DRAFT BASIC ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR

DEVELOPMENT OF A FUEL DEPOT ON A PORTION OF PORTION 1 OF THE FARM LEEUSPRUIT 385 JU, UNDER NKOMAZI LOCAL MUNICIPALITY IN MPUMALANGA PROVINCE

REF No:1/3/1/16/1E-470

PREPARED BY	PREPARED FOR
Singo Consulting (Pty) Ltd	ITHUBA PETROLEUM (PTY) LTD

2023

DOCUMENT CONTROL	
PROJECT TITLE	Development of a fuel depot on a portion of portion 1 of the farm Leeuspruit 385 JU
SITE LOCATION	Hectorspruit, Nkomazi Local Municipality, Mpumalanga Province
COMPILED FOR	Ithuba Petroleum (Pty) Ltd
COMPILED BY	Mrs Rudzani Shonisani Radebe
REVIEWED BY	Dr NK Singo
COMPETENT AUTHORITY	Department of Agriculture, Rural Development, Land Environmental Affairs
DARDLEA REF NO	1/3/1/16/1E-470)
DWS REF NO	CT26052
VERSION	DBAR AND EMPR
YEAR	2023

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The opinion expressed in this, and associated reports are based on the information provided by Ithuba Petroleum (Pty) Ltd to Singo Consulting (Pty) Ltd ("Singo Consulting") and is specific to the scope of work agreed with Ithuba Petroleum (Pty) Ltd. Since the client is the owner or lessor of the property, many of the advice and acts contained in this legally binding contract remain his or her duty.

Singo Consulting acts as an advisor to the Ithuba Petroleum (Pty) Ltd and exercises all reasonable skill and care in the provision of its professional services in a manner consistent with the level of care and expertise exercised by members of the environmental profession.

Where site inspections, testing or fieldwork have taken place, the report is based on the information made available by Singo Consulting during the visit, visual observations and any subsequent discussions with regulatory authorities. The data and information used in this report were provided to Singo Consulting by the client and also referred to other outside sources (includes historical site investigation information and third-party expert research).

Singo Consulting (Pty) Ltd ("Singo Consulting") takes reasonable care and diligence when providing services and preparing documents, but it has been assumed that the information provided to Singo Consulting (Pty) Ltd ("Singo Consulting") is accurate.

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ABBREVIATIONS AND ACRONYMS

BA	Basic Assessment
BAR	Basic Assessment Report
BID	Background Information Document
BSc	Bachelor of Science
CBA	Critical Biodiversity Area
CA	Competent Authority
CC	Close Corporation
DARDLEA	Department of Agriculture, Rural Development, Land and Environment
DBAR	Draft Basic Assessment Report
EA	Environmental Authorization
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioners Association of South Africa
EIA	Environmental Impact Assessment
EMPR	Environmental Management Programme Report
GN	Government Notice
GSSA	Geological Society of South Africa
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IAIAsa	South African Affiliates of the International Association for Impact Assessment
LaRSSA	Land Rehabilitation Society of Southern Africa
Mamsl	Meters above mean sea level
MBSP	Mpumalanga Biodiversity Sector Plan
N/A	Not Applicable
NEMA	National Environmental Management Act
NGOs	Non-Government Organizations
PhD	Philosophy of Doctorate
PPP	Public Participation Process
SABS	South African Bureau of Standard
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resources Agency
SANRAL	South Africa National Roads Agency
SANS	South African National Standard
SOEs	State-Owned Entities

EXECUTIVE SUMMARY

Singo Consulting (Pty) Ltd, the independent consulting firm, has been appointed by Ithuba Petroleum (Pty) Ltd to conduct socio-economic and environmental impacts assessment, compile Basic Assessment Report (BAR), develop Environmental Management Programme Report (EMPr) and apply Water Use Authorization for the proposed fuel depot for diesel on a portion of portion 1 of the farm Leeuspruit 385 JU under Nkomazi Local Municipality in Mpumalanga Province. Ithuba Petroleum (Pty) Ltd has a wholesale licence (W/2016/0141) issued by the Department of Mineral Resources and Energy (Previously known as Department of Energy). Project site GPS coordinates: 31.671934 E; -25.491063 S and located at the corner of the Jeppe's Reef Road and Strydom Block Road, within Ward 7, approximately 5 km South of Hectorspruit and 16 km East of Malelane in Nkomazi Local Municipality, Mpumalanga Province. The developmental footprint of the proposed development covers only 1.052 Hectares. Proposed Infrastructures include: aboveground storage tanks, Loading and offloading area, Parking Area, Generator Area, Office Area, Ablution facility (Toilet with septic tank).

Activities have been listed in terms of Sections 24(2), 24(5), 24D, and 44, read with section 47A (1)b of the National Environmental Management Act,1998 (Act No 107 of 1998) as activities that require an Environmental Impact Assessment (either Basic Assessment Report or a full Environmental Impact Assessment) before the commencement. Therefore, Singo Consulting (Pty) Ltd as an independent consulting firm has been appointed by Ithuba Petroleum (Pty) Ltd to conduct a Basic Assessment, develop Environmental Management Programme Report and apply General Authorization. Triggered activities are described below:

Activity Number	Activity Description
GN R983: Activity 14	The proposed development will store diesel in above ground storage tanks with a combined capacity of 500m3
GN R983 Activity 27	The development of an access road into the property from the main road will be created with a reserve of less than 13,5 metres within urban area.
GN R983 Activity 4	There will be clearing of vegetation during the developmental stages, the area extent of the fuel depot is approximately 1.052 Ha.

Public Participation Process was done to inform the Interested and Affected parties through newspaper advertisement, emails, telephones, and site notice board placements. However, no response regarding the site notice and newspaper advertisements. Therefore, no public meeting took place.

No alternative sites were investigated as the applicant has joint venture agreement with Leese of the land. Potential impacts associated with the development phases (Preconstruction, Construction, Operation Decommissioning) of the proposed development on proposed site were identified and their extent, duration, probability, reversibility, replaceability, and cumulativeness were determined. Impacts identified are Topographical alteration, Biodiversity loss, water pollution, geology alteration, soil pollution, air pollution, noise pollution, visual impacts, traffic impacts, and socio-economic impacts. No cumulative impacts are expected on geology, soil, topography, land use, vegetation, hydrology and Geohydrology, air quality, and archaeological and cultural sensitivity sites. The aforementioned impacts can be minimized by effectively implementing the mitigation measures as indicated in the Environmental Management Programme Report section of this report.

1. INTRODUCTION

1.1. Background

Singo Consulting (Pty) Ltd, the independent consulting firm, has been appointed by Ithuba Petroleum (Pty) Ltd, the Wholesale Licence Holder, to conduct socio-economic and environmental impacts assessment, compile Basic Assessment Report (BAR), develop Environmental Management Programme Report (EMPr) and apply Water Use Authorization for the proposed fuel depot for diesel on a portion of portion 1 of the farm Leeuspruit 385 JU under Nkomazi Local Municipality of the Ehlanzeni District Municipality in Mpumalanga Province (Figure 1). Ithuba Petroleum (Pty) Ltd has a wholesale licence (W/2016/0141) issued by the Department of Mineral Resources and Energy (Previously known as Department of Energy). The developmental footprint of the proposed development covers only 1.052 hectares of 5.2 hectares. The proposed infrastructures are as follows: Aboveground storage tanks (500m^3) for storing 50ppm diesel, Loading and offloading area, Parking Area, Generator Area, Office Area, Ablution facility (Toilet with septic tank) (Figure 2).

Activities have been listed in terms of Sections 24(2), 24(5), 24D, and 44, read with section 47A (1)b of the National Environmental Management Act,1998 (Act No 107 of 1998) as activities that require an Environmental Impact Assessment (either Basic Assessment Report or a full Environmental Impact Assessment) before the commencement. Therefore, Singo Consulting (Pty) Ltd as an independent consulting firm has been appointed by Ithuba Petroleum (Pty) Ltd to conduct a Basic Assessment, develop Environmental Management Programme Report and apply General Authorization. Triggered activities are described on table 1:

Table 1. Triggered Activities

Activity Number	Activity Description
GN R983: Activity 14	The proposed development will store diesel in above ground storage tanks with a combined capacity of 500m3
GN R983 Activity 27	The development of an access road into the property from the main road will be created with a reserve of less than 13,5 metres within urban area.
GN R983 Activity 4	There will be clearing of vegetation during the developmental stages, the area extent of the fuel depot is approximately 1.052 Ha.

1.2. Location

Project site GPS coordinates: 31.671934 E; -25.491063 S and located at the corner of the Jeppe's Reef Road and Strydom Block Road, within Ward 7, approximately 5 km South of Hectorspruit and 16 km East of Malelane in Nkomazi Local municipality, Mpumalanga Province (Figure 1).

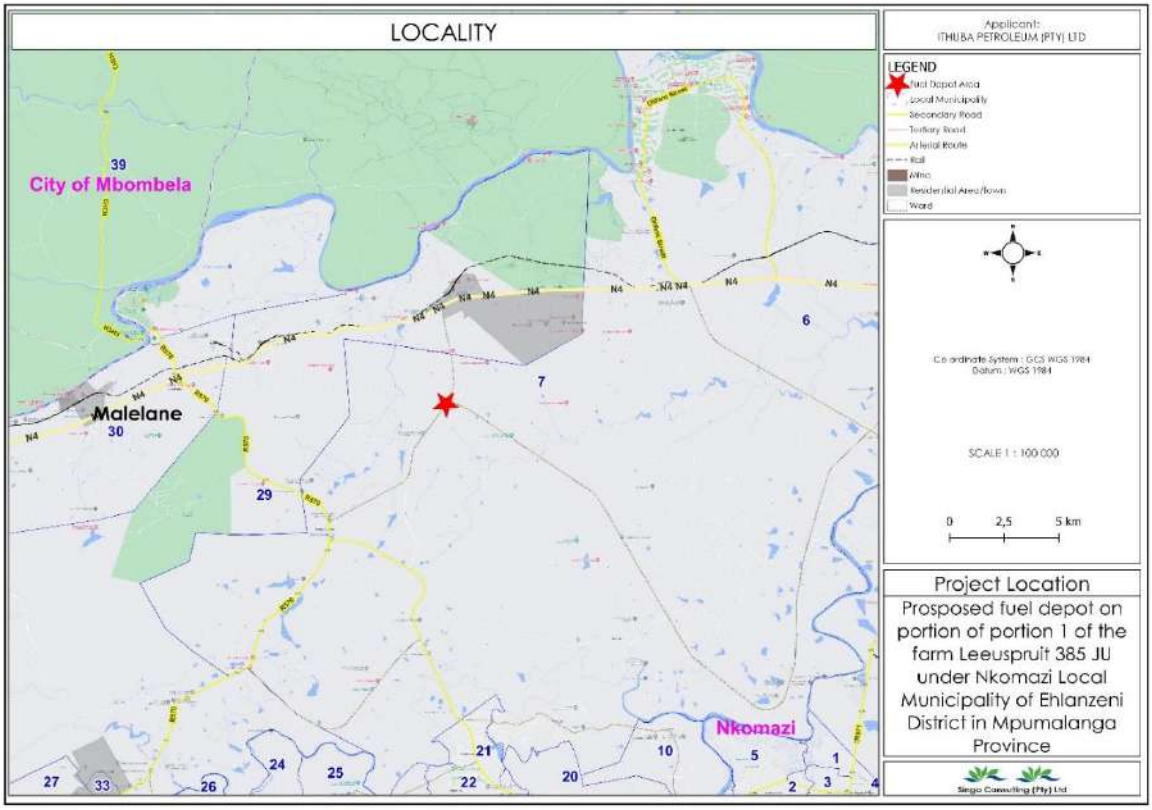


Figure 1:Locality (Singo Consulting (Pty) Ltd, 2023)

1.3. Contacts details

(a) Applicant

Table 2: Applicant's Contact details

Applicant	Ithuba Petroleum (Pty) Ltd
Trading Name	
Contact Person	Mr Leon van Eeden
Physical Address	60 Banjo Walk, Belhar,Cape Town, Western Cape, 7493
Postal Address	P. O Box 160, Komatipoort
Postal Code	1340
Telephone	083 393 7953
Email	leon@two-ships.co.za

(b) Landowner

Table 3: Landowner's Contact details

Landowner	Tebenguni Business Enterprises CC
Contact Person	Nxumalo Ronny Lubisi
Postal Address	P.O Box 199, SIDLAMAFA
Postal Code	1332
Cellphone	063 726 2633
Email	

(c) Environmental Assessment Practitioner (EAP)

Ithuba Petroleum (Pty) Ltd has appointed Singo Consulting (Pty) Ltd, an independent environmental consultancy, to undertake the Basic Assessment process of the proposed development under the Environmental Impact Assessment Regulations (EIA),2014 (as amended) (Table 4).

Table 4: Details of the EAP

Company Name	Singo Consulting (Pty) Ltd
Environmental Assessment Practitioner	Mrs Rudzani Radebe Shonisani EAPASA CV attached on Appendix I2
Reviewer	Dr Kenneth Singo PhD Environmental Geology, MSc Environmental Management, BSc Hons Mining and Environmental Geology EAPASA:2019/825 CV attached on Appendix I2
Telephone number	013 692 0041
Cell number	Dr Singo: 072 081 6682 Mrs Rudzani Shonisani Radebe:078 548 1244
E-mail	kenneth@singoconsulting.co.za/rudzani@singoconsulting.coz.a

1.4. Details of the Specialist Studies

According to the Department of *Forestry, Fisheries and the Environment's (DFFE) screening report*, the proposed area is in a very highly sensitive site in aquatic biodiversity, high sensitive in agriculture, animal species and civil aviation. Aquatic biodiversity study was not conducted as the development footprint of the proposed development is on *other natural area* (Screening report). Agricultural study to investigate the potential impacts of the proposed development on agriculture was not conducted as no agricultural activities observed on site during the site assessment and historic image of the site was also used to assess the activities that were previously conducted on site (no evidence of agricultural activities). The southern side of the proposed site, the area is occupied by sand mining. Additionally, the rezoning of the land scheme has been lodged with the local municipality. Civil Aviation sensitivity was also not conducted it is explained on section 5.16. The following specialist studies were undertaken as part of the Basic Assessment Report to address issues that need thorough investigation (Table 5)

Table 5: Specialist studies

Specialist Study	Consultant	Company
Hydrogeological study	Khulekani Zwane	Singo Consulting (Pty) Ltd
Ecology/Biodiversity Study	Dineo Makhuvele	Singo Consulting (Pty) Ltd

2. DESCRIPTION OF THE SITE, DESIGN AND SIZE OF THE FUEL DEPOT

2.1. Introduction

The proposed development is on a portion of portion 1 of the farm Leeuspruit 385 JU under Nkomazi Local Municipality of the Ehlanzeni District Municipality in Mpumalanga Province. Additionally, it is located 5 km from Hectorspruit, the corner of Jeppe's Reef Road and Strydom Block Road. The total area of the site is 5.2 Hectares.

The land use scheme is zoned as agricultural in terms of Nkomazi Spatial Planning and Land Use Management By-Law, 2015. However, rezoning application of land use scheme has been lodged to the Nkomazi Local Municipality and waiting for the outcome of this EA application. The proposed development will occupy 1.052 of the 5.2 Hectares of the application area and will comprise the following infrastructures in Figure 2.

Aboveground Storage Tanks Area (500 m3) 	Generator Area 	Loading and offloading area 
Pumps 	Parking Area 	Ablution Facility with Septic Tank 

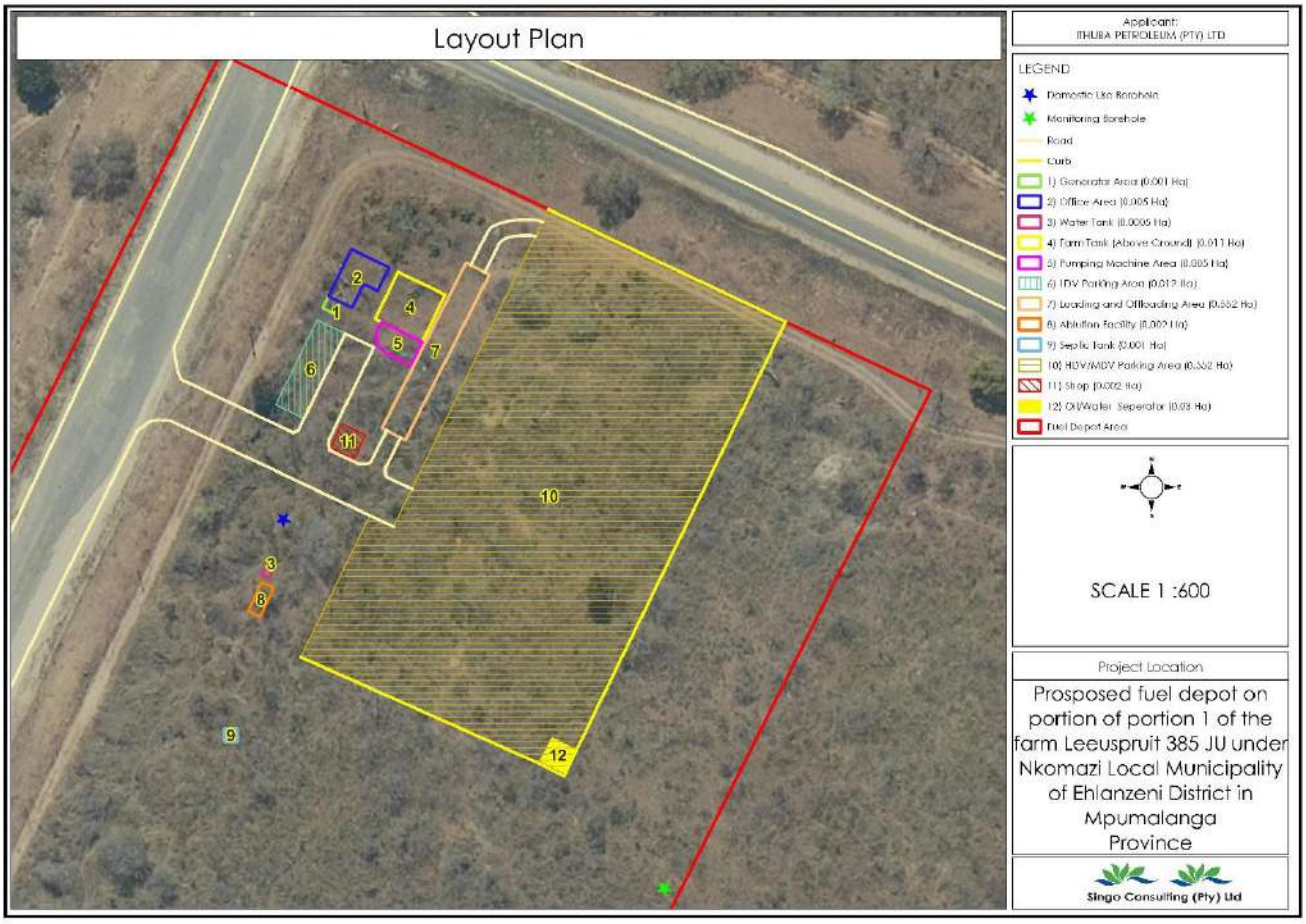


Figure 2: Proposed Layout (Singo Consulting (Pty) Ltd, 2023)

2.2. Other Services

Two boreholes will be drilled for domestic use and monitoring purposes. Water Use Authorization (General Authorization) has been applied with the Mpumalanga Province's Department of Water and Sanitation (CT26052) (see Appendix I). The water pumping system will be installed and pump water into a 10 000 L water tank. The water from the tank will then be used for drinking and ablution within the proposed depot area. A compacted layer of 150mm thick of the G5 will be used for parking area foundation. On top of this layer, 19mm of stone will be used. On the sides of the parking area, Kerbs will be constructed to channel rainwater from parking area to the oil/water separator before discharge to the environment (Figure 2). Spillkits company will remove oil from the separator and any hazardous contaminants that might occur on site. There is an existing electricity network running along Jeppe's reef road the proposed area. However, the proposed fuel depot will be using renewable energy. Solar and generator will be sure for generation of power for the proposed development. No connection to the existing electricity network will occur. General waste and hazardous area will be constructed on site for storage of wastes. General waste will be disposed at registered landfills and hazardous waste (e.g. soil contaminated with fuel/oil, paint tins, etc.) would be taken by Spillkits Company and disposed at a Hazardous Waste Disposal Facility. The sewage from the proposed site directed to the septic tank through sewage pipes. All fire-fighting controls will be in accordance with the National Building Regulations, the SANS Code of Practice (related to Community Protection against Fire) and with "Red Book" standards.

3. NEED AND DESIRABILITY OF THE PROJECT

The proposed project area is located on a portion of portion 1 of the farm Leeuspruit 385 JU, within ward 7 of the Nkomazi Local Municipality, Mpumalanga Province. Malelane town is located approximately 16 km West of the proposed site. The proposed site is located at corner of Jeppe's Reef and Strydom Blok road, South of Hectorspruit. The Area is located 5 km from N4 from Malelane to Komatipoort Border post. The area has high volume of traffic. This is the road to Mozambique through Komati poort border post. The nearest competitor is located 28 km in Komati poort which is owned by Transnet (State Owned Entity) for refilling the good trains to Richards Bay. Therefore, the proposed development will not interfere with the existing fuel depots since they are located quite a distance from the proposed area.

The development of the fuel depot will boost the local economy and reduce the unemployment rate. Contractors from local communities will be used for the construction of the proposed fuel depot. 8 permanent jobs will be created during the operational phase of the proposed development. The preference for the jobs will be local people.

4. APPLICABLE LEGISLATION, POLICIES, AND OR GUIDELINES

Numerous activities have been listed in terms of Sections 24(2), 24(5), 24D, and 44, read with section 47A (1)b of the National Environmental Management Act,1998 (Act No 107 of 1998) as activities that require an Environmental Impact Assessment (either Basic Assessment Report or a full EIA) before the commencement. The proposed project will require a Basic Assessment process as the following listed activities (as identified in the EIA regulations, 2014 (as amended)) are triggered. List all legislations, policies and/or guidelines of any sphere of government that apply to the application as contemplated in the EIA regulations, if applicable:

Table 6: Applicable Legislations, policies and or Guidelines

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
South African Constitution 108 of 1996	The Constitution is the supreme law of the land and includes the Bill of rights which is the cornerstone of democracy in South Africa and enshrines the rights of people in the country. It includes the right to an environment that is not harmful to human health or well-being and to have the environment protected for the benefit of present and future generations through reasonable legislative and other measures (Naledzani Environmental Services, 2019)	National & Provincial	1998
National Environmental Management Act (Act No. 107 of 1998) (as amended)	To promote the protection of the environment where development is taking place and ensure that a risk-averse and cautious approach is taken when making decisions about activities (Naledzani Environmental Services, 2019)	National & Provincial	1998
National Environmental Management Waste Act (Act 59 of 2008) as amended	To protect the surrounding environment from environmental pollution, ensuring effective and efficient disposal of waste.	National & Provincial	2008
National Environmental Management: Biodiversity Act (Act 10 of 2004)	For the protection, management and conservation of biological diversity (Government Gazette, 2011). It also promotes the use of indigenous biological resources in a sustainable manner.	National & provincial	2004
National Environmental Management: Air Quality Act (Act 39 of 2004)	For the protection of air quality, through minimization of air pollution and greenhouse gas emissions into the atmosphere.	National Department of Environmental Affairs, Provincial and Local Municipalities	2004
National Water Act, 1998 (Act No. 36 of 1998)	According to (LEDET, 2014) this act "promote equitable access to water, efficient and sustainable use of water in the public interest, reduction and, prevention of water resource pollution".	The national department of Water and Sanitation	1998
Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) (as amended)	To control the use of natural resources, promote	National Department of Agriculture, Forestry and Fisheries	1983
National Heritage Resources Act (Act No 25 of 1999)	The act ensures that any development taking place on the ground takes into consideration the significance of Cultural, Archaeological, and paleontological sites and materials, historical sites, graves and burial sites within the site.	National Department of Arts and Culture	1999
National Forest Act (Act 84 of 1998)	For sustainable management and protection of trees or forests.	National and provincial Department of Forestry	1998
National Road Traffic Act (Act No 93 of 1996)	To ensure that the contractor obeys all the driving laws which are approved by the Local Authorities.	National and Provincial Department of Road and Transport	1996
National Building Regulations and Building Standards Act (Act 103 of 1977)	To ensure that the contractor obeys all the rules concerning the design and construction of the proposed development.	National Building Department	1977

Petroleum Products Act 120 of 1977 as amended - Petroleum Products Wholesale Licences	To ensure preparation use/distribution of petroleum products and securing of wholesale licences.	National Department of Energy	2006
Occupational Health and Safety Act (Act No. 85 of 1993)	For the protection of workers	National & Provincial of Occupational Health and Safety	1993
All relevant Provincial regulations and Municipal By-laws	To ensure that all the development taking place within the municipality are in line with the SDF and IDP objectives. All development should be according to the local municipality laws. It also focuses on issues affecting the local community.	National, Provincial & Local	2016
South African National Standards (SANS) 10 of 10089: The Petroleum Industry (2008): **Part 1**: Storage and distribution of petroleum products in above-ground bulk installations. **Part 2:** Electrical and other installations in the distribution and marketing sector.	The South African National Standards (SANS/SABS), applicable to the Petroleum Industry and the installation of aboveground storage tanks, pumps/ dispensers and pipework at service stations, would be applicable and must be complied with. These standards should be considered as a minimum.	National South African National Standards	1999, 2007 & 2008

5. BIOPHYSICAL DESCRIPTION

Appendix 1 of the EIA Regulations (2014, as amended) requires a description of "the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects".

The following environmental attributes are for the whole portion of portion 1(5.2 Hectares) of the farm Leeuspruit 385 JU, Nkomazi Local Municipality.

5.1. Climate

The climatic attributes used for the study are rainfall and temperature. The climate attributes used for the project are for Hectorspruit which is located approximately 5 km North of the proposed site. The area experiences summer rain (September to April). The area receives the highest rainfall (94mm) in December and the lowest (2mm) in July (Figure 3 (A). The winter season occurs between May and August when the minimum temperature drops to 10.6o C and rises to 29.1◦ C in December (Figure 3 (B))

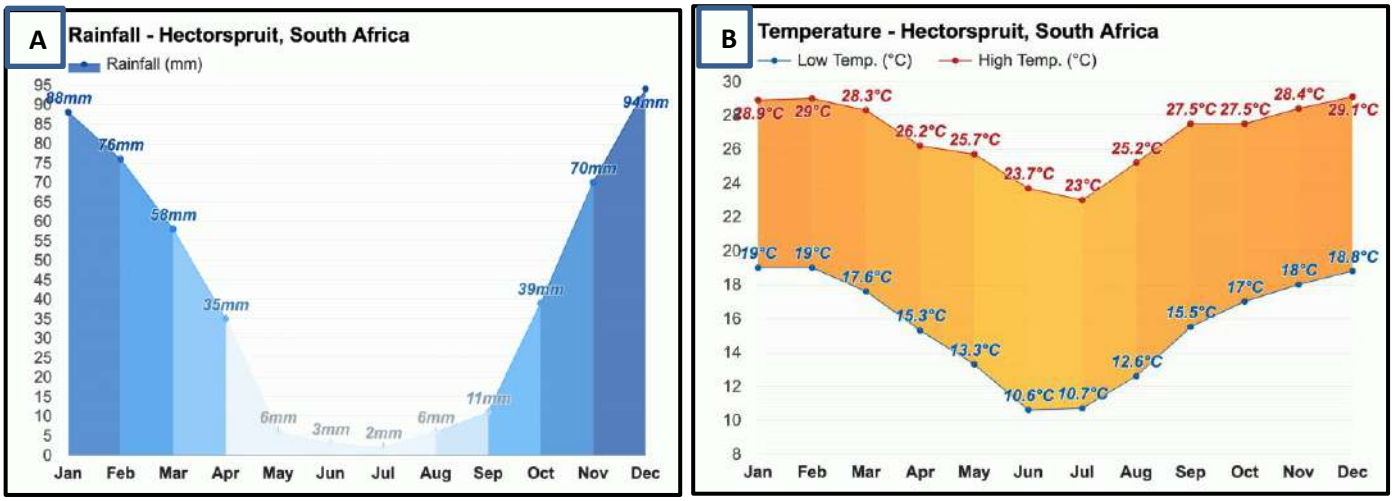
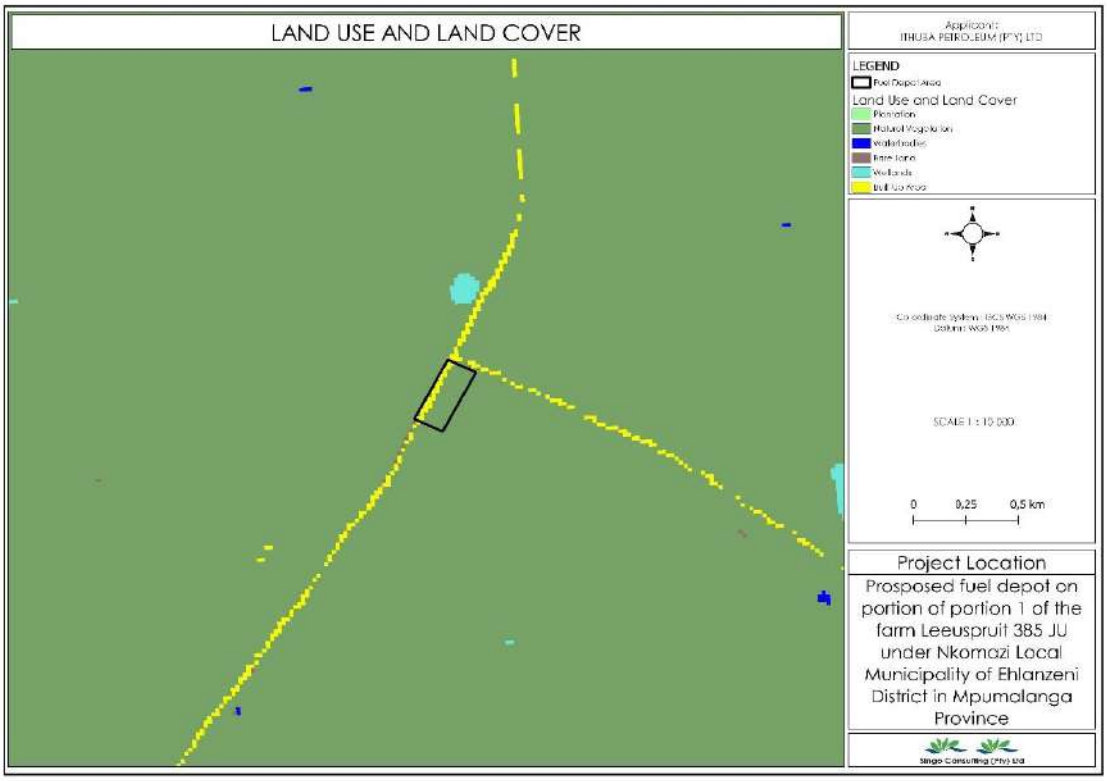


Figure 3: (A) Rainfall (B) Minimum and Maximum Temperature

5.2. Land use and Land Cover

The proposed site falls within natural vegetation and a road (built-up) according to the Department of Forestry, Fisheries, and the environment South Africa National Land Cover 2018 (Figure 4). There are no infrastructures observed within the proposed site (Developmental footprint). The proposed site is surrounded by sand mining (South) and lodges (South, East, West and North sides).


LAND USE AND LAND COVER
Applicant:
ITHUBA PETROLEUM (PTY) LTD
LEGEND
Fuel Depot Area
Land Use and Land Cover
Plantation
Natural Vegetation
Wetlands
Bare Land
Wetlands
Built Up Area
SCALE 1 : 10 000
0 0,25 0,5 km
Project Location
Prosposed fuel depot on portion of portion 1 of the farm Leeuspruit 385 JU under Nkomazi Local Municipality of Ehlanzeni District in Mpumalanga Province
Singo Consulting (Pty) Ltd

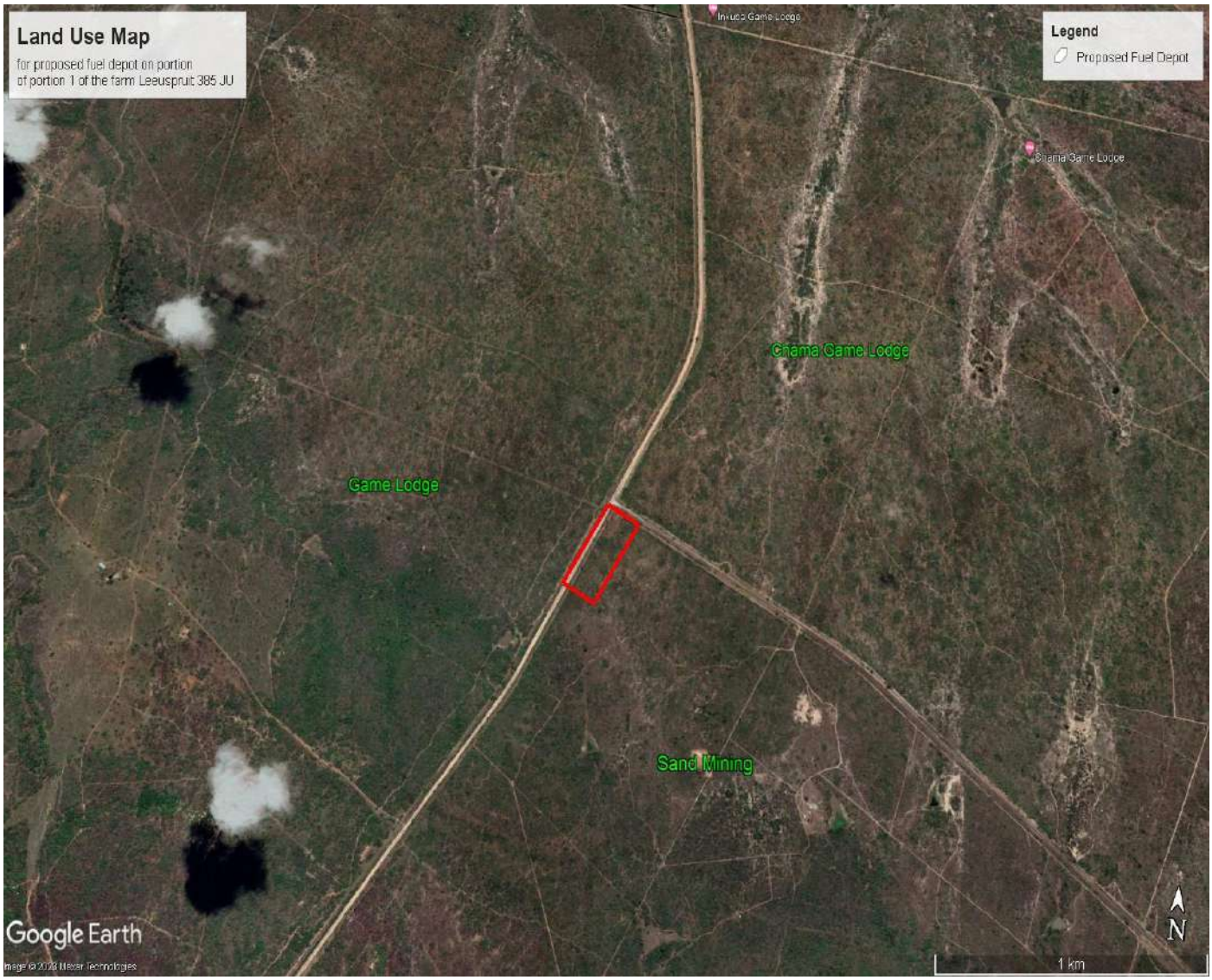

Land Use Map
for proposed fuel depot on portion of portion 1 of the farm Leeuspruit 385 JU
Legend
Proposed Fuel Depot
Invuse Game Lodge
Chama Game Lodge
Chama Game Lodge
Game Lodge
Sand Mining
Google Earth
1 km
N

Figure 4: Land Use and Land Cover

5.3. Geology and Geotechnical Engineering

The site is underlain by alluvial of the Salisbury Kop Granite. The soil is medium to coarse-grained from porphyritic granite/granodiorite (Figure 5). No outcrop of rock observed on site during site visit.

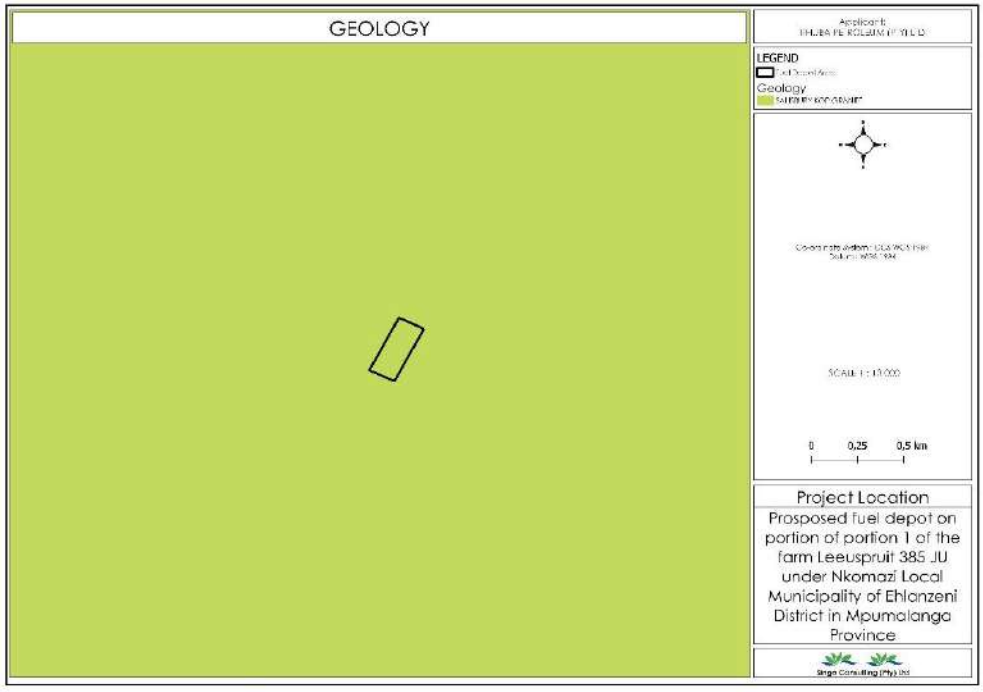


Figure 5 : Geology (Singo Consulting (Pty) Ltd, 2023)

A geotechnical study was conducted by Singo Consulting (Pty) Ltd to assess the geotechnical properties of the area for the development of the fuel depot. Four test pits were excavated to the depth of 3m (Figure 6). The samples were collected and submitted to Roadlab for laboratory analysis. Results of Laboratory analysis are not yet back. Dynamic Cone Penetration tests were also done during investigation to evaluate and correlate the stiffness of the soil profile.

