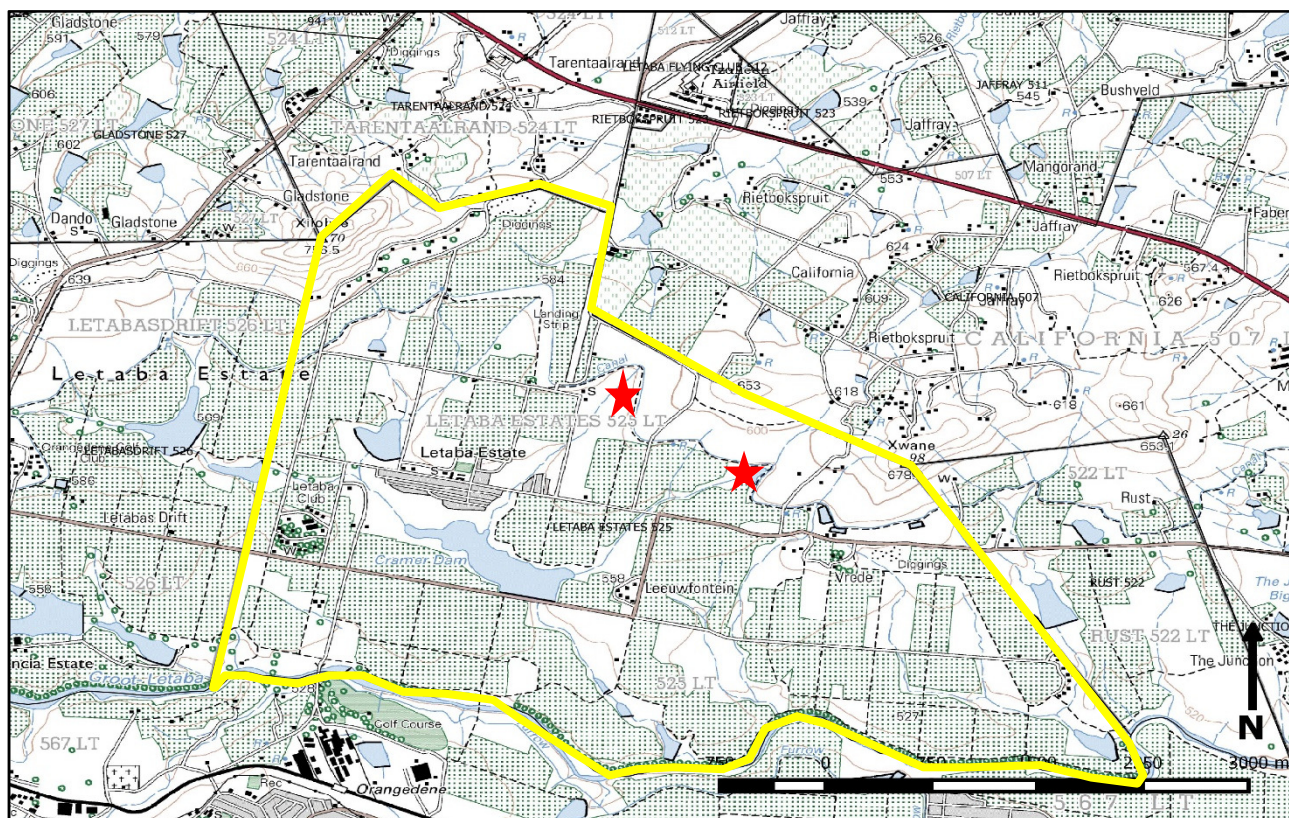
This consultative Environmental Scoping Report (ESR) was compiled following the scoping-phase investigations and public participation, and is currently available for public review and comment. Upon expiry of the comment period, all comments received from I&APs will be incorporated into the final ESR, which will then submitted to the Limpopo Department of Economic Development and Environmental Tourism (LDEDET) for decision making.

2. SITE LOCATION AND DESCRIPTION

2.1. Location

The proposed dam sites are located on the Remaining Extent of the farm Letaba Estates 525- LT near Tarentaalrand, approximately 21 km south-east of Tzaneen, in the Limpopo Province (Figure 2.1).

Figure 2.1: 1:50 000 topocadastral map of the location (proposed dam sites indicated with red stars)



The approximate coordinates for the two proposed dams are as follows:

- Dam 1: 23° 51' 2.42" S 30° 19' 6.33" E
- Dam 2: 23° 51' 24.27" S 30° 19' 39.36" E

The site is under the jurisdiction of the Greater Tzaneen Municipality. The property is approximately 1906,45ha in extent.

2.2. Description

The property currently consists mostly of citrus orchards, with some natural areas remaining close to the water bodies on the property. The property has been cultivated for more than 100 years.

Staff housing is clustered in certain parts of the property, and an office complex is located in the western section. A juicing facility is also operated in the southern part of the property. Farm roads criss-cross the site, consisting of the main tarred road through the central part of the site, and a number of gravel farm roads providing access to all parts of the farm.

One large dam and a number of smaller dams (mostly in-stream) are located on the farm, and are used for irrigation. The drainage lines and streams on the property drain roughly south-eastward, toward the Great Letaba River. An irrigation canal, which is operated by the Letaba Water Users Association and draws water from the Great Letaba River, furthermore traverses the site, and the applicant abstracts water from the canal in terms of their existing allocation, for use in irrigation.

Properties in the vicinity of the subject property are predominantly utilised for commercial agriculture.

Figure 2.1: Aerial photograph (Google Earth 2017) showing the location and boundaries of the property and proposed dam sites

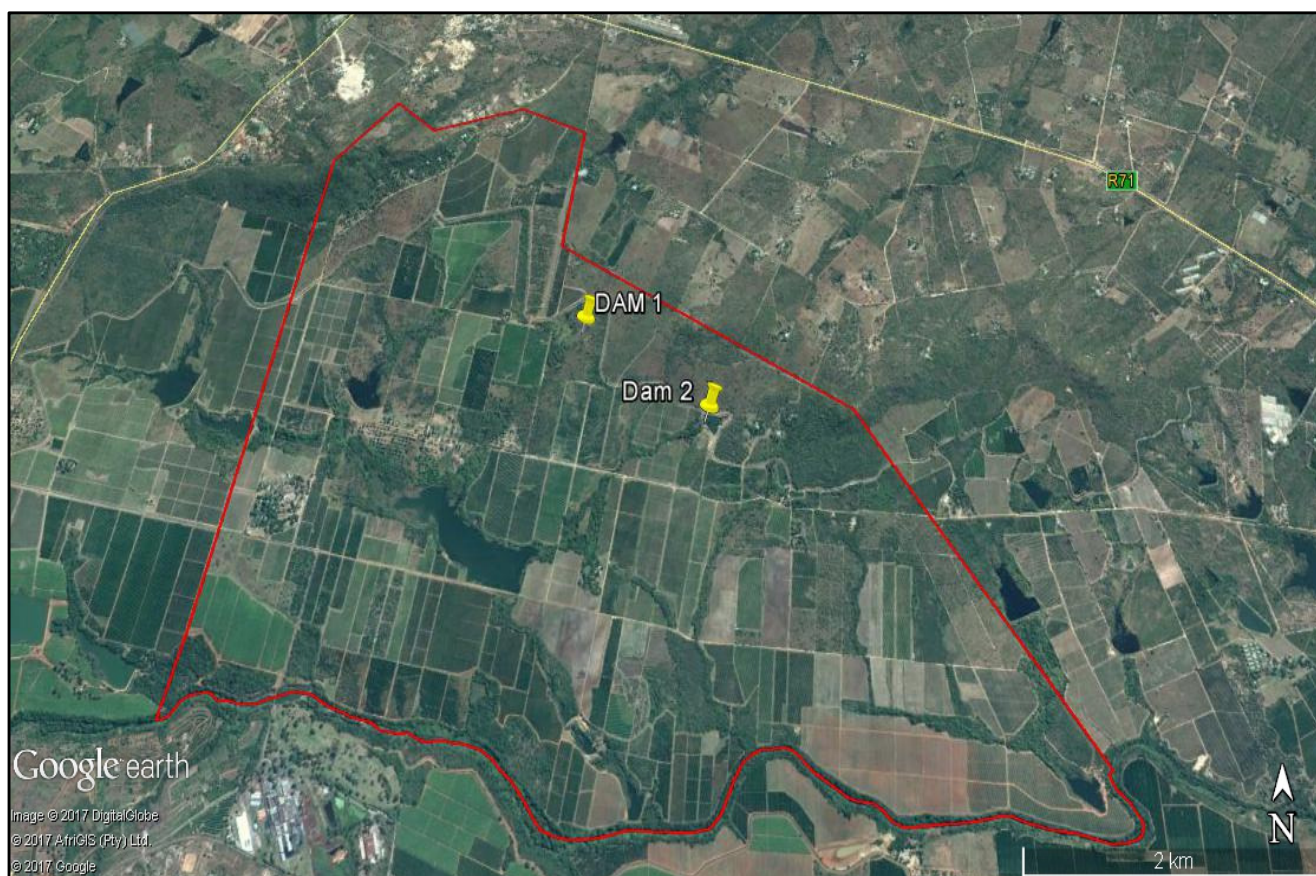


Table 1.1: General site information

District	Mopani District
Local Municipality	Greater Tzaneen Municipality
Property description	Remaining Extent of the farm Letaba Estates 525-LT
Extent / size	1906.4532ha
Surveyor-General code	T00LT0000000052500000
Nearest town	Tzaneen
Coordinates	Dam1: 23° 51' 2.42"S 30° 19' 6.33"E Dam2: 23° 51' 24.27"S 30° 10' 39.36"E
Current land use	Agriculture Pockets of indigenous vegetation
Surrounding land use	Agriculture Natural areas Residential areas

3. PROJECT DESCRIPTION

The applicant proposes the establishment of two balancing dams in the upper reaches of non-perennial tributaries of the Letaba River, for the storage of water from the irrigation canal for use in irrigation of citrus orchards. The applicant currently has insufficient water storage capacity. Without the storage, it becomes a challenge to irrigate over the weekends when the canal is closed, or in dry periods when allocations from the canal are restricted. It is proposed that water abstracted from the canal in terms of the applicant's existing allocation (from the Letaba Water Users Association) be stored in these dams for use when the canal is closed or when flows and allocations are reduced.

- (a) **Dam 1** is expected to be classified as a small-size, Category II dam with a significant hazard potential rating. It is proposed to have a dam wall of maximum 12m high, a maximum base width of 63m and an embankment length of 305m (including spillway). The surface area will be approximately 14.38ha at full supply level and gross storage capacity $\pm 647\,200\text{m}^3$. An open side channel spill-way is proposed on the left bank.
- (b) **Dam 2** is expected to be classified as a small-size, Category I dam with a low hazard potential rating. It is proposed to have a dam wall of maximum 9.5m high, a maximum base width of 51m and an embankment length of 310m (including spillway). The surface area will be approximately 3.29ha at full supply level and gross storage capacity $115\,000\text{m}^3$. An open side channel spill-way is proposed on the right bank.

The dams are proposed to consist mainly of zoned earthfill embankments. The work is proposed to be carried out as follows:

- Excavation and backfilling of cut-off core trenches
- Forming of new embankments using suitable material from within the dam basin
- Excavation and forming of flood spillways (open side channels)
- Installation of 200mm / 315mm diameter uPVC outlet pipes encased in reinforced concrete, equipped with closing mechanisms on the downstream sides
- Installation of toe drains with V-notch measuring structures
- Grass establishment through hydro-seeding on the entire embankments after construction

4. PROJECT MOTIVATION, NEED AND DESIRABILITY

4.1. Motivation, need and desirability

The success of commercial agriculture is in a large way dependent on a secure irrigation source. The applicant has a sufficient water allocation from the Letaba Water Users Association for abstraction from the irrigation canal that runs along the proposed dam sites for the dams, but current storage capacity for irrigation water onsite is insufficient. It becomes a challenge to irrigate during weekends when the canal is closed; the applicant would therefore like to have dams in which to store some of the water taken during the week, so that they can use this over weekends. They would also like to have sufficient storage capacity so that they can take and store water in terms of their allocation during wetter / high-flow seasons, for use during drier / lower-flow seasons in order to sustain their orchards. It is important to note that the applicant does not intend increasing the volume that they abstract, but only wish to increase storage capacity to be better able to utilize their existing water allocation.