Figure 6: Test Pit Map

5.4. Soil, Land Capability, and Farming

5.4.1. General Soil

There is soil within the proposed site classified as *Association of Classes 1 to 4: Undifferentiated structureless soils* (Figure 7). The soils have medium to coarse-grained particle sizes. They are weathered and transported from porphyritic granite/granodiorite of Salisbury Kop Granite. No outcrop of rocks observed on site during site visit.

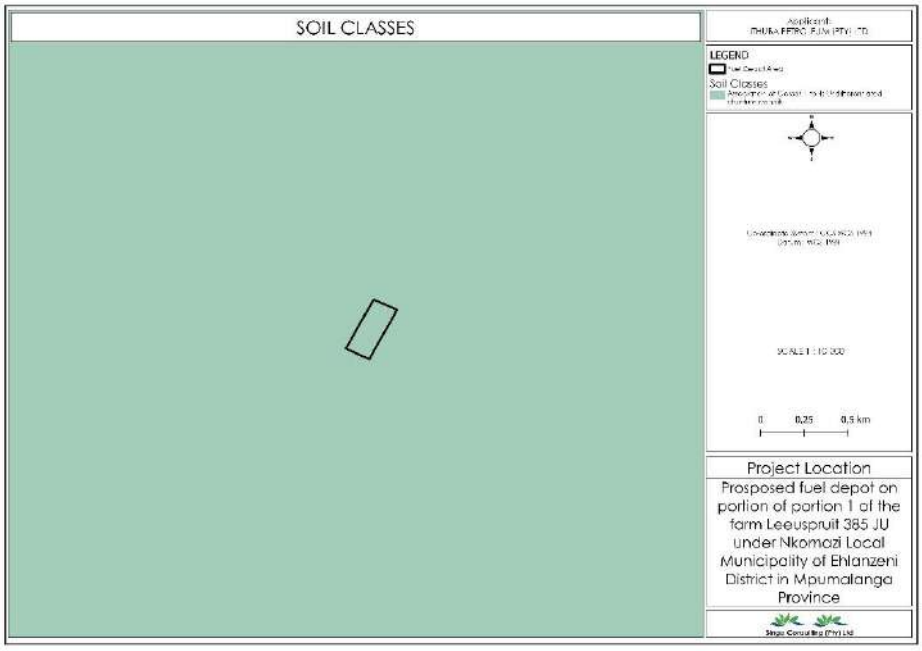


Figure 7 : Soil Classes

5.4.2. Land Capability

In terms of land capability, the proposed site is indicated as Arable (Figure 8). However, no crop farming activities on site and within 5km for the site observed. The area is still on its virgin state and surrounded by lodges and there is subsistence livestock farming at 1.2 km.

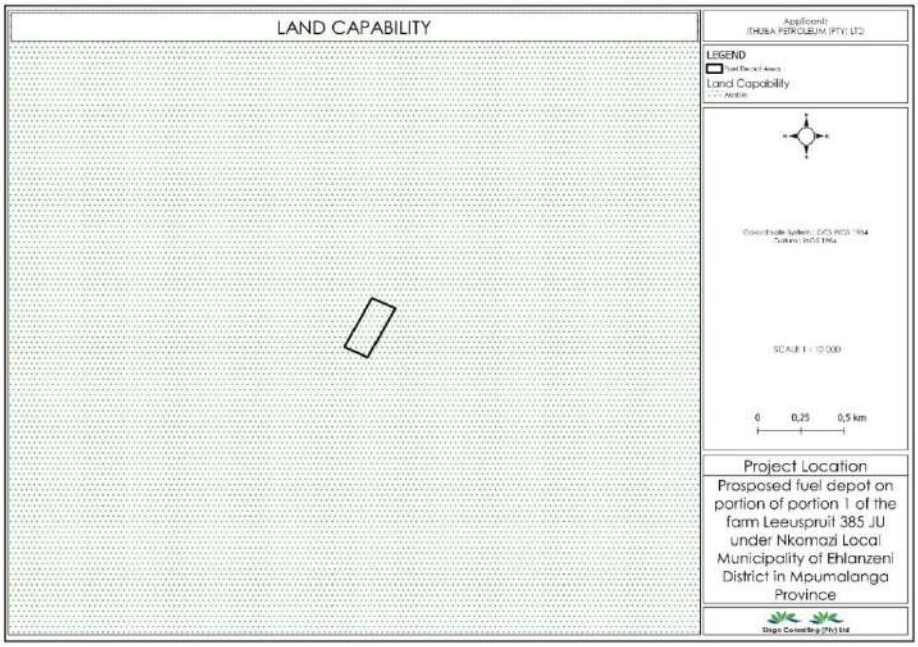


Figure 8: Land Capability (Singo Consulting (Pty) Ltd, 2023)

5.4.3. Farming Type

According to map on Figure 9, the farming type is sugar. However, there is no sugar farming within the proposed area and within 5km radius.

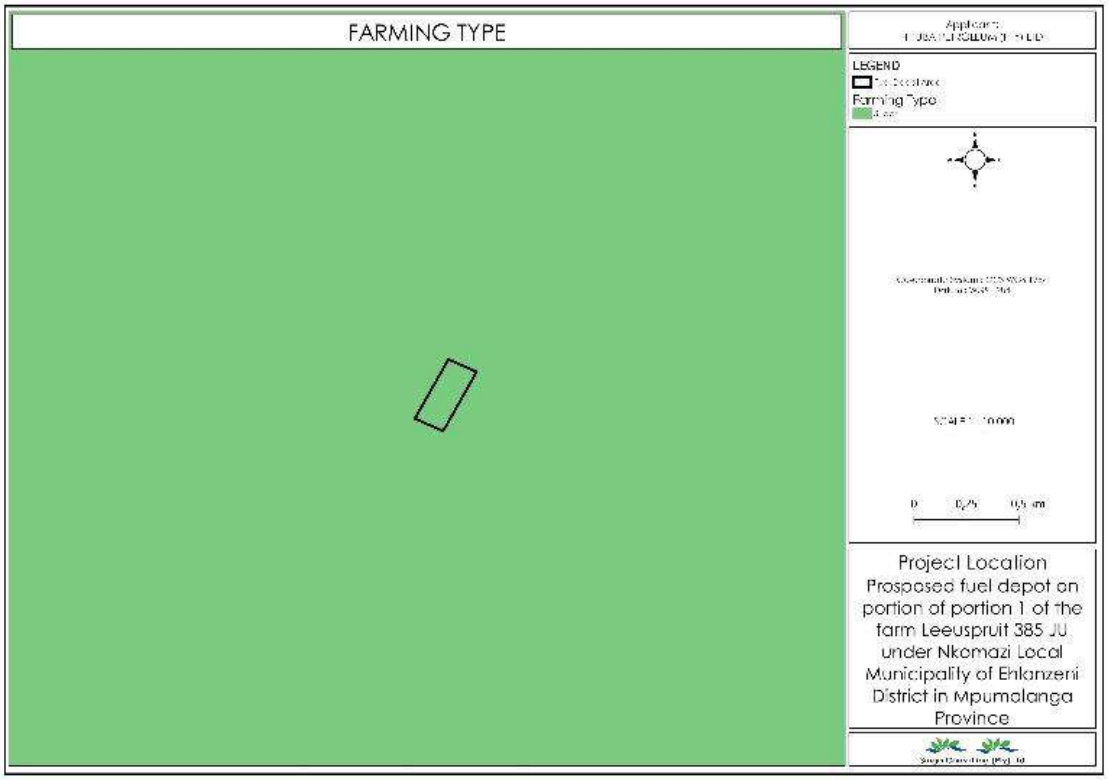


Figure 9 : Farming Type (Singo Consulting (Pty) Ltd, 2023)

5.5. Topography

The proposed site lies between 330 and 342 meters above mean sea level (mamsl). The area is generally flat (Figure 9). However, there are grasses, trees and some patches of bare land that were observed during the site assessment.

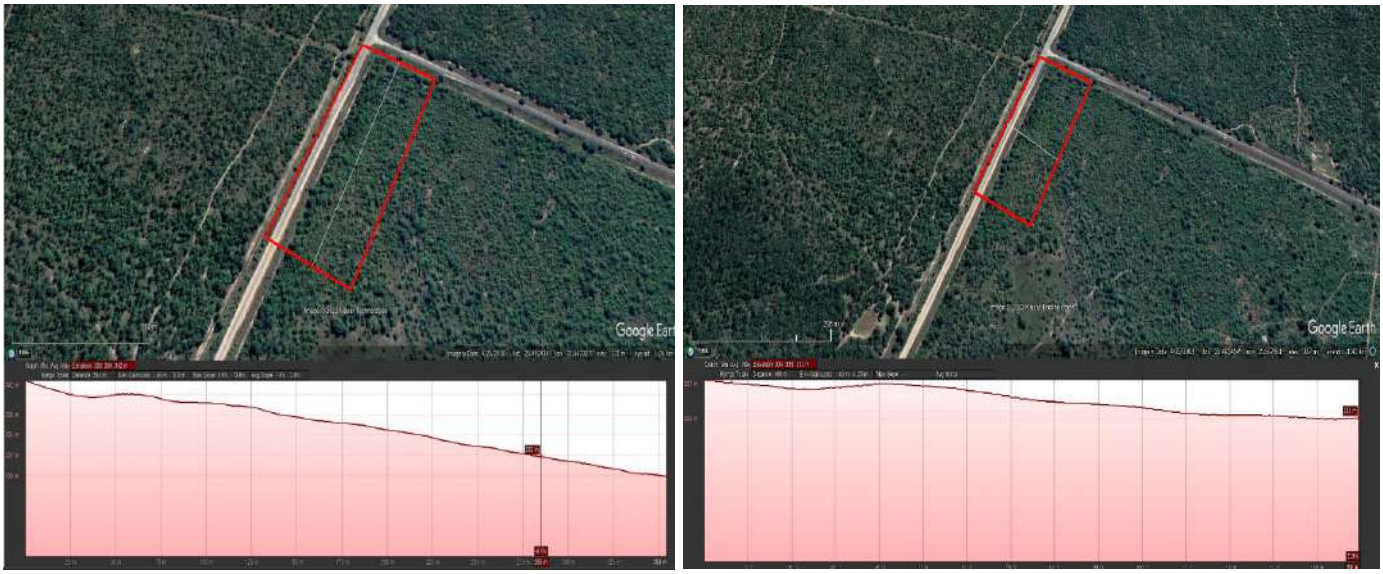
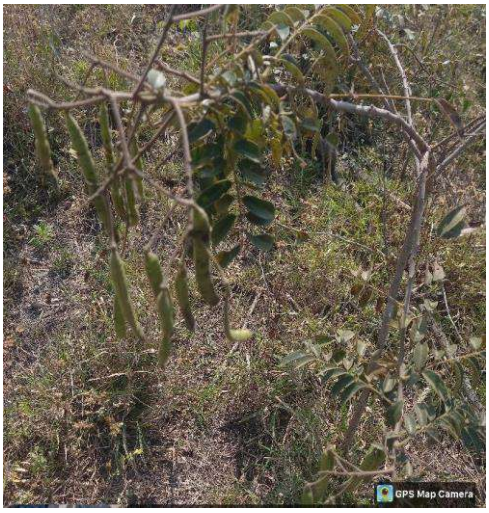


Figure 10:Topology (Singo Consulting (Pty) Ltd, 2023)

5.6. Ecology

5.6.1. Vegetation

The vegetation cover within the proposed site is classified as Sour Lowveld Bushveld and Mixed Lowveld Bushveld to vegetation studies by Mucina and Rutherford (2016). The area is covered with a mixture of woodland and grassland. During site assessment, it was observed that some areas of the proposed site are covered with natural vegetation that include:

Terminalia Sericea 	*Ficus sycomorus* 
Euphorbia cooperi N.E.Br. ex A.Berger 	Trichilia emetica Vahl 
Gomphocarpus fruticosus 	*Senna spectabilis* 

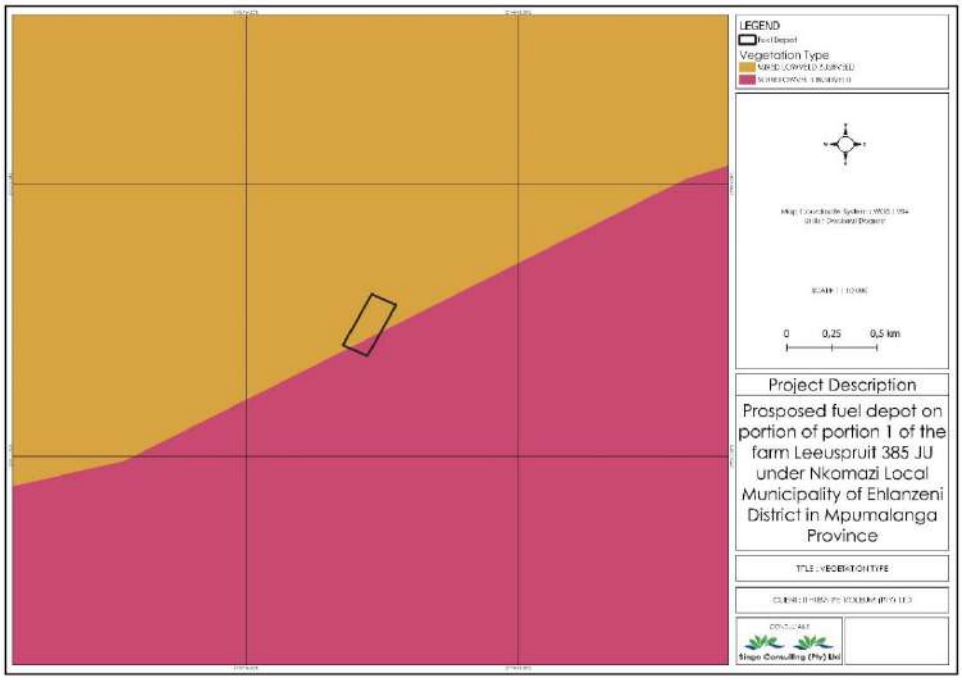


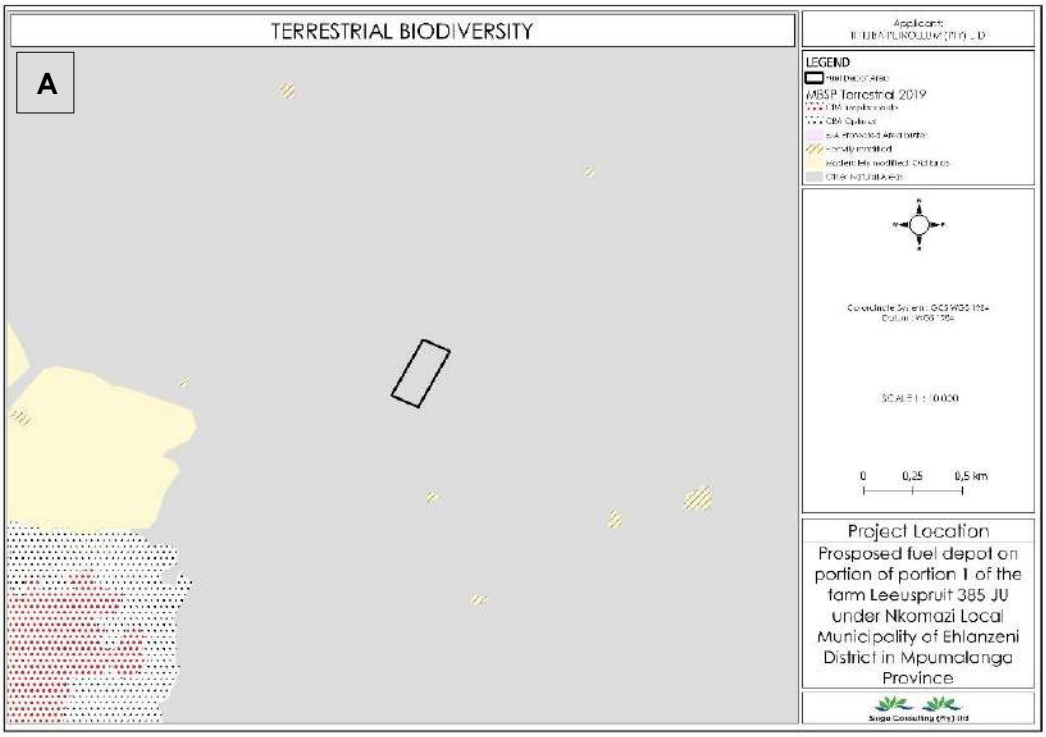
Figure 11: Vegetation Type

5.6.2. Fauna

According to the screening report, the Mammalia species are of medium sensitivity. No mammal species observed during site assessment. However, it was mentioned that the animals from the nearby nature reserve such as Impala and Wildebeest cross over to the proposed project area. DFFE's Screening report shows that the proposed project area has the bird species with high sensitivity namely Aves-Terathopius ecaudatus, Aves-Torgos tracheliotos, Aves-Polemaetus bellicosus, Aves-Bucorvus leadbeateri and Aves-Aquila rapax. However, no bird's species were observed during site assessment namely. Due to their erratic flight patterns and short sighting intervals, birds can be challenging to photograph. Copy of specialist study is attached in Appendix E (i).

5.6.3. Terrestrial Biodiversity

According to Mpumalanga Biodiversity Sector Plan (MBSP) Terrestrial Biodiversity Assessment (2019), the area is categorized as Other Natural Areas (Figure 12 (A)). This agrees with the Department of Forestry, Fisheries and the Environment's screening tool that the area is categorized as low terrestrial sensitive areas (Figure 12(B)). However, grasses, trees and small patches of bare land were observed during the site visit.



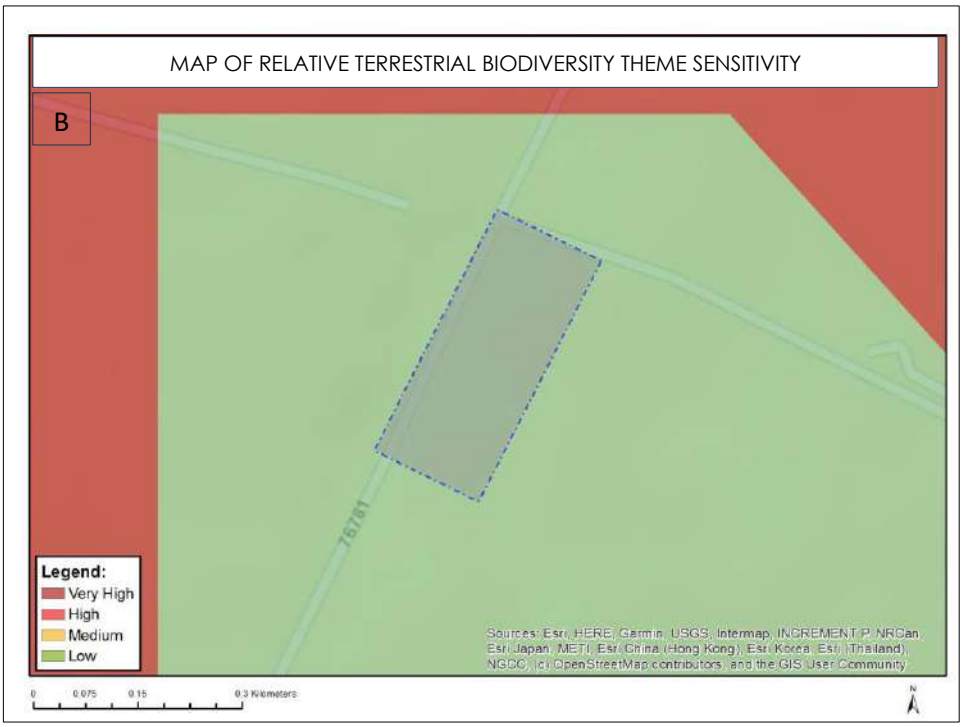


Figure 12: (A) Terrestrial Biodiversity (Singo Consulting (Pty) Ltd, 2023) and
(B) Terrestrial Biodiversity Theme (DFFE's Screening Report;2023)

5.7. Hydrology and geohydrology

5.7.1. Quaternary Catchment and Water Management Area

The proposed site is located within the Komati-Usuthu Water Management Area and more specifically the X13L quaternary catchment (Figure 13). More details of the quaternary catchment is available on Geohydrology study (Appendix E(ii)).

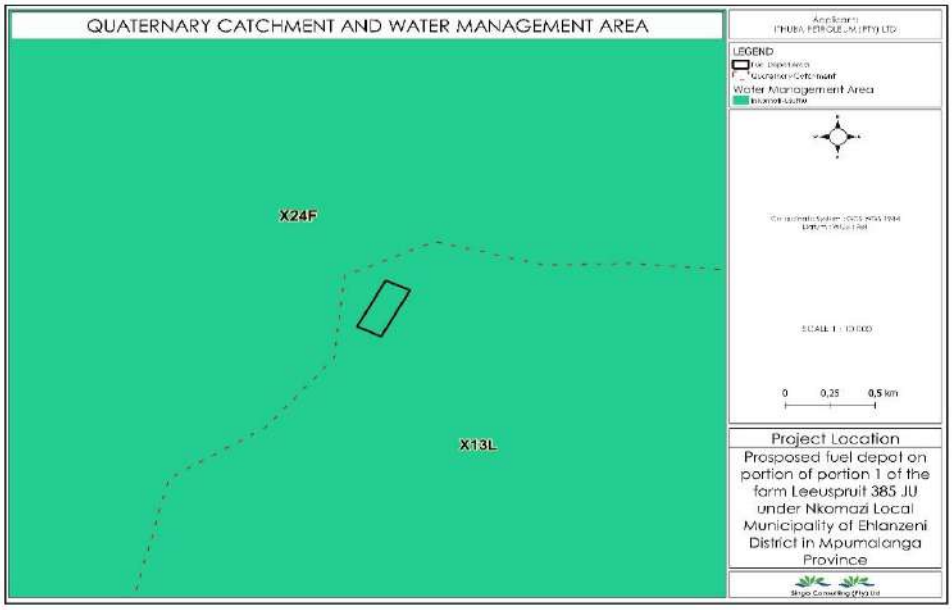


Figure 13:Quaternary Catchment and Water Management Area (Singo Consulting (Pty) Ltd, 2023)

5.7.2. Surface Water, Wetlands and Aquatic Biodiversity

The proposed development is located within 500m radius from wetland and beyond 100m from non-perennial river. There is no perennial river within 1 km radius from the proposed site (Figure 14 (A)). According to MBSP Freshwater Biodiversity Assessment (2019), the proposed site (5.2 ha) falls within *Other Natural Areas and ESA: Important Subcatchments* (Figure 14 (B)). Figure 14 (B) agrees with the DFFE's screening report (Figure 14 (C)) that portion of 5.2 hectares proposed site is high sensitive to aquatic biodiversity. However, the development footprint (1.052 Ha) of the proposed development falls on *Other Natural Areas*. Although the aquatic biodiversity sensitivity is high, no specialist study conducted as only *Other Natural Areas will be affected by the project.*

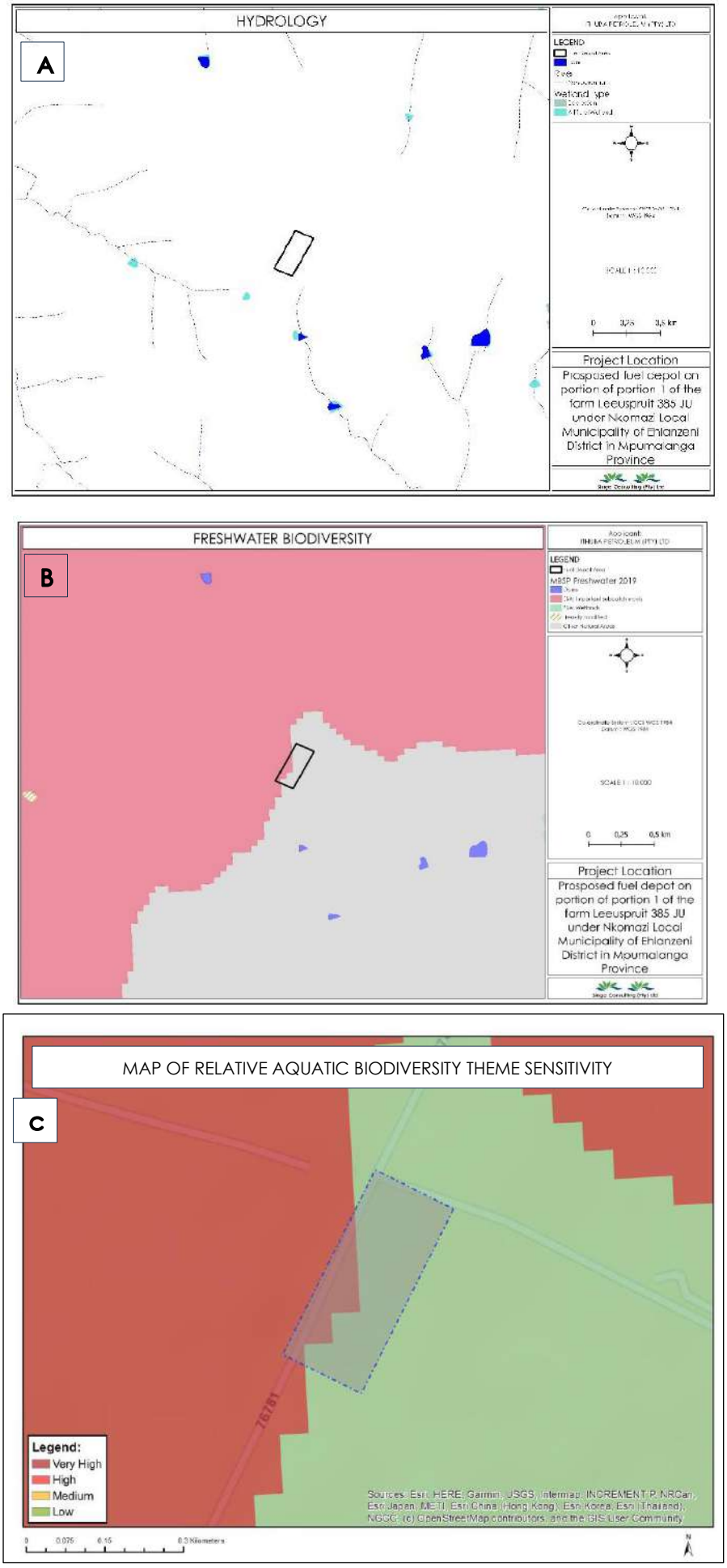


Figure 14: (A) Hydrology, (B) Freshwater Biodiversity and (C) Aquatic Biodiversity (DFFE's Screening Report)

5.7.3. Geohydrology

The hydrogeological assessment was conducted by through hydrocensus, sampling and chemical analysis for both surface and groundwater by a qualified Hydrogeologist from Singo Consulting (Pty) Ltd. There is only on borehole located at elevation of 310masl and 1.2km South East of the proposed site. The borehole is drilled to the depth of 150m and water was encountered at the depth of 80m. On the 18th of August 2023, water sample was from the borehole and submitted to the lab for laboratory analysis (Ph, EC, and chemical analysis). More information is available on Appendix E (ii)

5.8. Air Quality

No industrial activities taking place within a 4 km radius of the proposed site. However, the busy N4 road at approximately 5 km could lead to emission of greenhouse gases.

5.9. Noise

There area is in a remote area and surrounded by guest house/lodges. There is limited movement of both people and vehicles, less 10 cars pass the proposed area per hour (this was estimated during site assessment). Therefore, the noise within and around the area is very low and will be very low.

5.10. Archaeological and Cultural interest

According to Department of Forestry, Fisheries and the Environment's screening report, the area is categorised low sensitivity (Figure 15). Therefore, no Heritage Impact Assessment (HIA) was conducted. Based on drive-throughs and fieldwalking, the area has no archaeological remains.

Additionally, sub-surface archaeological material and unmarked graves may still exist and when encountered during construction, work must be stopped forth-with and must be notified to the South African Heritage Resources Agency (SAHRA). Copies of the BAR, specialist studies and KML were uploaded on SAHRA website.

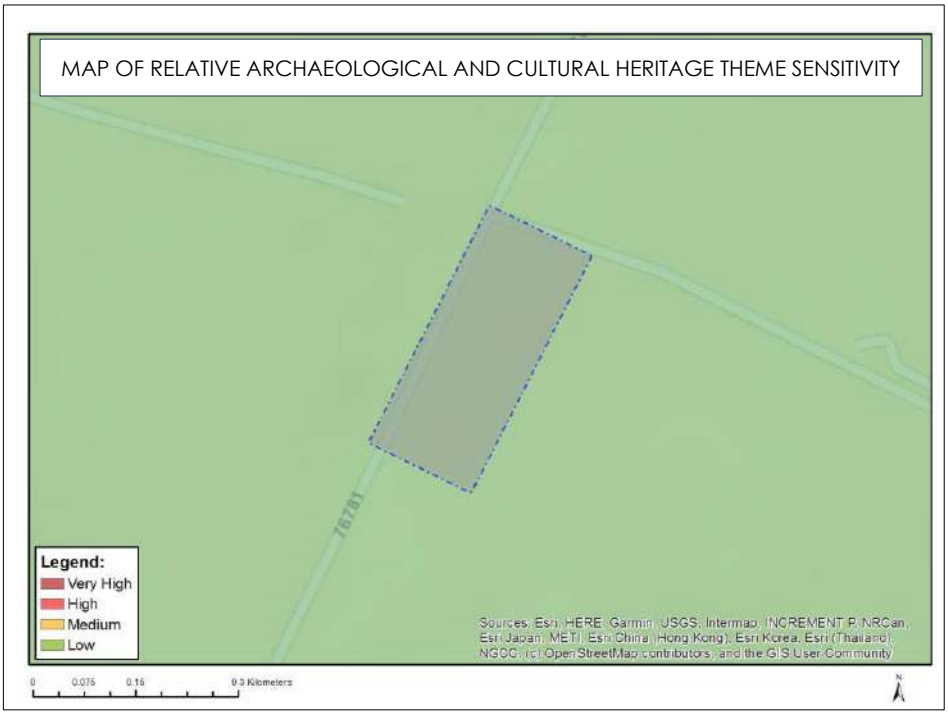


Figure 15: Archaeological and Cultural Heritage

5.11. Traffic

The proposed fuel depot area is accessible through Jeppe's Reef Road from Hectorspruit and kaMlushwa, through Strydom Road. There is limited movement of vehicles, approximately 9 cars pass the area per hour.

5.12. Visual Aspects

Grasses, trees, bare land and sand mining are highly visible from Strydom and Jeppe's Reef Road (Figure 16).

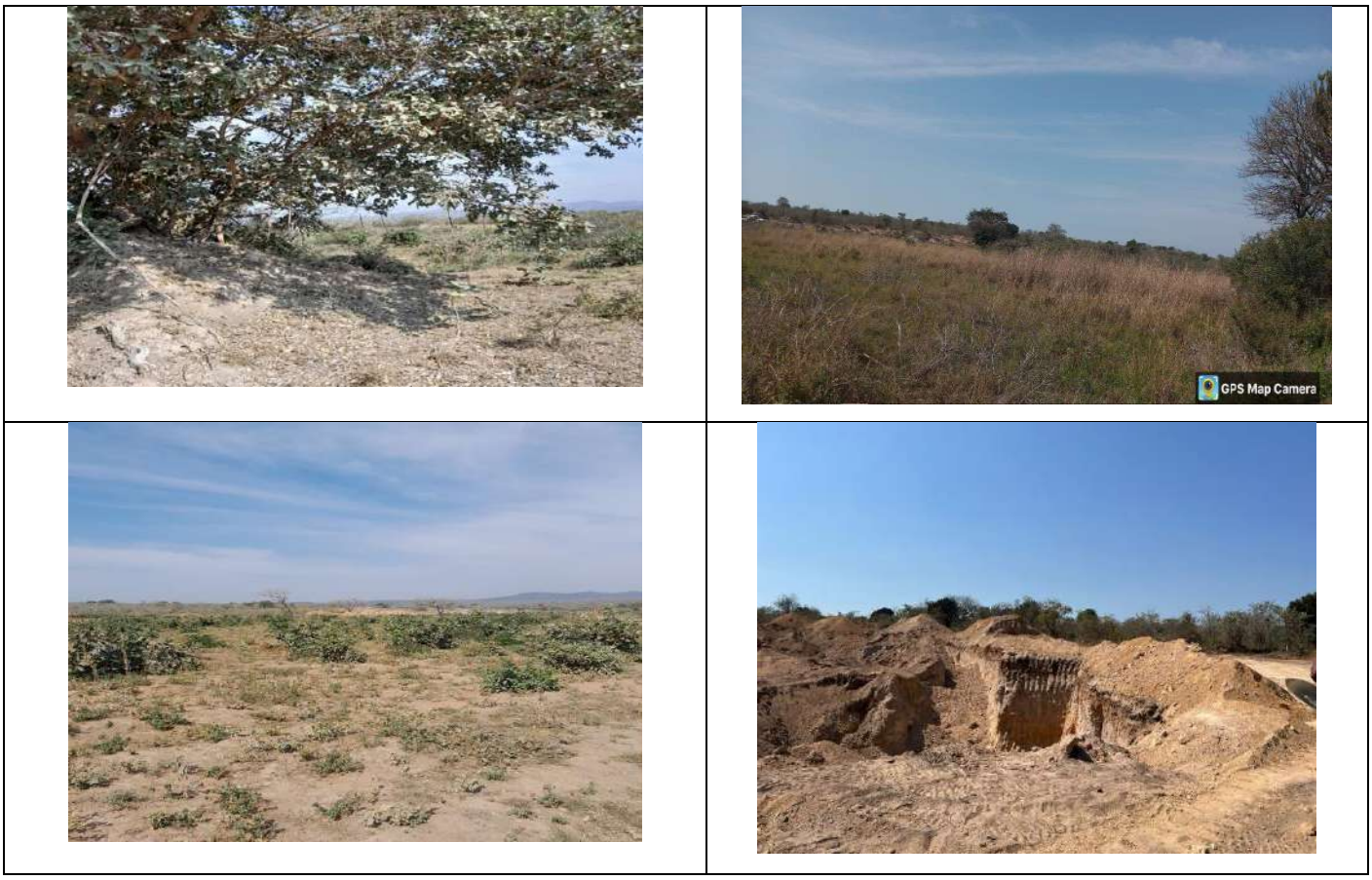


Figure 16:Visual Aspects

5.13. Socio-economic aspects

The site is located 5 km South of Hectorspruit under Nkomazi Local Municipality in Mpumalanga Province. According to the Stats SA census, in 2001, the population size was 334 668 and in 2011 it was 390 610. The population grew by 55 942 between 2001 and 2011 and the average population growth rate was 1.5% per annum. According to a community survey in 2016, the population size is 410 907. This means there is population growth within the area.

5.14. Competitor site

Local supply centres refer to fuel depots within 20 km radius of the proposed site. The published draft guidelines (January 2020) of the Department of Energy (DoE), based on the Amended Petroleum Products Act of 1977, an urban/semi-urban site to evaluate the competitors within a 5 km radius was not used because the location of fuel depot is within a regional road and in rural area. No fuel depot within this radius(20 km) was observed during site assessment and using google earth (Figure 17). The closest existing fuel depot found is located at approximately 28km in Komati Poort and it is owned by State Owned Entity called Transnet. This depot is used for refilling Transnet's trains to Richards Bay.

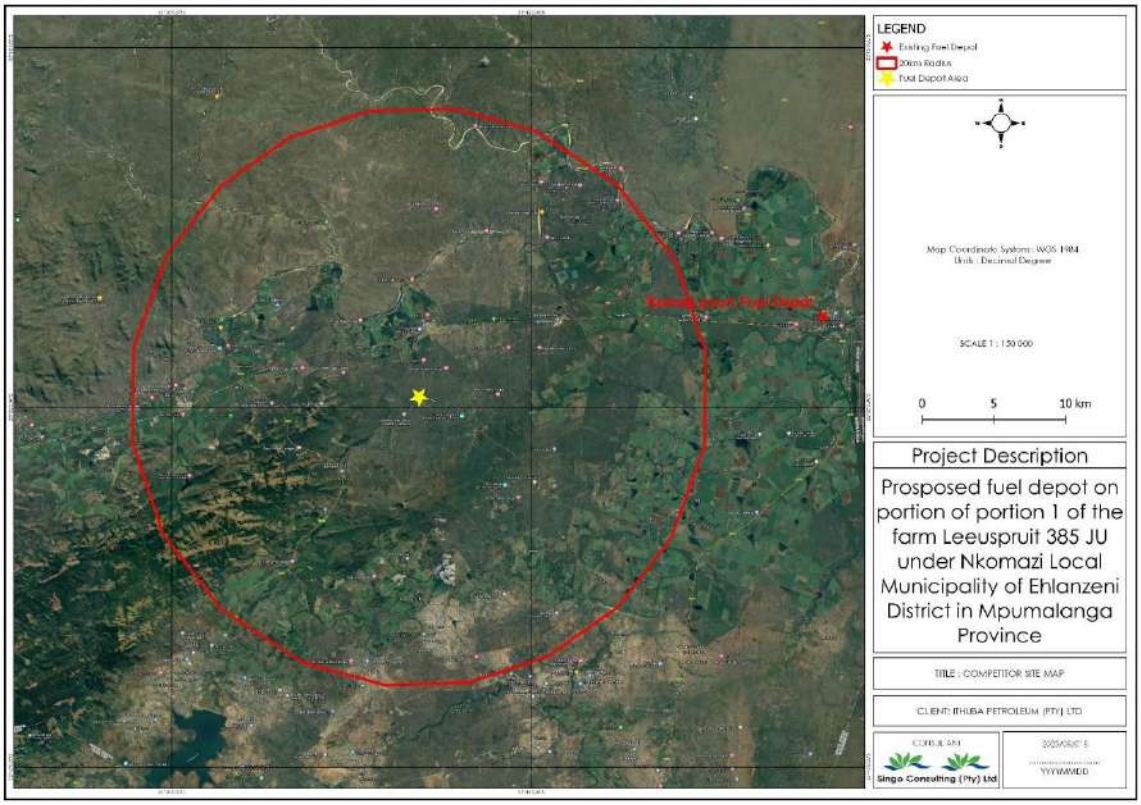


Figure 17: Competitor site

5.15. Alien invasive species

During ground truthing, eight species categorised as Category 1b and two species NEMBA Category 2 were observed onsite. Other unlisted exotic plants were also recoded. Table 7 lists exotic floral species identified during ground truthing:

Table 7: Alien Invasive species

Common names	Scientific names	Threat Status (SANBI, 2017)	SA Endemism	Alien Category
Blackjack	*Bidens Pilosa*	Not Evaluated	Naturalized Exotics	
Black Wattle	*Acacia mearnsii*	Least Concern	Naturalized Exotics	NEMBA Category 2
Rhus lancea	*Searsia lancea*	Least Concern	Not Evaluated	
Eagle Fern	*Pteridium aquilinum*	Least Concern	Not Endemic	
Long-leaved wattle	*Acacia longifolia*	Not Evaluated	Naturalized Exotics	NEMBA Category 1b
Populus alba	*White poplar*	Not Evaluated	Naturalized Exotics	NEMBA Category 2
Red River Gum	*Eucalyptus camaldulensis*	Not Evaluated	Not Indigenous	NEMBA Category 1b
Bur Weed	*Xanthium strumarium*	Not Evaluated	Naturalized exotics	NEMBA Category 1b
Thorny poinciana	*Caesalpinia decapetala (Roth) Alston*	Not Evaluated	Naturalized exotics	NEMBA Category 1b
Tall Verbena	*Verbena bonariensis*	Not Evaluated	Naturalized exotics	NEMBA Category 1b
Large cocklebur	*Xanthium strumarium L.*	Not Evaluated	Naturalized exotics	NEMBA Category 1b
Cluster Pine	*Pinus pinaster Aiton*	Not Evaluated	Naturalized exotics	NEMBA Category 1b
spear thistle	*Cirsium vulgaren*	Not Evaluated	Naturalized exotics	NEMBA Category 1b
Silver wattle	*Acacia dealbata Link*	Least Concern	Not Endemic	NEMBA Category 2

5.16. Civil Aviation

On the 20th March 2022, the DFFE published a Protocol that requires EAP's to assess the impacts of the proposed development on nearby civil aviation facilities. The screening tool indicates that area is high sensitivity (Figure 18).

Civil Aviation Site Sensitivity Verification (CASSV) was conducted to verify or revise the assigned sensitivity level.

According to National Web-based screening report, if the proposed area falls on site identified as High Sensitivity in Civil Aviation theme, the Civil Aviation Compliance Statement must be included. Therefore, as per Figure 18, the proposed site is within high sensitive site in terms of Civil Aviation was identified, GN 320 must be complied with:

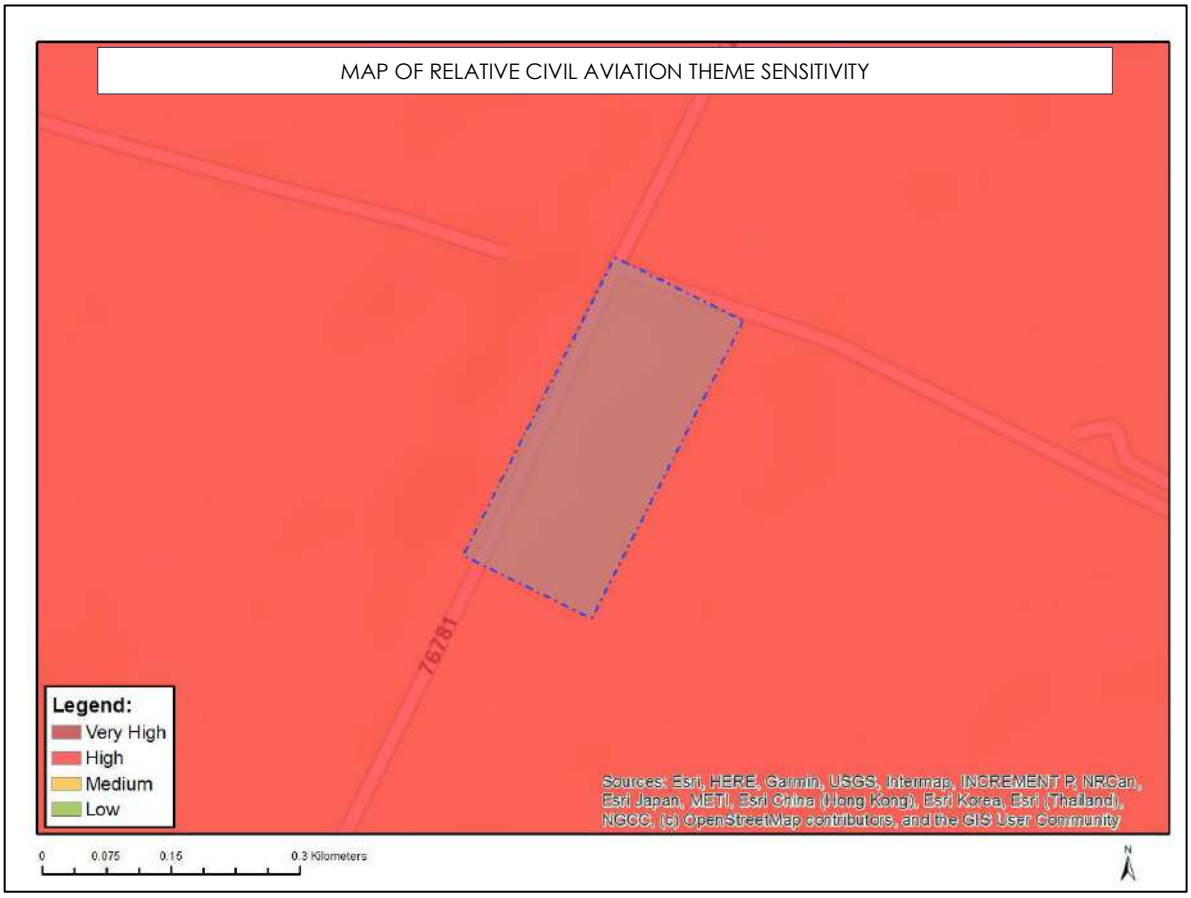


Figure 18: Civil Aviation (DFFE Screening Report)

The CASSV was conducted based on the following information:

- The proposed project sites and footprints were plotted on the Screening Tool to identify the sensitivity allocated (Figure 18)
- Existing spatial databases were used to determine the location of civil aviation installations in relation to the proposed project area, and to identify preliminary areas of concern in terms of impacts to civil aviation installations (Figure 19)
- A site visit was undertaken to confirm the current land use and the environmental sensitivity as it relates to Civil Aviation (Figure 20)
- Topography of proposed site relative to the airports (Figure 21)

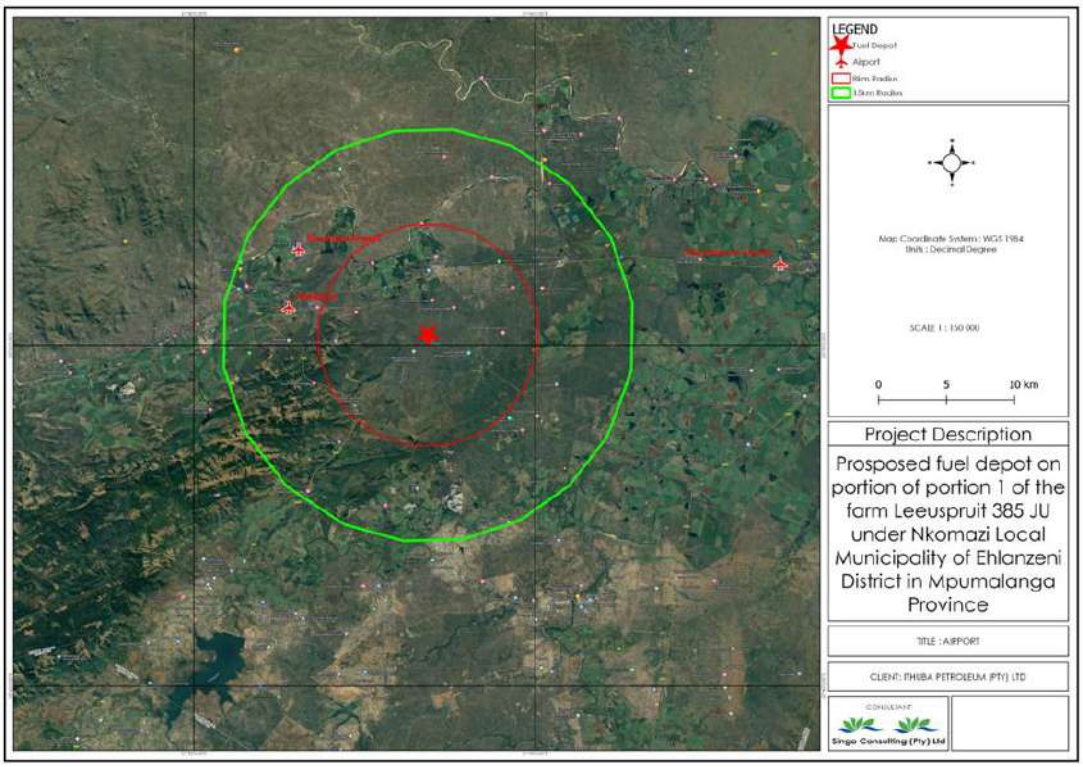


Figure 19: Proposed Site relative to Airports

There are three airports/aerodrome found around the proposed site (Figure 19). Malelane airport and Riverside airport (Malelane aerodrome) are located between 8km and 15km from the proposed site. Komati poort airport is located at approximately 29km North East of the proposed site. There is no evidence of airport/aerodrome within the proposed site (Figure 20)

Figure 20: Site Pictures

The elevations between the proposed site and the nearby airports/aerodrome(8km-15km) were modelled using google earth pro. According to Figure 21, there are mountains (447masl) between the proposed site and airports.

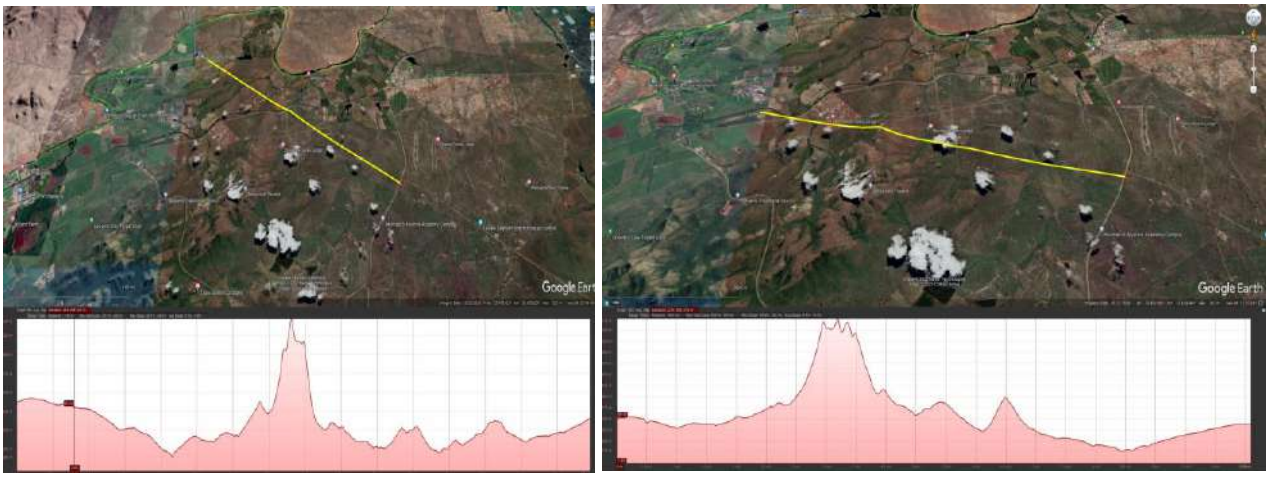


Figure 21: Elevation relative to Airports (A) Malelane Aerodrome and (B)Malelane Airport

The analysis has determined that the proposed development and associated infrastructure would not interfere radar, communications, or navigation infrastructure in the environs of the Malelane aerodrome nor present any material additional risk to operations at the airport within the contemplation of the 2020 Protocol. The roof and tanks will be painted with grey colour to avoid glint and glare risk and is perpendicular to the runways of both airports/aerodrome (Not along the runway direction). There is a mountain between proposed site and both airports/aerodromes. That means the airplane will pass the proposed area at elevation above 447masl and the maximum height of the proposed infrastructures is 3m. On this basis, therefore, it is recommended that the Sensitivity Classification of the proposed Development area be amended to *'low'*. No Civil Aviation Compliance Statement is therefore required.

6. PUBLIC PARTICIPATION PROCESS

6.1. Project Announcement

6.1.1. Newspaper Advertising

A block advert (150mm and 95mm) was advertised on local newspaper *Lowvelder* newspaper on the 1st September 2023 in terms of Environmental Impact Assessment Regulations, 2014 (as amended). A copy of the advert is in Appendix F(ii)

6.1.2. Site Notice

Notices according to the Environmental Impact Assess Regulations, 2014 (as amended) were placed at the following locations: Figure 22. Copy of site notice in both English and local language is in Appendix F (i).

Figure 22: Site Notice placement

Malelane Public Library (31.509970; -25.493885)

Malelane Post Office (31.510173; -25.494228)

Site Notice 1 (31.665106; -25.501709)

Site Notice 2 (31.671811; -25.459832)

Site Notice 3 (31.673780; -25.451680)

No persons registered as interested and affected parties with regards to the advertising of the project. There was thus no need for a public meeting.

6.1.3. Emails

Emails were sent to different local authorities, stakeholders, existing fuel depot adjacent farms and government departments with the Background Information Document (BID) and Registration form. BID and Registration are in Appendix F(iii).

6.1.4. Identified local authorities/government departments, existing fuel depot, adjacent farms and stakeholders

Table 8: Identified local authorities/government departments, existing fuel depot, adjacent farms and stakeholders who received BIDs

Departments/SOE/Municipalities/ Other Entities/Stakeholders	Contact Person	Correspondence	Comments
Nkomazi Local Municipality	Nokwanda Nkosi	Date: 28 August 2023	No comments
Adjacent Farm	Elmon Sifunda	Date: 01 September 2023	No comments
Eskom	Wayleave department	Date: 28 August 2023	No comments
Department of Agriculture, Land Reform, and Rural Development	Rhulani Chavalala	Date: 28 August 2023	No comments
Mpumalanga Tourism and Parks Agency	Phumla Nkosi	Date: 29 August 2023	No comments
Enhlanzeni District Municipality	Lebogang Mdluli	Date: 29 August 2023	Noted the invitation
Sasol	Johan Botha	Date: 29 August 2023	Not directly affected by the proposed project as their pipeline is located 3 km away
Department of Forestry, Fisheries and the Environment	Admin	Date: 29 August 2023	No comments
SANRAL	NRstat	Date: 29 August 2023	No comments
IUCMA	Rasiu	Date: 29 August 2023	No comments
Transnet	Philix Mnisi	Date: 28 August 2023	No Comments
Adjacent farm	Richard Smith	Date: 01 September 2023	No Comments
Mpumalanga Province Department of Agriculture, Rural Development, Land and Environmental Affairs	Thokozile Sithole	Date: 04 September 2023	No comments
Department of Agriculture, Land Reform, and Rural Development	Mary Mogale Elly Thulari	Date:29 August 2023	Kindly register us

6.2. Release of Draft BAR and EMPR

Draft BAR and EMPr will be released for 30 days public review from 08 September 2023 to 09 October 2023 through the followings:

- Email
- Courier
- Hand delivery

6.3. Summary of issues and response

Appendix 1 (3)(h)(iii) of the EIA Regulations, 2014 (as amended) requires that a summary of the issues raised by interested and affected parties be provided in the Basic Assessment Report as well as an indication of the way the issues were addressed. Issues/concerns raised by stakeholders/Interested and Affected Parties will be incorporated into final BAR and EMPr to be submitted to the Competent Authority (Tabel 9).

Table 8: Summary of issues and response

Issues	**I&AP, Stakeholders, Authority (Section of Report)**	**Response**

7. DESCRIPTIONS OF ALTERNATIVES

According to Appendix 1 of the EIA Regulations, 2014 (as amended), one of the objectives of the basic assessment process is to identify the alternatives considered for the proposed development and to rank these alternatives in terms of the potential impacts identified to identify the preferred alternatives.

The EIA Regulations (2014; as amended) define alternatives as *"different means of meeting the general purpose and requirements of the activity, which may include alternatives to the -*
a. property on which or location where the activity is proposed to be undertaken;

b. type of activity to be undertaken;

c. design or layout of the activity;

d. technology to be used in the activity; or

e. operational aspects of the activity;

and includes the option of not implementing the activity."

In addition to the above-mentioned, Section 24O(1)(b)(iv) of NEMA requires that the competent authority must take into account "*where appropriate, any feasible and reasonable alternatives to the activity which is the subject of the application and any feasible and reasonable modifications or changes to the activity that may minimize harm to the environment.*" This section, therefore, provides a detailed description of the various alternatives investigated and the process followed to decide on the preferred alternatives to be implemented.

7.1 Alternative sites

No alternative sites were considered as the applicant has joint venture with the lessee approved by the landowner (Department of Agriculture, Land Reform and Rural Development)

7.2. The No project option

The '*no project option'* is the alternative of not going ahead with the proposed development. The '*no project option'* is only considered if it is found that the development will have significant negative impacts on the environment, which cannot be mitigated or managed. If the '*no project option'* in terms of the proposed development was exercised, it could mean that:

- There would still be a need for fuel depot in the area as the nearest fuel depot is located approximately 28km and is for Transnet's trains.
- Truckers would have to continue driving/walking long distances for diesel.
- The area will remain under development and high unemployment rate will increase.
- Local economy will remain the same.

It is anticipated that this development will add to the development potential and local economic growth

7.3. Concluding statement on alternatives

No alternative sites were considered as the applicant has joint venture with the lessee approved by the landowner (Department of Agriculture, Land Reform and Rural Development).

8. ENVIRONMENTAL IMPACT DESCRIPTION AND EVALUATION

8.1. Introduction

This section of the report describes and evaluates the potential impact of the proposed development on the environment. The impact of the development has to be assessed in terms of the following development phases:

- **Planning and design phase**

The pre-construction phase involved mostly office work and site assessment for the design of the layout plan, the Basic Assessment report, and specialist studies. The purpose of conducting the above activities was to obtain the Environmental Authorization for the said development. However, no impacts are associated with the above-mentioned mentioned activities.

- **Construction phase**

The construction of the proposed fuel depot and associated infrastructures will involve the pegging of the site, installation of aboveground storage tanks, installation of services, and construction of buildings and parking areas. This would involve the following:

- Vegetation cover clearing
- Barricading of the site
- Leveling of the site
- Excavation for trenches and pits for aboveground tanks, foundations, and services
- Installation and connection of services (aboveground storage tanks, fuel pipes, sewer pipes)
- Laying of the required foundations
- Erection of buildings (Office)
- Construction of access roads
- Landscaping

- **Operational phase**

The operational phases would involve the usage of the various infrastructures associated with the proposed fuel depot.

- **Decommissioning Phase**

At this point of the project planning process, the necessity for and timing of the decommissioning of the proposed project is not anticipated nor known. However, in order to minimise the extent of rehabilitation activities required during the decommissioning phase, constant effort will be applied to rehabilitation activities throughout the construction, operation and maintenance phases of the project. This includes the removal of barricading nets and rehabilitation of the disturbed areas (Landscaping). This EMPr would have to address issues such as the removal of building rubble and the rehabilitation of the site. Soil conservation measures would also have to be implemented.

8.2. Evaluation of impacts

The evaluation of impacts is conducted in terms of the following criteria: Table 9

Table 9:Criteria Used for Rating of Impacts

	A brief written statement of the environmental aspect being impacted by a particular action or activity.			
Extent	The area over which the impact will be expressed			
	National (4): The whole of South Africa	Regional (3) Provincial and parts of neighbouring provinces	Local (2) Within a radius of 2-5 km of the construction site	Site (1) Within the construction site and surroundings (1.9 km)
Duration	Indicates what the lifetime of the impact will be			
	Permanent (4) Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient	Long-term (3) The impact will continue or last for the entire operational life of the development but will be mitigated by direct human action or by natural processes thereafter. The only class of impact which will be non-transitory	Medium-term (2) The impact will last for the period of the construction phase, where after it will be entirely negated	Short-term (1) The impact will either disappear with mitigation or will be mitigated through a natural process in a span shorter than the construction phase
Intensity	Describes whether an impact is destructive or benign			
	Very High (4) Natural, cultural and social functions and processes are altered to extent that they permanently cease	High (3) Natural, cultural and social functions and processes are altered to extent that they temporarily cease	Moderate (2) The affected environment is altered, but natural, cultural and social functions and processes continue albeit in a modified way	Low (1) The impact affects the environment in such a way that natural, cultural and social functions and processes are not affected
Probability	Describes the likelihood of an impact occurring			
	Definite (4) The impact will certainly occur	Highly Probable (3) Most likely that the impact will occur	Possible (2) The impact may occur	Improbable (1) The likelihood of the impact materializing is very low
Impact Reversal	The probability and the degree of reversing the activity impact			
	Highly Impossible (4) Impact reversal will certainly be impossible	Moderate (3) The impact can be reversed to some extent with loss of natural resources	Possible (2) High possibility of impact reversal	Definite (1) The impact can be totally reversed
Irreplaceable Loss	Loss of resources that cannot be replaced;			
	Definite (4) Resources definitely are lost	Highly Probable (3)Most likely that resources will be lost	Possible (2) Resources may be lost	Improbable (1)Loss of resources is highly unlikely

The predicted/possible impacts associated with the development of proposed fuel depot are in table 10

Table 10:Predicted/possible impacts of the proposed fuel depot.

ENVIRONMENTAL ATTRIBUTES	POTENTIAL IMPACT CONSTRUCTION PHASE	EXTENT	DURATION	INTENSITY	PROBABILITY	IMPACT REVERSAL	IRREPLACEABLE LOSS	POTENTIAL IMPACT OPERATIONAL PHASE	EXTENT	DURATION	INTENSITY	PROBABILITY	IMPACT REVERSAL	IRREPLACEABLE LOSS	POTENTIAL IMPACT (DECOMMISING PHASE	EXTENT	DURATION	INTENSITY	PROBABILITY	IMPACT REVERSAL	IRREPLACEABLE LOSS
TOPOGRAPHICAL	The topography of the site will be alternated through the removal of vegetation and the cut-and-fill process when leveling the site for the construction of building infrastructures. Changes to the topography could indirectly result in changes to run-off patterns and increase the risk of soil erosion if mitigation measures are not implemented effectively	1	1	2	3	1	1	During the operational phase, direct impact on topography will continue due to the presence of the infrastructures which could result in increased surface water runoff. This could impact the non-perennial river and nearby residences if mitigation measures are not effectively implemented.	1	4	2	3	1	1	During the decommissioning phase, temporary infrastructures will be demolished and removed from the site. Topsoil will be brought back and shaped to conform to the original slope of the area, which will have a possible impact on the topography and runoff from the site.	1	1	1	2	1	1
BIODIVERSITY LOSS	The construction activities would result in the removal of 1.052 hectares of grass and shrubs. This includes the placement of temporary infrastructures such as mobile offices and storerooms. However, the impact on the vegetation is deemed to be low as part of the area is being used for agricultural activities. Removal of vegetation cover could increase surface water runoff and lead to soil erosion and introduction of alien invasive species	1	1	2	2	1	1	During the operation phase, biodiversity loss could be a result of the people or motorists who park/ walk on the designated area (walk path and parking)	N/A	N/A	N/A	N/A	N/A	N/A	Demolition and removal of temporary infrastructures and landscaping would be positive. This could lead to the introduction of alien invasive species. Recommended invasive species control and mitigation measures will be implemented. These include uprooting and using appropriate herbicides.	1	1	2	2	1	1

WATER POLLUTION	There are no direct impacts on watercourses as there are streams, rivers, dams, or wetlands within the site. However, the construction of the proposed fuel depot would change the surface water runoff (Direction and velocity) to the wetland. This could lead to soil erosion, sedimentation, and flooding to the nearby road and surrounding environment during extreme rain events as water would no longer infiltrate the ground. Aquifer water capacity will be disturbed/reduced as there would be groundwater extraction through a borehole. The volume of water within the aquifer will be reduced. The impact on groundwater could be regional and irreversible.	3	1	2	2	3	1	The presence of the buildings and parking area/car wash bay will continue impacting the surface water runoff of the site (decreased infiltration and increased runoff velocities). If not well managed, this could erosion, sedimentation, and flooding on the Road STRYDOM ROAD and the surrounding environment if stormwater management measures are not effectively implemented. Groundwater will be continually disturbed/ reduced as water will be pumped and utilized for car washing and domestic. The impact on groundwater is regional and irreversible.	3	4	2	2	3	1	Removal of temporary containers and stormwater could initially result in soil erosion. However, proper rehabilitation and re-vegetation of the site after the removal of the above-mentioned infrastructures will have a positive impact in terms of reduced soil erosion risk, flooding, and sedimentation. Groundwater would be continually disturbed/ reduced as water will be pumped and utilized for car washing and domestic. The impact on groundwater is regional and irreversible.	3	1	2	2	3	1

GEOLOGY	Excavating the ground for the foundation of the proposed infrastructures will have an impact on the underlying geology. The soil is medium to coarse-grained from porphyritic granite/granodiorite and transported from Salibury Kop Granite. Excavation for service infrastructures and foundations could lead to the disintegration of the intact underlying geology. However, the parking area/carwash area would not require deep foundations. Therefore, the impacts would be low and not reversible.	1	4		2	4	4	During the operational phase, the impacts could continue if the Geotechnical recommendations are not implemented effectively.	N/A	N/A	N/A	N/A	N/A	N/A	No impacts during the decommissioning phase	N/A	N/A	N/A	N/A	N/A	N/A
SOIL POLLUTION	During construction, removal of topsoil (leveling) and excavation for service infrastructures and foundations of infrastructures will have negative impacts on soil structure and nutritional and chemical properties. In addition, this will expose the area to surface runoff pattern changes and increase the risk of soil erosion. The soil profile will be modified during the construction phase. Topsoil will be removed and stockpiled to be used at a later stage. This will be done for aboveground tanks, parking area/carwash, and other service infrastructures (Sewage pipes).	1	4	2	2	2	1	There is potential for soil contamination during the operation phase, as a result of accidental spills or leaks from the aboveground fuel storage and handling infrastructure, including pipework and aboveground storage tanks.	1	4	2	1	1	1	The rehabilitation including the landscape will bring positive impacts on topsoil and reduce soil erosion. This could lead to the introduction of alien invasive species. Recommended invasive species control and mitigation measures will be implemented. These include uprooting and using appropriate herbicides.	1	4	2	2	1	1

	Compaction of the foundation will modify the soil structure (Making the area to be impermeable). Some of these impacts are reversible and site-based. However, if mitigation measures are not implemented effectively. this could affect the nearby wetlands, settlements, and other watercourses. Contamination of the environment, specifically the soil and groundwater could arise during the construction phase. This could arise as a result of, for example, poor machinery services (engine and hydraulic oils, fuels, and grease spills), improper fittings of the aboveground tanks, and pipes, and inadequate ablution facilities																				
AIR POLLUTION	Dust generation by construction vehicles and Carbon Monoxide (COx) emission during the construction phase could affect site workers and nearby residents. The intensity of impacts depends on wind direction, velocity, and mitigation measures implemented.	1	1	1	1	N/A	N/A	No dust will be generated as the site would be paved. Carbon Monoxide (COx) would be generated by vehicles coming to the site for fuel refill, car wash, LPG refill, restaurant, and store.	1	4	1	1	4	4	Dust generation by construction vehicles and Carbon Monoxide emission during construction phases could affect site workers and nearby residents. However, dust and Carbon Monoxide would be low as few vehicles would be used during this phase.	1	1	1	1	4	4
NOISE	Vehicles in and out of the proposed site together with actual earthwork could contribute to the							In the operational phase, people and vehicles coming to the proposed fuel depot area could contribute							Construction vehicles for material delivery together with actual earthwork could contribute to the						

	ambient noise level. This would affect the nearby animals and residents. Noise pollution cannot be mitigated; however, this would be a very short period.							to the ambient noise level. Noise pollution could not be mitigated							ambient noise level. This would affect the nearby animals and residents. Noise pollution cannot be mitigated; however, this would be a very short period.						
VISUAL IMPACTS	The area is covered by grasses and plants. In the construction phase, there will be visual impacts on the site as there will be the removal of plants, topsoil, and stockpiling of different soil profiles. Erection of parking area/carwash, LGP facility, fuel refilling pumps, shops, and workshop will change the visibility of the area.	1	1	4	4	4	4	The presence of the proposed fuel depot will affect the visibility of the area. There will be a fuel depot infrastructure in an area that was previously occupied by natural vegetation.	1	4	4	4	4	4	Landscaping which is the removal of unused stockpiles, backfilling of the pits, and spreading of the topsoil will have visual impacts on the area as this modifies the landscape of the area. This impact will be site-based and positive.	1	1	4	4	4	4
TRAFFIC IMPACTS	Delivery of building materials could lead to a slight increase in traffic along Road STRYDOM ROAD. Road 2951 connects Samora Michel Monument and Museum with nearby towns and villages. This will have an impact on motorists that use the Road STRYDOM ROAD. The impact would be low and for short period.	2	1	1	2	4	N	Taxis, buses, trucks, and other vehicles to the proposed fuel depot area could cause a slight increase in traffic along the Road Jeppe's Reef Road	2	4	1	2	4	N	Removal of unused stockpiles, machinery, and temporary infrastructures from the site could contribute to a slight increase in traffic at the Jeppe's Reef Road.	2	1	1	2	4	N

SOCIO-ECONOMIC IMPACTS	The construction phase is the intensive-labour phase. Unskilled, semi-skilled, and skilled employees from the nearby villages will be temporarily employed during the construction phase. This will contribute to job creation as youths (Economic active age) are the highest population group within the local municipality. Nkomazi local municipality like other municipalities is facing a high unemployment rate. This impact is positive.	2	2	1	4	N/A	N/A	Unskilled, skilled, and skilled employees from the nearby villages will be temporarily employed during the decommissioning phase. These include employees that would be dismantling the temporary facilities (containers, barricading nets, setting out poles). This will boost the Nkomazi local municipality economy.	2	2	1	4	N/A	N/A	Fewer people, as compared to the construction phase, will be permanently employed during the operation phase for fuel refill, shops, gas refill, workshop, and carwash. This will boost the Nkomazi local municipality economy.	2	2	1	4	N/A	N/A

8.3. Cumulative impacts

Based on the status quo of the area (Agricultural activities) and scale (small) of the proposed project, no cumulative impacts are expected on geology, soil, topography, land use, vegetation, hydrology, geohydrology, air quality, sites of archaeological and cultural sensitivity. However, there could be a cumulative impact on the traffic volumes in the area, but it is expected to be low.

8.4. 'No project' impacts

The '*no project option'* is the alternative of not going ahead with the proposed development. The 'no project option' is only considered if it is found that the development will have significant negative impacts on the environment, which cannot be mitigated or managed.
If the '*no project option'* in terms of the proposed development was exercised, it could mean that:

- There would still be a need for fuel depots in the area.
- The area will remained underdeveloped
- Motorists would have to continue driving/walking long distances for diesel.
- Other potential uses for the site would have to be investigated.

It is anticipated that this development will add to the development potential and local economic growth.

8.5. Concluding remarks

The establishment of a fuel depot would not have an impact on the soil arability, ground and surface water, and sites of archaeological/cultural interest. However, due to the bareness of the area, the proposed fuel depot would have a low negative impact on the vegetation (a small part of the area), traffic, and visual aspects of the site.

Medium negative impacts because of this development are anticipated in terms of topography, geology, soil, and noise. These potential impacts can be minimized by effectively implementing the mitigation measures as indicated in the Environmental Management Programme Report section of this report.

9. AFFIRMATION BY EAP

I, **Mrs Rudzani Shonisani Radebe** of Singo Consulting (Pty) Ltd declare that the information provided is correct and relevant to the activity/ project and that, the information was made available to interested and affected parties for their comments. All specialist (s) reports are relevant for the competent authority to make an informed decision.

……
Signature on behalf of the applicant

Singo Consulting Pty Limited
Name of company (if applicable)

Date:……

PART B

10. ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

10.1. What is the Environmental Management Programme Report?

Environmental Management Plan (EMP) is defined as an environmental management tool used to ensure that unwarranted or reasonably avoidable negative impacts of the construction, operation, and decommissioning of a project are prevented, as well as that the positive benefits of the projects are enhanced, is now known as an environmental management programme Report (EMPr) (Lochner, 2005).

According to Regulation 19(4) of the EIA Regulations, 2014 (as amended), an Environmental Management Programme (EMPr) shall be following Appendix 4 of the EIA Regulations, 2014 (as amended) and be a component of the Basic Assessment Report.

10.2. Purpose of the EMPr

An EMPr provides mechanisms/methods for the prevention of undue or reasonably avoidable adverse environmental impacts while enhancing the positive environmental benefits of a development. The EMPr derives from the provisions of the National Environmental Management Act (Act No. 107 of 1998, (NEMA)(as amended), and bestows a 'Duty of Care' on those who cause, have caused or may cause pollution or degradation of the environment as per Section 28 (1) of NEMA.

10.3. Objectives of the EMPr

The EMPr provides recommended measures and guidelines for environmental monitoring throughout the different phases of an activity. The specific objectives for this EMPr include:

- Provision of the details of the applicant;
- The outline of the legal requirements;
- Identifies the regulatory and policy stipulations applicable to the activity;
- The mitigation measures for construction associated impacts and key measures to be implemented in the operational phase of the project;
- Specification of roles and responsibilities of parties in the implementation of this EMPr;
- Identifying construction activities that might have detrimental impacts on the environment;
- Identification of measures that could optimize beneficial impacts;
- To establish a method of monitoring and auditing environmental management practices during all phases of development;
- Mechanisms for monitoring compliance with the EMPr and reporting thereon;
- Specifying time periods within which the measures contemplated in the Environmental Management Programme must be implemented.

10.4. Scope of the EMPr

In accordance with the requirements of the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations, 2014, this EMPr is to be implemented by the developer/applicant as well as any employee, contractor, agent or sub-contractor appointed to act on behalf of the developer/applicant in the execution of the project, in order to ensure environmental compliance on-site. Thus, the specifications outlined in this EMPr are applicable to all activities undertaken by the developer/applicant as well as appointed contractors and all persons involved in the execution of the works. The Environmental Code of Conduct that provides a simplified set of rules that should be adhered to by all persons involved with the project at all times has also been developed. This is to be displayed at strategic points to ensure constant environmental awareness.

The effectiveness of the EMPr depends on the level of compliance with conditions and measures in the EMPr by the applicant. It is further assumed that compliance with the EMPr will be monitored and audited as set out in this EMPr and contractual clauses.