Construction of the dams is anticipated to create 6 jobs during the construction phase, and to contribute to supporting jobs in companies supplying services related to the design and construction of the dams. 4 permanent new jobs are anticipated to be created in new orchards that can be supported by the additional water storage capacity. In addition, 120 permanent workers and approximately 1 200 annual seasonal workers are employed on the farm and depend partially on the availability of irrigation water (less water leads to a smaller crop, which requires fewer seasonal workers for picking). The project will also indirectly contribute to the local economy, which in a large way is based on agriculture, for instance by making use of locally based supporting services such as transport, fruit cartons, agricultural chemicals, etc.

4.2. Motivation for selected preferred alternatives

The selection of the dam sites on the property was based on the following considerations:

- **Dam 1:** The preferred position provides a large undeveloped surface area to accommodate a large storage capacity and it is located directly adjacent to the canal from which its water will be abstracted. The natural topography favours the construction of a dam embankment here, and clayey material which can be used for dam construction is found within the proposed dam basin. The position is furthermore on a clearly defined watercourse, and suitable foundation conditions were found at this position.
- **Dam 2:** A small dam is already situated at this position. It is also located adjacent the canal that will be used to fill it up, and the undeveloped surface area is adequate to accommodate sufficient storage capacity. The natural topography favours the construction of a dam embankment here, and clayey material which can be used for dam construction is found within the proposed dam basin. The position is furthermore on a clearly defined watercourse, and suitable foundation conditions were found at this position.

The type of dam – earthfill – was selected for both of the proposed dams, because due to the length and shape of the wall and the restricted area, only an earthfill embankment would be feasible. Suitable material for construction of the earthfill dam walls is also found within the basins of both proposed dams. No other technologies were investigated.

5. INVESTIGATION OF ALTERNATIVES

5.1. Project Alternatives

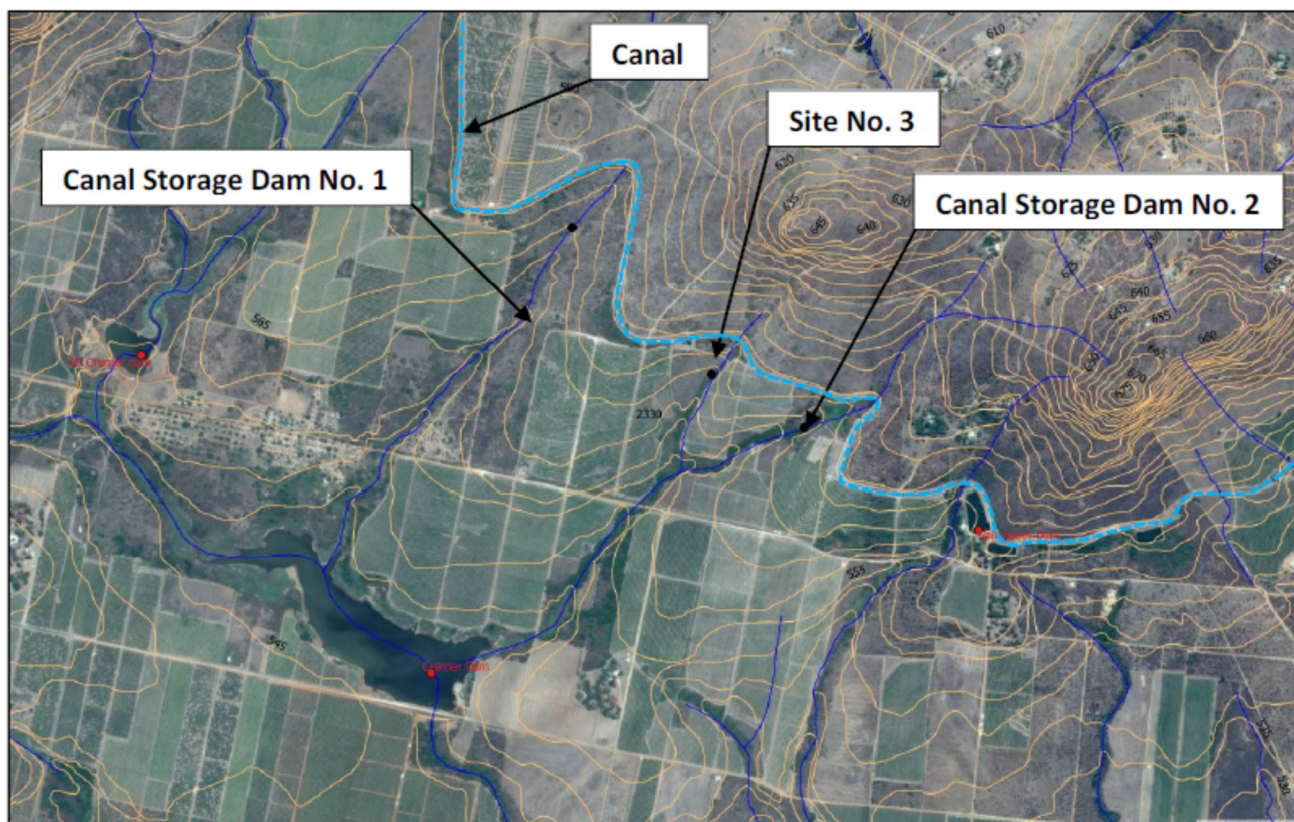
No project alternatives were investigated within the ambit of this EIA, as the applicant's purpose with the project is to establish sufficient water storage for irrigation of his proposed orchards.

5.2. Site Alternatives

No alternative properties were investigated, as the water is required on this property, where the applicant has existing orchards which need to be irrigated. The irrigation canal from which the water will be abstracted, is also on this property.

Initially 3 locations on the property were investigated; however, it was later determined that the third position (marked as Site No. 3 on the aerial photo below) would not be suitable, as only a relatively small surface area is available for dam construction and the site is not situated on a clearly defined watercourse. Sites 1 and 2 hold more advantages, as these two positions are on clearly defined watercourses, have sufficient undeveloped surface area available, contain clayey material within the basins to be used for construction of the dam walls, and the natural topography favours dam construction.

Figure 4.1: Alternative dam positions



5.3. Technology Alternatives

The type of dam – earthfill – was selected for both of the proposed dams, because due to the length and shape of the wall and the restricted area, only an earthfill embankment would be feasible. Suitable material for construction of the earthfill dam walls is also found within the basins of both proposed dams. No other technologies were investigated.

5.4. No-go Alternative

The 'no-go' alternative refers to the scenario in which the proposed activity does not take place and the site remains as it is.

If the no-go alternative is taken, the impacts that can be anticipated to be associated with the proposed dams would not come to pass and the conditions and trends on the property can be expected to remain as per the status quo. Impacts that can be expected to be experienced in case of the no-go alternative being selected include the following:

Table 5.1: Potential impacts that may be associated with the no-go option

POTENTIAL IMPACT	STATUS	EXTENT	MAGNITUDE	LIKELIHOOD	SIGNIFICANCE
Bio-physical aspects					
Soil erosion and siltation rates and trends remain unchanged	Neutral	Local	Medium	Highly probable	Low
No alteration of topography within dam basins	Neutral	Local	Low-Medium	Highly probable	Very low
No contribution to unlocking the agricultural potential of the property	Neutral	Local	Medium	Highly probable	Medium
No disturbance of aquatic fauna and flora by construction activities	Neutral	Local	Low-medium	Definite	Low
No ingress of foreign matter into streams and wetlands, with concomitant impacts on fauna and flora	Neutral	Local	Unknown	Highly probable	Very low
Water abstraction remains unchanged	Neutral	Local	Low	Highly probable	Low
No fragmentation of aquatic habitat	Neutral	Local	Low	Definite	Low
Hydrological regime remains unchanged	Neutral	Local	Medium	Highly probable	Low
No intercepting sediment load and preventing its transport downstream	Neutral	Local	Medium	Highly probable	Low

No inundation of portions of streams, and streams remain free-flowing	Neutral	Local	Low	Definite	Low
No creation of habitat for water-loving birds and other fauna.	Neutral	Local	Low-medium	Definite	Medium
Water quality trends remain unchanged	Neutral	Local	Unknown	Highly probable	Very low
No construction-related veld fire risk	Neutral	Local	Very low	Definite	Very low
No habitat destruction	Neutral	Local	Medium	Highly probable	Medium
No further spreading of alien plant species or bush encroachment by indigenous trees due to disturbance of natural vegetation	Neutral	Local	Low	Highly probable	Very low
No reduction in infestation by alien invasive plants due to improved management thereof	Neutral	Local	Low	Highly probable	Low
In-stream flow regime remains unchanged	Neutral	Local	Low	Highly probable	Low-Medium
No construction-related disruption of the activities of fauna on and around the site	Neutral	Local	Very low	Definite	Very low
No creation of habitat for water-dependent fauna, e.g. certain fish, amphibians and bird species	Neutral	Local	Low	Definite	Low-Medium
Faunal species composition onsite remains unchanged	Neutral	Local	Low	Highly probable	Low
Socio-economic aspects					
No supporting local businesses through local procurement of materials, equipment & services (construction phase)	Neutral	Local	Low	Definite	Low
No direct or indirect job creation (construction phase)	Neutral	Local	Low	Definite	Low
No contribution to job creation and job security by buffering the farm against drought (operational phase)	Neutral	Local	Low	Definite	Low
Contribution to local economy (operational phase)	Neutral	Local	Low	Definite	Low
No visual impact of construction activities and site clearing	Neutral	Local	Medium	Definite	Very low
No visual impact of the new dams	Neutral	Local	Medium	Definite	Very low

No noise associated with construction activities and heavy vehicles during construction	Neutral	Local	Very low	Definite	Very low
No heritage impacts if sites or objects of heritage-related significance are found	Neutral	Local	Unknown	Definite	Very low

6. APPLICABLE LEGISLATION

6.1. Environmental Legislation

6.1.1. National Environmental Management Act, EIA Regulations (2014)

The EIA Regulations (2014, as amended 2017), published in terms of section 24(5) read with section 44 of the National Environmental Management Act (NEMA, Act No. 107 of 1998), stipulate that a full scoping and EIA process is required to be undertaken for the proposed project.

Table 6.1: Listed activities triggered by the proposed project in terms of the EIA Regulations.

ACTIVITY NR.	ACTIVITY DESCRIPTION
Listing Notice 1	
12(i)(a)	The development of dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres <i>For the establishment of two instream dams, taking up a total area of approximately 18ha.</i>
19	The infilling or depositing of any material of more than 10m ³ into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10m ³ from a watercourse. <i>For removal, infilling or moving of material – mainly soil, sand and rock – within a watercourse as part of dam construction.</i>
27	The clearance of an area of 1ha or more, but less than 20ha of indigenous vegetation, except where such clearance of indigenous vegetation is required for the undertaking of a linear activity or maintenance purposes undertaken in accordance with a maintenance management plan. <i>For clearance of approximately 15.5ha of indigenous vegetation for the construction of two dam walls and inundation of the associated dam basins.</i>
Listing Notice 2	
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 5m or higher or where the high-water mark of the dam covers an area of 10ha or more. <i>For the establishment of two dams with walls of maximum 12m and 9.5m high, respectively. The water surface area will be approximately 17.7ha in total.</i>
Listing Notice 3	

12(e)ii	<p>The clearance of an area of 300m² or more of indigenous vegetation, except where such clearance of indigenous vegetation is required for the undertaking of a linear activity or maintenance purposes undertaken in accordance with a maintenance management plan, where such clearance takes place within a critical biodiversity area identified in bioregional plans.</p> <p><i>For clearance of approximately 14.5ha of indigenous vegetation within a CBA1 in terms of the Limpopo Conservation Plan, for the construction of "Dam 1" dam walls and inundation of the associated dam basin.</i></p>
14(i)(a)(e)i(ff) 14(ii)(a)(e)i(ff)	<p>The development of dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 10m², where such development occurs within a watercourse, in Limpopo, outside urban areas, in critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.</p> <p><i>For development of "Dam 1" within a CBA1 in terms of the Limpopo Conservation Plan version 2, which will take up approximately 14.5ha, along with a pump house next to the dam, with a physical footprint which may slightly exceed 10m².</i></p>

6.1.2. National Water Act (1998)

A water allocation is already in place from the Letaba Water Users Association for water abstraction from the irrigation canal, and the authorised volume is sufficient for the proposed new dams.

A Water Use Licence Application (WULA) will be submitted to DWS in terms of the National Water Act (NWA, Act No. 36 of 1998) for the Section 21(b), (c) and (i) water uses triggered by the proposed dams, as highlighted below:

Table 6.2: Applicable water uses in terms of the National Water Act (1998)

Section	Description of Water Use	Relevant Activity
21(b)	Storage of water	The storing of water in the dams.
21(c)	Impeding or diverting the flow of water in a watercourse.	Establishment of the dams.
21(i)	Altering the beds, banks, course or characteristics of a watercourse.	Establishment of the dams.

A Water Use Licence Application (WULA) will be submitted to DWS in due course. Proof of submission of the WULA will be submitted to LDEDET as part of the EIR.

The engineers will also submit an application to DWS's Dam Safety Office for registration for Dam Safety purposes in terms of Section 120 of the National Water Act. Dam 1 is expected to be classified as small size, Category II-dam with a significant hazard potential rating and Dam 2 is expected to be classified as a small size, Category I dam with a low hazard potential rating.

6.2. National Forests Act (1998) and Limpopo Environmental Management Act (2003)

Should specimens be destroyed of any plant species that are protected in terms of the National Forests Act and/or the Limpopo Environmental Management Act (LEMA), permits will be required from the Department of Agriculture, Forestry and Fisheries (DAFF) and/or LDEDET for the destruction of these plants. This will include plants within the dam basin, as well as plants in other areas that will be disturbed, such as the dam wall, material lay-down areas, or other areas used during construction.

Protected species should be preserved as far as possible. For instance, material lay-down areas or vehicle / machinery access routes should be selected away from identified protected species and large trees.

6.3. Other Legislation

Table 6.3: Other applicable legislation

LEGISLATION	RELEVANT SECTIONS	PERTAINS TO
The Constitution Act (No 108 of 1996)	Chapter 2, Section 24	Bill of Rights: Environmental rights
Conservation of Agricultural Resources Act (1983)	Section 5	Prohibition of the spreading of weeds
Fencing Act (No 31 of 1963)	Section 17	Clearing of bush for fencing
Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (No 36 of 1947)	Sections 3 – 10	Control of the use of pesticides, herbicides and fertilizers, and precautions to protect workers in this regard
Limpopo Environmental Management Act	Schedule 2, 3, 11 and 12	Lists of protected animals and plants
National Environmental Management Act (No 107 of 1998) and regulations (2014)		
National Environmental Management: Air Quality Act (No 39 of 2004)	Section 32	Control of dust
	Section 34	Control of noise
	Section 35	Control of offensive odours
National Environmental Management: Biodiversity Act (No 10 of 2004)	Section 57	Restricted activities involving listed threatened or protected species
	Sections 65–69	Regulation of activities involving alien species
	Sections 71, 73 and 75	Regulation of activities involving invasive species
National Environmental Management: Waste Amendment Act (No 26 of 2014)	Chapter 4, Part 4	Waste management activities
	Chapter 5	Licensing of waste management activities
	Chapter 5	Institutional and planning matters
	Chapter 7	Compliance and enforcement
National Heritage Resources Act (No 25 of 1999)	Section 34	Protection of structures older than 60 years
	Section 35	Protection of archaeological and palaeontological sites and material as well as meteorites
	Section 36	Conservation of burial grounds and graves

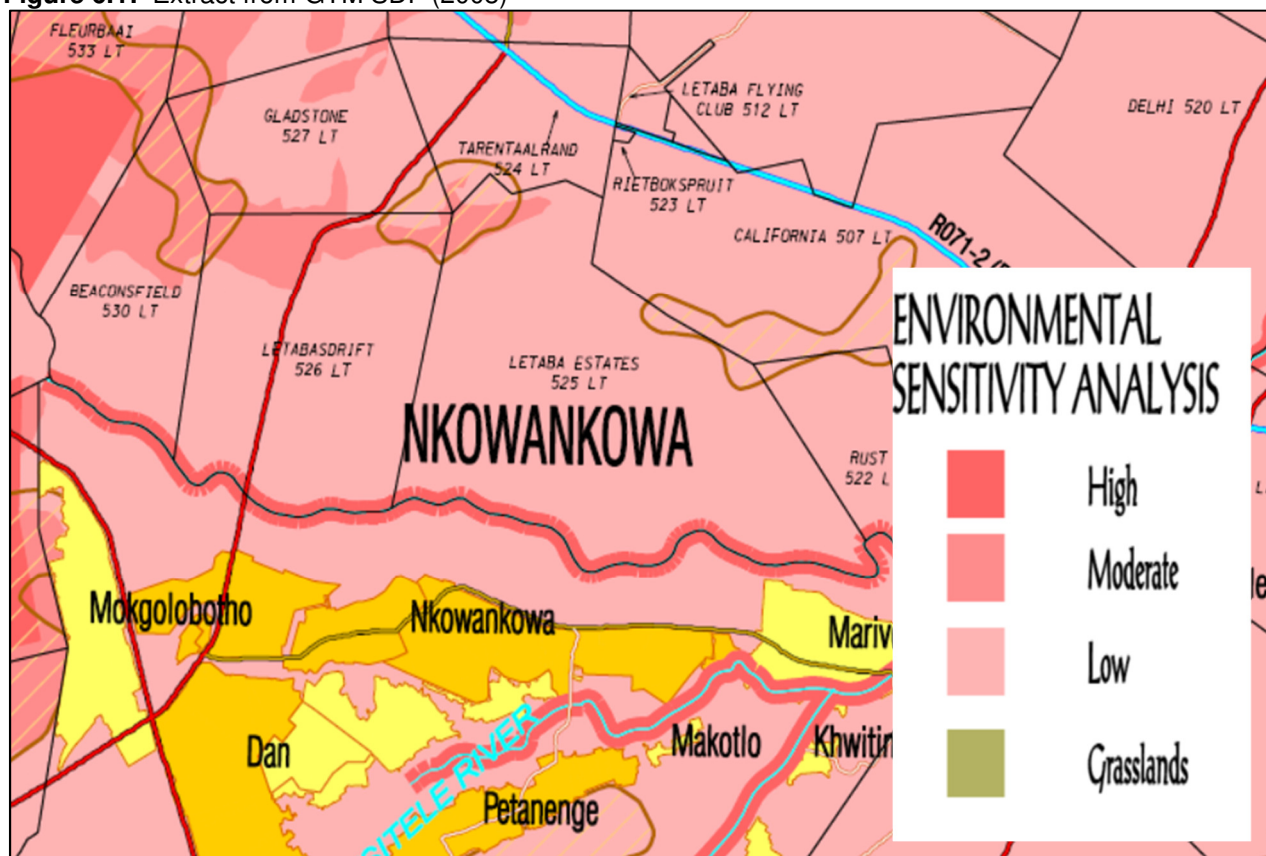
National Forests Act (No 84 of 1998), as amended by the Forestry Laws Amendment Act (No 35 of 2005) and Regulations (GN466 of 2009)	Section 7	Prohibition on destruction of trees in natural forests
	Sections 12–16	Declaration of trees, groups of trees, woodlands or tree species as protected
	Section 17	Declaration of controlled forest areas
National Water Act (No 36 of 1998)	Section 19	Prevention and remedying effects of pollution, particularly where pollution of a water resource occurs or might occur as a result of activities on land
	Section 20	Control of pollution of water resources following an emergency incident
	Chapter 4 (Sections 21-55)	Governs water use
Occupational Health and Safety Act (No 85 of 1993)	Section 8	General duties of employers to their employees
	Section 9	General duties of employers and self-employed persons to persons other than their employees

6.4. Municipal and provincial planning tools

6.4.1. Greater Tzaneen Municipality – Integrated Development Plan and Spatial Development Framework

The GTM Spatial Development Framework (SDF, 2008) indicates the site as containing areas of low environmental sensitivity. It is also indicated as having areas with slopes between 1:5 and 1:20.

Figure 6.1: Extract from GTM SDF (2008)

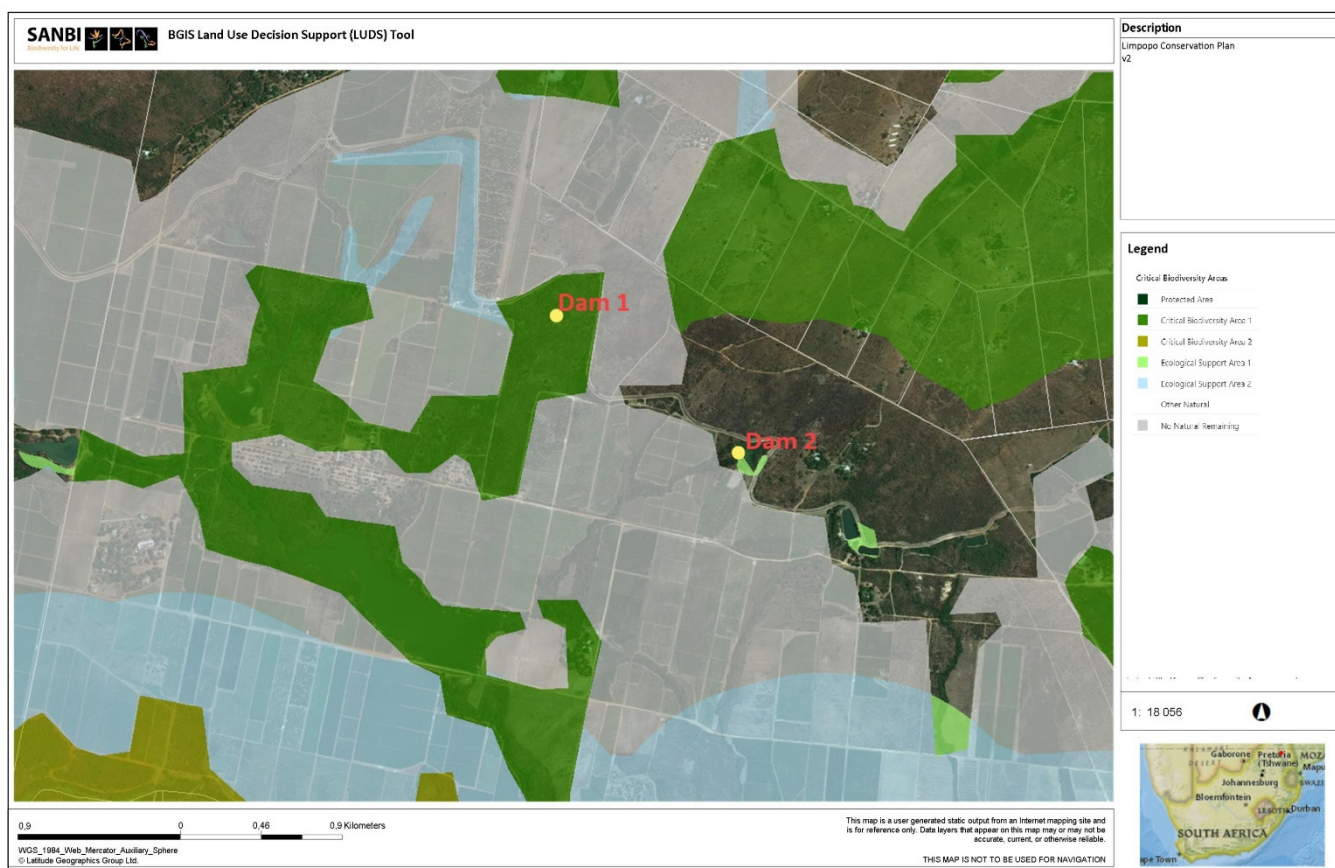


Agriculture forms a significant part of the municipal economy. The GTM Integrated Development Plan (IDP, 2017/2018) indicates that the GTM is the main contributor to the Mopani District's agricultural GDP (Gross Domestic Product), supplying 43% of the district's agricultural GDP.