10.5.Details of the EAP

Aspect	Details
Representative	Dr. Kenneth Singo (Principal EAP), EAPASA (2019/825), Pr. Nat. Sci (400069/16), Member of LaRSA, IAIASA, GSSA (Geology and Hydrogeology Division)
Other contact details	Tel No.: 013 692 0041 Cell.: 072-081-6682/078-2727-839 Fax No.: 086-514-4103 E-mail address: kenneth@singoconsulting.co.za
Expertise/experience	Dr. Singo is a Principal Consultant (Earth Science), and Reg. EAP (EAPASA) in the Mining, Agricultural and Construction sector and currently works for Singo Consulting, an advisory firm based in eMalahleni. He has over 12 years' experience in diverse areas of natural resources including Geology, Geochemistry and Environmental Geochemistry. He is a coal expect with extensive experience of the Waterberg, Soutpansberg, Witbank, Highveld, and Springbok flats, as well as the Tete (Moatize) coalfield in Mozambique. Kenneth holds an MSc in Environmental Geochemistry (University of South Africa (UNISA)), BSc (Hons) in Mining and Environmental Geology (the University of Venda), and Ph.D. (Geology, Applied Environmental Mineralogy and Geochemistry) at the University of Johannesburg. Dr. Singo has knowledge of Mine Water and Mine Environmental Management (acid mine drainage, heavy metal assessments and tailings management) in various commodities including coal, gold, magnesite and base metals (Cu, Pb, Zn). He has extensive knowledge of defunct mining waste and wastewater impact assessments in communities residing in the vicinity of those mines. This knowledge was gained through MSc. Kenneth has sound knowledge of risk assessment, both in terms of human health and the environment. He is experienced in the appraisal of potential constraints, as well as devising means of mitigation through remedial strategy development, feasibility and validation. During his PhD studies, Dr. Singo has learned how to operate within contaminated lands. His PhD largely focused on disused mines (gold, copper and magnesite) ranging from Phase I and Phase II investigations to development of remedial strategies (i.e. Phase III). His PhD further equipped him to intensively understand the waste classification, profiling and understanding of the implications associated with the management of waste, landfill disposal profiling and development of beneficiation strategies.

11. DESCRIPTION OF THE PROPOSED PROJECT

11.1.Introduction

The proposed development is on a portion of portion 1 of the farm Leeuspruit 385 JU under Nkomazi Local Municipality of the Ehlanzeni District Municipality in Mpumalanga Province. (Figure 1). Additionally, it is located 6 km from Hectorspruit, the corner of Jeppe's Reef Road and Strydom Block Road. The total area of the site is 5.2 Hectares. The land use scheme is zoned as agricultural in terms of Nkomazi Spatial Planning and Land Use Management By-Law, 2015. However, rezoning application of land use scheme has been lodged to the Nkomazi Local Municipality and waiting for the outcome of this EA application.

The proposed development will occupy 1.052 of the 5.2 Hectares of the application area and will comprise the following infrastructures on Table 6 (Typical Example) and Figure 2 (Conceptual design) below.

Aboveground Storage Tanks Area (500 m^3) 	Generator Area 
Loading and offloading Area 	Pumps 

Parking Area	Ablution facility with septic Tank
	

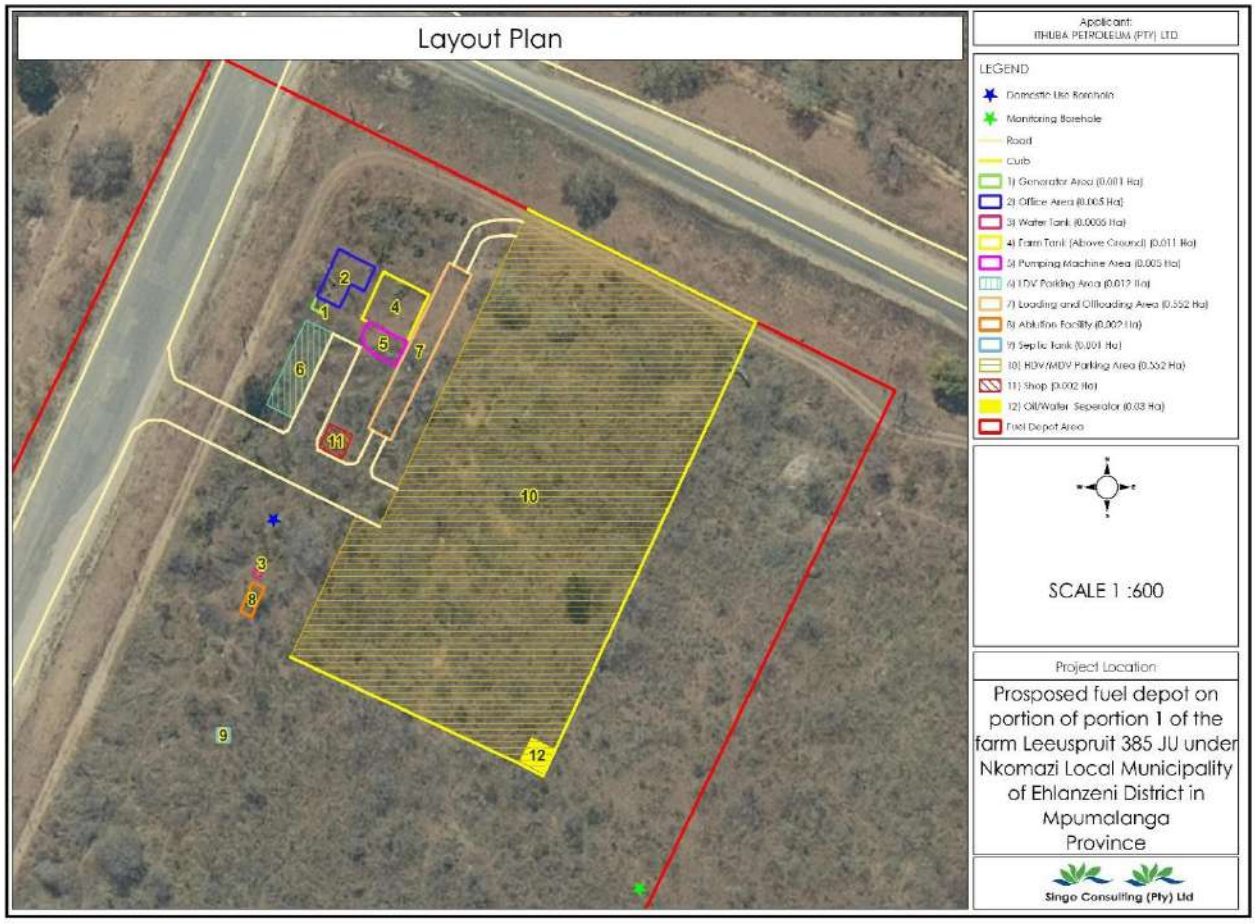


Figure 23: Proposed Layout

The proposed project will not be connected to existing infrastructure network except road. Sewage will be Septic tank, water (borehole), Energy (Solar and Generator). Stormwater will be guided to the oil/water separator through impermissible surface and Kerbs around the parking area.

11.2.Phases of the project lifecycle

Table 11: Phases of the project lifecycle.

Category	Phase	Description
Category A	Pre-construction	This section provides guidelines on pre-construction activities including site establishment and clearance, environmental induction and training & awareness.
Category B	Construction	This section will provide guidelines on construction methods and considerations
Category C	Rehabilitation	This section of the EMPr provides management principles for the rehabilitation phase of the Development. This will include best practice, procedures and responsibilities as required for various associated activities.

12. MITIGATION AND MANAGEMENT MEASURES TO BE IMPLEMENTED

The EMPr specifies the minimum requirements to be implemented by the developer as per the scope of works and scope of the environmental authorisation, in order to minimise and manage the potential environmental impacts and ensure sound environmental management practices. It also provides the framework for environmental monitoring throughout the construction and operational phases.

The provisions of this EMPr are binding on the developer during the life of the project. The EMPr must be binding on Ithuba Petroleum (Pty) Ltd or any authority to which responsibility for the construction activities has been delegated to, until such time that the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs or applicable environmental authority has formally absolved the Developer from its responsibilities in terms of this EMPr.

It is essential that the EMPr requirements be carefully studied, understood, implemented, and adhered to at all time. To simplify the EMPr requirements, each aspect related to the EMPr has been addressed in the table below. Each action within the EMPr is supported by the priority of when the specific action will need to be implemented. Each of these aspects is briefly described below for ease of reference.

- **Environmental measures, actions and controls**

This section indicates the actions required to either prevent and/or minimise the potential impacts on the environment that is associated with the project.

- **Responsibility**

This section indicates the party responsible for implementing the environmental measures and action plans laid out in the EMPr.

- **Monitoring frequency**

This section indicates when the actions for that specific aspect must be implemented and/or monitored.

Pre-construction phase

Environmental risk/ issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of action
Permits and approvals					
Permits and authorisations	To ensure that all the required permissions are obtained to allow for implementation of the activity	All necessary authorisations, permits and licenses must be obtained by the Developer prior to the commencement of construction	Copies of permits available	Developer	Once-off
Enforcement of EMPr in contracting					
Inclusion of EMPr requirements in Project contracting	To make the EMPr enforceable under the conditions of the contract	The EMPr document must be included as part of the tender documentation for all contractor appointments.	The EMPr is included as part of the tender documentation	Applicant Contractor	Once-off
Timeous appointment of ECO	To ensure that and independent ECO is available to monitor activities	Independent ECO to be appointed before the start of construction activities. ECO to provide training of the construction team on the EMPr, environmental resources and compliance requirements.	ECO appointed	Applicant	Once-off
Methods statements	Development of MS to detail and guide implementation of activities	Method Statements as directed by the ECO must be provided by the contractor. All activities which require method statements may only commence once the method statements have been approved by the engineer and or ECO as applicable. Where applicable, the contractor will provide job- specific training on an ad hoc basis when workers are engaged in activities, which require method statements.	Method statements available	Contractor	On-going
Design and planning (designs, site preparation and access)					
Designs and plans to consider authority requirements	To ensure that designs that are in accordance with authorities' requirements are in place	The design of the access roads, storm water infrastructure, the water pipeline to ensure that there is limited impact on the receiving environment; The fuel depot façade to enhance the visual character of the area; A landscape plan should be prepared and form part of the building plan submission to the local authority. As far as possible, all yards and storage areas to be enclosed by masonry walls or screens.	Designs that are acceptable to the municipality	Developer	Once off

Environmental risk/ issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of action
		The parking bays should be paved with brick or other unit pavers to minimise expansive asphalt areas. External lighting should be confined to the dispensing forecourt, commercial outlets and other essential areas. Lights should be low-level, where possible, and fitted with reflectors to avoid light spillage. Lights and signage should be fixed to buildings or walls, where possible, to avoid unnecessary masts and visual clutter. Signage related to the enterprise should be confined to the tower, canopy and entrances. Other corporate or advertising signage and flags should be avoided or restricted.			
Impacts on existing services	Minimise impacts of foundations, on utility lines (e.g. potable water pipe line)	Prior to the establishment of the site camp / office, the Contractor will produce a site layout plan showing the positions of all equipment storage, waste stockpiling, fuel storage areas and other infrastructure. Excavations to be sensitive to existing pipelines and services on site; All site disturbances must be limited to the areas where approved structures will be constructed. Access in and out of the site must be allowed only at one point to minimise impacts during construction.	Minimal disruption of services	Contractor	During site establishment
Loss of vegetation, and topsoil due to establishment of the camp	To minimise damage to/loss of vegetation, and retain quality of topsoil	Site to be established under supervision of ECO/ESO. - Use to be made of transformed areas for the camp. Limit site clearing to areas where the camp is to be established; Camp to be positioned away from the wetland area but close to the entrance to the site.	Minimal vegetation removed/ damaged during site activities	Contractor	Before any construction activity commences
Pollution of the environment from waste in construction camp	To prevent unhygienic usage on the site and pollution of the natural assets	Weather proof waste bins must be provided and emptied regularly. The contractor to clean up the contractor's camp and construction site on a daily basis. Temporary waste storage points shall be predetermined and be located in already disturbed areas. These storage points should be accessible by waste removal trucks and shall not be highly visible from the properties of the surrounding landowners/in areas where the wind direction will not carry	No waste bins overflowing No litter or building waste lying in or around the site	Contractor ESO	Daily/weekly

Environmental risk/ issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of action
		bad odours across the properties of adjacent landowners. This site should comply with the following: Skips for the containment and disposal of waste that could cause soil and water pollution, i.e. paint, lubricants, etc.; Small lightweight waste items should be contained in bins with lids to prevent littering; and Bunded areas for containment and holding of dry building waste.			
	Recycle material where possible and correctly dispose of unusable wastes	Waste shall be separated into recyclable and nonrecyclable waste, and shall be separated as follows: General waste: including (but not limited to) construction rubble; and Reusable construction material.	Containers available on site	Contractor ESO	Daily/weekly
Increased fire risk to site and surrounding areas	To decrease fire risk	Fires shall only be permitted in specifically designated areas and under controlled circumstances. Fire extinguishers to be provided in all vehicles and fire beaters must be available in camp site. Emergency numbers/contact details must be available on site, where applicable.	No unattended open fires Fire beaters present on site Emergency numbers/ details displayed at site camp	Contractor	Monitor daily
Construction site					
Geological stability and soils					
Stability of structures	To ensure the stability of slopes and buildings	Slope stabilisation to be implemented where slopes are prone to failure. Precautionary measures and foundation design from the engineers must be implemented.	No signs of collapse of slopes and buildings	Contractor, engineer	Monitor weekly
	To prevent seepage of groundwater into excavations, due to perched water.	Special drainage designs will be required in areas with shallow ground water given that the site is underlain by granite. Precautionary measures to prevent seepage of groundwater into excavations should be implemented.	No ground water seepage visible in excavations	Contractor, engineer	Monitor weekly
Un authorized pits and quarries	To prevent unauthorized, borrow pits on site	No borrow pits will be dug on or off site if not approved by the relevant authorities.	No unauthorized burrow pits/quarries on site	Contractor, ESO, ECO	Monitored monthly

Environmental risk/ issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of action
		Daily movement of construction material must be done effectively and must be kept to a minimum required for the construction. Fill material, where required, will be obtained from nearby and existing licensed borrows pit operators.			
Impact of blasting on site	To prevent hazards associated with blasting	Should any blasting be required, legislated procedures must be followed including: Informing adjacent residents/properties in advance. Blasting operations should be carefully controlled and the necessary safety precautions implemented, and the necessary blasting permit obtained. Dust suppression techniques e.g. erection of dust nets must be implemented, to mitigate low visibility on nearby roads and to protect surrounding residents from dust pollution	No incidents reported and complaints from I&APs Blasting permit available		
Loss of topsoil	To prevent the loss of topsoil To prevent soil and materials being tracked onto the road.	Stockpiling to be done in designated areas so as not to interfere with the natural drainage channels and must not be higher than 2m unless slope failure is prevented. In order to minimise erosion of topsoil and siltation and disturbance to existing vegetation, it is recommended that stockpiling be done in already disturbed/exposed areas. Vegetation to be removed only in areas designated during the planning stage and for the purpose of construction. Rehabilitation to be done immediately after the involved works is completed. Establish an all-weather site access and wheel wash or shake down. Silt to be removed from road surface (entrance to the construction area)	No loss of topsoil Excavated materials correctly stockpiled No visible signs of erosion of topsoil/ sedimentation. Vegetation only removed in designated areas	Contractor, ECO	Monitor daily
Erosion and siltation	To prevent erosion, siltation and water pollution	Mark out the areas to be excavated to avoid unnecessary clearing of flora resulting in exposed soil prone to erosion. The eradication of alien vegetation should be followed up as soon as possible by replacement with indigenous vegetation to ensure quick and sufficient coverage of exposed areas. Drainage channels should be provided on site to convey storm water to sand/silt traps.	No erosion scars All damaged areas successfully rehabilitated Earth bunds present	Contractor, ESO	Monitor daily

Environmental risk/ issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of action
		Construction work must be properly programmed to minimise soil excavation in the rainy season. Exposed stockpiles must be covered with impervious sheets before a rainstorm. The top layer of soil shall be stripped and stockpiled in areas where this material will not be damaged, removed or compacted. All surfaces that are susceptible to erosion, shall be protected either by cladding with biodegradable material or with the top layer of soil being seeded with grass seed/planted with a suitable groundcover. Cut-off drains should be excavated up- and down-hill of denuded areas to reduce run-off across these areas. Large, exposed areas should be limited. Where possible areas earmarked for construction during later phases should remain covered with vegetation until the actual construction phase. This will prevent unnecessary exposure to erosion and siltation in these areas. Storm water diversion measures are recommended to control peak flows during thunderstorms. Cover stockpiles and surround downhill sides with a sediment fence to stop materials washing away.	Drainage channels established Cut-off drains excavated Stockpiles covered and sediment fence erected around stockpiles Stockpiles suitably covered and sediment fence erected		
	To prevent the compaction of valuable soils due to traffic and equipment	All compacted areas should be ripped prior to them being rehabilitated by the contractor. Construction vehicles should only use the designated routes as determined in the pre-construction phase. The top layer of all areas to be excavated must be stripped and stockpiled in areas where this material will not be damaged, removed or compacted. This stockpiled material should be used for the rehabilitation of the site. Topsoil to be striped at start of works and store in stockpiles no more than 2.5m high in designated materials storage area.	Minimal compaction of soils	Contractor, ESO	Monitor daily
	Contamination of soils	Vehicle maintenance may only take place in designated and specially prepared areas. Should the soil be contaminated by the leaking of fuel the following should apply: The contaminated soil should be removed to a depth of 200 mm and disposed of. Thereafter the area should be treated with an organic solvent	No signs of leakage Leakage adequately rehabilitated	Contractor, ESO	Monitor daily

Environmental risk/ issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of action
Hydrology					
Pollution of ground- and surface water From spillage, leakage, incorrect storage and handling of chemicals; oils; lubricants, cement, fuels and other hazardous materials.)	To minimise surface- and groundwater pollution	The base of the fuel tank excavations should be flat and free from rocks and other foreign objects and covered by 150mm thick backfill of acceptable quality, compacted to specification with the correct backfill material and prepared using accepted construction practices to ensure stability and sustainability of aboveground tanks. The UST installation must comply with SANS 10089 part 1 (storage of dangerous goods in USTs). The USTs must have a secondary containment area to prevent subsurface leaks from seeping directly into the ground. All pipework will be double walled and comply with SANS 62- 1 and 2, SANS 1132 (pipework). Adequate stormwater drainage should be constructed. All hazardous substances must be stored on an impervious surface in a designated bunded area, able to contain 110% of the total volume of materials stored at any given time. The integrity of the impervious surface and bunded area must be inspected regularly and any maintenance work conducted must be recorded in a maintenance report. Shallow groundwater needs to be tested and diverted to an appropriate destination to avoid contamination. - Provide proper warning signage to make people aware of the activities within designated areas. Employees should be provided with absorbent spill kits and disposal containers to handle spillages. Train employees and contractors on the correct handling of spillages and precautionary measures that need to be implemented to minimise potential spillages. All earth moving vehicles and equipment must be regularly maintained to ensure their integrity and reliability. No repairs may be undertaken beyond the contractor lay-down area. Employees should record and report any spillages to the responsible person. An Emergency Preparedness and Response Plan will be developed and implemented should an incident occur. Access to storage areas on site must be restricted to authorised employees only. Ensure the establishment of storm	No visible signs of erosion No visible signs of pollution	Contractor	Monitor daily

Environmental risk/ issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of action
		water diversion berms around the contractor laydown area and other potential contaminated areas (e.g. diesel storage tanks or refuelling station). All contaminated standing water should be immediately removed and treated or disposed of appropriately. All incidents must be reported to the responsible site officer as soon as it occurs. Care must be taken to ensure that no water from the construction site enters the natural watercourse. Preventative measures include establishing sumps from where contaminated water can be either treated in situ or removed to an appropriate waste site. Storm water management structures (channels, bunded areas, sumps) should be designed into the project to trap any potentially contaminated storm water and return it to the relevant process or allow it to be stored and properly disposed of. Excess or spilled concrete should be confined within the works area and then removed to a waste site Increased run-off during construction must be managed using berms and other suitable structures as required to ensure flow velocities are reduced.			
Fauna and flora					
Damage to sensitive/indigenous vegetation	To protect the sensitive vegetation	If any red data species are discovered during construction, procedures as stipulated at the end of the EMPr should be followed. All exotic invaders and weeds must be eradicated. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance. Areas affected by the construction activities must be rehabilitated by hydro-seeding with natural occurring grass seeds immediately after every section has been completed and all new alien vegetation species should be removed on a regular basis until natural grasses has established up to 80 %. Upon completion of construction and rehabilitation the ECO should assess and approve the adequacy of the	No exotic plants used for landscaping No measurable signs of habitat destruction Minimal damage to the possible indigenous vegetation that exists on site.	Contractor, ESO, construction workers	As and when required

Environmental risk/ issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of action
		rehabilitation and ensure that sufficient levels of rehabilitation have been undertaken to allow reestablishment of the necessary vegetation. Locally available indigenous plants must be used in the landscaping of the site. Rehabilitation works should be monitored until 80 % of vegetation has been established.			
Waste management	Effective management of waste generated during construction activities (Sources: domestic spent grinding material, mixed concrete, paint cans and brushes, insulation material, building rubble and other construction waste)	General waste disposal bins will be made available for employees to use throughout the construction phase. Where possible construction waste should be recycled or reused. Waste will be temporarily stored on site before being disposed of appropriately. General waste will be disposed of an approved waste disposal facility. Records of all waste being taken off-site must be kept as evidence. Evidence of correct disposal must be kept. Building rubble will be used, where possible in construction or buried with the necessary town planning approvals. Where this is not possible, the rubble will be disposed of at an appropriate site. Burning of waste material will not be permitted. Hazardous materials will be generated if there are spillages during construction and maintenance periods. This waste should be cleaned up using absorbent material provided in spill kits on site. Absorbent materials used to clean up spillages should be disposed of in a separate hazardous waste bin. The storage area for hazardous material must be concreted, bunded, covered, labelled and well ventilated. Provide employees with appropriate PPE for handling hazardous materials. All hazardous waste will be disposed of in a registered hazardous waste disposal facility. To lower the potential for leachate formation, domestic waste should be placed in a watertight container and disposed of on a regular basis.	Method statement available Separated waste on site Waste disposal records Bins provided Waste disposal certificates available Skip provided on site	Contractor	Once-off, ongoing

Environmental risk/ issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of action
		Used oil must be disposed of in accordance with the correct procedures. All equipment that has the potential for spillages or leakages shall be equipped with drip-trays Ensure that care is taken to ensure that spillages of oils and effluent are limited during maintenance. In the event of a spill/leak, the source of the spill or leak must be identified and addressed. The oil/effluent spill/leak must be cleaned immediately and any contaminated soil must be removed and disposed of through a recognisable waste disposal method			
Management of materials and/or facilities					
Toilets/ablution facilities	Ensure proper sanitation is achieved which will encourage the workforce to utilise toilets provided and not the surrounding habitat Minimise potential of diseases on site Minimise potential to pollution on soils, water resources and natural habitats	The contractor is responsible for providing all sanitary arrangements for his and the sub-contractors team. A minimum of one chemical toilet must be provided per 15 persons. Sanitary arrangements must be to the satisfaction of the ECO and the local authority. Toilets must be of the chemical type. The contractor must keep the toilets in a clean, neat and hygienic condition. The contractor must supply toilet paper at all toilets at all times. Toilet paper dispensers must be provided in all toilets. Toilets provided by the contractor must be easily accessible and a maximum of 50m from the works area to ensure they are utilised. All toilets will be located within the contractor's camp. Should toilets be needed elsewhere, their location must first be approved by the ER, EO or ECO. The contractor (who must use reputable toilet servicing company) must be responsible for the cleaning, maintenance and servicing of the toilets. The contractor (using reputable toilet-servicing company) must ensure that all toilets are cleaned and emptied before the builders' or other public holidays. Toilets must be secured to the ground and always have a sufficient locking mechanism operational. All toilets to be at least 50m away from the stream.	Workforce use toilets provided No complaints received from I&APs as well as members of the workforce No visible or measurable signs pollution of the environment (soils, ground and surface water)	Contractor	Ongoing

Environmental risk/ issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of action
Stockpiles	Minimise scaring of the soil surface and land features Minimise disturbance and loss of soil Minimise construction footprint Minimise sedimentation of nearby drainage lines Maintain the integrity of topsoils for landscaping and rehabilitation Containment of invasive plant growth Minimise contamination of storm water run-off	All stockpiled material must be easily accessible without any environmental damage. All temporarily stockpiled material must be stockpiled in such a way that the spread of materials is minimised. The stockpiles may only be placed within the demarcated areas the location of which must be approved by the ER, EO or ECO prior each development phase to be undertaken. The storage area must avoid the riparian zone and buffer zone. Storm water run-off from the stockpile sites and other related areas must be directed into the storm water system that will be designed with the necessary pollution prevention measures such as silt traps. Storm water run-off may not run freely into the immediate and surrounding environments. Stockpiles are to be stabilised if signs of erosion are visible. Soils from different horizons must be stockpiled such that topsoil stockpiles do not get contaminated by sub-soil material. Topsoil stockpiles must be monitored for invasive exotic vegetation growth. Contractors must remediate as and when required in consultation with the EO, ER and ECO. No plant, workforce or any construction related activities may be allowed onto the topsoil stockpiles. Topsoil stockpiles must be clearly demarcated as no-go areas. Stockpiles must not be higher than 2m to avoid compaction thereby maintaining the soil integrity and chemical composition.	No visible erosion scars once construction is completed The footprint has not exceeded the agreed site in terms of EA, etc. Minimal invasive weed growth No signs of sedimentation and erosion	Contractor, ECO, ESO	Ongoing
Oils and chemicals	Prevention of pollution of the environment Minimize chances of transgression of laws controlling pollution	The contractor must provide method statements for the "handling & storage of oils and chemicals", "fire", and "emergency spills procedures". These substances must be confined to specific and secured areas within the contractor's camp, and in a way that does not pose a danger of pollution even during times of high rainfall. The specific area may not be close to the riparian and 2m buffer zone at any time. Areas for fuels must be imperviously bunded with adequate containment (at least 1.5 times the volume of the fuel) for potential spills or leaks. Storage areas must display the required safety signs depicting "no smoking", "no naked lights" and "Danger" containers	No pollution of the environment No litigation due to transgression of pollution control acts No complaints from I&APs Method statements	Contractor	Ongoing

Environmental risk/ issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of action
		must be clearly marked to indicate contents as well as safety requirements. Drip trays (minimum of 10cm deep) must be placed under all vehicles that stand for extended periods of time. The surface area of the drip trays will be dependent on the vehicle and must be large enough to catch any hydrocarbons that may leak from the vehicle while standing. The depth of the drip tray must be determined considering the total amount / volume of oil in the vehicle. The drip tray must be able to contain the volume of oil in the vehicle. Spill kits must be available on site and in all vehicles that transport hydrocarbons for dispensing to other vehicles on the construction site. All spilled hazardous substances must be contained in impermeable containers for removal to a licensed hazardous waste site, (this includes contaminated soils, and drenched spill kit material). Material Safety Data Sheets (MSDS) must be prepared for all hazardous substances on site and supplied by the supplier where relevant. MSDS's must be updated as required. These must be made available to the ECO.			
Cement pollution	Minimise the possibility of cement residue entering the surrounding environment. Minimise pollution of soil, surface and ground water resources	The contractors must provide and maintain a method statement for "cement and concrete batching". The method statement must provide information on storage, washing & disposal of cement, packaging, tools and plant. The mixing of concrete must only be done at specifically selected sites on mortar boards or similar structures to contain run-off into soils, stream and natural vegetation. Should this be close to the stream, adequate protective and preventative measures are to be implemented. Cleaning of cement mixing and handling equipment must be done using proper cleaning trays. The visible remains of concrete, either solid, or from washings, must be physically removed immediately and disposed of as waste to a registered landfill site All empty containers must be stored in a dedicated area and later removed from the site for appropriate disposal at a licensed facility.	No evidence of contaminated soil on the construction site No evidence of contaminated water resources Method statement	Contractor	Ongoing

Environmental risk/ issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of action
		Any spillage that may occur must be removed and immediate remedial action taken. Cement batching areas must be located in consultation with the ECO to ensure residues are contained and that the proposed location does not fall within sensitive areas such as drainage lines, storm water channels, etc.			
Social impacts					
Employment opportunities	Enhancement of employment opportunities for locals	Local labour and contractors must be used wherever possible.	Contracts awarded to local contractors	Contractor	As and when required
Noise impact	To maintain noise levels below "disturbing" as defined in the national and provincial Noise Regulations	Site workers must comply with the Provincial noise requirements. Noise activities shall only take place during working hours. Work hours must be strictly enforced unless permission is given. Permission must not be granted without consultation with the local businesses by the EO. The layout designs of proposed new developments in the area must take the noise impact of the road into consideration and a form of noise screening must be implemented where buildings are to be located closer than 200m from the road i.e. building façade - the placement of windows away from the sources of noise or a noise barrier. The Contractor must respond timeously in the event of any complaints by local residents.	No complaints from surrounding residents and I&APs Noise attenuation measures implemented.	Contractor	Monitored daily, once-off
Dust impact	Minimise dust from the site (access roads; exposed area cleared for construction; Debris handling; Emissions from construction machinery and equipment; and Trucks transporting spoil and fill material)	The contractor to provide and maintain a method statement for "dust control". The method statement must provide information on the proposed source of water to be utilised and the details of the licenses acquired for such usage (if any) Dust pollution could occur during the construction works, especially during the dry months. Regular and effective damping down of working areas (especially during the dry and windy periods) must be carried out to avoid dust pollution, impacting on adjacent residential areas and creating dangerous driving conditions on nearby roads.	Method statement available No visible signs of dust pollution No complaints from surrounding residents and I&APs	Contractor	Monitored daily, ongoing

Environmental risk/ issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of action
		When necessary, these working areas should be damped down in the mornings and afternoons, by sprinkling bare areas with water. All vehicles transporting material that can be blown off (e.g. soil, rubble etc.) must be covered with a tarpaulin, and speed limits of 20 km/h must be adhered to. Dust nets must be used where the construction site borders the Residential Area. If monitoring results or complaints indicate inadequate compliance with the EMPr, the source of the problem must be identified and existing procedures modified to ensure that the problem is rectified	Damping down undertaken		
Visual impact	Minimise the visual impact of construction works	The disturbed areas shall be rehabilitated immediately after every section of the road is constructed. Shade cloth must be used to conceal and minimise the visual impact of the site camps and storage areas. Possible mitigation measures that could be considered are the establishment of dense vegetation at strategic points to screen-off the most visible sections of the roads / construction of berms adjacent to the road/ a combination of berms with vegetation.	Visual impacts minimised	Contractor, ESO	Monitor daily
Occupational Health and Safety	Ensure the safety and security of the public and employees	Erect proper signs indicating the operations of heavy vehicles in the vicinity of dangerous crossings and access roads or even on the application site if necessary. Except for the appointed security personnel, no other workers, friend or relatives will be allowed to sleep on the construction site (weekends included). Construction vehicles and activities to avoid peak hour traffic times. The following actions would assist in management of safety along the road: Adequate road marking; Allowance for pedestrians and cyclists where necessary; Erect proper signs indicating the danger of the excavation in and around the site; and All areas that are excavated to a depth of 1.5 m and more must be marked with barrier tape to reduce the risk of injuries.	Signs are visible No incidences reported No signs of sleeping quarters on site Barrier tape erected around excavations Emergency procedures available No detrimental fire hazards	Contractor, ECO, site supervisor	Monitored daily, on-going

Environmental risk/ issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of action
		The contractor must ensure that all emergency procedures are in place prior to commencing work. Emergency procedures must include (but not be limited to) fire, spills, contamination of the ground, accidents to employees, use of hazardous substances and materials, etc. The contractor must ensure that lists of all emergency telephone numbers / contact persons are kept up to date and that all numbers and names are posted at relevant locations throughout the construction site. The nearest emergency service provider must be identified during all phases of the project as well as its capacity and the magnitude of accidents it will be able to handle. The contact details of this emergency centre, as well as the police and ambulance services must be available at prominent locations around the construction site and the construction crew camps. Fires shall only be permitted in specially designated areas. All contractors, consultants and labourers must ensure that the necessary personal protective equipment (PPE) is worn on site. The construction site must be fenced off to prohibit unauthorised access and site access must be strictly controlled.			
Cultural and heritage resources					
Cultural and heritage rehabilitation				Contractor, ECO	Monitor daily
Rehabilitation after construction					
Rehabilitation process	To ensure rehabilitation of the site	The site shall be cleared of construction material, rubble/waste soon after construction is completed. Compacted soils shall be ripped at least 200 mm deep. All clumps and rocks larger than 30 mm diameter shall be removed from the soil to be rehabilitated. The soil shall be levelled before seeding. Hydro-seed the soil with suitable indigenous ground covering as specified. Watering shall take place at least once per day for the first 14 days until seeds have germinated. Thereafter watering should take place until grass has hardened off.	Rehabilitation undertaken	Contractor	Once a day, then every four days

Environmental risk/ issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of action
Site clearing	No materials to wash into the stormwater system	Remove erosion and sediment controls only if all bare soil is sealed, covered or re-vegetated.	No pollution of the stormwater system	Contractor	As required
	Removal and proper disposal of waste	Decontaminate and collect waste in storage area for off-site recycling or disposal Arrange for final collection and removal of excess and waste materials.	No waste on site once construction is completed	Contractor	As required
Health and safety	Minimize occupational risk to employees as well as surrounding land	Relevant operational staff must receive training on the correct operation of the storage tanks, as well as maintenance and repair procedures when leaks are detected.	Training manual available	Operator	Throughout operation phase

Operational phase

Environmental risk/ issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of action
	Users and occupiers	An emergency response plan must be available on site and employees must be familiar with the plan. The correct PPE should be used on the site. Appropriate Health & Safety signage must be placed on and around the tank. Fire extinguishers and sand bags must be readily available onsite and easily accessible. Firefighting equipment must comply with SANS 1151 (Portable rechargeable fire extinguishers - Halogenated hydrocarbon type extinguishers), and be inspected regularly. No smoking may be permitted on site. No cell phones may be used during fuel dispensing. Overfill and spillages during tanker refuelling and fuel dispensing should be prevented by the installation of automatic cut off devices. Tanker delivery drivers must be present during delivery of fuel with the emergency cut off switch and a fire extinguisher.	PPE provided Fire equipment available Spill kits available		

Environmental risk/ issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of action
		A closed coupling must be used when fuel is being transferred from the bulk delivery vehicle to the USTs to prevent fugitive emissions.			
Soil and groundwater contamination	Minimise impact to soil and/ or groundwater that may occur as a result of leaks	Regular inspection of all pipes, tanks and other associated infrastructure. Accidental spills that occur outside of the bund area must be contained and prevented from entering the stormwater system.	Emergency response plan	Contractor, ECO	Throughout operation phase
		Spills must be treated with the appropriate spill absorbent. Where necessary, spill absorbent must be removed by a certified hazardous waste removal company. Any significant spills or leak incidents must be reported in terms of the National Environmental Management Act and the Water Act. USTs must be fitted with automatic leak detectors that alert management to a leak. Fuel dispenser pumps must be located on a hardened surface to contain spillages. The accumulated contents of the oil/water separator must be removed by an accredited company. The oil/water separator must be inspected regularly to ensure that it is functioning at all times. Water discharged from the oil/water separator must be monitored to ensure it meets the required standard. Overfill and spillages during tanker refuelling and fuel dispensing should be prevented by the installation of automatic cut off devices. Tanker delivery drivers must be present during delivery of fuel with the emergency cut off switch. In the event of the pump dispenser or the hoses being knocked over or ripped off, the fuel supply must be cut off by shear-off valves. All forecourt staff must undergo appropriate training, which must include training to prevent spillages during fuel dispensing.	Remediation plan		

Environmental risk/ issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of action
		The USTs, pipelines and other associated infrastructure must be inspected regularly for leaks and to ensure structural integrity A closed coupling must be used when fuel is being transferred from the bulk delivery vehicle to the USTs. An Emergency Response Plan must be in place for the site, this must clearly describe emergency procedures and include emergency contact numbers. If contamination or leakage is detected, Shell's Emergency Response Plan must be followed. Following a leak or accidental spill, a remediation plan must be compiled and executed. Accidental spills that may occur on the forecourt must be cleaned up immediately using a spill absorbent, which must then be removed by a licenced contractor. Fuel stock must be monitored on a daily basis and these records must be kept on site USTs must have corrosion protection. Inspection wells will be installed within the UST containment area, at all four corners of the containment area. These wells must be inspected on a monthly basis so that leaks can be detected early. An early warning system must be considered for placement within the monitoring wells or beneath the storage tanks. Wellheads on boreholes down gradient of the proposed facility must be constructed to prevent any ingress of surface water either from a fuel spill or water flooding. Shallow monitoring wells must be installed around the storage tanks to ensure any potential leakage from the tanks is detected in time. These wells must be of uPVC or HDPE material and have an internal diameter of at least 50mm. A minimum of one up gradient and two down gradient wells be installed. The depth of the well must be at least 2m below the depth of the storage tank.			

Environmental risk/ issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of action
		Piezometers must be installed in all wells and water level monitoring carried out and recorded either manually or with electronic data loggers Any spill should be cleaned up immediately and contaminated soil should be disposed of at a designated site The pump, refuelling and forecourt areas should all be located on a hardened surface which drains into a common drain. This drain must feed onsite oil and water separator such as a Zorbit Grease Trap The accumulated grease and oil must be removed by an accredited company			
	Pollution from cleaning of equipment	Maintenance on the fuel tanks must be carried out during times of low inflow preferably during May, June and July. In upset conditions (e.g. equipment malfunctioning) the flow must be diverted to available process equipment. Chemicals that have been used for cleaning should be disposed of correctly. MSDSs should always be available. A specialized waste disposal company is to be contracted to ensure the safe handling, storage and transportation of the chemical waste. Emergency plan and procedures are to be in place in the event of spillage	Emergency plan and procedures in place. All workers trained on procedures for disposal of the contaminated water. A waste disposal company will be contracted for the safe disposal of chemical waste	Operator	Throughout operation phase
Damage to the wetland leading to loss of ecological structure		Any discharge of runoff into the wetland system must be done in such a way as to prevent erosion. In this regard, special mention is made of the use of energy dissipating structures in storm water discharge; Ongoing monitoring of the wetland for erosion, incision, and proliferation of alien vegetation Implement alien vegetation control program within wetland areas.	Intact wetland area	Management authority	Ongoing

Environmental risk/ issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of action
Waste management	Effective waste management: Sludge handling, oil, other hazardous and general wastes generated during operational activities	The sludge generated in the process must be disposed of appropriately. To lower the potential for leachate formation, domestic waste is to be placed in a water tight container and disposed of on a regular basis. Used oil must be disposed of in accordance with the correct procedures. All equipment that has the potential for spillages or leakages shall be equipped with drip-trays. To ensure that spillages of oils and effluent are limited. In the event of a spill/leak, the source of the spill or leak must be identified and correctly addressed. The oil/effluent spill/leak must be cleaned immediately and any contaminated soil must be removed and disposed of through a recognisable waste disposal method.ng maintenance. Submersible pumps are to be fitted with leak detectors that check the integrity of the pipework.	Waste disposal contract Leak detection procedures and cleaning methodology	Operator	Throughout operation phase
Traffic associated with the bulk delivery of fuels	Reduce any traffic congestion	Delivery times should be scheduled so that they do not conflict with other deliveries/ removals. There is to be sufficient turning space for delivery vehicles.	Delivery route defined	Operator	Throughout operation phase
Air quality	Minimize negative impact on air quality	USTs to be fitted with breather pipes. Vent pipes to be fitted such that they face away from the neighbouring residential areas. All operator delivery vehicles will be adequately maintained to reduce exhaust emissions.	Air quality not impacted negatively	Operator	Throughout operation phase
Employment creation	Maximize employment opportunities	All recruitment must be in-line with Employment Equity Policy. The policy will also promote the employment of women to ensure that gender equality is attained as per the Employment Equity Act No 55 of 1998. Where possible, priority should be given to job seekers from the local area.	Employment equity policy Certificates	Operator	Throughout operation phase

Environmental risk/ issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of action
		The operator must build the capacity of employees through development plans, technical, health and safety training and provide them with relevant training certificates.			
Noise	Minimize noise pollution	A grievance procedure will be established whereby noise complaints can be received, recorded and responded to appropriately. Equipment such as mechanical equipment, extraction fans, refrigerators that are fitted with noise reduction facilities (e.g. side flaps, silencers etc) must be used as per operating instructions and maintained properly. Noise levels should comply with the SANS Code of Practice 100103 – 0994 (recommended noise levels). Local by-laws for noise levels must be adhered to. Noise, especially at night, should be kept to a minimum.	Experienced noise levels to be within acceptable limits. Grievance procedure	Operator	Throughout operation phase
Visual	Minimize visual impact associated with the day-to-day operations	Litter and waste should be effectively managed to avoid visual problems in the area. Buildings and landscaping should receive on-going maintenance to avoid visual decay. Buildings and landscaping should receive on-going maintenance to avoid visual decay. Light pollution should be minimised. Lighting on site is to be sufficient for safety and security purposes but shall not be intrusive to road traffic on the adjacent R566.	Visual inspection	Operator	Throughout operation phase

Decommissioning phase

At this point of the project planning process, the necessity for and timing of the decommissioning of the proposed project is not anticipated nor known. However, in order to minimise the extent of rehabilitation activities required during the decommissioning phase, constant effort will be applied to rehabilitation activities throughout the construction, operation and maintenance phases of the project.

Environmental risk/ issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of action
Traffic impacts associated with the UST removal and required machinery.	Manage any potential traffic congestion	Co-ordination of movement of vehicles on and off site to reduce risks and prevent congestion on roads in the vicinity of the site. Peak traffic hours should be avoided. Large vehicle turning must take place onsite and not in the adjacent roads. In cases where activities may obstruct traffic, local traffic officials must be contacted.	Incident Report	Contractor	Throughout decommissioning phase
Noise impacts associated with decommissioning activities.	Manage any potential noise impacts	Inform surrounding businesses about the decommissioning and the expected duration thereof. Decommissioning activities to occur during working hours only (8am- 5pm). Contractors to be conscious of the noise generated during their decommissioning activities and should limit excessive noise wherever possible. Where possible, decommissioning equipment should be installed with silencers. Ear plugs and other applicable Personal Protection Equipment must be used by workers onsite, as required	Incident Report	Contractor and/or Shell	Throughout decommissioning phase
Refuse (refers to all general refuse).	Limit the potential for site pollution and the accumulation of refuse materials on site.	All refuse must be removed from site by the contractor and disposed of at a registered facility. Daily inspection must be undertaken on site and immediate surrounds. All excavation rubble must be collected into a skip and disposed of, as and when required.	Visual inspection	Contractor and/or Shell	Throughout decommissioning phase
Dust control	Limit fugitive dust emissions	The Contractor will take appropriate measures to minimise the generation of dust as a result of the works. Such measures may include wetting of surfaces and covering of soil stockpiles. Any complaints received from neighbours must be reported to Shell and measures must be taken to limit dust.	Visible fugitive dust	Contractor	Throughout decommissioning phase
Access control	Minimise health and safety risks to onsite personnel and the public.	The work area must be fenced off to prevent unauthorized access to working areas. Only designated workers, supervision and nominated personnel will be allowed in work areas.	Incident Report	Contractor	Prior to and throughout decommissioning

Environmental risk/ issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of action
		Relevant signage must be placed in and around the proposed site, for purposes of awareness.			
Soil contamination	Minimize soil contamination.	Residual material must be removed from the USTs and associated infrastructure and the USTs will be degassed before removal. Soil samples will be obtained from the base and sides of the UST excavation to verify that the site is unimpacted and does not pose a contamination risk to human or the environment. Backfill material must be unimpacted. Or ensure appropriate handling of impacted soil (i.e. bioremediation at an appropriately licensed facility) or reuse of the soil as backfill onsite.	Visual assessment on site and incident report. The removal of soil from the UST excavation must be in accordance with the specifications of the excavation plan.	Removal contractor, Environmental Control Officer, Hazardous Waste Disposal Contractor and Shell	Throughout decommissioning phase
Groundwater pollution	Minimise groundwater contamination during or after decommissioning.	Ensure fuel has been removed from the UST. Pipes and vents must be disconnected and removed before the tank is lifted. The UST must be securely fastened before transportation via truck from the site.	Visual assessment	Removal Contractor, Environmental Consultant, and Shell	Throughout decommissioning phase
Waste	Minimize the generation of waste, incl. hazardous waste, may contaminate the receiving environment	All hazardous material to be disposed of at a registered hazardous waste site for disposal by a licensed contractor. The rubble is disposed of at a registered landfill site, with proof of disposal certificates. Solid waste must be properly managed and disposed of in a licensed waste disposal facility and must comply with relevant legislation.	Visual inspection	Removal and Hazardous Waste Disposal Contractor	Throughout decommissioning phase
Impacts on existing infrastructure, services and servitudes	Avoid damage or destruction of existing infrastructure in the near vicinity of the proposed activities.	The person(s) conducting the demolition must be familiar with the location of buried utilities that may be present around the site. These include water, electricity, sewage, gas, compressed air, communication and, close circuit television.	Visual inspection and incident report	Removal Contractor, and Shell	Throughout decommissioning

Environmental risk/ issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of action
		Should existing infrastructure need to be interrupted for decommissioning purposes, prior approval must be received from the relevant parties, before commencing with decommissioning.			
Visual impact	Minimizing visual impact to surrounding receptors	Fencing of decommissioning area and attaching shade cloth, where necessary. At the end of the life of the project unneeded structures should be demolished and removed from the site. Unneeded roads, parking and other paved areas should be broken up and the site re-instated or redeveloped.	Visual inspection	Removal Contractor, and Shell	Throughout decommissioning phase
Vibrations	Minimizing the impacts of vibrations on surrounding receptors	Decommissioning activities causing vibration will only be undertaken during working hours only (8am- 5pm). Equipment will be used as per operating instructions and maintained properly during project works. The applicant will adhere to local authority by-laws relating to noise control.	Visual inspection and incident report	Removal Contractor, and Shell	Throughout decommissioning phase
Fire Risks		Fire safety is to be considered and all vehicles should have fire extinguishers Employees are to be trained on fire safety and there should be fire marshals. The prescribed fire safety precautions in terms of the Occupational Health and Safety Act must be adhered to.			

13. REHABILITATION PLAN

13.1.Site rehabilitation

All working areas shall be rehabilitated before the team leaves the site. This includes closure and rehabilitation of any temporary access routes and stream diversion. All foreign material not utilised in the rehabilitation activities shall be removed, re-vegetation of all exposed soil done and any potential erosion risks addressed.

Any areas that the Engineer in liaison with the ECO believes may have been impacted upon or disturbed, shall be rehabilitated to the satisfaction of the Engineer, which includes all areas where top material has been stripped. The Contractor shall clear everything from the Site not forming part of the Permanent Works. The composition of vegetation to be used for any rehabilitation work shall be agreed to by the ECO.

The Contractor shall not use herbicides, pesticides, fertilisers or other poisonous substances for the rehabilitation process unless otherwise agreed with the Engineer and ECO. All rehabilitated areas shall be considered "no go" areas and the Contractor shall ensure that none of his staff or equipment enters these areas. The Contractor shall undertake to remove all alien vegetation re-establishing on the area and shall implement the necessary temporary or permanent measures to combat soil erosion.

13.2.Removal of materials

After construction, any area cleared or disturbed (as a result of the activity) within and outside the boundaries of the construction site shall be rehabilitated to a state as specified by the ECO.

All construction equipment and excess aggregate, gravel, stone, concrete, bricks, temporary fencing shall be removed from the site upon completion of the work. No discarded materials of any nature shall be buried on the site, or on any vacant or open land in the area and shall only be disposed of at the appropriate registered waste disposal site.

13.3.Control of alien vegetation

All invasive alien plants shall be cleared from the site. On-going clearance shall be undertaken during the operation of the activity.

13.4.Landscaping and preparation for planting

Top material that is disturbed or removed during construction and excavation shall be replaced, preferably using topsoil stockpiled prior to excavation activities, or with topsoil sourced from another reputable source. However, where possible, soils from different areas should not be mixed. Care shall be taken not to mix the topsoil with the subsoil during shaping operations. Indigenous plants shall be used in the landscaping of the site. Plants that are proclaimed as problem plants or noxious weeds are to be excluded from the landscaping plan and these should be removed immediately, should they occur on site. According to the South African National Biodiversity Institute, species recommended for landscaping of the public areas include:

Trees and shrubs:

Buddleja saligna (False olive)
Buddleja salviifolia (Sagewood)
Celtis africana (White stinkwood)
Diospyros lycoides (Bluebush)

Dombeya rotundifolia (Wild pear)
Gymnosporia buxifolia (Common spike-thorn)
Olea europaea (Wild olive)
Rhus lancea (Karee)
Rhus leptodictya (Mountain Karee)

Bulbs and forbs

Agapanthus species (Agapanthus)
Albuca species
Barleria obtusa
Ceratotheca triloba (Wild foxglove)
Chlorophytum species
Crinum species (Orange River Lily/Graslelie)
Felicia muricata
Gazania krebsiana (Botterblom)
Gerbera species (Barberton Daisy)
Leonotis species (Wild dagga)
Nemesia species
Trachyandra species
Watsonia species (Watsonia)

The landscaping architect and excavation contractor shall be in consultation with each other and the ECO so as to prevent misunderstandings and therefore prevent potential negative environmental impacts as a result of land scaping activities. An ecological approach to landscaping is recommended. Plants introduced into the project sites shall be guided by ecological rather than horticultural principles. For example, ecological communities of indigenous plants provide more biodiversity and habitat opportunities and would blend with natural vegetation. This approach is also less costly to maintain and is sustainable in the long term.

14. PROCEDURES FOR ENVIRONMENTAL INCIDENTS

Leakages and spills

- Identify source of problem;
- Stop the leak, if safe to do so;
- Contain spilt material, using spills kit or sand;
- Notify Environmental Control Officer;
- Remove spilt material and place in sealed container for disposal (if possible); and - Site Manager in liaison with ECO, to follow Incident Management Plan.

Failure of erosion/sediment control devices

- Prevent further escape of sediments;
- Contain escaped material using silt fence, hay bales, pipes, etc.;
- Notify ECO;
- Repair or replace failed device as appropriate;
- Dig/scrape up escaped material; take care not to damage vegetation;
- Remove escaped material from site; and
- Monitor for effectiveness until re-establishment.

Bank/slope failure

- Stabilise toe of slope to prevent sediment escape using aggregate bags, silt fence, logs, hay bales, pipes, etc.;
- Notify ECO;
- Site Manager, in liaison with ECO to follow Incident Management plan;
- Divert water upslope from failed fence;
- Protect area from further collapse as appropriate;
- Restore as advised by ECO; and
- Monitor for effectiveness until stabilised.

Discovery of rare/endangered species

- Stop work and notify ECO;
- If a plant is found, mark location of plants;
- If an animal, mark location where sighted;
- ECO to identify or arrange for identification of species and or the relocation of the species if possible;
- If confirmed significant, ECO to liaise with Endangered Wildlife Trust; and - Recommence work when cleared by ECO.

Discovery of archaeological/heritage items

- Stop work; notify ECO, do not disturb the area;
- ECO to arrange appraisal of specimen;
- If confirmed significant, the Site Manager in consultation with the ECO to liaise with National, Cultural and History Museum, P.O. Box 28088, SUNNYSIDE, 0132.
- Recommence work when cleared by ECO.

15. EMPR REVIEW

The Site Supervisor is responsible for ensuring the work crew complies with procedures, and for informing the work crew of any changes that may have been affected on the EMPr. If the contractor cannot comply with any of the activities as described above, they should inform the ECO with reasons within 7 working days. The ECO must identify measures to ensure compliance with environmental laws. Where amendments to the EMPr are required, the process provided for in the Regulations must be followed.

Annexure 1: Sample

Method statement Solid Waste Management

Contract: ..... **Date:** .....

WHAT WORK IS TO BE UNDERTAKEN? [give a brief description of the works to be undertaken on site that will generate waste (hazardous and non-hazardous wastes)]: *Note: lease attach extra pages if more space is required.

*Insert additional pages as required

WHERE ARE THE WORKS TO BE UNDERTAKEN? (where possible, provide an annotated plan and a full description of the extent of the works): *Note: please attach extra pages if more space is required

*Insert additional pages as required

Method statement Solid Waste Management (contd.)

Start and end date of the works for which the method statement is required:

Start date: ..... **End date:** .....

HOW IS WASTE TO BE MANAGED ON SITE? (provide as much detail as possible, including annotated sketches and plans where possible):*Note: please attach extra pages if more space is required.

*Insert additional pages as required

Annexure 2: Sample (must be updated).

Environmental incident log			
Date	**Environmental condition**	**Comments** Include any possible explanation for current and responsible parties. Include photographs, records, etc. if available.	**Corrective action taken** Give details and attach documentation as far as possible.

REFERENCES

Lochner, P. 2005. Guideline for Environmental Management Plans. CSIR Report No ENV-S-C 2005-053 H. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town

APPENDICES

Appendix A: Letters

(i) Acknowledgement Letter

agriculture, rural development, land & environmental affairs
MPUMALANGA PROVINCE
REPUBLIC OF SOUTH AFRICA

Building 4, Aqua Street, Riverside Park, Mbombela, 1200, Mpumalanga Province, P.O Box 266, Mbombela, 1200
Tel: +27 (013) 759 4000

LitikoLetekulima, Kutfutfukiswa KwelindzawoTasemakhaya, Temhlaba Netesimondzawo | Departement van Landbou, LandelikeOntwikkeling, GrondenOngewing Sake | umNyangoweZelimo UkuThuthukiswakweeNdawozemaKhaya, iNarhaneeNdabazeBhoduluko

Enquiries : Thokozile Sithole
Telephone : 082 7373 400
Reference : 1/3/1/16/1E-470

Dr Kenneth Singo
Singo Consulting (Pty) Ltd
Private Bag X 7214
Witbank
1035

Email: Kenneth@singoconsulting.co.za

Dear Sir

APPLICATION FOR ENVIRONMENTAL AUTHORISATION: DEVELOPMENT OF A FUEL DEPOT ON A PORTION OF PORTION 1 OF THE FARM LEEUSPRUIT 385 JU, NKOMAZI LOCAL MUNICIPALITY.

The Department confirms having received the application form for environmental authorization and the draft basic assessment report for the abovementioned project on 14 August 2023.

The application has been assigned the reference number **1/3/1/16/1E-470**. Kindly quote this reference number in any future correspondence in respect of the application. The responsible officer is **Thokozile Sithole** and all correspondence must be directed to: The Director, Environmental Impact Management. Please note that you must, within 90 days from 14 August 2023, submit to this office a final basic assessment report - inclusive of specialist reports and an EMPr - which has already been subjected to a public participation process, and was provided to registered interested and affected parties for a period of at least 30 days for comment, and which reflects the incorporation of any comments received, including any comments from this office. In this regard you are referred to the requirements of Regulation 40(3).

Please note that in terms of the provisions of Regulation 45, this application will lapse, and this office will deem the application to have lapsed, if the applicant fails to submit the basic assessment report within the timeframe specified above.

Please draw the applicant's attention to the fact that the activity may not commence prior to an environmental authorisation being granted by the Department.

Yours faithfully,

pp

MR. X. NKOSI
DEPUTY DIRECTOR: ENVIRONMENTAL IMPACT MANAGEMENT
DATE: 17/08/2023

MPUMALANGA
THE PLACE OF THE RISING SUN

(ii) Wholesale Licence

energy

Department:
Energy
REPUBLIC OF SOUTH AFRICA

WHOLESALE LICENCE CERTIFICATE

THIS IS TO CERTIFY THAT
ITHUBA PETROLEUM PRIVATELY LIMITED

ID/REGISTRATION NUMBER
2015/399372/07

LICENCE NUMBER
W/2016/0141

Is a wholesale Licence holder in terms of the
Petroleum Products Act, 1977 (Act No. 120 of 1977)

LICENSED PETROLEUM PRODUCTS
AVIATION GASOLINE, BIOFUELS, DIESEL, JET FUEL, LIQUEFIED PETROLEUM GAS, PARAFFIN, PETROL

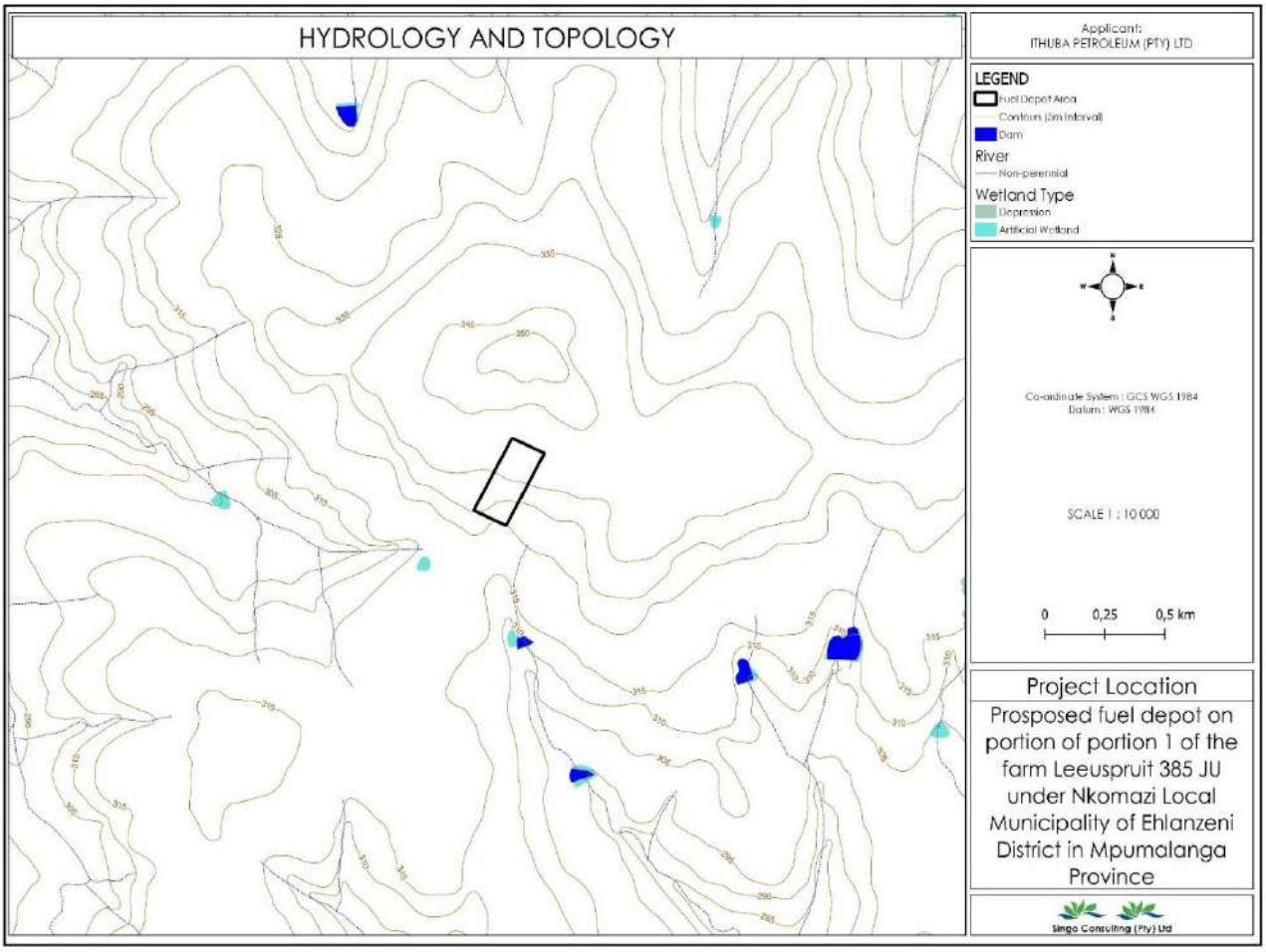
ADDRESS

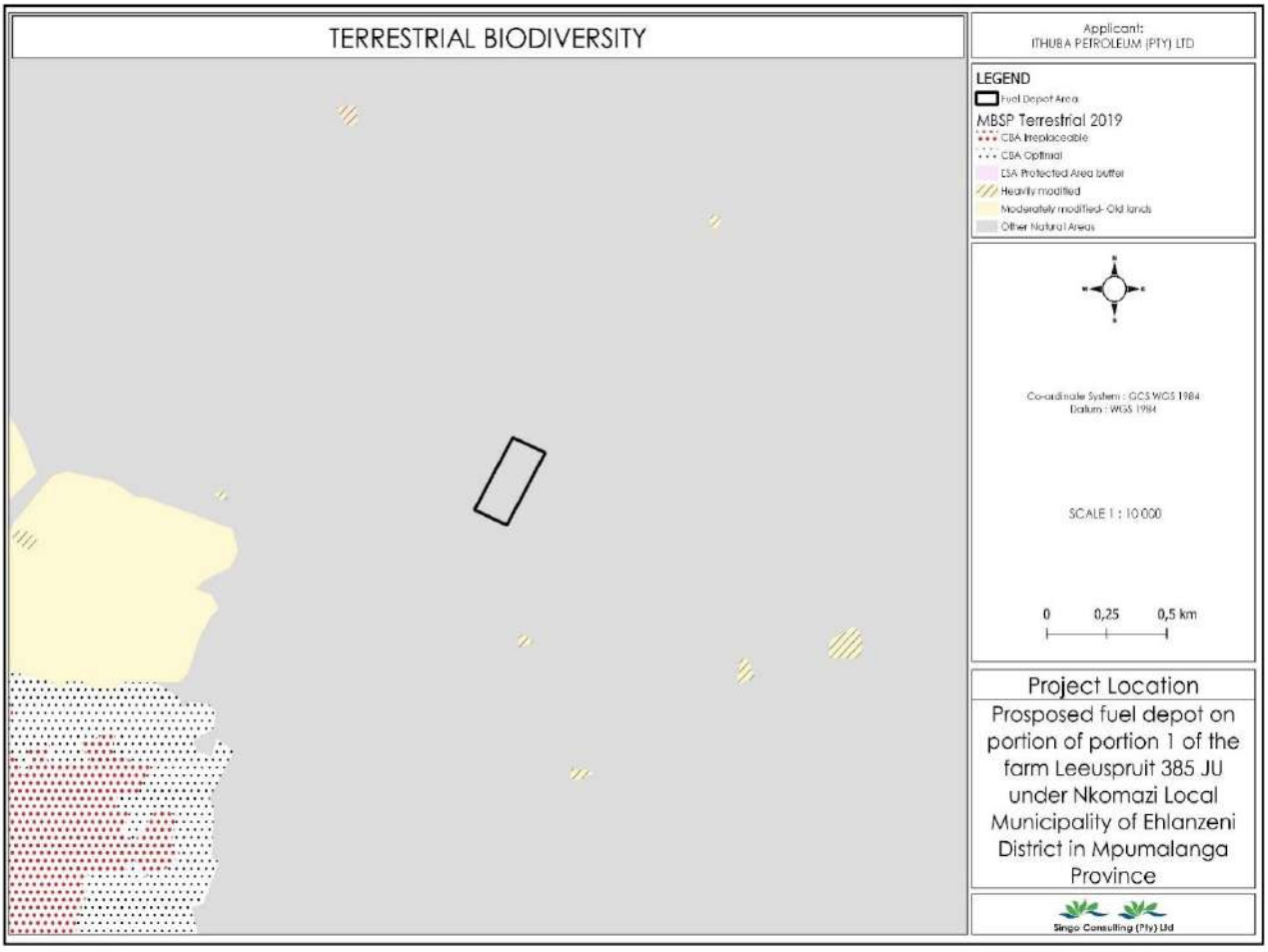
60 BANJO WALK
BELHAR
CAPE TOWN
WESTERN CAPE
7493