6.4.2. Limpopo Conservation Plan version 2 (2013)

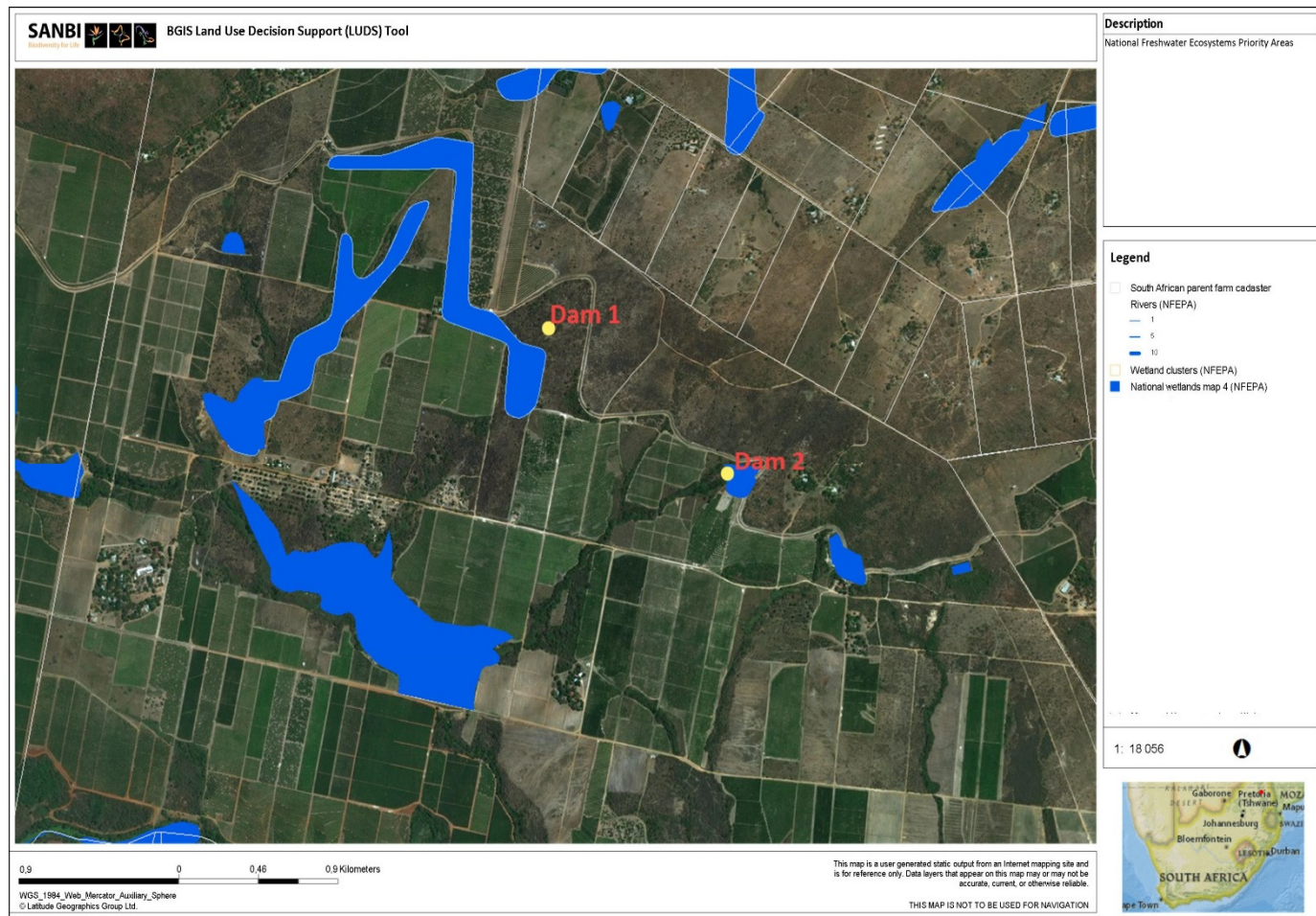
According to the Limpopo Conservation Plan version 2 (2013), Dam 1 is situated in a Critical Biodiversity Area 1 (CBA 1) and Dam 2 is in "Other Natural Vegetation". The property also has areas within an Ecological Support Area 1 (ESA 1), but this will not be affected by the proposed dams.

Figure 6.2: Extract from Limpopo Conservation Plan (image: SANBI BGIS, 2017)



The National Freshwater Ecosystem Priority Area (NFEPA) Map indicates that there is a wetland near Dam 1 and an artificial wetland, an existing damaged dam, at the proposed site of Dam 2.

Figure 6.3: Location of the dam sites in the context of FEPAs



7. IMPACT ASSESSMENT METHODOLOGY

Potential impacts were scored on the following basis:

- **Status:**
 - *Positive* – the proposed project is to have a positive impact in terms of the particular parameter;
 - *Negative* – the proposed project is to have a negative impact in terms of the particular parameter;
 - *Neutral* – the proposed project is to have neither a positive nor a negative impact in terms of the particular parameter.
- **Extent:**
 - *Local* – the impact is to be felt on the site and in its immediate surroundings, up to a radius of 50km from the site;
 - *Sub-regional* – the impact is to be felt at a distance of up to 100km from the site;
 - *Regional* – the impact is to be felt in the Limpopo Province;
 - *National* – the impact is to be felt across provincial boundaries.
- **Duration:**

Refers to the period of time over which impacts can be expected to be experienced.

- *Short term* – 0 to 5 years;
- *Medium term* – more than 5 years, up to 15 years;
- *Long term* – more than 15 years;
- *Permanent* – the impact is irreversible.

- **Magnitude:**

Refers to the intensity of the potential impact, if it is experienced.

- *Negligible* – the impact will barely be felt, if at all. No mitigation required;
- *Very low* – the parameter will only be affected to a very small extent by the proposed project. No mitigation required, but monitoring is recommended where applicable;
- *Low* – the parameter will only be affected to a small extent by the proposed project. No mitigation required, but monitoring is required where applicable;
- *Medium* – the parameter will be affected by the proposed project, but functions in terms of the parameter can still continue. Mitigation and monitoring required;
- *High* – functioning in terms of the parameter will be significantly affected by the impact. Extensive mitigation and long-term monitoring required.

- **Likelihood:**

- *Improbable* – it is unlikely that the impact will be experienced;
- *Possible* – the impact may be experienced. Monitoring required; mitigation may also be required based on the type of impact and its significance;
- *Highly probable* – the impact will most likely be experienced. Monitoring and mitigation required based on the type of impact and its significance in order to reduce the probability of the impact occurring and/or to reduce the magnitude of the impact;
- *Definite* – the impact will be experienced. Monitoring and mitigation required based on the type of impact and its significance in order to reduce the probability of the impact occurring and/or to reduce the magnitude of the impact.

- **Significance:**

Significance is based on a consolidation of the anticipated extent, duration, magnitude and likelihood of the potential impact.

- *Negligible* – The impact will barely be felt, if at all. No mitigation required;
- *Low* – The parameter will only be affected to a small extent by the proposed project. No mitigation required, but monitoring is recommended;
- *Medium* – The parameter will be affected by the proposed project, but functions in terms of the parameter can still continue. Mitigation and monitoring required;
- *High* – Functioning in terms of the parameter will be significantly affected by the impact. Extensive mitigation and long-term monitoring required.

8. ENVIRONMENTAL SCOPING INVESTIGATION – BIO-PHYSICAL INVESTIGATIONS

8.1. Climate

8.1.1. Status quo

The site is situated in a sub-tropical summer rainfall area with dry winters. Summers are hot and humid, with an average summer midday temperature of 29.1 °C in Tzaneen in January; winters are mild with very rare frost, and the average winter midday temperature is 21.9 °C in July. The region experiences its coldest temperatures during July when average evening temperature is 6.3 °C.

The mean annual rainfall of the catchment, based on the nearest rainfall station (Leeufontein 0679592W), is given as 760mm (Element, 2017).

The average potential mean annual gross evaporation, as measured by A-pan, is about 1 800mm in the mountainous western section of the WMA, where this site is located. The highest A-pan evaporation occurs between October and January, and the lowest in June (Luvuvhu/Letaba ISP, 2004).

January is the month in which the highest rainfall is received, whilst on average in July the lowest rainfall is received. Frost is infrequent but may occur at higher altitudes (Mucina & Rutherford 2006, SA Explorer 2012). The area is not particularly windy.

8.1.2. Potential impacts

The proposed project is not anticipated to have any impact on the local climate, aside from micro-climatic impacts of negligible significance.

The climate may impact on the project in that rain during the construction phase can cause soil erosion, particularly on exposed slopes which have not been stabilised. Rainfall during the operation phase will also determine how quickly the dam will fill.

Table 8.1: Potential impacts in terms of climate

CONSTRUCTION PHASE							
Potential impact	Status	Extent	Duration	Magnitude	Likelihood	Significance without mitigation	Significance with mitigation
Rain during the construction phase can cause soil erosion, particularly on exposed, unstable slopes, which in turn may lead to siltation of the stream	Negative	Local	Short term	Medium	Highly probable	Medium	Low
OPERATIONAL PHASE							
Not anticipated	-	-	-	-	-	-	-

8.2. Topography, Soils, Agriculture and Geology

8.2.1. Status quo

Topography

The dam sites are located at 577m and 588m above mean sea level (mamsl) respectively, and both the dams are situated in non-perennial tributaries of the Letaba River. The dam sites are both located in valleys, on non-perennial drainage streams which drains into the Cramer dam south which drains into the Great-Letaba River. The proposed dam sites are all located downstream from an existing irrigation canal with Dam 2 located in the place of an existing dam.

Soils

The area has Red, yellow and /or greyish soils with high base status.

Agriculture

The Letaba River Catchment – and in particular the Groot-Letaba sub-area within which this site is located – is a highly productive agricultural area, and agriculture is the base of the regional economy. Permanent fruit crops (such as are planned for this site and is also prevalent in the surrounding area) constitute approximately 47% of cultivation (Luvuvhu/Letaba ISP, 2004).

The dam sites are surrounded by cultivation (citrus orchards) and the surrounding larger areas is widely used for commercial agriculture. The dams would contribute to agricultural production as they will play a crucial role in the irrigation of the orchards.

Geology

The geology in the specific area consists of biotite granites. At some places, the granite bedrock daylights above ground level. Due to the location of the dams, near to rocky outcrops (“koppies”), it is expected that the granite bedrock, at some places on the proposed centre lines, may be shallow (Element,2017).

The area is generally underlain by the potassium-poor gneisses of the Goudplaats gneiss (Swazian Erathem) and an Archaean granite dyke underlies most of the area. Shales and quartzite of the Wolkberg Group are present but not common (Mucina & Rutherford, 2006).

The Olifants-Letaba EMF indicates the general area as being underlain by Archaean granite and Gneiss basalt complex, which are the oldest exposed rock formations in the area. It forms the basement rock complex for other rock systems, and consists mainly of old Granite and Gneis formations and primitive groups of schistose rocks including metamorphosed sediments such as phyllites, banded ironstone, quartzite, conglomerate and limestone, together with rocks of igneous origin such as amphibolites, greenstone lavas, and chlorite-schists (Olifants-Letaba EMF, 2010).

8.2.2. Potential impacts

Topography

The topography will be slightly altered through the excavation of soil from within the dam basins for construction of the dam walls. This is anticipated to be of low significance, as the excavated area will in any case be inundated after completion of construction.

Soils

Potential acceleration of soil erosion is likely to occur on a short-term basis that is expected to be limited largely to the construction phase, when earthworks and clearing of vegetation takes place.

Agriculture

The establishment of the proposed dams is anticipated to improve agricultural production on the rest of the property by ensuring greater security of irrigation water.

Geology

Geology is not anticipated to be impacted.

Potential impacts that may be associated with topography, soils, agriculture and geology are summarised in the following table:

Table 8.3: Potential impacts in terms of topography, soils, agriculture and geology

CONSTRUCTION PHASE							
Potential impact	Status	Extent	Duration	Magnitude	Likelihood	Significance without mitigation	Significance with mitigation
Soil erosion and associated siltation downstream	Negative	Local	Short term	Medium	Highly probable	Medium	Low
Alteration of topography within dam basins	Negative	Local	Long term	Low-Medium	Highly probable	Very low	Very low
OPERATIONAL PHASE							
Contribution to unlocking the agricultural potential of the property by providing irrigation security	Positive	Local	Long term	Medium	Highly probable	Medium	Medium

8.3. Surface hydrology, aquatic ecology and wetlands

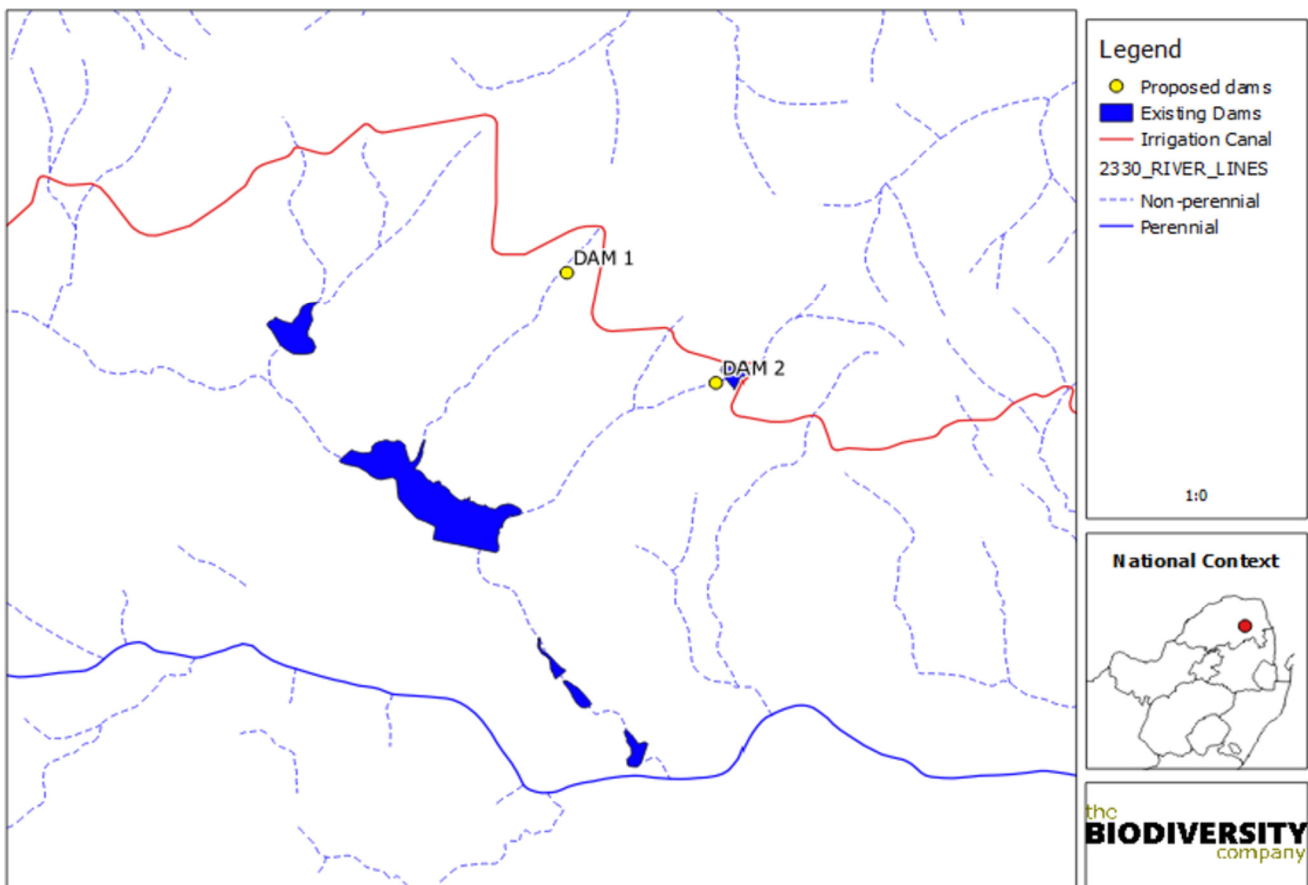
8.3.1. Status quo

Surface hydrology

The proposed project site is located in the upper reaches of non-perennial tributaries of the Great Letaba River, within the B81D Quaternary Catchment, which forms part of the Groot Letaba Sub-Area of the Olifants Water Management Area (WMA). Dam 1 is situated on a 1st order tributary and Dam 2 on a 2nd order tributary, based on the Strahler stream order classification (The Biodiversity Company, 2017).

A canal that is fed by the Great Letaba River traverses the property, adjacent (directly upstream of) the proposed dam sites and will be the source of water for the dams. The water discharged from the small existing dam at the Dam 2 site, feeds into the Cramer dam which is located on the property. A non-perennial watercourse traverses the Dam 1 proposed site and the Great Letaba River forms the southern boundary of the property.

Figure 8.1: Map of the project area, indicating the location of the proposed dams in relation to the Letaba River, irrigation canal, non-perennial tributaries and existing dams (The Biodiversity Company, 2017).



Aquatic ecology

A desktop aquatic ecological assessment has been done by The Biodiversity Company (2017).

Based on the topographical map data (10m contours) and the stream orders, it is very unlikely that fish communities would naturally occur in these tributaries. Any flow present in these tributaries can be concluded to originate from releases from the irrigation canal; under natural conditions these tributaries would only have exhibited surface flows for brief periods following rains. Colonisation of the existing dams and proposed dams by fish species most likely occurs in a top-down direction, as the canal is open to the Letaba River. It should also be noted that the four existing dams situated downstream of the proposed dam sites already present migration barriers to fish wanting to migrate into the remaining stream reaches.

The fish communities present in the project area are unusual in that originated from a top-down migration scenario as escapees from the irrigation canal, instead of the usual upstream migration scenario expected under natural conditions. Fish communities would not have been expected in these tributaries under natural conditions or in the absence of the canal. Construction of fishways or any other engineering designs designed to facilitate upstream migration of fish into the proposed dams is therefore considered to be unnecessary.

Wetlands

No wetland conditions were observed onsite, but a specialist wetland and riparian delineation and functional assessment during the impact assessment phase will investigate whether there are in fact any wetlands or riparian conditions.

8.3.2. Potential impacts

The construction of dams has numerous environmental impacts. According to Tahmiscioğlu *et al*, (2011) and Manatunge *et al*, (2010) (both quoted in Limosella 2017) the following positive and negative effects are associated with the construction of dams:

- Decreased sediment transfer within the hydrological system, which in turn restricts the egg laying zone of fish
- Disruption of species migration within the stream.
- The areas that will be under water from the dam are lost.
- Deterioration of water quality due to the decomposition of fauna and flora in the water.
- Decreased water quantity downstream leading to biodiversity changes.
- Negative effects associated with the construction process.
- Narrowing of channel may lead to vegetation overgrowth.
- A rise in evaporation may be expected as a result of the increase in the water surface area.

Certain impacts can be seen as either positive or negative, depending on the perspective. Alteration of the hydrological regime from non-perennial to a more constant flow due to the dams may pose negative environmental impacts to a system adjusted to a non-perennial stream, but downstream water users may see it as a positive impact due to more reliable water availability throughout the year.

Similarly, inundation of areas of free-flowing streams may be negative to the local ecology which is adjusted to non-perennial water availability, but could pose positive impacts in terms of habitat creation for water-loving species such as birds.

On condition that mitigation measures are adhered to, no impact to downstream water resources are expected to result from the proposed development. Recommended mitigation measures will also be incorporated into the detailed EMPR in the impact assessment phase.

Table 8.4: Potential impacts in terms of surface hydrology and wetlands

CONSTRUCTION PHASE							
Potential impact	Status	Extent	Duration	Magnitude	Likelihood	Significance without mitigation	Significance with mitigation
Disturbance of aquatic fauna and flora by construction activities	Negative	Local	Short term	Low-medium	Highly probable	Medium	Low
Ingress of foreign matter into streams and wetlands, with concomitant impacts on fauna and flora	Negative	Local	Short term	Unknown	Possible	Low	Very low
OPERATIONAL PHASE							
Increased water abstraction, though still within existing allocation	Negative	Local	Long term	Low	Highly probable	Low-medium	Low
Fragmentation of aquatic habitat	Negative	Local	Long term	Low	Definite	Low	Low
Change in hydrological regime from non-perennial to a more constant stream flow released downstream of the dam.	Negative / Positive	Local	Long term	Medium	Highly probable	Low	Low
Intercepting sediment load and preventing its transport downstream	Negative	Local	Long term	Medium	Highly probable	Low	Low
Inundation of portions of streams, and conversion of site from free-flowing to standing water.	Negative / Positive	Local	Long term	Low	Definite	Low	Low
Creation of habitat for water-loving birds and other fauna.	Positive	Local	Long term	Low-medium	Highly probable	Low	Medium
Deterioration in water quality downstream	Negative	Local	Long term	Unknown	Possible	Low	Very low

8.4. Ecology

An ecological assessment was undertaken by Bateleur Ecological Services in 2017, consisting of fieldwork complemented by a desktop review of available information.

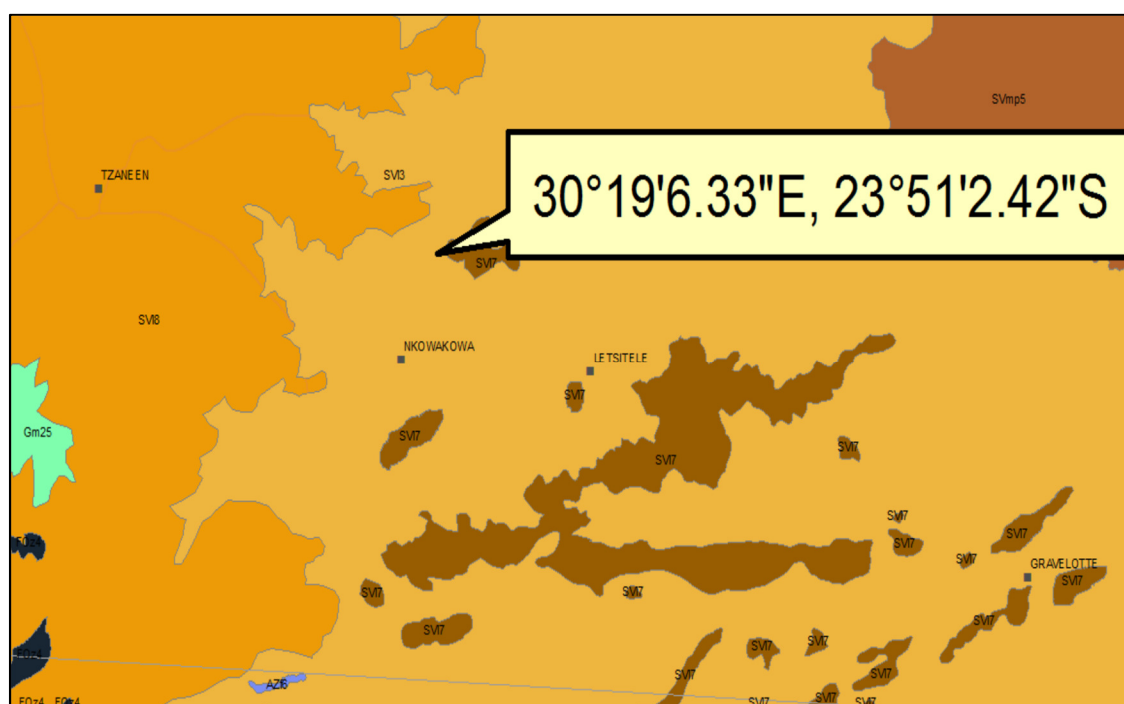
8.4.1. Status quo

Vegetation type

The site is located within the SVI 3 Granite Lowveld veld type, which forms a band extending from Limpopo and Mpumalanga Provinces, Swaziland and marginally also KwaZulu-Natal: A north-south belt on the plains east of the escarpment from Thohoyandou in the north, interrupted in the Bolobedu area, continued in the Bitavi area, with an eastward extension on the plains around the Murchison Range and southwards to Abel Erasmus Pass, Mica and Hoedspruit areas to the area east of Bushbuckridge. Substantial parts are found in the Kruger National Park spanning areas east of Orpen Camp southwards through Skukuza and Mkuhlu, including undulating terrain west of Skukuza to the basin of the Mbyamiti River (Mucina & Rutherford 2006).

The vegetation unit has a conservation status of Vulnerable. Target 19%. Some 17% statutorily conserved in the Kruger National Park. About the same amount conserved in private reserves mainly the Selati, Klaserie, Timbavati, Mala Mala, Sabi Sand and Manyeleti Reserves. More than 20% already transformed, mainly by cultivation and by settlement development. Erosion is very low to moderate (Mucina & Rutherford 2006).

Figure 8.2: Reference map of site location within the SVI 3 Granite Lowveld veld Vegetation Type (Mucina & Rutherford, 2006)



Important taxonomy within the vegetation type includes (Mucina & Rutherford, 2006):

Tall Trees - *Acacia nigrescens*, *Sclerocarya birrea* subsp. *caffra*. Small Trees: *Acacia nilotica*, *Albizia harveyi*, *Combretum apiculatum*, *C. imberbe*, *C. zeyheri*, *Ficus stuhlmannii*, *Peltophorum africanum*, *Pterocarpus*

rotundifolius, *Terminalia sericea*, *Acacia exuvialis*, *A. gerrardii*, *Bolusanthus speciosus*, *Cassia abbreviata* subsp. *beareana*, *Combretum collinum* subsp. *suluense*, *Dalbergia melanoxylon*, *Gymnosporia glaucophylla*, *Lannea schweinfurthii* var. *stuhlmannii*, *Pavetta schumanniana*, *Plectroniella armata*, *Terminalia prunioides*.