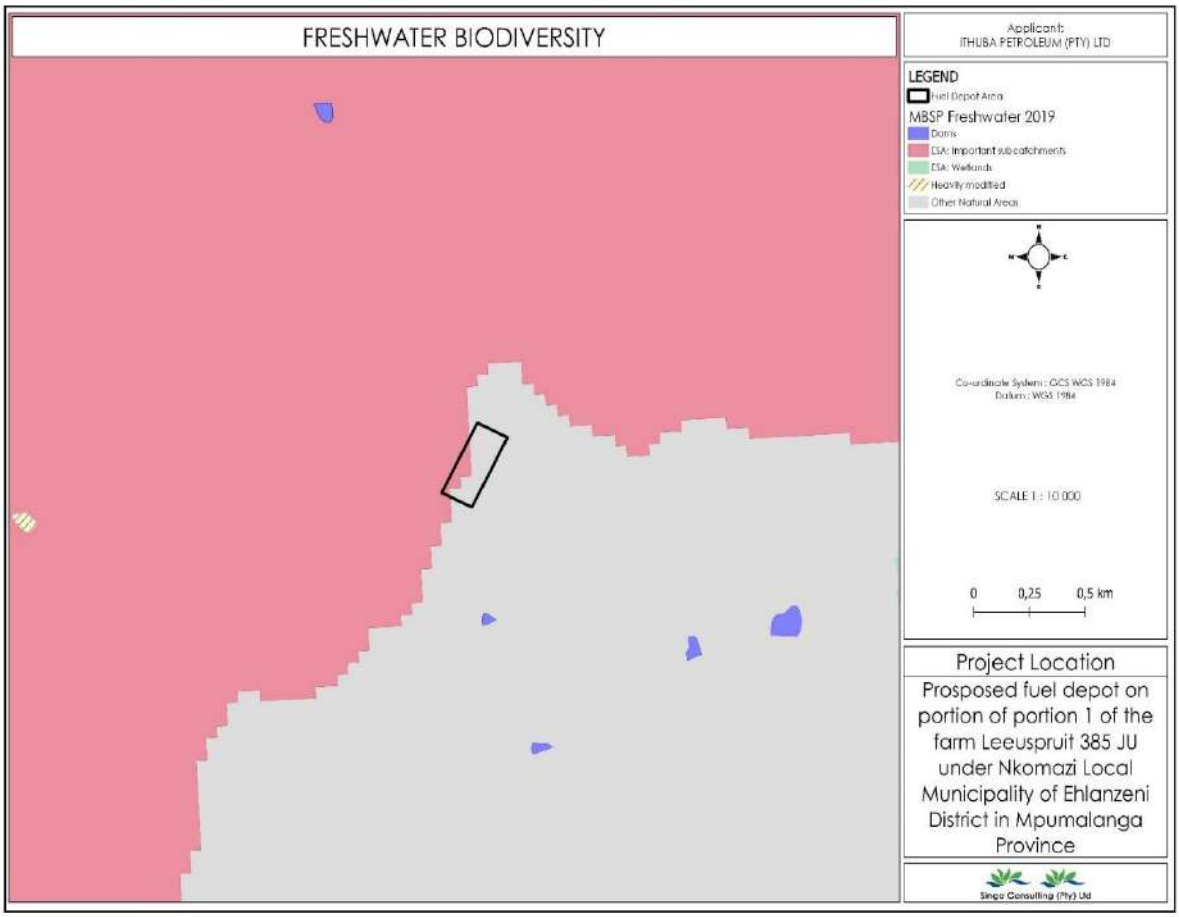
08 June 2016
Date of Issue

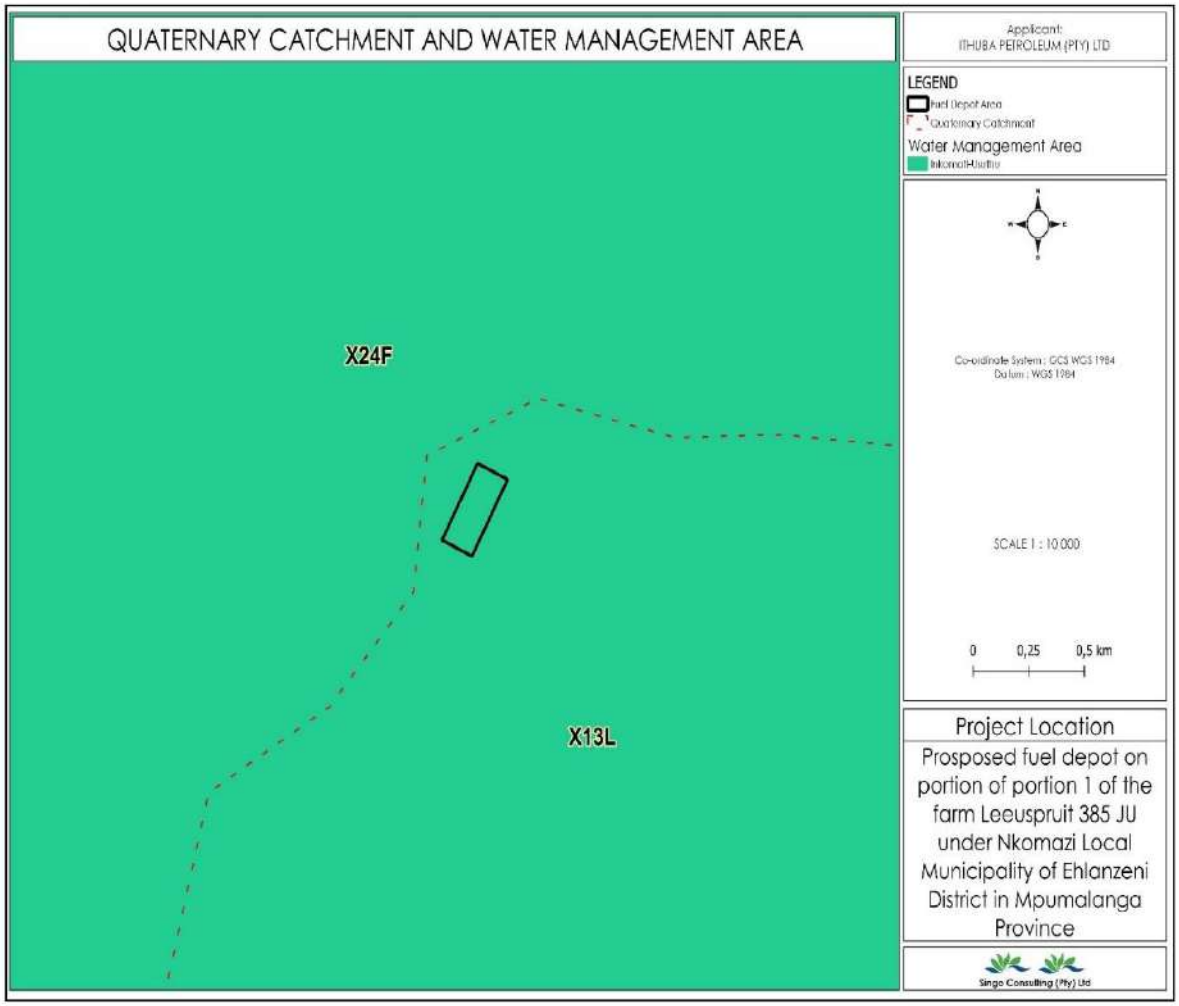
Controller of Petroleum Products

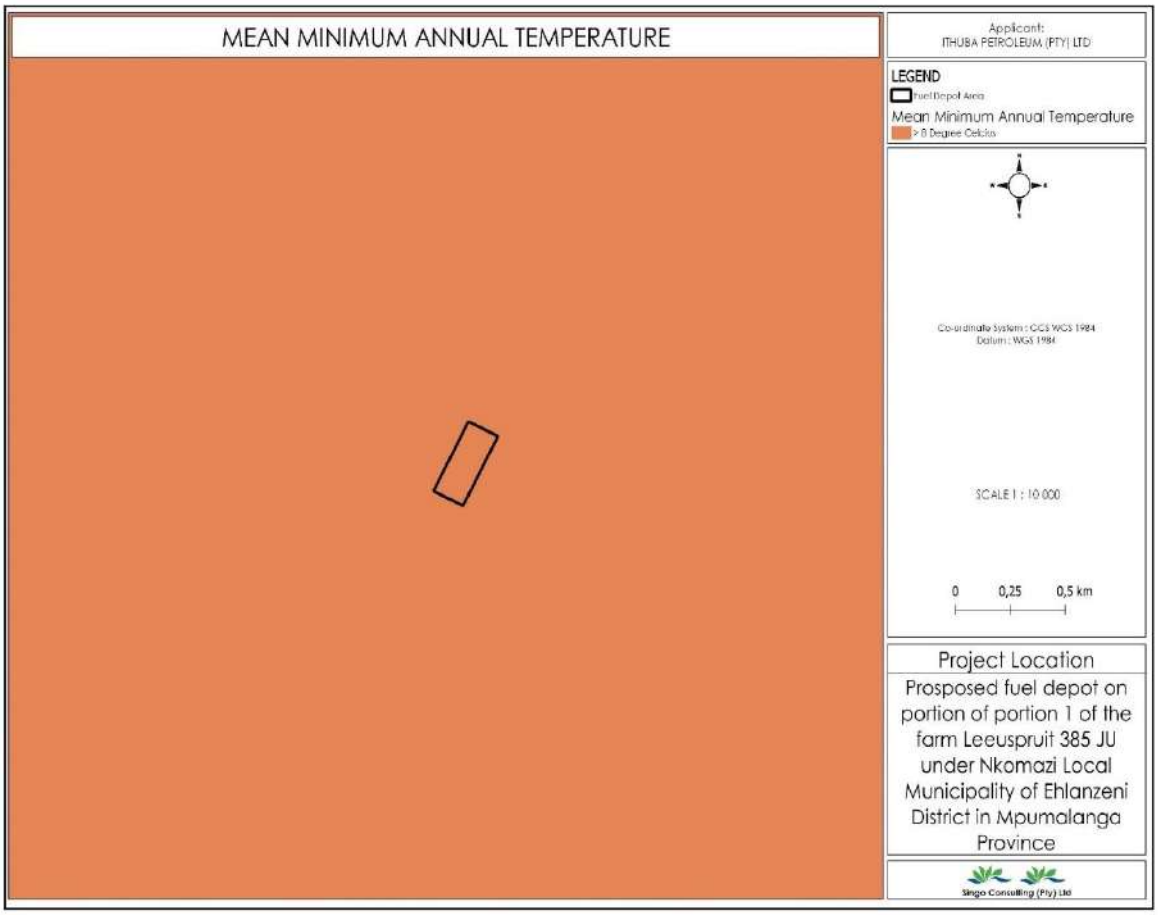
APPENDIX B: PROJECT MAPS

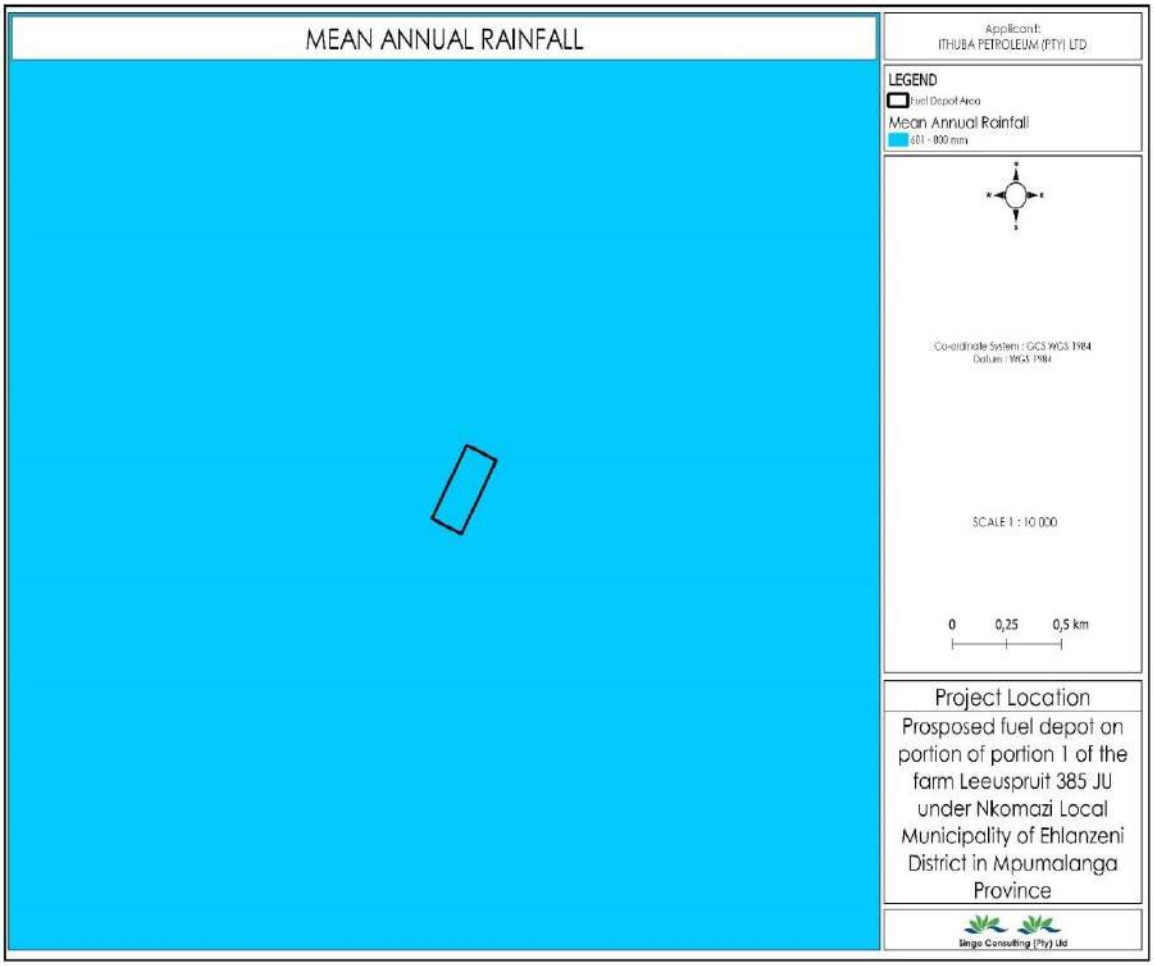


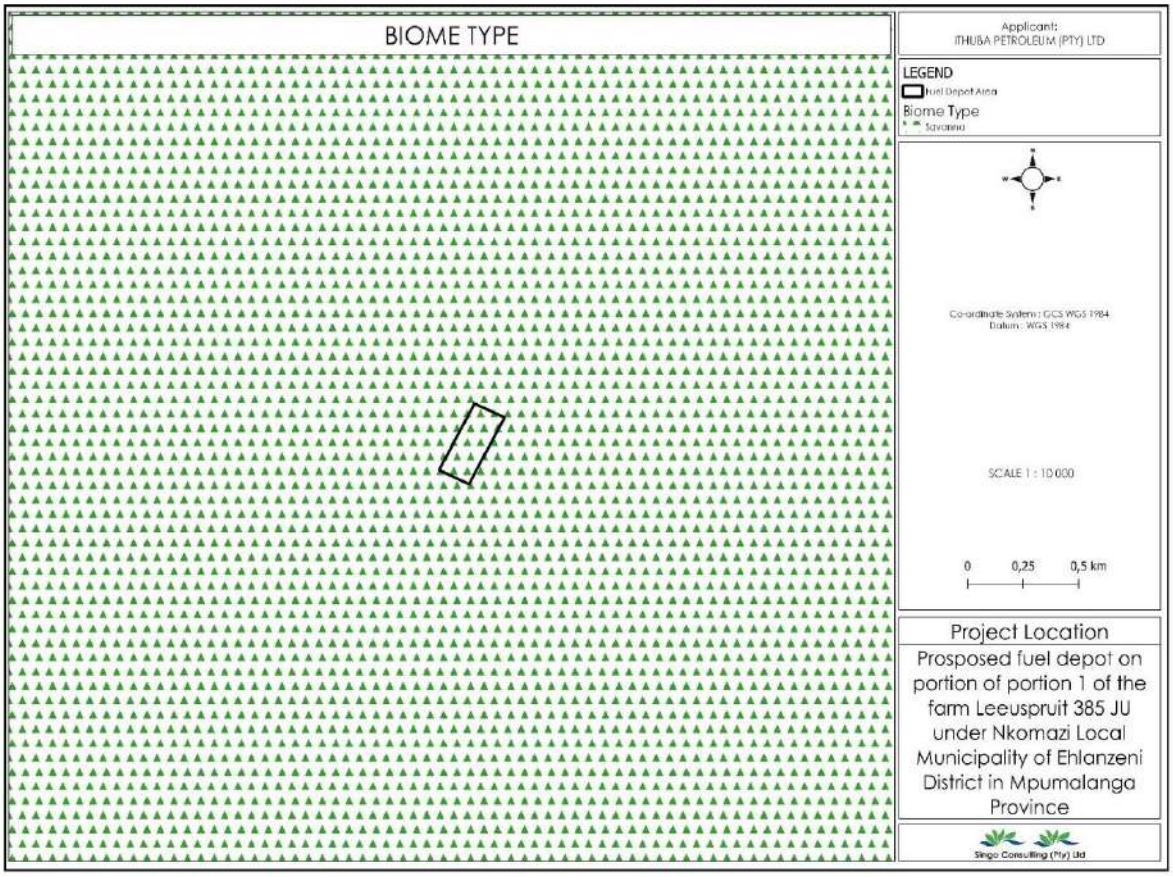


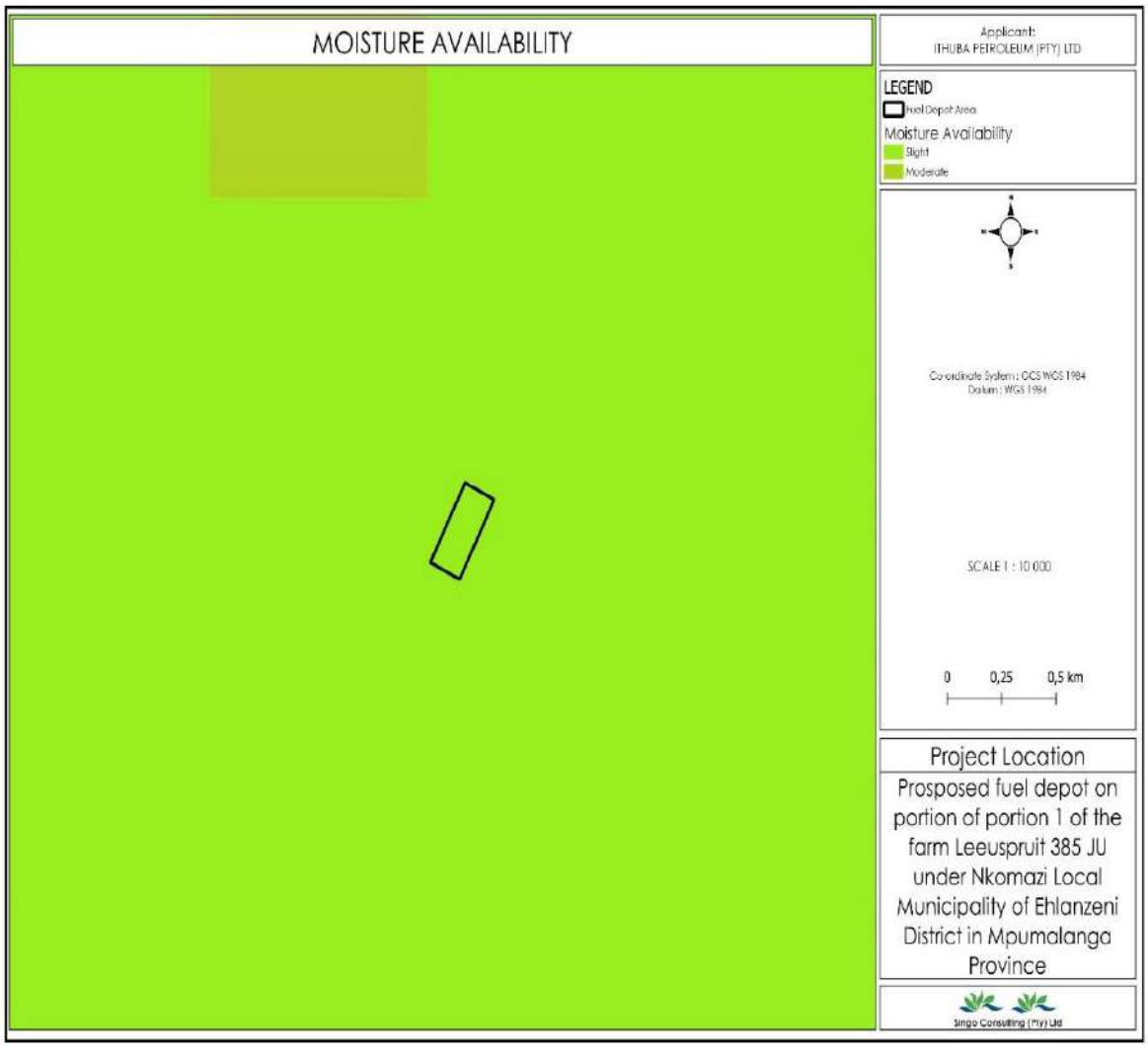

FRESHWATER BIODIVERSITY
Applicant:
ITHUBA PETROLEUM (PTY) LTD
LEGEND
Fuel Depot Area
MBSP Freshwater 2019
Dams
ESA: Important sub catchments
ESA: Wetlands
Heavily modified
Other Natural Areas
Co-ordinate System : GCS WGS 1984
Datum : WGS 1984
SCALE 1 : 10 000
0 0,25 0,5 km
Project Location
Prosposed fuel depot on portion of portion 1 of the farm Leeuspruit 385 JU under Nkomazi Local Municipality of Ehlanzeni District in Mpumalanga Province
Singo Consulting (Pty) Ltd

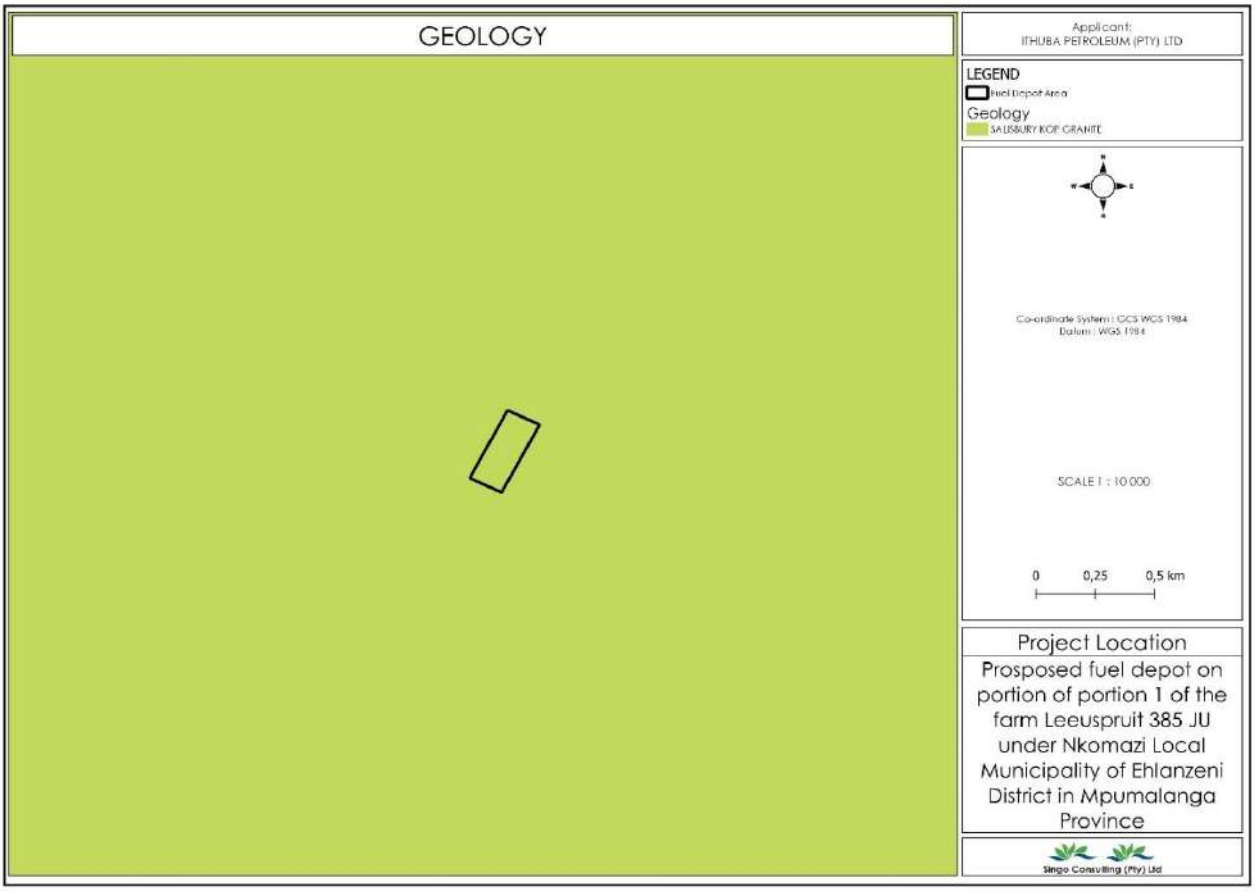

QUATERNARY CATCHMENT AND WATER MANAGEMENT AREA
X24F
X13L
Applicant:
ITHUBA PETROLEUM (PTY) LTD
LEGEND
Fuel Depot Area
Quaternary Catchment
Water Management Area
Inkomati-Usuthu
Co-ordinate System : GCS WGS 1984
Datum : WGS 1984
SCALE 1 : 10 000
0 0,25 0,5 km
Project Location
Prosposed fuel depot on portion of portion 1 of the farm Leeuspruit 385 JU under Nkomazi Local Municipality of Ehlanzeni District in Mpumalanga Province
Singo Consulting (Pty) Ltd

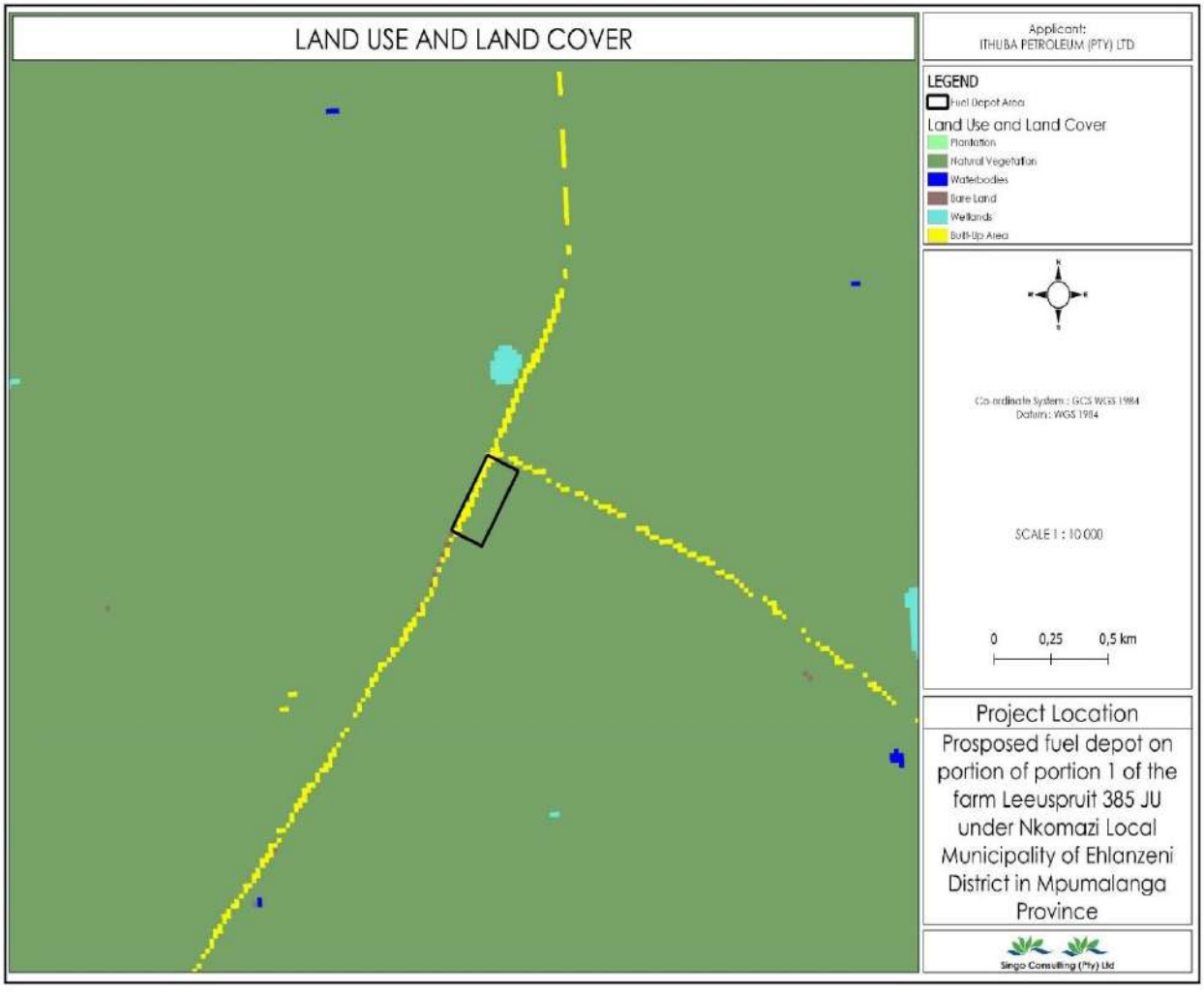

MEAN MINIMUM ANNUAL TEMPERATURE
Applicant:
ITHUBA PETROLEUM (PTY) LTD
LEGEND
Fuel Depot Area
Mean Minimum Annual Temperature
> 0 Degree Celcius
Co-ordinate System : GCS WGS 1984
Datum : WGS 1984
SCALE 1 : 10 000
0 0,25 0,5 km
Project Location
Prosposed fuel depot on portion of portion 1 of the farm Leeuspruit 385 JU under Nkomazi Local Municipality of Ehlanzeni District in Mpumalanga Province
Singo Consulting (Pty) Ltd

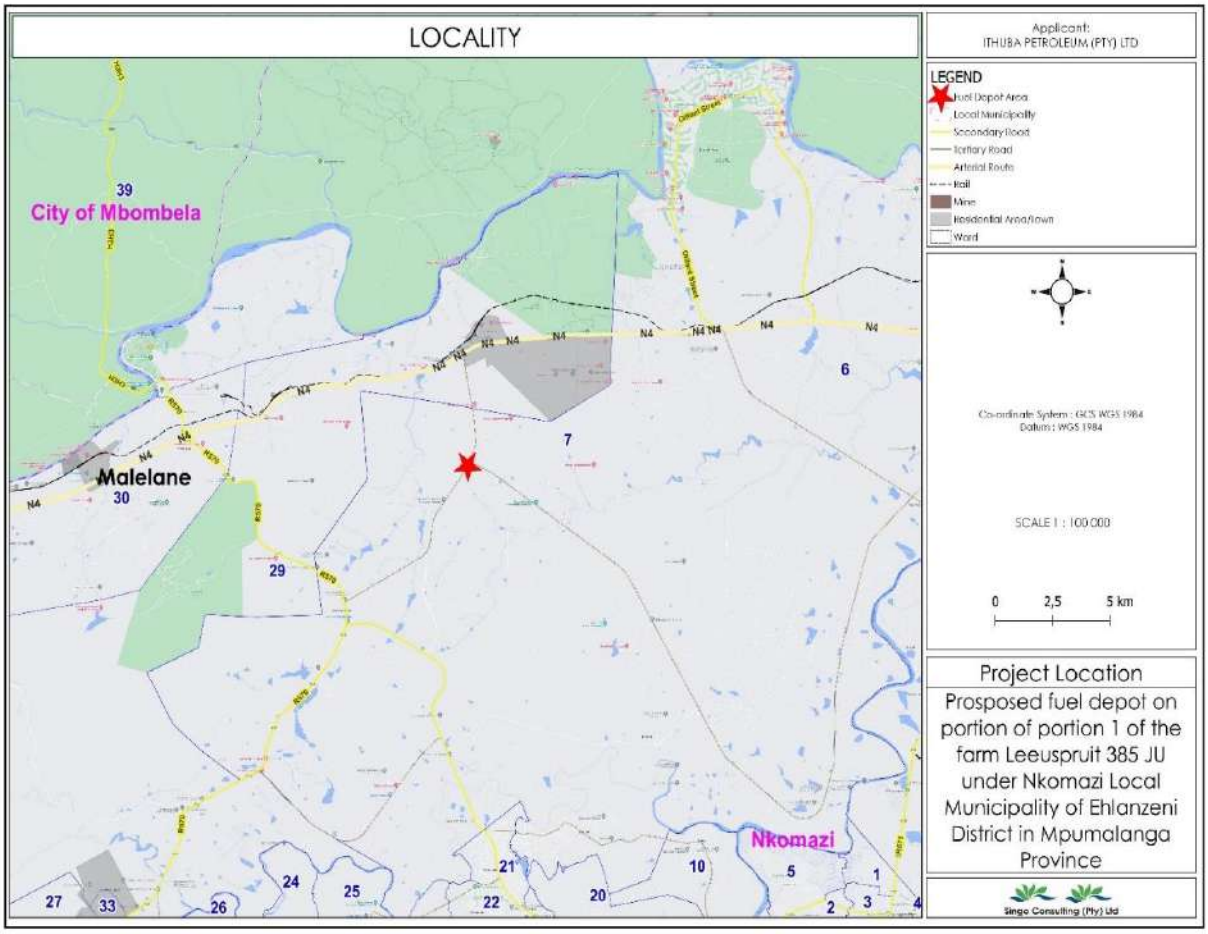

MEAN ANNUAL RAINFALL
Applicant:
ITHUBA PETROLEUM (PTY) LTD
LEGEND
Fuel Depot Area
Mean Annual Rainfall
601 - 800 mm
Co-ordinate System : GCS WGS 1984
Datum : WGS 1984
SCALE 1 : 10 000
0 0,25 0,5 km
Project Location
Prosposed fuel depot on portion of portion 1 of the farm Leeuspruit 385 JU under Nkomazi Local Municipality of Ehlanzeni District in Mpumalanga Province
Singo Consulting (Pty) Ltd

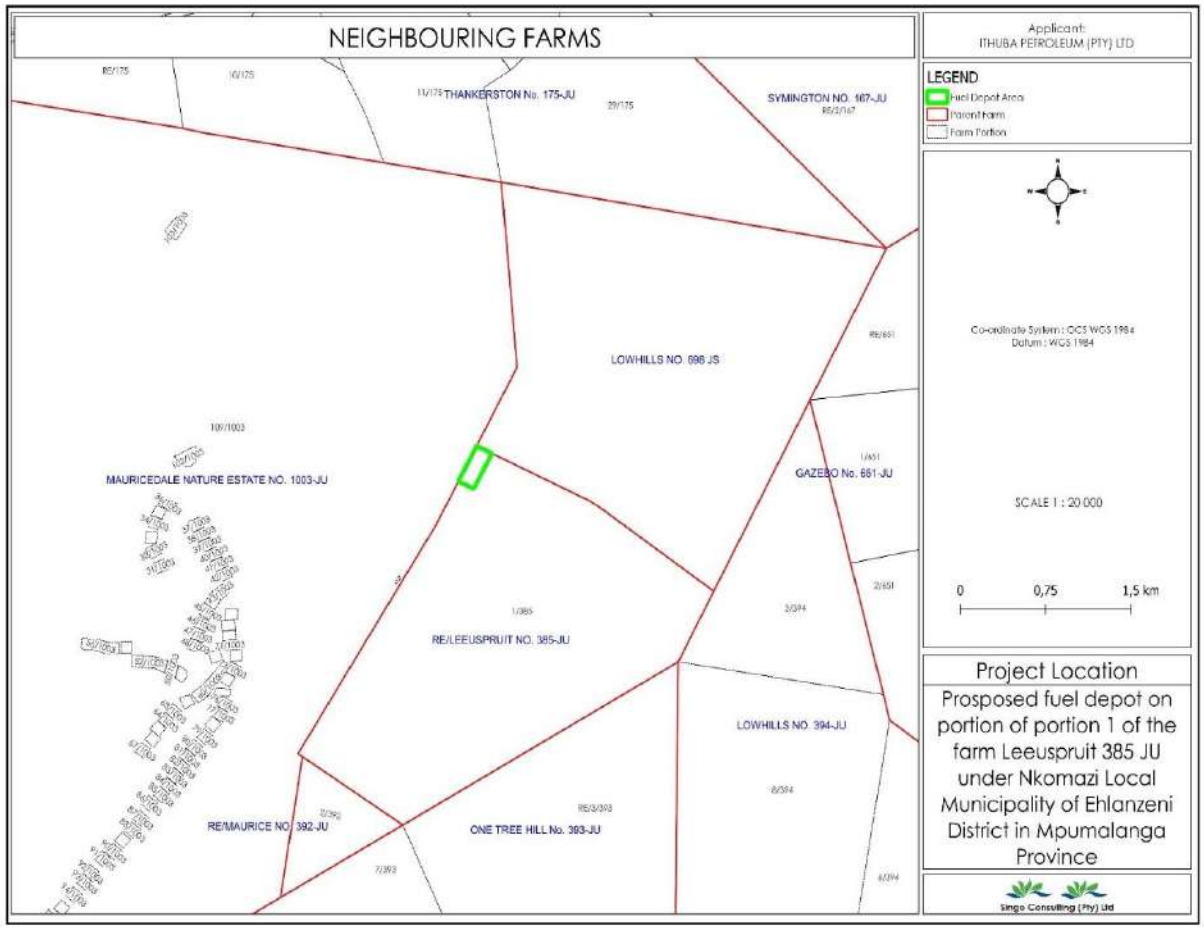

BIOME TYPE
Applicant:
ITHUBA PETROLEUM (PTY) LTD
LEGEND
Fuel Depot Area
Biome Type
Savanna
Coordinate System: GCS WGS 1984
Datum: WGS 1984
SCALE 1 : 10 000
0 0,25 0,5 km
Project Location
Prosposed fuel depot on portion of portion 1 of the farm Leeuspruit 385 JU under Nkomazi Local Municipality of Ehlanzeni District in Mpumalanga Province
Singo Consulting (Pty) Ltd


MOISTURE AVAILABILITY
Applicant:
ITHUBA PETROLEUM (PTY) LTD
LEGEND
Fuel Depot Area
Moisture Availability
Slight
Moderate
Coordinate System: GCS WGS 1984
Datum: WGS 1984
SCALE 1 : 10 000
0 0,25 0,5 km
Project Location
Prosposed fuel depot on portion of portion 1 of the farm Leeuspruit 385 JU under Nkomazi Local Municipality of Ehlanzeni District in Mpumalanga Province
Singo Consulting (Pty) Ltd


GEOLOGY
Applicant:
ITHUBA PETROLEUM (PTY) LTD
LEGEND
Fuel Depot Area
Geology
SALISBURY KOP GRANITE
Co-ordinate System : GCS WGS 1984
Datum : WGS 1984
SCALE 1 : 10 000
0 0,25 0,5 km
Project Location
Prosposed fuel depot on portion of portion 1 of the farm Leeuspruit 385 JU under Nkomazi Local Municipality of Ehlanzeni District in Mpumalanga Province
Singo Consulting (Pty) Ltd


LAND USE AND LAND COVER
Applicant:
ITHUBA PETROLEUM (PTY) LTD
LEGEND
Fuel Depot Area
Land Use and Land Cover
Plantation
Natural Vegetation
Waterbodies
Bare Land
Wetlands
Built-Up Area
Co-ordinate System : GCS WGS 1984
Datum : WGS 1984
SCALE 1 : 10 000
0 0,25 0,5 km
Project Location
Prosposed fuel depot on portion of portion 1 of the farm Leeuspruit 385 JU under Nkomazi Local Municipality of Ehlanzeni District in Mpumalanga Province
Singo Consulting (Pty) Ltd


LOCALITY
Applicant:
ITHUBA PETROLEUM (PTY) LTD
LEGEND
Fuel Depot Area
Local Municipality
Secondary Road
Tertiary Road
Arterial Route
Rail
Mine
Residential Area/Town
Ward
City of Mbombela
Malelane
Nkomazi
N4
Co-ordinate System : GCS WGS 1984
Datum : WGS 1984
SCALE 1 : 100 000
0 2,5 5 km
Project Location
Prosposed fuel depot on portion of portion 1 of the farm Leeuspruit 385 JU under Nkomazi Local Municipality of Ehlanzeni District in Mpumalanga Province
Singo Consulting (Pty) Ltd


NEIGHBOURING FARMS
Applicant:
ITHUBA PETROLEUM (PTY) LTD
LEGEND
Fuel Depot Area
Parent Farm
Farm Portion
THANKERSTON No. 175-JU
SYMINGTON NO. 167-JU
LOWHILLS NO. 698 JS
MAURICEDALE NATURE ESTATE NO. 1003-JU
GAZEBO No. 661-JU
RE/LEEUSPRUIT NO. 385-JU
LOWHILLS NO. 394-JU
RE/MAURICE NO. 392-JU
ONE TREE HILL No. 393-JU
Co-ordinate System : GCS WGS 1984
Datum : WGS 1984
SCALE 1 : 20 000
0 0,75 1,5 km
Project Location
Prosposed fuel depot on portion of portion 1 of the farm Leeuspruit 385 JU under Nkomazi Local Municipality of Ehlanzeni District in Mpumalanga Province
Singo Consulting (Pty) Ltd

APPENDIX C: SITE PHOTOGRAPHS


GPS Map Camera


GPS Map Camera


GPS Map Camera


GPS Map Camera


GPS Map Camera

Appendix D: PROPERTY INFORMATION

(I) Title Deed

Deeds Office Property

JU, LEEUSPRUIT, 385, 1, MPUMALANGA

Lexis® WinDeed

This report is compiled exclusively from the very latest data directly supplied to WinDeed by the Deeds Office.

Any personal information obtained from this search will only be used as per the Terms and Conditions agreed to and in accordance with applicable data protection laws including the Protection of Personal Information Act, 2013 (POPI), and shall not be used for marketing purposes.

** ASTERISKS INDICATE THE INFORMATION IS ENRICHED FROM THE WINDEED DATABASE.

SEARCH CRITERIA			
Search Date	2023/09/04 13:42	Farm Number	385
Reference	-	Registration Division	JU
Report Print Date	2023/09/04 13:42	Portion Number	-
Farm Name	LEEUSPRUIT	Remaining Extent	NO
Deeds Office	Mpumalanga	Search Source	Deeds Office

PROPERTY INFORMATION			
Property Type	FARM	Diagram Deed Number	T26012/1980
Farm Name	LEEUSPRUIT	Local Authority	NKOMAZI LOCAL MUNICIPALITY
Farm Number	385	Province	MPUMALANGA
Registration Division	JU	Remaining Extent	YES
Portion Number	1 (REMAINING EXTENT)	Extent	624.2014H
Previous Description	-	LPI Code	T0JU00000000038500001
Suburb / Town**	15KM NORTH OF VLAKBULT	Co-ordinates (Lat/Long)**	-25.503401 / 31.676102

OWNER INFORMATION (1)			
NATIONAL GOVERNMENT OF THE REPUBLIC OF SOUTH AFRICA			Owner 1 of 1
Company Type**	GOVERNMENT	Document	T223/2012
Registration Number	-	Microfilm / Scanned Date	-
Name	NATIONAL GOVERNMENT OF THE REPUBLIC OF SOUTH AFRICA	Purchase Price (R)	7 000 000
Multiple Owners**	NO	Purchase Date	2011/09/15
Multiple Properties**	NO	Registration Date	2012/01/12
Share (%)	-		

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Page 1 of 2

ENDORSEMENTS (4)				
#	Document	Institution	Amount (R)	Microfilm / Scanned Date
1	I-88/2012C	-	-	-
2	CL-RPBA	-	-	-
3	INFO FROM PRETORIA DEEDS REGIS	-	-	-
4	JU,385,1	-	-	-

HISTORIC DOCUMENTS (5)				
#	Document	Institution	Amount (R)	Microfilm / Scanned Date
1	I-444/2010AT	-	-	-
2	B59352/2002	-	-	-
3	T26013/1980	PIERIESFONTEIN BOERDERY PTY LTD	Unknown	-
4	T26013/1980	PIERIESFONTEIN BOERDERY CC	Unknown	-
5	T26013/1980	PIERIESFONTEIN BOERDERY PTY LTD	Unknown	-

ii) Consent Letter

agriculture, land reform & rural development

Department
Agriculture, Land Reform and Rural Development
REPUBLIC OF SOUTH AFRICA

EHLANZENI SHARED SERVICE CENTRE: MPUMALANGA
DIRECTORATE: PROPERTY MANAGEMENT
Private Bag X11305, Nelspruit, 1200; Tel: 013 752 2064; Fax: 013 755 2820; Web: www.dalrrd.gov.za

Attention: Tebenguni Business Enterprises CC
Hectospruit
1330

Dear Mr. Changie Nxumalo

CONSENT FOR THE APPROVAL OF JOINT VENTURE BETWEEN TEBENGUNI BUSINESS ENTERPRISES CC AND TWO SHIPS TRADING 299 (PTY) LTD ON PORTION 1 OF THE FARM LEEUSPRUIT NO. 385 JU, MPUMALANGA PROVINCE, MEASURING 5.2511 HECTARES IN EXTENT FOR THE DEVELOPMENT OF A FILLING STATION AND TRUCK DEPORT.

We confirm that the proposed farm is under the management and control of the Department of Rural Development and Land Reform. We hereby grant the joint venture the authority to carry on with the development while we are waiting for the process within the department to be completed by relevant structures.

Should you require any further clarification please feel free to contact the office on the details above?

Kind regards,

BS MH

PROJECT OFFICER: EHLANZENI DSSC
DATE: 25/07/2023

Appendix E: Specialist Reports
Appendix F: Public Participation
(i) Site Notice (a) Isizulu

ISAZISO SOKUGUNYAZWA KWEMVELO KANYE NEZICELO ZOKUGUNYAZWA NGOKUJWAYELEKILE ZOKUTHUTHUKISWA KWENDAWO YEFUTHA ENGXENYENI 1 YEFARM LEEUSPRUIT 385 JU, ESINGAPHAKATHI KUKAMASIPALA WENDAWO WASENKOMAZI, EMPUMUMA. DARDLEA REF NO: TBA AND DWS REF NO: TBA

I-Ithuba Petroleum (Pty) Ltd ifake izicelo zeLayisense Yokugunyazwa Kwemvelo kanye Nokusebenzisa Amanzi endaweni ehlongozwayo yokugcina uphethiloli engxenyeni 1 yepulazi i-Leeuspruit 385 JU, kuMasipala Wendawo waseNkomazi, esifundazweni saseMpumalanga. Isaziso sikhishwa ngokoMthetho Wokuphathwa Kwemvelo Kazwelonke (NEMA) (uMthetho No. 107 ka-1998) njengoba uchitshiyelwe, kanye neMithethonqubo Yokuhlolwa Komthelela Emvelweni (EIA), 2014 njengoba ichitshiyelwe kanye noMthetho Wamanzi Kazwelonke, (uMthetho 36 ka-1998).

Le phrojekthi ihlanganisa cishe u-5.20 Ha (1.052 ha) ngobubanzi. Indawo yephrojekthi izixhumanisi ze-GPS: 31.671934 E,-25.491063 S futhi itholakala ekhoneni lomgwaqo uJeppe's Reef kanye noStrydom Block Road, phakathi kukaWadi 7, cishe amakhilomitha ayisi-6 eNingizimu yeHectorspruit kanye no-16 km eMpumalanga yeMalelane kumasipala wendawo yaseNkomazi, esifundazweni saseMpumalanga.

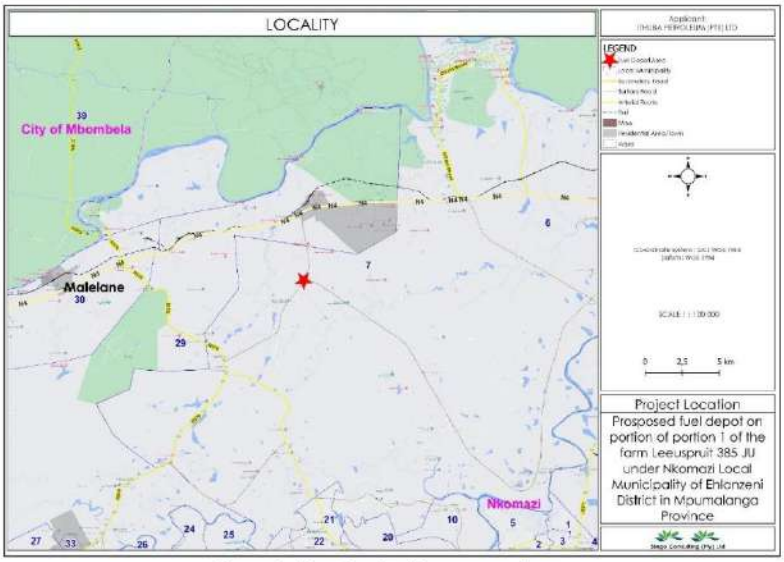


Figure 1: Map showing the proposed area

Inqubo Yokuhlanganyela Komphakathi Nezikhathi Zesikhathi:

Isahluko 6, umthethonqubo 40(2)(3) we-EIA Regulations (GNR 326, 7 April 2017) sidinga ukuthi Inqubo Yokubambiqhaza Komphakathi inikeze ukufinyelela kulo lonke ulwazi olungase lube nomthelela esinqumweni esimayelana nesicelo, siphinde siveze ukuthi Abangase babe nentshisekelo nabathintekayo banikezwe ithuba lokuphawula ngemibiko nezinhlelo zephrojekthi.