Tall Shrubs - *Combretum hereroense*, *Dichrostachys cinerea*, *Euclea divinorum*, *Strychnos madagascariensis*, *Gardenia volkensii*, *Hibiscus micranthus*, *Tephrosia polystachya*.

Low Shrubs - *Abutilon austro-africanum*, *Agathisanthemum bojeri*, *Aptosimum lineare*, *Barleria elegans*, *Clerodendrum ternatum*, *Commiphora africana*, *Gossypium herbaceum* subsp. *africanum*, *Pavonia burchellii*.

Woody Climber - *Sphedamnocarpus pruriens* subsp. *pruriens*.

Herbaceous Climber - *Rhynchosia totta*.

Graminoids - *Brachiaria nigropedata*, *Digitaria eriantha* subsp. *eriantha*, *Eragrostis rigidior*, *Melinis repens*, *Panicum maximum*, *Pogonarthria squarrosa*, *Aristida congesta*, *Bulbostylis hispidula*, *Chloris mossambicensis*, *Enneapogon cenchroides*, *Heteropogon contortus*, *Leptochloa eleusine*, *Perotis patens*, *Schmidtia pappophoroides*, *Sehima galpinii*, *Tricholaena monachne*, *Urochloa mosambicensis*.

Herbs - *Achyranthes aspera*, *Aspilia mossambicensis*, *Becium filamentosum*, *Chamaecrista absus*, *Commelina benghalensis*, *C. erecta*, *Cucumis africanus*, *Evolvulus alsinoides*, *Heliotropium strigosum*, *Hermbsstaedtia odorata*, *Hibiscus praeteritus*, *Indigofera filipes*, *I. sanguinea*, *Kohautia virgata*, *Kyphocarpa angustifolia*, *Leucas glabrata*, *Ocimum gratissimum*, *Phyllanthus maderaspatensis*, *Pupalia lappacea*, *Vahlia capensis* subsp. *vulgaris*, *Waltheria indica*. Succulent Herbs: *Orbea rogersii*, *Stapelia leendertziae*.

Vegetation units on site

Dam 1: Located in a Critical Biodiversity Area 1, but consists of severely degraded and transformed open woodland. Encroachment by *Arundo donax* reeds. Indigenous vegetation in drainage lines and in open veld in the form of young plants.

Dam 2: Artificial dam located on the stream, with constant discharge from the dam to other dams and abstraction points downstream. The constant flow, which is due to the man-made and managed dam, supports riverine forest at the river's edge, comprising of species such as *Adina microcephala* and *Ficus sycomorus*, surrounded by thicket containing alien invasive species such as *Lantana camara*. Area surrounding the dam comprising an array of indigenous and exotic species in a pioneer stage due to slashing and other ongoing disturbances. *Eichhorja crassipes* (water hyacinth) was observed as a dominant water plant.

Fauna

Due to the sites being somewhat degraded ecologically, presence or activity of larger mammal species is expected to be limited, but small animals such as porcupine and bush-pig are likely to be evident. The potential of any protected species occurring on site is very low.

Ecological sensitivity

Both sites are sensitive due to their location on watercourses, but the Dam 1 site is considered the most sensitive of the two sites, due to its location within a CBA, even though it is ecologically degraded.

An ecological study, wetland delineation and aquatic desktop study during the impact assessment phase will investigate the sites' sensitivity in more detail; the findings will be reported in the EIAR.

8.4.2. Potential impacts

The potential impacts of the proposed dams on the vegetation are anticipated to be medium due to the location of Dam 1 within a CBA, even though the proposed dam sites consist of mostly degraded natural vegetation with significant infestation of alien vegetation.

The construction phase will allow for the removal of a large amount of alien vegetation, however, it will also cause destruction of whatever natural vegetation remains in the dam basins.

Fauna are likely to be disturbed by construction-related activities, particularly noise, vibrations, human presence and of course the removal of sections of habitat. However, no negative long-term impacts on terrestrial fauna and birds are expected.

The presence of a year-round supply of surface water at the site (in the form of the dams) is likely to draw water-dependent fauna such as birds and provide foraging habitat for them, and in this way the dams may serve as a refuge for water-loving species, especially if fringes of indigenous habitat are left intact around the dams (or re-established) and managed properly to remove alien invasive species, etc.

Table 8.5: Potential impacts in terms of **vegetation**

CONSTRUCTION PHASE							
Potential impact	Status	Extent	Duration	Magnitude	Likelihood	Significance without mitigation	Significance with mitigation
Veld fire risk associated with "hot" construction activities and workers smoking etc	Negative	Local	Short term	Very low	Possible	Low	Very low
OPERATIONAL PHASE							
Habitat destruction in the areas to be inundated by dams or cleared for embankments	Negative	Local	Long term	Medium	Definite	Medium	Medium
Possible further spreading of alien plant species or bush encroachment by indigenous trees due to disturbance of natural vegetation	Negative	Local	Long term	Low	Possible	Low	Very low
Possible reduction in infestation by alien invasive plants due to improved management thereof	Positive	Local	Long term	Low	Highly probable	Very low	Low
Changing the in-stream flow regime downstream of	Negative / Positive	Local	Long term	Low	Highly probable	Low-Medium	Low-Medium

the dam, creating a steadier, more predictable flow, with concomitant impacts on ecology which may be positive, negative or neutral							
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Table 8.6: Potential impacts in terms of fauna

CONSTRUCTION PHASE							
Potential impact	Status	Extent	Duration	Magnitude	Likelihood	Significance without mitigation	Significance with mitigation
Disruption of the activities of fauna on and around the site due to construction activities, and possible trapping / hunting / killing fauna by labourers	Negative	Local	Short term	Very low	Highly probable	Low	Very low
OPERATIONAL PHASE							
Creation of habitat for water-dependent fauna, e.g. certain fish, amphibians and bird species	Positive	Local	Long term	Low	Highly probable	Low-Medium	Low-Medium
Change in faunal species composition onsite through change in habitat types	Neutral	Local	Long term	Low	Possible	Low	Low
Changing the in-stream flow regime downstream of the dam, with concomitant impacts on ecology which may be positive, negative or neutral	Negative	Local	Long term	Medium	Highly probable	Low-Medium	Low-Medium

9. ENVIRONMENTAL SCOPING INVESTIGATION – SOCIO-ECONOMIC INVESTIGATIONS

9.1. Heritage Assessment

9.1.1. Status quo

The area can be considered disturbed due to the fact that most of the area has been impacted on by agricultural activities.

There are no known graves, buildings older than 60 years, or areas with cultural or religious significance on the site. According to the most recent archaeological cultural distribution sequences by Huffman (2007), this area

falls within the distribution area of various cultural groupings originating out of both the Urewe Tradition (eastern stream of migration) with facies from the Kwale and Moloko branches possibly occurring, and the Kalundu Tradition (western stream of migration) with facies from the Happy Rest sub-branch possibly occurring. Stone Age artifacts and materials dating to the Early, Middle and Late Stone Age are often recorded during survey near rivers and drainage lines in the Limpopo Province.

9.1.2. Potential impacts

A specialist heritage impact assessment will be undertaken during the impact assessment phase to determine whether there are graves or archaeological material on the proposed development footprints.

Should any previously undetected subterranean heritage remains however be found on site during the remainder of the construction phase, this must be reported to the Limpopo Heritage Resources Agency (LIHRA) or South African Heritage Resources Agency (SAHRA) and work onsite halted until given the go-ahead by LIHRA and/or SAHRA.

Table 9.1: Potential heritage impacts

CONSTRUCTION PHASE						
Potential impact	Status	Extent	Duration	Magnitude	Likelihood	Significance
None expected	-	-	-	-	-	-
OPERATIONAL PHASE						
None expected	-	-	-	-	-	-

9.2. Social Aspects

8.2.1. Status quo: Greater Tzaneen Local Municipality (Information adapted from GTM IDP 2017/2018)

Location

The GTM forms part of the Mopani District in the Limpopo Province. The municipal area, which covers roughly 3 240 km², extends from Haenertsburg in the west to Rubbervale in the east (a distance of 85 km), and from just south of Modjadjiskloof in the north to Trichardtsdal in the south (47 km).

The GTM comprises the proclaimed towns of Tzaneen, Nkowankowa, Lenyenye, Letsitele and Haenertsburg, together with 125 rural villages. The municipal area is divided into 34 wards; this site is located within Ward 21.

Population

According to the South African Statistics Census 2011, the GTM has increased its population from 375 588 to 390 092 (an increase of 14 504) with females outnumbering males as they comprise 53% of the population. Young people between the ages of 14 –35 constitute 40% (156 900) of the total population of the municipality.

Income, employment and education

The latest labour force survey by Statistics South Africa (first quarter 2012) indicates that unemployment in Limpopo has deteriorated from 19.3% in March 2011 to 21.9% in March 2012. During this period the number of discouraged work seekers increased from 415,000 (March 2011) to 424,000 in March 2012. This is the strict definition of unemployment, which excludes discouraged work seekers. The unemployment rate will be worse if discouraged work seekers are included.

Unfortunately, these official statistics are not available at the district or the municipal level. The only estimates at the municipal level that are available until the 2011 census results are published, are from commercial statistical service providers, such as Quantec and Global Insight. Quantec estimated the unemployment rate in GTM at 37.1% for 2010. They have not yet made an estimate for 2011.

Economic activities and opportunities

The finance, insurance, real estate & business services is the main employer within the GTM, providing 27% of the available jobs within the GTM's area of jurisdiction. General governmental services supply 19% of jobs, followed by trade, catering and accommodation (15%), and transport, storage and communication (12%). Other economic sectors provide a minority of job opportunities.

The sector supplying the greatest proportion of the GTM's Gross Domestic Product (GDP) is Community Services (37%), followed by Finance (24%) and Trade (10%).

The GTM is the main contributor to the Mopani District's agricultural GDP (Gross Domestic Product), supplying 43% of the district's agricultural GDP.

Infrastructure and services

Water: The GTM has applied to the Department of Water and Sanitation (DWS) for an increased allocation to abstract raw water for purification and supply to residents. However, due to the pressure on the Ebenezer and Tzaneen Dams, DWS has not yet been able to grant such an increase, and hence water supply is a concern over the long term. Water supply challenges is being experienced in the entire municipality especially where boreholes are dysfunctional due to lack of regular maintenance, theft of electrical cables while others being that they never operated from the time of construction. Some water schemes initially designed to cater certain number of households are unable to supply due to increase in demand while those schemes were not upgraded. Certain infrastructural projects are in the pipeline, such as raising the Tzaneen Dam wall (currently underway) and establishing a new dam near Nwamitwa (currently unknown when construction will start).

The GTM's drinking water quality is very good, and the GTM was awarded Blue Drop status by DWS in 2009 for the high quality of drinking water. Many of the rural areas are supplied by boreholes that are managed by the Mopani District Municipality (MDM).

Sanitation: Much of the municipal area, specifically in the extensive rural areas, relies on Ventilated Improved Pit (VIP) toilets. It is the MDM's responsibility to install these. Haenertsburg relies on individual septic tanks and French drains, whilst Tzaneen, Nkowankowa and Lenyenye have waterborne sewerage. Farms generally make use of septic tanks and French drains. Several villages have been, or are in the process of being, reticulated with waterborne sewerage.

Electricity: Electricity over most of the municipal area is provided by the GTM, but Nkowankowa, Lenyenye and the southernmost areas of the municipal area are supplied directly by Eskom. The GTM also supplies electricity to certain areas which do not fall within its area of jurisdiction, including Eiland and Gravelotte. Major investments have been made into electricity supply infrastructure in Tzaneen over the past approximately 2 years, which has improved the reliability and future capacity of electricity supply. The electrification backlog is estimated at 17.8%. A total number of 4,775 out of 108,926 households in the municipality receive Free Basic Electricity.

Housing: There is a backlog of more than 12 590 RDP houses and 1 563 middle income beneficiaries, but challenges are experienced in terms of the availability of land for the provision of these houses.

Health care: There are 29 clinics, 4 health centres and 165 visiting points within the municipal area, but only 16 of the visiting points have functioning structures, with the rest of the visiting points being community centres, day-care centres, farms or even just designated trees.