Isicelo Selayisensi Yokusebenzisa Amanzi

Idepho yamafutha ehlongozwayo izokwakhiwa engxenyeni 1 yepulazi i-Leeuspruit 385 JU, kuMasipala Wendawo waseNkomazi, esifundazweni saseMpumalanga. Ukwakha kuzodinga ukugunyazwa okujwayelekile okuvela eMthethweni Wamanzi Kazwelonke (NWA), 1998 (uMthetho wama-36 we-1998). Isigaba sama-40 se-NWA (1998) sidinga ukuthi i-Ithuba Petroleum (Pty) Ltd ifake isicelo futhi ithole ilayisensi eMnyangweni Wezamanzi Nokuthuthwa Kwendle (DWS) ngaphambi kokusebenzisa lokhu kusetshenziswa kwamanzi.

Isigaba 41(4) se-NWA sidinga ukuthi i-Ithuba Petroleum (Pty) Ltd inikeze umphakathi isaziso esifanelekile emaphephandabeni nakweminye imidiya - (i) echaza llayisensi efakelwa isicelo; futhi (ii) esho ukuthi ukuphikisa okubhaliwe kungase kufakwe ngokumelene nesicelo zingakapheli izinsuku ezingama-30 zekhalenda ukuze Ubambe iqhaza Komphakathi (okungukuthi iphephandaba) futhi ukubuyekezwa kocwaningo lochwepheshe kuzotholakala zingakapheli izinsuku ezingama-30 zekhalenda ngesikhathi sokubuyekezwa kwe-BAR ne-EMPr esalungiswa. Amazwana kufanele abuyiselwe engakadluli uLwesine 7th of September 2023.

Umbiko Wokuhlola Okuyisisekelo (BAR) kanye noMbiko Wohlelo Lokuphathwa Kwezemvelo (EMPR) onocwaningo oluldhethekile uzotholakala uma ucelwa kubo bonke ababambiqhaza nabathintekayo abanentshisekelo nge-imeyili, ama-courier, nakuMasipala Wasekhaya waseNkomazi (Civic Centre, 9 Park Street, Malelane, 1320) isikhathi sekhalenda lezinsuku ezingama-30 kusukela mhla ziyisi-8 kuSepthemba 2023 kuya kumhla ziyisi-9 kuMfumfu wezi-2023. Ukubuyekezwa kocwaningo lochwepheshe ngokuhambisana ne-GNR 267 (24 March 2017) ye-NWA (Umthetho 36,1998), kuzoba ngama-60 -inkathi yekhalenda yosuku kusukela mhla ziyisi-8 kuSepthemba 2023 kuya kumhla ziyisi-8 kuNovemba 2023..

Zonke izinkinga eziphakanyiswe zizodingidwa yinkampani ezimele iSingo Consulting (Pty) Ltd.

Consultant contact person (Public Participation Officer):

PPO: Mr Mundalamo Tsedzuluso
Office B70, 5 Balalaika Street
Tasbet Park Ext 2
Witbank
1035
Tell: 013 692 0041
Cell: 072 362 6124

Applicant contact person(s):

ITHUBA PETROLEUM (PTY) LTD

Applicant: Mr Leon Van Eeden
60 Banjo Walk
Bethar
Cape Town
Western Cape
7493
Cell: 083 393 7953

(c) English

NOTICE OF ENVIRONMENTAL AUTHORIZATION AND GENERAL AUTHORIZATION APPLICATIONS FOR THE PROPOSED FUEL DEPOT DEVELOPMENT ON A PORTION OF PORTION 1 OF THE FARM LEEUSPRUIT 385 JU, SITUATED WITHIN NKOMAZI LOCAL MUNICIPALITY, MPUMALANGA PROVINCE. DARDLEA REF NO: TBA AND DWS REF NO: TBA

Ithuba Petroleum (Pty) Ltd has lodged Environmental Authorization and General Authorization applications for a proposed fuel depot on a portion of portion 1 of the farm Leeuspruit 385 JU, Nkomazi Local Municipality, Mpumalanga Province. Notice is hereby given in terms of the National Environmental Management Act (NEMA) (Act No. 107 of 1998) as amended, and the Environmental Impact Assessment (EIA) Regulations, 2014 as amended and the National Water Act, (Act 36 of 1998)

The project is covering approximately **5.20 Ha (1.052 ha developmental footprint)** in extent. Project site GPS coordinates: 31.671934 E,-25.491063 S and located at the corner of the Jeppe's Reef Road and Strydom Block Road, within Ward 7, approximately 6 km South of Hectorspruit and 16 km East of Malelane in Nkomazi local municipality, Mpumalanga Province

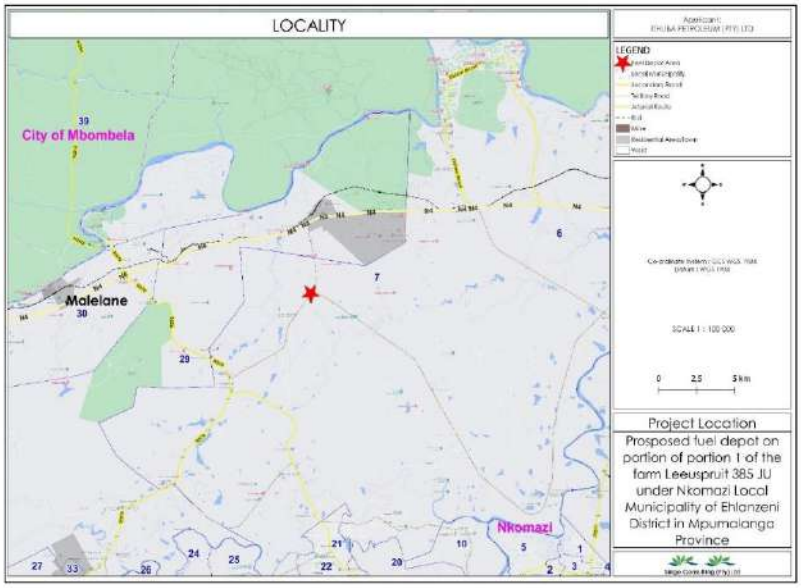


Figure 1: Map showing the proposed area

Public Participation Process and Timelines:

Chapter 6, regulation 40(2)(3) of EIA Regulations (GNR 326, 7 April 2017) requires that the Public Participation Process provides access to all information that may have potential to influence the decision regarding the application, it further outlines that the potential interested and affected parties be provided with an opportunity to comment on project reports and plans.

Water Use Licence Application

The proposed fuel depot will be constructed on a portion of portion 1 of the farm Leeuspruit 385 JU, Nkomazi Local Municipality, Mpumalanga Province. Construction will require a General Authorisation (GA) in terms of Section 39 of the NWA (1998), for triggered Sections 21 a, 21 c & I water uses.

Section 41(4) of the NWA requires Ithuba Petroleum (Pty) Ltd to give the public suitable notice in newspapers and other media - (i) describing the License applied for; and (ii) stating that written objections may be lodged against the application within 30 calendar days for Public Participation (i.e newspaper) and the review of the specialist studies will be available within 30 calendar days for draft BAR& EMPr review period. Comments should be returned by no later than **Thursday 7th of September 2023.**

The Basic Assessment Report (BAR) and Environmental Management Programme Report (EMPR) with specialist studies will be available upon request to all stakeholders and registered interested parties through emails, couriers, and at **Nkomazi Local Municipality (Civic Centre, 9 Park Street, Malelane, 1320)** for a **30-day** calendar period from **8th of September 2023 to the 9th of October 2023.** Review of specialist studies in accordance with the GNR 267 (24 March 2017) of the NWA (Act 36,1998), will be a **60-day** calendar period from **8th September 2023 to 8th November 2023.**

All issues raised will be addressed by the independent consultant firm **Singo Consulting (Pty) Ltd.**

Consultant contact person (Public Participation Officer):

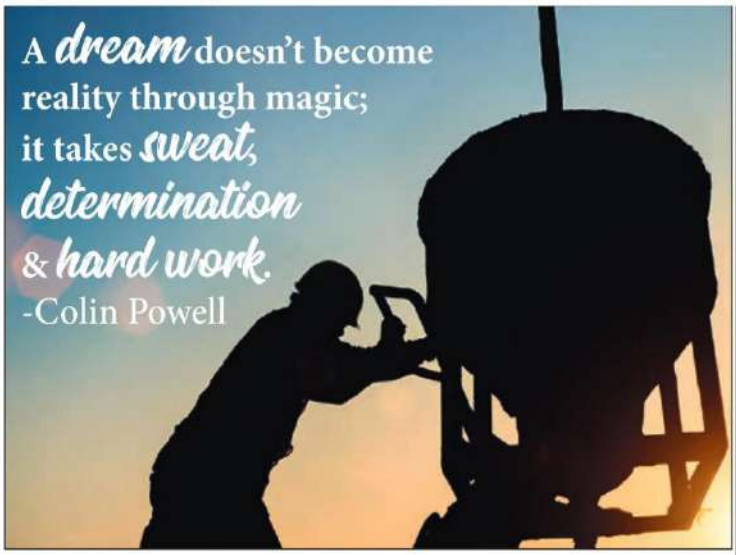
PPO: Mr Mundalamo Tsedzuluso
Office 870, 5 Balalaika Street
Tasbet Park Ext 2
Witbank
1035
Tell: 013 692 0041
Cell: 072 362 6124
Fax: 086 514 4103
Email: tsedzuluso@singoconsulting.co.za

Applicant contact person(s):

ITHUBA PETROLEUM (PTY) LTD

Applicant: Mr Leon Van Eeden
60 Banjo Walk
Belhar
Cape Town
Western Cape
7493
Cell: 083 393 7953
Email: leon@two-ships.co.za

(ii) Newspaper Advertisement



NOTICE OF ENVIRONMENTAL AUTHORISATION AND GENERAL AUTHORISATION APPLICATIONS FOR THE PROPOSED FUEL DEPOT DEVELOPMENT ON A PORTION OF PORTION 1 OF THE FARM LEEUSPRUIT 385 JU SITUATED WITHIN NKOMAZI LOCAL MUNICIPALITY, MPUMALANGA PROVINCE DARDLEA REF NO: 1/3/1/16/1E-470 AND DWS REF NO: TBA

This newspaper advertisement serves to inform all interested and affected parties that Environmental Authorization and General Authorization applications for the proposed fuel depot have been lodged in terms of the National Environmental Management Act (NEMA) (Act No. 107 of 1998) as amended, National Water Act, (Ac 36 of 1998) and the Environmental Impact Assessment (EIA) Regulations, 2014 as amended that Ithuba Petroleum (Pty) Ltd has appointed Singo Consulting (Pty) Ltd to carry out environmental authorization (Basic Assessment (BAR)) and water use authorization processes for the above-mentioned applications.

Project Description: The proposed project will entail the establishment of a new fuel depot on a portion of portion 1 of the farm Leeuspruit 385 JU, Nkomazi Local Municipality, Mpumalanga Province. The proposed fuel depot will consist of the following infrastructures: ablution facility (mobile toilets, septic tank), LDV parking area, MDV/HDV parking area, aboveground tanks, diesel pump, Convenience shop, boreholes, and offices.

Project Location: Project site GPS coordinates: 31.671934 E,-25.491063 S and located at the corner of the Jeppe's Reef Road and Strydom Block Road, within Ward 7, approximately 6km south of Hectorspruit and 16km east of Malelane in Nkomazi Local Municipality, Mpumalanga Province.

Size of the Site: Total area of the application site is approximately 5.200 ha and the developmental footprint is 1.052 ha.

Applicable Legislation: The proposed project requires EA and General Authorisation (Water) for the following listed activities in terms of EIA Regulations, 2014, as amended:
- GNR. 517 of 21 June 2021 (Listing Notice 1), as amended: Activity No. 14; and
- GNR. 517 of 21 June 2021 (Listing Notice 1), as amended: Activity No. 27.
- GNR. 517 of 21 June 2021 (Listing Notice 1), as amended: Activity No. 4.
- General Authorisation (GA) in terms of Section 39 of the NWA (1998), for triggered section 21 a, 21 c & I water uses.

The above-mentioned activities require a Basic Environmental Assessment and Water Use Licence process to be conducted in support of the EA application.

Invitation to Comment: The public participation process for this application is conducted according to the requirements of the EIA Regulations of 4 December 2014, as amended. Should you wish to register as an I&AP for the proposed project and be kept informed of the progress of the project and public participation opportunities, please request and complete an "Interested and Affected Party" registration form (obtained from the Consultant, Tsedzuluso Mundalamo, on the details below) and completed I&AP registration forms should be submitted to Tsedzuluso Mundalamo no later than **Thursday the 7th of September 2023** using the contact details provided below. The public is also invited to review and comment on DBAR and EMPr which will be available for review at: **Local Public Library** for a 30 days calendar period from **8th of September 2023 to 9th of October 2023.** Review of specialist studies in accordance with the GNR 267 (24 March 2017) of the NWA (Act 36,1998), will be a 60-day calendar period from **8th September 2023 to 8th November 2023.** The report together with specialist studies will be available at the Nkomazi Local Municipality (Civic Centre, 9 Park Street, Malelane, 1320)

Invitation to a Public Meeting: no public meeting has been scheduled, however should the need arise, it will be communicated.

Lesi silkhangiso sephephandaba silhlose ukwazisa bonke abathintekayo nabathintekayo ukuthi izicelo zokugunyazwa kwezemvelo kanye nokugunyazwa okujwayelekile kwendawo egcina uphethiloli ehlongozwayo zifakwe ngokoMthetho Wokulawulwa Kwemvelo Kazwelonke (NEMA) (uMthetho No. 107 ka-1998) njengoba uchitshiyelwe, Wamanzi Kazwelonke, UMthetho, (uMthetho 36 ka-1998) kanye neMithethonqubo Yokuhlola Umthelela Emvelweni (EIA), 2014 njengoba ichitshiyelwe ukuthi Ithuba Petroleum (Pty) Ltd iqoke iSingo Consulting (Pty) Ltd ukuthi yenze ukugunyazwa kwemvelo (Basic Assessment (BAR)) futhi izinquba zelayisensi yokusetshenziswa kwamanzi kulezi zicelo ezibalwe ngenhla

Incazelo Yomklamo: Lo msebenzi ohlongozwayo uzobandakanya ukusungulwa kwendawo egcina uphethiloli entsha engxenyeni 1 yepulazi i-Leeuspruit 385 JU, kuMasipala Wendawo waseNkomazi, esifundazweni saseMpumalanga. Idepho kaphethiloli ehlongozwayo izoba nalezi ngqalasizinda ezilandelayo: Isikhungo sokugeza ngamanzi (izindlu zangasese Ezihambayo, ithangi le-Septic), Indawo Yokupaka I-LDV, Indawo Yokupaka i-MDV/HDV, amathangi angaphezulu, Iphampu Kadizili, Isitolo esikahle namahhovisi.

Indawo Yephrojekthi: Indawo yephrojekthi izixhumanisi ze-GPS: 31.671934 E,-25.491063 S futhi itholakala ekhoneni lomgwaqo uJeppe's Reef kanye noStrydom Block Road, phakathi kukaWadi 7, cishe amakhilomitha ayi-6 eNingizimu yeHectorspruit kanye no-16km eMpumalanga yeMalelane kumasipala wendawo yaseNkomazi, esifundazweni saseMpumalanga. Ubukhulu besizinda: Indawo yonke yendawo yesicelo iliganiselwa ku-5.200 ha kanti indawo ethuthukisiwe ingu-1.052 ha.

Umthetho Osebenzayo: Iphrojekthi ehlongozwayo idinga i-EA kanye Nokugunyazwa Okujwayelekile (Amanzi) kule misebenzi esohlwini elandelayo ngokweMithetho ye-EIA, 2014, njengoba ichitshiyelwe:
- GNR. 517 yangomhla zingama-21 kuJuni 2021 (Isaziso Sohlu 1), njengoba sichitshiyelwe: Umsebenzi No. 14; futhi
- GNR. 517 yangomhla zingama-21 Juni 2021 (Isaziso Sohlu 1), njengoba sishintshiwe: Umsebenzi No. 27.
- GNR. 517 yangomhla zingama-21 Juni 2021 (Isaziso Sohlu 1), njengoba sishintshiwe: Umsebenzi No. 4.
- Ukugunyazwa Okujwayelekile (GA) ngokweSigaba 39 se-NWA (1998), ngokusetshenziswa kwesigaba 21 a, 21 c & I.

Le misebenzi eshiwo ngenhla idinga Ukuhlola Okuyisisekelo Kwemvelo kanye nenqubo yelayisensi yokusebenzisa Amanzi ukuba yenziwe ngokweseksha lesicelo se-EA.

Isimemo Sokuphawula: Inqubo yokubamba iqhaza komphakathi yalesi sicelo yenziwa ngokwezidingo zeMithetho ye-EIA yamhla zizi-4 kuZibandlela wezi-2014, njengoba ichitshiyelwe. Uma ufisa ukubhalisa njengo-I&AP kuphrojekthi ehlongozwayo futhi ublale uncikwazi ngenqubekelaphambili yephrojekthi kanye namathuba okuhlanganyela komphakathi, sicela ucele futhi ugcwalise ifomu lokubhalisa "Labathintekayo Nabathintekayo" (elitholwe ku-Consultant, Tsedzuluso Mundalamo ku- imininingwane engezansi) kanye namafomu okubhaliswa kwe-I&AP agcwaliswe kufanele athunyelwe ku-Tsedzuluso Mundalamo engakadluli uLwesine mhla ziyisi-7 kuSeptemba 2023 kusetshenziswa imininingwane yokuxhumana ehlinzekwe ngezansi. Umphakathi uyamenywa futhi ukuthi ubuyekeze futhi uphawule nge-DBAR kanye ne-EMPr ezotholakala isikhathi sekhalenda lezinsuku ezingama-30 (8 September 2023-9 October 2023). Ngokuvumelana ne-GN 267 ye-NWA (uMthetho 36,1998), ama-I&AP ayamenywa ukuba abuyekeze izifundo zochwephesha zale phrojekthi isikhathi esiyizinsuku ezingama-60 (8 Septemba 2023-8 Novemba 2023). Umbiko kanye nezifundo zochwephesha zizotholakala kuMasipala Wasekhaya waseNkomazi (Civic Centre, 9 Park Street, Malelane, 1320)

Isimemo Somhlangano Womphakathi: awukho umhlangano womphakathi ohlelwe, kodwa uma kunesidingo, kuyokwaziswa.

Consultant contact person(s) (Public Participation Officer) (PPO):

Singo Consulting (Pty) Ltd
PPO: Mr Mundalamo Tsedzuluso
Office 870, 5 Balalaika Street
Tasbet Park Ext 2
Witbank
1035.
Tel: 013 692 0041
Cell: 072 362 6124
Fax: 086 514 4103
Email: tsedzuluso@singoconsulting.co.za

Applicant Contact person(s):

ITHUBA PETROLEUM (PTY) LTD
Applicant: Mr Leon Van Eeden
60 Banjo Walk
Belhar
Cape Town
Western Cape
7493
Cell: 083 393 7953
Email: leon@two-ships.co.za

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BACKGROUND INFORMATION DOCUMENT

Proposed fuel depot Station Development on portion of portion 1 of the farm Leeuspruit 385 JU.

NKOMANZI MAGISTERIAL DISTRICT, MPUMALANGA

Prepared by: Singo Consulting (Pty) Ltd

Prepared for: ITHUBA PETROLEUM (PTY) LTD

INTRODUCTION AND THE PURPOSE OF THIS DOCUMENT

Singo Consulting (Pty) Ltd has been appointed as an independent Environmental Consultant by **Ithuba Petroleum (Pty) Ltd** to conduct Environmental Impact Assessment (EIA), Compile an Environmental Management Programme Report (EMPr), Apply for General Authorisation (GA) in terms of Section 39 of the NWA (1998), for triggered section 21 a, 21 c & I water uses and undertake Public Participation Process (PPP). This is done for processes of acquiring environmental authorization for the proposed Site application on **portion of portion 1 of the farm Leeuspruit 385 JU,** in the Nkomazi Local Municipality, Mpumalanga Province. **DARDLEA Ref Number: 1/3/1/16/1E-470 and DWS ref No: CT26052**

The Purpose of this Background Information Document (BID) is to provide a perfunctory description of the project and outline EIA and WULA processes to be followed and contributions from Interested and Affected Parties (I&APs) on the issues related to the project in question, allowing comments and concerns to be raised.

Results of the EIA, both negative and positive will be submitted and made available to the relevant Departments such as the Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA) and if requested, Water and Sanitation, Landowners and other interested stakeholders.

This **Background Information Document** therefore requests and invite I&APs to comment on the environmental, physical, social and economic impacts associated with the proposed activities. Be assured that your comments are of great value as they ensure that relevant issues are taken into consideration. Attached at the end of this document is a registration from, kindly complete it and send it back to **Mr Tsedzuluso Mundalamo** through given means of communication also attached there.

PROJECT DESCRIPTION

Site Application has been submitted for a **Fuel Depot** on the property mentioned above. Project site GPS coordinates: 31.671934 E,-25.491063 S and located at the corner of the Jeppe's Reef Road and Strydom Block Road, within Ward 7, approximately 6 km South of Hectorspruit and 16 km East of Malelane in Nkomazi local municipality, Mpumalanga Province. See Figure 1.

The proposed fuel depot will consist of the following infrastructures: Ablution facility (Mobile Toilets, Septic tank), LDV Parking Area, MDV/HDV Parking Area, Aboveground tanks, Diesel Pump, Convenient shop, boreholes, and offices.

All the activities will be guided by the project's EMPr such that the project does not impact the environment negatively.

REGULATORY FRAMEWORK

Therefore, EIA (through BAR & EMPr) process to be undertaken will be conducted in accordance with the National Environmental Management Act (Act 107 of 1998) and Environmental Impact Assessment regulations as amended (April 2017).

Other regulatory guidelines to be followed include: National Air Quality Standards (GN 1210: 2009) and National Dust Control Regulations (GN No. 827 of 2013), NWA (Act 36,1998) (GNR 267:2017)

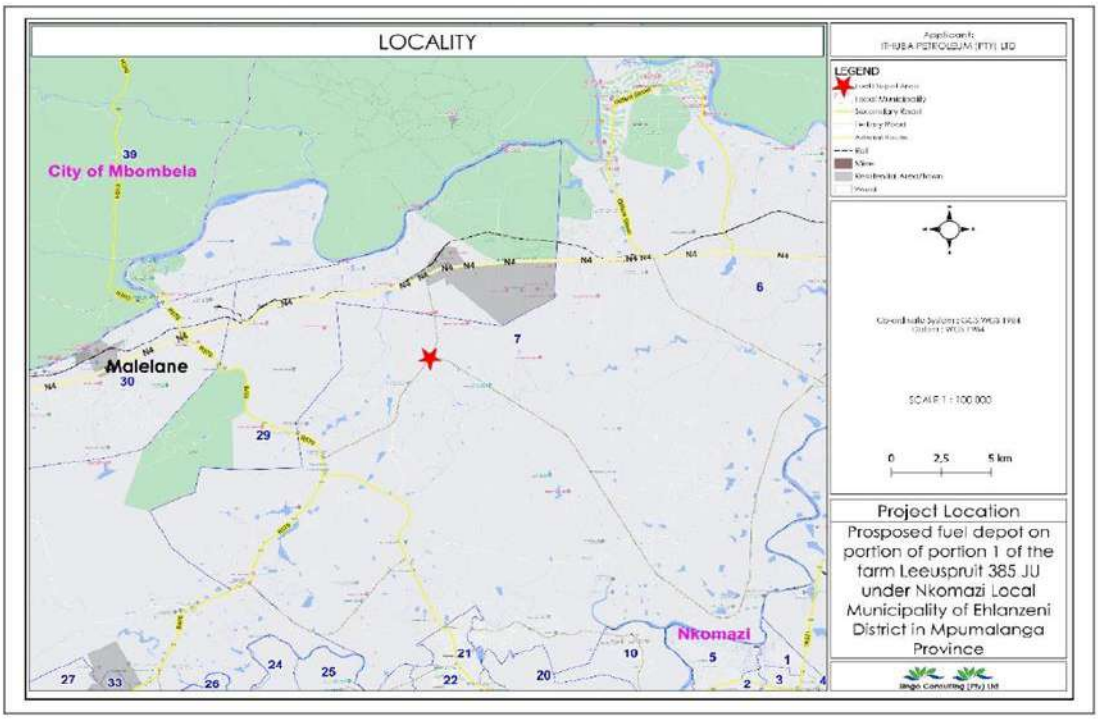


Figure 1: Locality of the Proposed fuel depot

BASIC AND ENVIRONMENTAL IMPACT ASSESSMENT PROCESSES

These are planning and decision-making tools used in identifying potential environmental, economic and social consequences of a proposed activity prior the commencement of the activity.

These together with the public issues and concerns are to be identified sufficiently early so that they can be assessed and incorporated into the final reports when/if necessary.

These tools are regarded crucial because they are utilized in order to demonstrate to the relevant stakeholders about the potential impacts due to the proposed activities.

PUBLIC PARTICIPATION PROCESS

Public Participation remains a cornerstone of the Environmental Impact Assessment process. It ensures provision of relevant and enough information with openness and transparency. Public Participation process presents to I&APs, an opportunity to understand what the project is about, and affords them an opportunity to make valuable contributions towards the EIA process.

I&APs can be any person, group of persons or organization interested in or affected by the proposed activity, and any organ of state that may have jurisdiction over any aspect of the activity.

The key objective of PPP during the BAR and EMPR phase is to afford the I&APs with an opportunity to comment and provide valuable inputs during the planning phase of the project.

For this specific proposed project, I&APs will be given a period of 30 days to comment and raise issues/concerns with regards to this BID.

Kindly note the following dates:

- Announcement of the Site Application: **18th August 2023**
- Stakeholder engagement and consultation and review of Draft Basic Assessment Report and Environmental Management Programme Report: **08th September 2023 to 9th October 2023.**
- Stakeholder engagement and consultation and review of Specialist Studies: **08th September 2023 to 8th November 2023**

Office No: Office 870, 5 Balalaika Street Tasbet Park Ext 2,Witbank 1035.

Tel: +27 72 362 6124/ +27 13 692 0041
Fax: +27 86 5144 103
Email: tsedzuluso@singoconsulting.co.za
: admin@singoconsulting.co.za

REGISTRATION & COMMENT SHEET (FARM LEEUSPRUIT 385 JU)

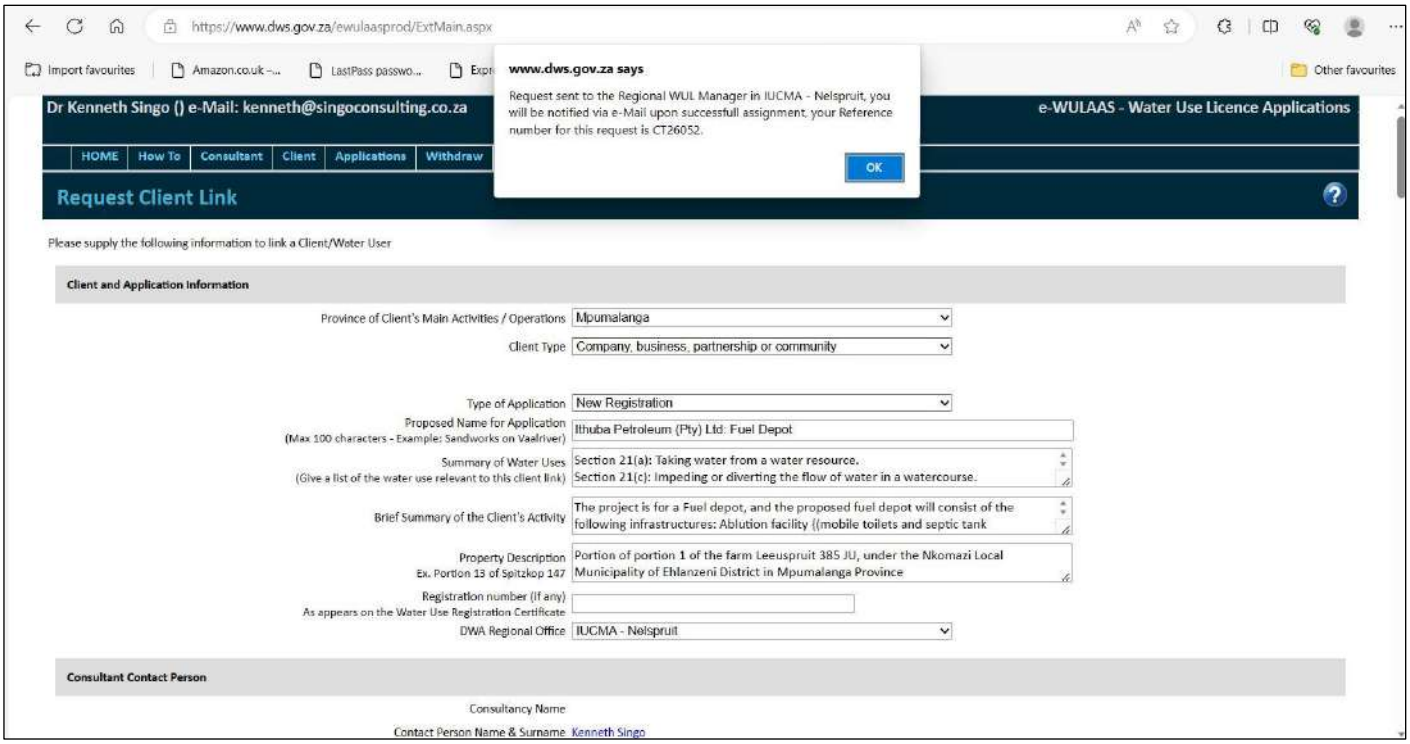
Attention: **Tsedzuluso Mundalamo** Email: **tsedzuluso@singoconsulting.co.za**

Title		Name		Surname	
Company					
Designation					
Address					
Tel No.			Fax No.		
E-mail			Cell No.		
I would like to receive my notifications be (mark with "X"):			Post ☐	E-mail: ☐ Fax: ☐	
Please indicate why you would have an interest in the above-mentioned project.					
Please provide your comments and questions here:					
Please feel free to attach a separate document					
Please add any person you think may be interested and affected parties:					
Full name			Company		
Address					
E-mail			Contact No.		

APPENDIX G: EAP CVs

(i) : Compiler (On request)
(ii) : Reviewer (On request)

APPENDIX H : WATER USE LICENCE



APPENDIX I: Screening Report

DARDLEA REF: 1/3/16/1E-420 AND DWS REF: CT26052

Ecology Study for Fuel Depot Station

Fuel Deport Station Development on portion of portion 1 of the farm Leeuspruit 385 Ju within the Nkomazi Local Municipality, Mpumalanga province, Mpumalanga Province

PREPARED BY:	PREPARED FOR
Singo Consulting (Pty) Ltd	ITHUBA PETROLIUM (PTY) LTD

2023

Report Credentials.

Disclaimer	**The opinion expressed in this and associated reports are based on the information provided by Ithuba Petrolium (Pty) Ltd to Singo Consulting (Pty) Ltd ("Singo Consulting") and is specific to the scope of work agreed with Ithuba Petrolium (Pty) Ltd. Singo Consulting acts as an advisor to the Ithuba Petrolium (Pty) Ltd and exercises all reasonable skill and care in the provision of its professional services in a manner consistent with the level of care and expertise exercised by members of the environmental profession. Except where expressly stated, Singo Consulting has not verified the validity, accuracy or comprehensiveness of any information supplied for its reports. Singo Consulting shall not be held liable for any errors or omissions in the information given or any consequential loss resulting from commercial decisions or acts arising from them. Where site inspections, testing or fieldwork have taken place, the report is based on the information made available by Ithuba Petrolium (Pty) Ltd or their nominees during the visit, visual observations and any subsequent discussions with regulatory authorities. The validity and comprehensiveness of supplied information has not been independently verified and, for the purposes of this report, it is assumed that the information provided to Singo Consulting is both complete and accurate. It is further assumed that normal activities were being undertaken at the site on the day of the site visit(s), unless explicitly stated otherwise. These views do not generally refer to circumstances and features that may occur after the date of this study, which were not previously known to Singo Consulting (Pty) Ltd or had the opportunity to assess.**
Copyright	

Project details

Report type	**Basic Terrestrial Biodiversity Assessment Study**
Project title	Basic Terrestrial Biodiversity Assessment Study for the proposed Fuel Deport Station Development on portion of portion 1 of the farm Leeuspruit 385 Ju within the Nkomazi Local Municipality, Mpumalanga province, Mpumalanga Province
Client	Ithuba Petrolium (Pty) Ltd
Site location	Portion of portion 1 of the farm Leeuspruit 385 Ju within the Nkomazi Local Municipality, Mpumalanga province, Mpumalanga Province
Version	1
Date	August 2023

		Electronic signatures
Compiled by	Dineo Makhubela (Environmental Specialist) Singo Consulting (Pty) Ltd (Candidate Natural Scientist, SACNASP Reg No: 158858)	
Second Reviewer	Mutshidzi Munyai (Hydrogeologist) Singo Consulting (Pty) Ltd (Water Resources Science (Candidate Natural Scientist), Environment Science (Candidate Natural Scientist) (SACNASP Registration Number 122464)	
Final review and approval	Dr. Kenneth Singo (Principal Consultant of Singo Consulting (Pty) Ltd)	

Executive Summary

Singo Consulting (Pty) Ltd was appointed by Ithuba Petrolium (Pty) Ltd to conduct an ecology report associated with the development of the Fuel Deport Station on portion of portion 1 of the farm Leeuspruit 385 JU within the Nkomazi Local Municipality, Mpumalanga province, Mpumalanga Province. The project area covers an extent of approximately 5.2 hectares and is located at a corner of the of the Jeppe Reef Road and Strydom Block Road, within ward 7 of the Magisterial District of Inkomazi Local Municipality in Mpumalanga Province. Due to the very high sensitivity rating of the site on the screening report, an Ecological Assessment (this report) has been undertaken as part of the Basic Assessment Process for the proposed project application.

The specialist assessment sought to assess the ecological state and current land-use of the proposed site, identify potential sensitive ecosystems, and plant species, and identify potential impacts of the proposed development. The objectives for the ecological assessment are as follows:

- ✓ Determine the general ecological state of the proposed project area.
- ✓ Examine and demarcate environmentally sensitive and critical areas.
- ✓ Ascertain the potential impacts of the proposed project on the environment and its associated fauna and flora.
- ✓ Map the environmentally sensitive and critical areas with regards to the proposed project.
- ✓ Identify and document protected, or red data listed fauna or flora species on site.
- ✓ Provide mitigation measures to avoid or prevent environmental impacts.
- ✓ Compile ecological assessment report with findings, recommendations, and maps of the sensitive or no-go areas.

A desktop assessment of the site was conducted in terms of current vegetation classifications and biodiversity programmes and plans. Upon the completion of the desktop assessment a site visit was undertaken on the 18th of August 2023 to determine the actual condition of the terrestrial ecology within the study area.

This report is updated based on the current findings and overall on-site ecological connectivity and ecological connectivity to the greater area. In general, the type and extent of the proposed activities coupled with the overall status of the sites to be affected are not expected to have extremely detrimental effects on the overall ecological character as long as mitigation measures are implemented.

The vegetation and habitat composition were assessed within the broader assessment footprint. The vegetation within the assessment footprint was then mapped using a combination of data from the field assessment, the Mucina and Rutherford (2018) vegetation map and aerial imagery from Google Earth. The vegetation recorded within the assessment unit exhibited some characteristics of Granite Lowveld. The

transformed areas around the proposed project area includes the farm stands, cultivation activities and the access roads (gravel). The ecological impacts of all aspects for the proposed project application were assessed and considered not to be acceptable, provided that the area is within a undisturbed environment (natural). Therefore, implementation of recommended mitigation measures coupled with comprehensive rehabilitation and monitoring in terms of re-vegetation and restoration is an important element of the mitigation strategy. Implementing the advised recommendations measures to protect the sensitivity of the area (specific ecosystems) and ensure that the natural resources in the area are sustainable.

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Glossary of Terms

TERM	DEFINITION
Alien species	Taxa in a given area, whose presence there, is due to the intentional or accidental introduction as a result of human activity.
Avifauna	The birds of a particular region, habitat, or geological period.
Biodiversity	Biodiversity is the variability among living organisms from all sources including inter alia terrestrial, marine and other aquatic ecosystems and ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.
Biome	A major biotic unit consisting of plant and animal communities having similarities in form and environmental conditions, but not including the abiotic portion of the environment.
Buffer zone	A collar of land that filters edge effects.
Conservation	The management of the biosphere so that it may yield the greatest sustainable benefit to present generation while maintaining its potential to meet the needs and aspirations of future generations. The wise use of natural resources to prevent loss of ecosystems function and integrity.
Conservation concern	Species of conservation concern are those species that are important for South Africa's conservation decision making processes and include all plants that are Threatened (see Threatened), Extinct in the wild, Data deficient, Near threatened, Critically rare, Rare and Declining. These plants are nationally protected by the National Environmental Management: Biodiversity Act. Within the context of these reports, plants that are provincially protected are also discussed under this heading.
Conservation status	An indicator of the likelihood of that species remaining extant either in the present day or the near future. Many factors are taken into account when assessing the conservation status of a species: not simply the number remaining, but the overall increase or decrease in the population over time, breeding success rates, known threats, and so on.
Community	Assemblage of populations living in a prescribed area or physical habitat, inhabiting some common environment.
Critically Endangered	A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future.
Data Deficient	There is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. However, "data deficient" is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate.
Declining	A taxon is declining when it does not meet any of the five IUCN criteria and does not qualify for the categories Threatened or Near Threatened, but there are threatening processes causing a continuous decline in the population (Raimondo *et al.*, 2009).
Ecological Corridors	Corridors are roadways of natural habitat providing connectivity of various patches of native habitats along or through which faunal species may travel without any obstructions where other solutions are not feasible.
Ecosystem	Organisms together with their abiotic environment, forming an interacting system, inhabiting an identifiable space.