Waste management: Kerbside refuse removal is provided in Tzaneen, Lenyenye, Nkowankowa, Haenertsburg and Letsitele and disposal is done at the landfill site at Tzaneen; however, this constitutes only 11% of the households within the municipal area. Very little at-source recycling is done, but basic composting of garden waste is done adjacent to the landfill site.

8.2.2. Potential impacts

Construction is anticipated to extend over a period of a couple of months, and work will be done almost entirely by machinery. A contractor will be brought in to construct the dam using his/her machinery and staff, and no casual labourers are anticipated to be hired.

The following **short-term** socio-economic impacts may be expected during the construction phase of the proposed project:

- Support of local job opportunities through support of local businesses in the procurement of materials, equipment and services to be used in the construction phase;
- The possibility exists that the presence of construction activities may lead to an increase in criminal activity, trespassing and/or rowdiness;
- Construction-related noise resulting mostly from construction machinery (particularly during earthworks), offloading of materials, and the rumble of heavy construction vehicles / plant on the road.

Long-term socio-economic impacts during the operational phase may relate to the following:

- Greater job security at the farm, as the dam will lead to reduced vulnerability of agricultural production to drought conditions, and therefore less risk of retrenchments during times of below-average rainfall.
- Contribution to local economic development – the dams will give greater security for commercial agriculture on the property, which in turn is anticipated to contribute more to the secondary agriculture-based industries in the area, such as transport and packaging firms. Staff employed at the farm are also anticipated to spend most of their disposable income locally, which in turn will also stimulate the local economy.

Table 9.2: Potential social impacts

CONSTRUCTION PHASE							
Potential impact	Status	Extent	Duration	Magnitude	Likelihood	Significance without mitigation	Significance with mitigation
Supporting local businesses through local	Positive	Local	Short term	Low	Highly probable	Very low	Low

procurement of materials, equipment & services							
Direct and indirect job creation	Positive	Local	Short term	Low	Highly probable	Very low	Low
OPERATIONAL PHASE							
Contribution to job creation and job security by buffering the farm against drought	Positive	Local	Long term	Low	Highly probable	Very low	Low
Contribution to local economy	Positive	Local	Long term	Low	Highly probable	Very low	Low

8.3. Visual Aspects

8.3.1. Status quo

Dam 1: The site consists of degraded natural vegetation surrounded by citrus orchards and bordered by an irrigation canal. The site has a very low public visibility, being located in a private farm and being approximately 470m away from the boundary of the neighbouring farm.

Dam 2: The site consists of an existing small dam and degraded natural vegetation, surrounded by citrus orchards and bordered by an irrigation canal. The site has a very low public visibility, being located in a private farm and being approximately 605m away from the boundary of the neighbouring farm.

8.3.2. Potential impacts

Construction-phase visual impacts can be expected in the form of site clearing, earthworks and construction activities themselves. In light of the short duration of the construction period and the limited visibility of the dam sites to the public or neighbours, construction activities are expected to have very low significance in terms of visual impacts.

Operational-phase impacts are anticipated to be **positive** – dams are usually regarded as aesthetically pleasing. The impacts are anticipated to have very low significance, though, as the sites are largely hidden from the public's or neighbours' view.

Table 9.3: Potential visual impacts

CONSTRUCTION PHASE							
Potential impact	Status	Extent	Duration	Magnitude	Likelihood	Significance without mitigation	Significance with mitigation
Construction activities and site clearing	Negative	Local	Short term	Medium	Definite	Low	Very low
OPERATIONAL PHASE							
Visual impact of the new dams	Positive	Local	Long term	Medium	Definite	Very low	Very low

8.4. Noise

8.4.1. Status quo

The site is situated in an area where ambient noise levels are low, with sounds mostly associated with the voices of workers on surrounding farms. There are no sensitive noise receptors (e.g. schools or dwellings) in close proximity to the proposed dam sites; the dam sites are surrounded by agricultural areas.

8.4.2. Potential impacts

Construction-phase impacts are anticipated to be mainly associated with construction activities themselves, including earthworks, off-loading of material from trucks, etc., as well as with construction vehicles moving to and from the site, and vehicles transporting construction workers. These impacts will be short-term in duration, occurring only whilst construction is underway, and will be very low in magnitude. The significance of the impacts will be further reduced by the absence of sensitive local noise receptors.

Given the short-term nature of construction phase noise impacts and the distance of the site from dwellings or other noise-sensitive receptors, noise impacts potentially associated with construction of the dam are anticipated to be of very low significance.

By its very nature, the dam will not generate any noise once completed. No operational-phase noise impacts are expected.

Table 9.4: Potential impacts in terms of noise

CONSTRUCTION PHASE							
Potential impact	Status	Extent	Duration	Magnitude	Likelihood	Significance without mitigation	Significance with mitigation
Noise associated with construction activities and heavy vehicles during construction	Negative	Local	Short term	Very low	Highly probable	Low	Very low
OPERATIONAL PHASE							
No operational-phase noise impacts are expected.							

8.5. Indirect and cumulative impacts

The nature of the project is such that it is anticipated to result in various indirect impacts associated with the agriculture which it is proposed to support. The dams will contribute to facilitating large-scale commercial agriculture on the site, hence the impacts associated with such agriculture can be indirectly linked to the proposed dams.

Furthermore, as is the case for any activity, impacts are not limited to those directly or even indirectly associated with the proposed activity – potential cumulative impacts need to be considered as well, so that activities can be seen not as stand-alone entities but as part of the larger picture.

The following tables highlight potential indirect and cumulative impacts of the proposed dams:

Table 9.5: Potential indirect and cumulative impacts – BIOPHYSICAL ASPECTS

CONSTRUCTION PHASE						
Potential impact	Status	Extent	Duration	Magnitude	Likelihood	Significance
Habitat loss and fragmentation	Negative	Local	Long term	Medium	Definite	Medium
OPERATIONAL PHASE						
Disruption of the stream's free flow, including disruption of movement of aquatic fauna	Negative	Local	Long term	Medium	Definite	Low
Increased water abstraction, with reduced water availability down-canal	Negative	Local	Long term	Low	Highly probable	Low-medium
Risk of contamination of water resources by agricultural chemicals in the associated farming operation	Negative	Local	Long term	Unknown	Possible	Medium

Table 9.6: Potential indirect and cumulative impacts – SOCIO-ECONOMIC ASPECTS

CONSTRUCTION PHASE						
Potential impact	Status	Extent	Duration	Magnitude	Likelihood	Significance
Job creation	Positive	Local	Short term	Low	Definite	Very low
Visual impacts	Negative	Local	Long term	Low	Definite	Low
Noise	Negative	Local	Short term	Very low	Highly probable	Very low
OPERATIONAL PHASE						
Job creation and supporting of associated agricultural jobs	Positive	Local- sub regional	Long term	Low-medium	Definite	Low-medium
Contribution to local economy	Positive	Local	Long term	Low-medium	Definite	Low-medium

10. PUBLIC PARTICIPATION PROCESS

10.1. Advertisement of Commencement of EIA Process

The initial public comment period / I&AP registration period was advertised for a period of 30 days (18 August to 18 September 2017)) in the following ways (please refer to Appendix D for copies of newspaper advertisements, photographs of site notices and the list of stakeholders who were directly notified):

- Publication of a notice (English and SePedi) in the local newspaper, the Letaba Herald, on 18 August 2017;
- Display of site notices (each containing both the English and the SePedi adverts) at and near the site;
- Direct notification of identified Interested and/or Affected Parties (I&APs) via fax, e-mail and/or post.

10.2. Public Meeting

A public meeting has been arranged for 21 November 2017, where information about the proposed project will be presented and I&APs will have the opportunity to discuss queries or concerns with members of the project team.

10.3. Issues Raised

Some neighbours have raised concerns that the volume of water reaching their properties may be affected by the proposed dams. However, the applicant will still only abstract their allocated volume, and do not intend increasing abstraction.

10.4. Availability of Consultative ESR for Review and Comment

This consultative ESR is currently available for public review and comment for a period of 30 days, from 13 November to 13 December 2017. Copies of the report are available onsite and at Polygon's offices at 21C Peace Street, Tzaneen, during this period. Electronic copies on CD are also available from Polygon upon request and copies (whether in hard copy or on CD) have been submitted directly to certain stakeholders for their comment (notably DWS, SAHRA and GTM).

11. PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT

11.1. Approach to Undertaking the Impact Assessment Phase of the Project

The impact assessment phase of this project will comprise a more in-depth assessment of potential impacts, as well as development of detailed impact mitigation measures. It will also include an extension of the public participation process in order to make the findings of the entire EIA available to I&APs and to obtain their comments.

11.2. Assessments to be conducted as part of the Environmental Impact Assessment phase

During the ESS phase of this project, the following aspects **were** assessed at a desktop level, complemented by a site inspection by Polygon, to determine the status quo and to identify potential impacts of the proposed development:

Bio-physical aspects

- Climate
- Topography, Soils, Agriculture and Geology
- Surface hydrology, aquatic ecology and wetlands
- Ecology

Socio-economic aspects

- Heritage
- Social aspects
- Visual aspects
- Noise

The following aspects have been identified as requiring further, more detailed specialist investigation; these **will be** looked at in more detail during the impact assessment phase of this project:

Bio-physical aspects

- **Ecological:** An ecological study will be undertaken by an ecologist to investigate the current conditions onsite in terms of vegetation and fauna, as well as potential impacts that may be wrought by the proposed project. The following aspects will be assessed through a combination of desktop investigations and a field investigation:
 - Vegetation types and units, including an assessment of whether vegetation is pristine or degraded
 - Gauging which faunal species are likely to occur onsite, based on the habitat found onsite
 - Ecological sensitivity of the site, including compilation of a sensitivity map and recommendations in terms of the suitability of parts of the site that are proposed for development;
 - Possible presence of threatened or protected species (fauna or flora);
 - Identification of potential ecological impacts that may be associated with the proposed project
 - Recommendation of measures for prevention, mitigation or management of potential ecological impacts
 - Recommendation as to whether the project can be supported from an ecological perspective
- **Wetland and riparian areas:** A wetland delineation will be undertaken to determine the extent of wetland and riparian conditions on the site and to assess the Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS). Potential impacts of the proposed projects on the wetland and riparian areas will be identified and an assessment done of the potential significance of such impacts. The investigation will combine a desktop study with fieldwork in which the focus will be on wetland indicators such as terrain unit indicators (hydrogeomorphic classification), vegetation and soils. Riparian indicators (specifically vegetation) will also be used to identify riparian areas along drainage lines.

The delineation method will follow the DWAF document “Updated manual for identification and delineation of wetlands and riparian areas” (DWAF, 2008), and the Minimum Requirements for Biodiversity Assessments (GDACE, 2009) as well as the Classification System for Wetlands and other Aquatic Ecosystems in South Africa. User Manual: Inland Systems (Ollis *et al*, 2013). These guidelines describe the use of indicators to determine the outer edge of the wetland and riparian areas such as soil and vegetation forms as well as the terrain unit indicator.

Socio-economic aspects

- **Heritage:** A Heritage Impact Assessment (HIA) will be undertaken to investigate whether sites or objects of heritage-related significance occur onsite or are likely to occur. Desktop investigations will be combined with a site walkover to look for grave sites, archaeological or palaeontological material, or for signs of disturbance where subterranean archaeological material is more likely to be found. Other aspects to be considered, will include whether the site holds any non-tangible cultural or religious value to local communities or residents.

11.3. Assessment of impacts

Impacts that may be associated with the proposed project will be assessed according to the following methodology:

- **Status:**

- *Positive* – the proposed project is to have a positive impact in terms of the particular parameter;
- *Negative* – the proposed project is to have a negative impact in terms of the particular parameter;
- *Neutral* – the proposed project is to have neither a positive nor a negative impact in terms of the particular parameter.

- **Extent:**

- *Local* – the impact is to be felt on the site and in its immediate surroundings, up to a radius of 50km from the site);
- *Sub-regional* – the impact is to be felt at a distance of up to 100km from the site;
- *Regional* – the impact is to be felt in the Limpopo Province;
- *National* – the impact is to be felt across provincial boundaries.

- **Duration:**

Refers to the period of time over which impacts can be expected to be experienced.

- *Short term* – 0 to 5 years;
- *Medium term* – more than 5 years, up to 15 years;
- *Long term* – more than 15 years;
- *Permanent* – the impact is irreversible.

- **Magnitude:**

Refers to the intensity of the potential impact, if it is experienced.

- *Negligible* – the impact will barely be felt, if at all. No mitigation required;
- *Low* – the parameter will only be affected to a small extent by the proposed project. No mitigation required, but monitoring is recommended;
- *Medium* – the parameter will be affected by the proposed project, but functions in terms of the parameter can still continue. Mitigation and monitoring required;
- *High* – functioning in terms of the parameter will be significantly affected by the impact. Extensive mitigation and long-term monitoring required.

- **Likelihood:**

- *Improbable* – it is unlikely that the impact will be experienced;
- *Possible* – the impact may be experienced. Monitoring required; mitigation may also be required based on the type of impact and its significance;
- *Highly probable* – the impact will most likely be experienced. Monitoring and mitigation required based on the type of impact and its significance in order to reduce the probability of the impact occurring and/or to reduce the magnitude of the impact;
- *Definite* – the impact will be experienced. Monitoring and mitigation required based on the type of impact and its significance in order to reduce the probability of the impact occurring and/or to reduce the magnitude of the impact.

- **Significance:**

Significance is based on a consolidation of the anticipated extent, duration, magnitude and likelihood of the potential impact.

- *Negligible* – The impact will barely be felt, if at all. No mitigation required;
- *Low* – The parameter will only be affected to a small extent by the proposed project. No mitigation required, but monitoring is recommended;
- *Medium* – The parameter will be affected by the proposed project, but functions in terms of the parameter can still continue. Mitigation and monitoring required;
- *High* – Functioning in terms of the parameter will be significantly affected by the impact. Extensive mitigation and long-term monitoring required.

11.4. Public Participation Process

11.4.1. Public Meeting

Just as during the ESS phase, a Public Meeting will be conducted during the EIA phase of the project. It is proposed that the EIA-phase public meeting be held during the public review period of the consultative Environmental Impact Report (EIR) and Environmental Management Programme (EMPR). The findings of the investigations conducted during the EIA will be presented at the meeting, and I&APs and members of the public will have the opportunity to discuss queries or concerns directly with the project team.

11.4.2. Issues Trail

All comments, queries or issues raised during the public participation process will be recorded in the issues trail along with the response given by the consultant and/or specialists, and comments raised during the impact assessment phase of the process will be distinguished from those raised during the scoping phase. The issues trail will provide a comprehensive overview of the issues around the project, and will be submitted to LDEDET along with the EIR. The issues trail will also be available for public review and comment as part of the draft EIR.

11.4.3. Availability of reports for public review

The consultative EIR and EMPR will be made available for public review and comment for a period of 30 days before the final report will be submitted to LDEDET for their decision-making.

11.5. Environmental Impact Report and Environmental Management Programme

Based upon the specialist investigations and public participation process conducted during the impact assessment phase of the project, the **EIR** will be compiled, in which potential environmental impacts, identified during the ESS phase of the project, will be weighed in terms of their status, probability, extent, duration and significance. In addition, the EIR will contain the findings of all investigations conducted during both the ESS phase and the impact assessment phase, as well as the results of all public participation undertaken during both these phases, in the form of proof of advertisement of the various stages of the EIA process, minutes of all public and stakeholder meetings and copies of all correspondence with stakeholders.

An **Environmental Management Programme** (EMPR) will be compiled and made available for review together with the consultation EIR. The consultation EMPR will contain detailed management and mitigation measures

in order to prevent, minimise or manage potential negative impacts and to optimise potential positive impacts during the construction phase, the operational phase and the potential decommissioning phase.

The EMPR will be compiled in collaboration with the specialist sub-consultants who have been involved in various aspects of the project, to ensure that recommended measures address each particular aspect in detail, that the measures are appropriate for the relevant aspect in the context of the particular site and that measures recommended in terms of different parameters are not mutually exclusive. During the public review period, input from stakeholders and the public will also be welcomed for consideration in the EMPR.

11.5.1. Public Review of the consultative EIR and EMPR

The public and stakeholders will be provided with the opportunity to peruse and comment on the consultative EIR and EMPR. These documents will be made available onsite and at Polygon's offices at 21C Peace Street, Tzaneen. Copies of the reports will also be distributed to certain key stakeholders, notably DWS, SAHRA, and GTM, at the outset of the public review period, and electronic copies of the reports will be available from Polygon upon request during the comment period. Any comments received with regards to the draft EIR and EMPR will be incorporated into the final report which will be submitted to LDEDET for decision-making following the public review period.

11.5.2. Authority Review of the EIR and EMPR

Following the public review period of the consultative EIR and EMPR, these documents will be finalised and submitted to LDEDET for their review and decision-making on the proposed project.

11.6. Authorisation

Following review of the final EIR and EMPR, LDEDET will authorise, reject or conditionally authorise the proposed project. All registered I&APs and stakeholders will be directly notified of the outcome of LDEDET's decision; parties will also be informed regarding the appeal process that can be followed if they feel that LDEDET's decision was wrongly issued.

11.7. Agreement with I&APs as to Plan of Study

I&APs are currently able to submit comments on this Plan of Study as part of the ESR, during the public comment period.

Polygon undertakes not to deviate from the Plan of Study in undertaking the impact assessment phase of the project, unless unforeseen circumstances necessitate material changes, in which case such changes will be discussed with LDEDET before being implemented.

12. CONCLUSIONS

The Environmental Scoping Study (ESS) undertaken as part of the EIA process thus far has identified no fatal flaw issues associated with the proposed project. From the scoping-level investigations, it was determined that the proposed development can potentially be supported on the proposed development site, on condition that the necessary impact mitigation and management measures are implemented, and the relevant

authorisations obtained. More detailed specialist investigations, as indicated in the Plan of Study, have also been identified to be undertaken during the impact assessment phase.

During the impact assessment phase, which will follow the scoping phase if LDEDET accepts this ESR, specialist ecological, wetland and heritage investigations will be undertaken, potential impacts will be investigated in more detail, and further stakeholder engagement will also be undertaken, wherein the findings of the studies that have been done will be presented to stakeholders and the general public to give further opportunity for submission of comments with regards to the proposed project. From the findings of the various investigations as well as the stakeholder engagement process, an Environmental Management Programme will be developed, which will contain measures for the prevention, mitigation and/or management of impacts that may be anticipated to be associated with the proposed project in the preferred location and using the preferred technology.

A summary of the potential impacts identified within the ESS is contained in Table 12.1.

Table 12.1: Summary of potential impacts

POTENTIAL IMPACT	STATUS	EXTENT	DURATION	MAGNITUDE	LIKELIHOOD	SIGNIFICANCE WITHOUT MITIGATION	SIGNIFICANCE WITH MITIGATION	REQUIREMENT FOR FURTHER STUDIES AND MITIGATION OF RESIDUAL IMPACTS
Bio-physical aspects								
Rain during the construction phase can cause soil erosion, particularly on exposed, unstable slopes, which in turn may lead to siltation of the stream	Negative	Local	Short term	Medium	Highly probable	Medium	Low	<ul style="list-style-type: none"> - Mitigation and monitoring required - No further studies required
Alteration of topography within dam basins	Negative	Local	Long term	Low-Medium	Highly probable	Very low	Very low	<ul style="list-style-type: none"> - No mitigation or monitoring required - No further studies required
Contribution to unlocking the agricultural potential of the property by providing irrigation security	Positive	Local	Long term	Medium	Highly probable	Medium	Medium	<ul style="list-style-type: none"> - No mitigation or monitoring required - No further studies required
Disturbance of aquatic fauna and flora by construction activities	Negative	Local	Short term	Low-medium	Highly probable	Medium	Low	<ul style="list-style-type: none"> - Mitigation and monitoring required - Specialist wetland delineation and functional assessment to be undertaken
Ingress of foreign matter into streams and wetlands, with concomitant impacts on fauna and flora	Negative	Local	Short term	Unknown	Possible	Low	Very low	<ul style="list-style-type: none"> - Mitigation and monitoring required - Specialist wetland delineation and functional assessment to be undertaken
Increased water abstraction, though still within existing allocation	Negative	Local	Long term	Low	Highly probable	Low-medium	Low	<ul style="list-style-type: none"> - Mitigation and monitoring required - Specialist wetland delineation and functional assessment to be undertaken
Fragmentation of aquatic habitat	Negative	Local	Long term	Low	Definite	Low	Low	<ul style="list-style-type: none"> - Mitigation and monitoring required

								- No further studies required
Change in hydrological regime from non-perennial to a more constant stream flow released downstream of the dam.	Negative / Positive	Local	Long term	Medium	Highly probable	Low	Low	- Mitigation and monitoring required - Specialist wetland delineation and functional assessment to be undertaken
Intercepting sediment load and preventing its transport downstream	Negative	Local	Long term	Medium	Highly probable	Low	Low	- Monitoring required - No further studies required
Inundation of portions of streams, and conversion of site from free-flowing to standing water.	Negative / Positive	Local	Long term	Low	Definite	Low	Low	- Mitigation and monitoring required - Specialist wetland delineation and functional assessment to be undertaken
Creation of habitat for water-loving birds and other fauna.	Positive	Local	Long term	Low-medium	Highly probable	Low	Medium	- Monitoring required - No further studies required
Deterioration in water quality downstream	Negative	Local	Long term	Unknown	Possible	Low	Very low	- No mitigation or monitoring required - No further studies required
Veld fire risk associated with "hot" construction activities and workers smoking etc	Negative	Local	Short term	Very low	Possible	Low	Very low	- Management and monitoring required during construction - No further studies required
Habitat destruction in the areas to be inundated by dams or cleared for embankments	Negative	Local	Long term	Medium	Definite	Medium	Medium	- Mitigation required - Specialist ecological and wetland assessments to be undertaken
Possible further spreading of alien plant species or bush encroachment by indigenous trees due to disturbance of natural vegetation	Negative	Local	Long term	Low	Possible	Low	Very low	- Mitigation and monitoring required - Specialist ecological assessment to be undertaken
Possible reduction in infestation by alien invasive plants due to improved management thereof	Positive	Local	Long term	Low	Highly probable	Very low	Low	- No mitigation or monitoring required

								- Specialist ecological assessment to be undertaken
Changing the in-stream flow regime downstream of the dam, creating a steadier, more predictable flow, with concomitant impacts on ecology which may be positive, negative or neutral	Negative / Positive	Local	Long term	Low	Highly probable	Low-Medium	Low-Medium	- No mitigation or monitoring required - Specialist ecological assessment and wetland delineation to be undertaken
Disruption of the activities of fauna on and around the site due to construction activities, and possible trapping / hunting / killing fauna by labourers	Negative	Local	Short term	Very low	Highly probable	Low	Very low	- Mitigation and monitoring required - Specialist ecological assessment to be undertaken
Creation of habitat for water-dependent fauna, e.g. certain fish, amphibians and bird species	Positive	Local	Long term	Low	Highly probable	Low-Medium	Low-Medium	- Mitigation and monitoring required - Specialist ecological assessment to be undertaken
Change in faunal species composition onsite through change in habitat types	Neutral	Local	Long term	Low	Possible	Low	Low	- Mitigation and monitoring required - Specialist ecological assessment to be undertaken
Socio-economic aspects								
Supporting local businesses through local procurement of materials, equipment & services	Positive	Local	Short term	Low	Highly probable	Very low	Low	- No mitigation or monitoring required - No further studies required
Direct and indirect job creation	Positive	Local	Short term	Low	Highly probable	Very low	Low	- No mitigation or monitoring required - No further studies required
Contribution to job creation and job security by buffering the farm against drought	Positive	Local	Long term	Low	Highly probable	Very low	Low	- No mitigation or monitoring required - No further studies required

Contribution to local economy	Positive	Local	Long term	Low	Highly probable	Very low	Low	- No mitigation or monitoring required - No further studies required
Construction activities and site clearing	Negative	Local	Short term	Medium	Definite	Low	Very low	- Monitoring required - No further studies required
Visual impact of the new dams	Positive	Local	Long term	Medium	Definite	Very low	Very low	- No mitigation or monitoring required - No further studies required
Noise associated with construction activities and heavy vehicles during construction	Negative	Local	Short term	Very low	Highly probable	Low	Very low	- Monitoring required - No further studies required
Possible heritage impacts if sites or objects of heritage-related significance are found	Negative	Local	Long term to permanent	Unknown	Unlikely	Very low	Very low	- Monitoring required - Specialist heritage investigation to be undertaken

13. REFERENCES

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