Edge effect	Inappropriate influences from surrounding activities, which physically degrade habitat, endanger resident biota and reduce the functional size of remnant fragments including, for example, the effects of invasive plant and animal species, physical damage and soil compaction caused through trampling and harvesting, abiotic habitat alterations and pollution.
Endangered	A taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future.
Endemic	Naturally only found in a particular and usually restricted geographic area or region.
Exotic species	Taxa in a given area, whose presence there, is due to the intentional or accidental introduction as a result of human activity.
Fauna	The animals of a particular region, habitat, or geological period.
Flora	Flora is the plant life occurring in a particular region or time, generally the naturally occurring or indigenous—native plant life
Forb	A herbaceous plant other than grasses.
Habitat	Type of environment in which plants and animals live.
Herpetofauna	The reptiles and amphibians of a particular region, habitat, or geological period.
Indigenous	Any species which occurs naturally in South Africa.
In situ	"In the place" In Situ conservation refers to on-site conservation of a plant species where it occurs.It is the process of protecting an endangered plant or animal species in its natural habitat. The plant(s) are not removed but conserved as they are. Removal and relocation could kill the plant and therefore in situ conservation is preferred/ enforced.
Invasive species	Naturalized alien species that have the ability to reproduce, often in large numbers. Aggressive invaders can spread and invade large areas.
Mammals	A warm-blooded vertebrate animal of a class that is distinguished by the possession of hair or fur, females that secrete milk for the nourishment of the young, and (typically) the birth of live young.
Mitigation	The implementation of practical measures to reduce adverse impacts.
Near Threatened	A Taxon is Near Threatened when available evidence indicates that that it nearly meets any of the five IUCN criteria for Vulnerable and is therefore likely to qualify for a threatened category in thenear future (Raimondo *et al.*, 2009).
Plant community	A collection of plant species within a designated geographical unit, which forms a relatively uniform patch, distinguishable from neighboring patches of different vegetation types. The components of each plant community are influenced by soil type, topography, climate and humandisturbance. In many cases there are several soil types within a given plant community (Gobbat *etal.*, 2004).
Protected Plant	According to Provincial Nature Conservation Ordinances or Acts, no one is allowed to sell, buy,transport, or remove this plant without a permit from the responsible authority. These plants areprotected by provincial legislation.
Threatened	Species that have naturally small populations, and species which have been reduced to small (often unsustainable) population by man's activities.
Red Data	A list of species, fauna and flora that require environmental protection - based on the IUCN definitions. Red data plants *now termed Plants of Conservation Concern.*

Reptile	A vertebrate animal of a class that includes snakes, lizards, crocodiles, turtles, and tortoises. They are distinguished by having a dry scaly skin and typically laying soft-shelled eggs on land.
Species diversity	A measure of the number and relative abundance of species.
Species richness	The number of species in an area or habitat.
Threatened	Threatened Species are those that are facing a high risk of extinction, indicated by placing in the categories Critically Endangered (CR), Endangered (E) and Vulnerable (VU) (Raimondo *et al.,* 2009)
Transformation	The removal or radical disturbance of natural vegetation, for example by crop agriculture, plantation forestry, mining or urban development. Transformation mostly results in a serious and permanent loss of biodiversity and fragmentation of ecosystems, which in turn lead to the failure of ecological processes. Remnants of biodiversity may survive in transformed landscapes.
Vegetation Unit	A complex of plant communities ecologically and historically (both in spatial and temporal terms) occupying habitat complexes at the landscape scale. Mucina and Rutherford (2006) state: "Our vegetation units are the obvious vegetation complexes that share some general ecological properties such as position on major ecological gradients and nutrient levels and appear similar in vegetation structure and especially floristic composition".
Vulnerable	A taxon is Vulnerable when it is not Critically Endangered or Endangered but meets any of the fiveIUCN criteria for Vulnerable and are therefore facing a high risk of extinction in the wild in the future (Raimondo *et al.*, 2009)

List of Acronyms

AI	Alien Invasive
AIS	Alien Invasive Species
BGIS	Biodiversity Geographic Information System
BMU	Biodiversity Management Unit
CARA	Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)
CBAs	Critical Biodiversity Areas
CR	Critically Endangered
DD	Data Deficient
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECA	Environmental Conservation Act, 1989 (Act No. 73 of 1989)
EMF	Environmental Management Framework
EMP	Environmental Management Plan
EMPr	Environmental Management Plan Report
EN	Endangered
EO	Environmental Officer
ESAs	Ecological Support Areas
EWT	Endangered Wildlife Trust
FEPA	Freshwater Ecosystem Priority Area
GPS	Global Positioning System
IBA	Important Bird Areas
IUCN	International Union for Conservation of Nature
LC	Least Concern
LT	Least Threatened
mamsl	Metres above mean sea level
Mtpm	million tonnes per month
NBA	National Biodiversity Assessment

NEMA	National Environmental Management Act
NEM:BA	National Environmental Management: Biodiversity Act
NT	Near Threatened
NWA	National Water Act
PA	Protected Area
QDGS	Quarter Degree Grid Square
RWD	Return Water Dam
SABAP	South African Bird Atlas Project
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
TOP (S)	Threatened or Protected (Species)
VMUS	Virtual Museum
WMA	Water Management Area
WUL	Water Use License
VU	Vulnerable

1. INTRODUCTION

a. Project area and description

Ithuba Petroleum (Pty) Ltd (herein referred to as "Applicant") intends to carry out a Fuel Depot development that covers an area of 5.2 ha in extent and has appointed Singo Consulting (Pty) Ltd to conduct socio-economic and environmental impacts assessment, compile Basic Assessment Report (BAR), develop Environmental Management Programme Report (EMPr) and apply Water Use Authorization for the proposed development which is located on a portion of portion 1 of the farm Leeuspruit 385 JU under Nkomazi Local Municipality in Mpumalanga Province as shown on **Figure 1** below.

b. Purpose of this report

In terms of the Protocol for the Specialist Assessment and Minimum Reporting Content Requirements for Environmental Impacts on Terrestrial Biodiversity (GNR. 320 of 2020), prior to the commencement of a specialist assessment, the current use of the land and the potential environmental sensitivity of the site under consideration as identified by the screening tool, must be confirmed by undertaking a site sensitivity verification. The results of the screening tool, together with the site sensitivity verification, ultimately determines the minimum report content requirements. According to the results of the Screening Report generated (see **Appendix 1**), the relative aquatic biodiversity theme sensitivity and Animal species theme sensitivity is classified as very high due to portions of the site occurring within an Ecological support area: Important subcatchments. Highly sensitive animal species recorded by the screening tool, are Aves-Terathopius ecaudatus Aves-Terathopius ecaudatus **(EN)**, Aves-Torgos tracheliotos **(EN)**, Aves-Polemaetus bellicosus **(EN)**, Aves-Bucorvus leadbeateri **(VU)** and Aves-Aquila rapax **(VU)**, which they carry a high sensitivity due to its status as a 'Vulnerable' and 'Critically Endangered' animal species in terms of the Red Data List.

According to Section 3 (1) of GNR. 320, 'an applicant intending to undertake an activity identified in the scope of this protocol, on a site identified on the screening tool as being of "very high sensitivity" for terrestrial biodiversity, must submit an Ecology Report'. Due to the very high sensitivity rating of the site, a Terrestrial Biodiversity Specialist Assessment has been undertaken as part of the BA Process for the proposed project application.

According to the Species Environmental Assessment Guideline (SANBI, 2020): *"Where the sensitivity indicated in the screening tool is 'medium' for the proposed development footprint. The presence or likely presence of the SCC identified by the screening tool must be investigated through a site inspection. Where SCC are found on site or have been confirmed as likely to be present, an assessment must be submitted in accordance with the requirements specified for 'very high' and 'high' sensitivity in the protocol. However,*

if the initial site sensitivity verification step indicates that the proposed development footprint/project areas of influence consist of a 'low' sensitivity and that the screening tool incorrectly classified the area as 'very high', 'high' or 'medium', then taxon-specific specialists are not required to perform an assessment and the specialist must submit a Terrestrial Animal/Plant Species Compliance Statement. However, if the initial site sensitivity verification step indicates that the proposed development footprint consists of a 'low' sensitivity then taxon-specific specialists are not required to perform an assessment and the EAP/specialist must submit a Terrestrial Animal/Plant Species Compliance Statement" (SANBI, 2020, p. 11).

c. Terms of reference

This specialist report is prepared in terms of the NEMA: EIA Regulations, 2014. The findings and recommendations in this report will inform and guide the EAP and regulatory authorities during the Environmental Impact Reporting and adjudicating process for the proposed development on the Farm Leeuspruit. The terms of reference for this investigation are limited to an ecological assessment that aims to:

- ✓ Determine the general ecological state of the proposed project area.
- ✓ Examine and demarcate environmentally sensitive and critical areas.
- ✓ Ascertain the potential impacts of the proposed project on the environment and its associated fauna and flora.
- ✓ Map the environmentally sensitive and critical areas with regards to the proposed project.
- ✓ Identify and document protected, or red data listed fauna or flora species on site.
- ✓ Provide mitigation measures to avoid or prevent environmental impacts.
- ✓ Compile ecological assessment report with findings, recommendations, and maps of the sensitive or no-go areas.

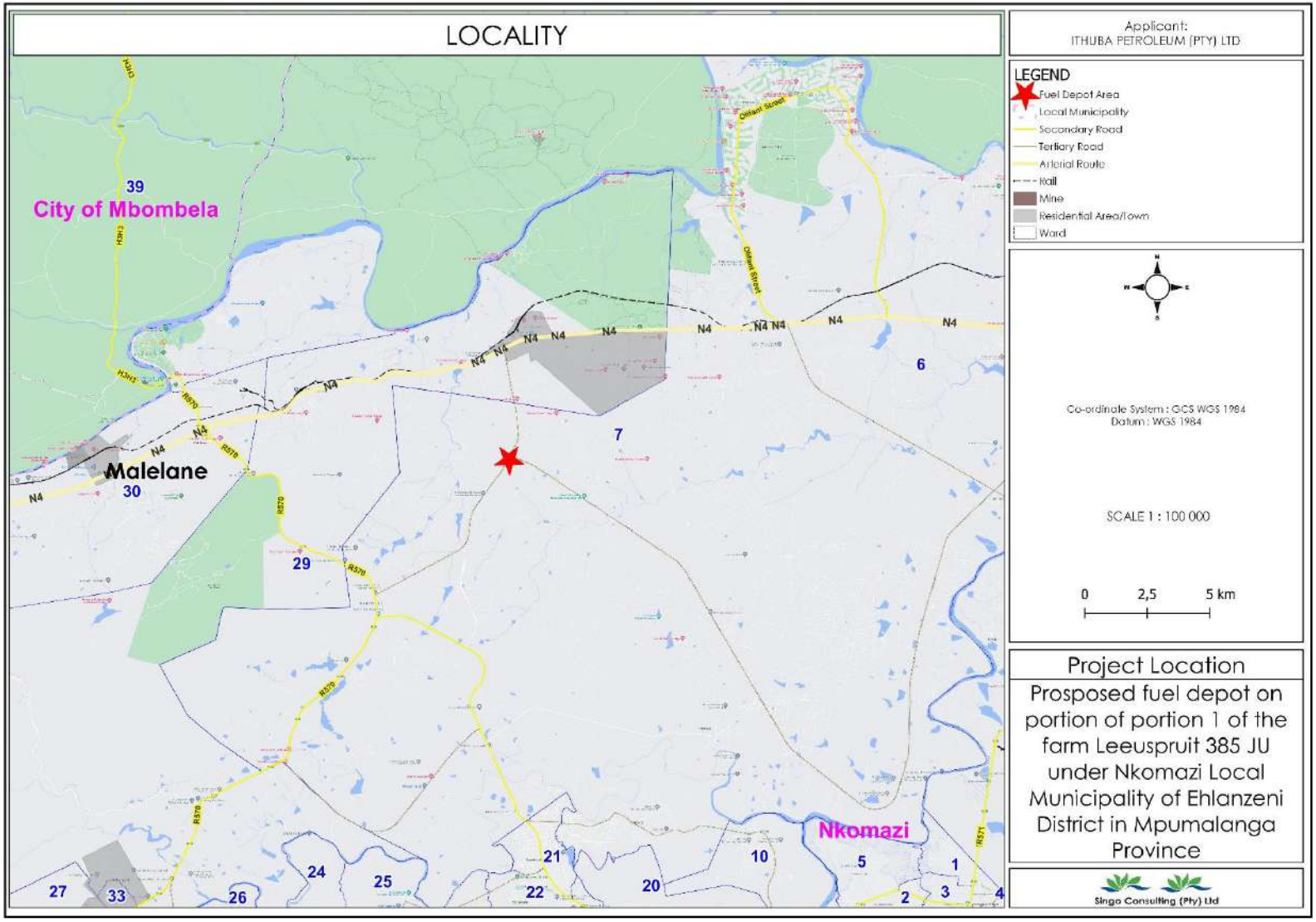

Figure 1: Locality Map of the proposed project area. (Singo Consulting (Pty) Ltd, 2023)

2. LEGISLATIVE REQUIREMENTS

This section summarizes the relevant sections of the acts that govern the activities and their potential impacts on the project area. These acts specifically refer to ecological and wetland studies.

Table 1: Legislative requirements.

Legislation/policy	Description
The Convention of Biological Diversity (Rio de Janeiro, 1992).	The purpose of the Convention on Biological Diversity is to conserve the variability among living organisms, at all levels (including diversity between species, within species and of ecosystems). Primary objectives include (i) conserving biological diversity, (ii) using biological diversity in a sustainable manner and (iii) sharing the benefits of biological diversity fairly and equitably.
South African Constitution 108 of 1996	The Constitution is the supreme law of the land and includes the Bill of Rights which is the cornerstone of democracy in South Africa and enshrines the rights of people in the country. It includes the right to an environment which is not harmful to human health or well-being and to have the environment protected for the benefit of present and future generations through reasonable legislative and other measures.
Strategic Framework for Sustainable Development in South Africa	The development of a broad framework for sustainable development was initiated to provide an overarching and guiding National Sustainable Development Strategy. The Draft Strategic Framework for Sustainable Development (SFSD) in South Africa (September 2006) is a goal orientated policy framework aimed at meeting the Millennium Development Goals. Biodiversity has been identified as one of the key crosscutting trends in the SFSD. The lack of sustainable practices in managing natural resources, climate change effects, loss of habitat and poor land management practices were raised as the main threats to biodiversity.
NEMA	This is a fundamentally important piece of legislation and effectively promotes sustainable development and entrenches principles such as the 'precautionary approach', 'polluter pays' principle, and requires responsibility for impacts to be taken throughout the life cycle of a project NEMA provides the legislative backing (Including Impact Assessment Regulations) for regulating development and ensuring that a risk-averse and cautious approach is taken when making decisions about activities.
EIA regulations	New regulations have been promulgated in terms of Chapter 5 of NEMA and were published on 7 April 2017 in Government Notice No. R. 326. Development

	and land use activities which require Environmental Authorisation in terms of the NEMA EIA Regulations, 2017, are in Listing Notice 3 (GG No. R.324, LN3) identified via geographic areas with the intention being that activities only require Environmental Authorisation when located within designated sensitive areas. These sensitive/geographic areas were identified and published for each of the nine (9) Provinces.
National Environmental Management: Biodiversity Act No 10 of 2004 (NEMBA)	The Biodiversity Act provides listing threatened or protected ecosystems, in one of four categories: Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Protected (Government Gazette, 2011). The main purpose of listing threatened ecosystems is to reduce the rate of ecosystem and species extinction and includes the prevention of further degradation and loss of structure, function and composition of threatened ecosystems.
Conservation of Agricultural Resources Act 43 of 1967	The intention of this Act is to control the over-utilisation of South Africa's natural agricultural resources, and to promote the conservation of soil and water resources and natural vegetation. The CARA has categorised a large number of invasive plants together with associated obligations of the landowner, including the requirement to remove categorised invasive plants and taking measures to prevent further spread of alien plants.
National Forest Act 84 of 1998	The protection, sustainable management and use of forests and trees within South Africa are provided for under the National Forests Act (Act 84 of 1998).
National Environmental Management: Protected Areas Act 57 of 2003	This Act provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. It also seeks to provide for the sustainable utilization of protected areas and to promote participation of local communities in the management of protected areas.
The RAMSAR Convention	Emphasis is placed on protecting wetlands and implementing initiatives to maintain or improve the state of wetland resources.
Convention on Biological Diversity	Countries are to rehabilitate or restore degraded ecosystem through the formulation of appropriate strategies and plans.
United Nations Convention to Combat Desertification	South Africa has responded to the UN Convention to Combat Desertification by developing a National Action Plan. The aim of the NAP is to implement at current and future policies that affect natural resource management and rural development, and establish partnerships between government departments, overseas development agencies, the private sector and NGOs.

3. GENERAL DESCRIPTION OF THE RECEIVING ENVIRONMENT

3.1. Climatic conditions

Climate is the state of the atmosphere over long time periods, such as over years, decades, centuries or greater and weather is defined as atmospheric conditions of an area over a short period of time (Naomi, 2004). Climate plays a significant role in shaping ecological processes and patterns across different scales, from local to global. It influences the distribution of species, community structure, ecosystem functioning, and species interactions. Here are some key aspects of the influence of climate in ecology, supported by references:

Species Distribution: Climate is a primary determinant of species distribution patterns. Different species have specific climatic requirements, such as temperature, precipitation, and humidity. Climate influences the geographic range of species, their abundance, and their ability to survive and reproduce. Changes in climate can lead to shifts in species' ranges and alter community composition. For example, Parmesan and Yohe (2003) demonstrated that many species have shifted their ranges poleward in response to global warming.

Phenology: Climate influences the timing of biological events, such as flowering, breeding, migration, and hibernation, collectively known as phenology. Many organisms have evolved to synchronize their life cycles with specific climatic cues. Changes in climate can disrupt these relationships, leading to mismatches between the timing of events, which can have cascading effects on ecological interactions. For instance, Thackeray et al. (2016) demonstrated that warmer spring temperatures can advance the timing of flowering in plants and affect the phenology of associated pollinators.

Community Structure and Biodiversity: Climate influences the composition and structure of ecological communities. Temperature, precipitation, and other climatic factors affect the distribution and abundance of species, as well as their interactions. Climate gradients can create distinct habitats and determine which species can persist in a given area. A study by McCain (2009) found that climate variables were strong predictors of species richness patterns across diverse taxa, highlighting the influence of climate on biodiversity.

Ecosystem Functioning: Climate affects various ecosystem processes, including primary productivity, nutrient cycling, energy flow, and decomposition rates. Temperature, moisture, and other climate variables directly influence the rates of photosynthesis, respiration, and nutrient availability, which ultimately shape ecosystem functioning. A meta-analysis by Hillebrand et al. (2008) showed that climate variables, especially temperature and precipitation, strongly influence primary productivity and nutrient cycling in aquatic and terrestrial ecosystems.

Climate for the purpose of the study is chosen since it does not change over a long period of time whereas weather conditions fluctuate more rapidly, and its data cannot be relied upon.

In Komatipoort, the summers are hot, muggy, wet, and partly cloudy and the winters are short, comfortable, dry, and clear. Over the course of the year, the temperature typically varies from 14°C to 30°C and is rarely below 11°C or above 35°C *(https://weatherspark.com/)*

Temperature

The project area mean annual temperature is greater than 8°C as shown on **Figure 2**, and with the information obtained by the in-house GIS Specialist and the weather spark website it is safe to state that the project areas have hot temperature.

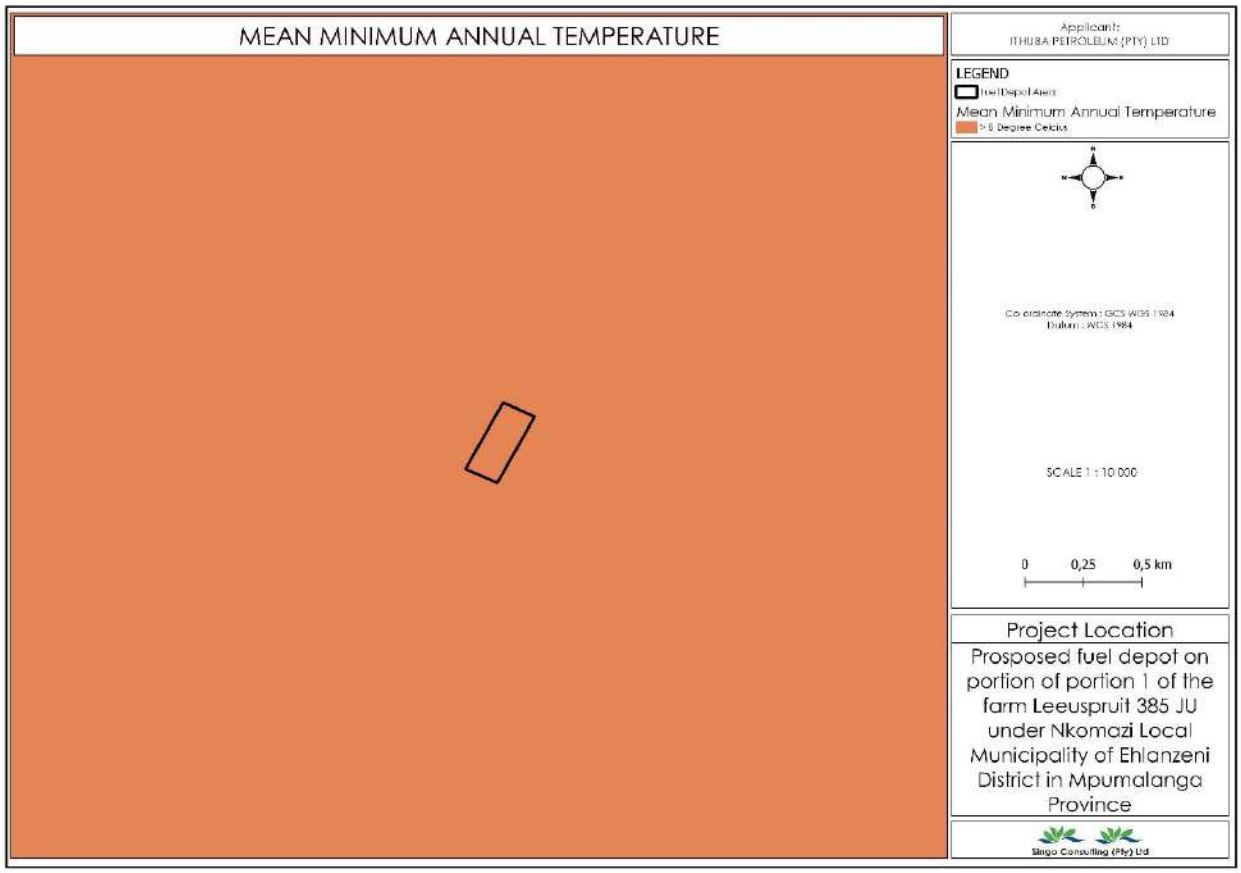

Figure 2: Mean Minimum Annual Temperature Map for the proposed project (Singo Consulting (Pty) Ltd, 2023)

Precipitation

The chance of wet days in Komatipoort varies significantly throughout the year. The wetter season lasts 5.3 months, from October 22 to April 1, with a greater than 24% chance of a given day being a wet day. The month with the most wet days in Komatipoort is December, with an average of 13.4 days with at least 1 millimeter of precipitation. The drier season lasts 6.6 months, from April 1 to October 22. The month with the fewest wet days in Komatipoort is July, with an average of 0.8 days with at least 1 millimeter of precipitation (See **Figure 3** below).

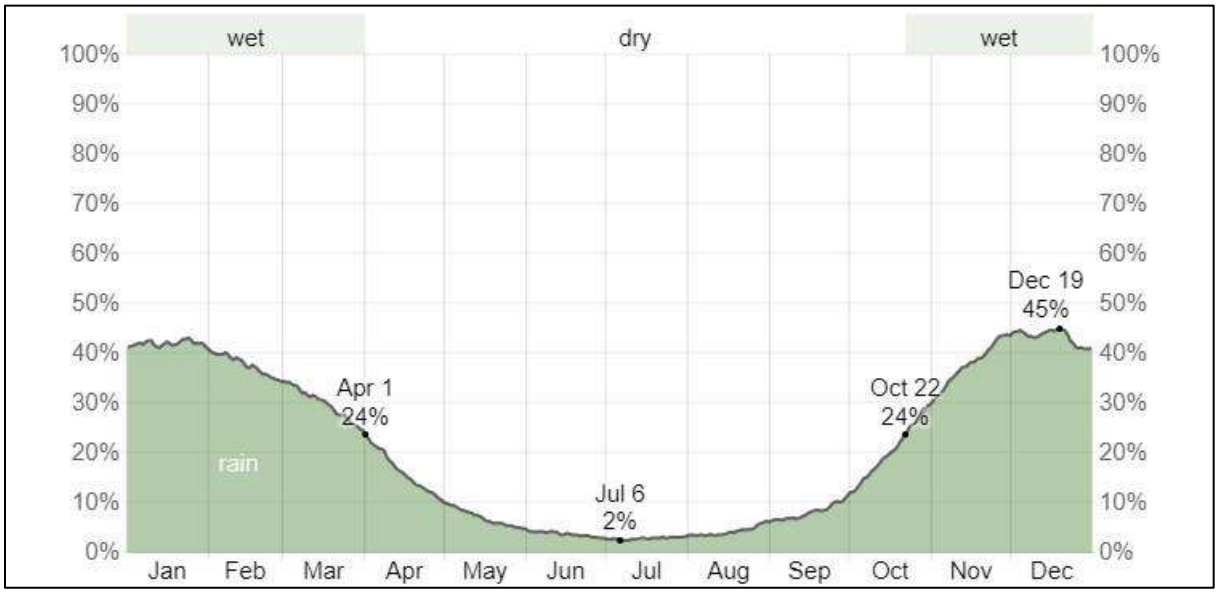

Figure 3: Daily Chance of Precipitation in Komatipoort. (https://weatherspark.com/)

To show variation within the months and not just the monthly totals, we show the rainfall accumulated over a sliding 31-day period centered around each day of the year. Komatipoort experiences significant seasonal variation in monthly rainfall. The rainy period of the year lasts for 8.4 months, from September 3 to May 17, with a sliding 31-day rainfall of at least 13 millimeters. The month with the most rain in Komatipoort is January, with an average rainfall of 106 millimeters. The rainless period of the year lasts for 3.6 months, from May 17 to September 3. The month with the least rain in Komatipoort is July, with an average rainfall of 6 millimeters (**Figure 4**) *(https://weatherspark.com/).*

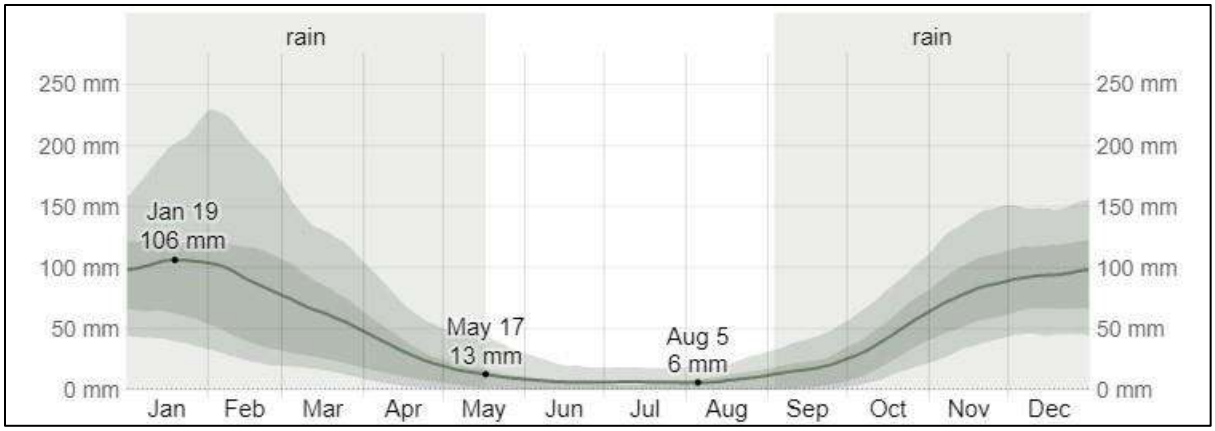

Figure 4: Average Monthly Rainfall in Komatipoort. (https://weatherspark.com/)

The proposed project application has the mean annual rainfall that ranges from 601 mm to 800 m as shown on **Figure 5** below, which shows that the project area consists of high rainfall.

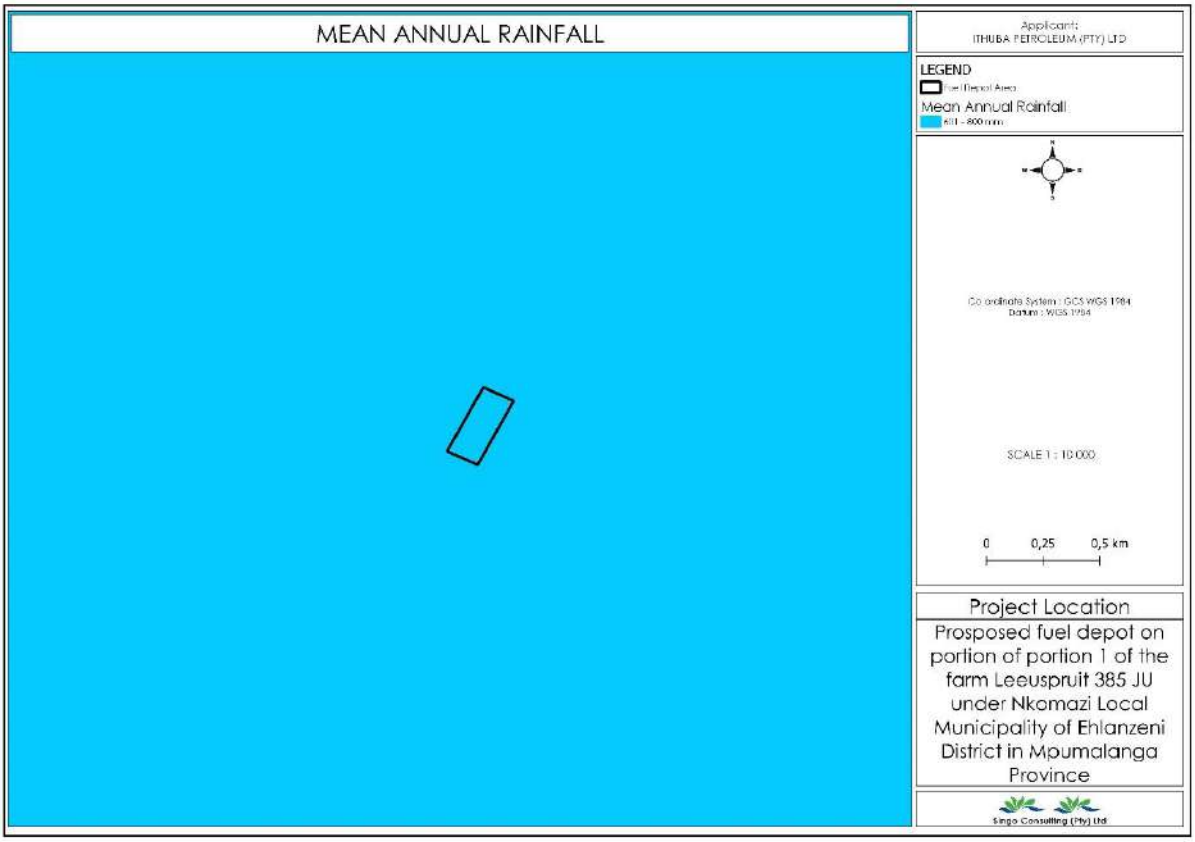

Figure 5: Mean Annual Rainfall Map for the proposed project. (Singo Consulting (Pty) Ltd , 2023)

3.2. Land use and land cover

The land use land cover map (**Figure 6**) shows that the proposed project area is covered with natural vegetation, and it was confirmed during site assessment that the land uses that are within the project area is Natural Vegetation (**Figure 7**). During ground truthing, adjacent to the project area, a wetland was observed.

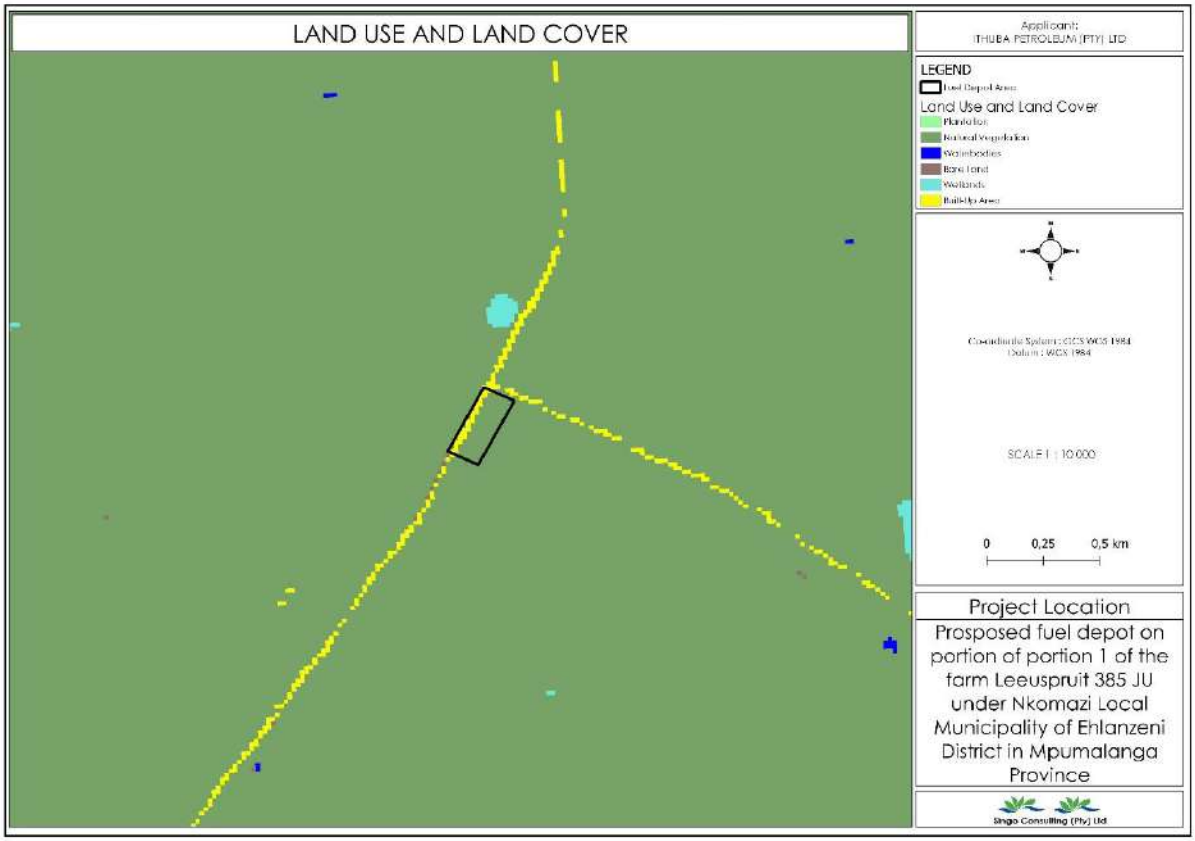

Figure 6: Land use and cover map. (Singo Consulting (Pty) Ltd , 2023)

Natural Vegetation	
Wetland	

Figure 7: Land use and cover of the proposed project area. (Singo Consulting (Pty) Ltd , 2023)

3.3. Overview of the biome type and conservation status

Biomes are broad ecological units that represent major life zones extending over large natural areas. Biomes are further divided into bioregions, which are spatial terrestrial units possessing similar biotic and physical features, and processes at a regional scale (*Rutherford, 1997*). Terrestrial biomes are usually classified based on the dominant vegetation, climate, or geographic location. The location and characteristics of the various biomes is mostly influenced by climatic conditions such as rainfall and temperature (*Siyavula Technology Powered Learning, 2023*).

The proposed project area falls in the Savanna biome (see **Figure 8**). Savannah biome occupies one third of the area of South Africa and is the largest biome in the country. It is found mainly in the western parts of Limpopo, the northern parts of the Northern Cape and Free State, the Northwest Province and KwaZulu Natal. This biome is defined by a well-developed grassy layer with a prominent woody layer of trees and shrubs. Altitude varies from sea level to 2000 m with average rainfalls of 230 mm-1000 mm. Almost every major geological soil type occurs in this biome. The great variation in environmental factors results and variation in vegetation, and also the animal life it supports (*https://www.hluhluwegamereserve.com*).

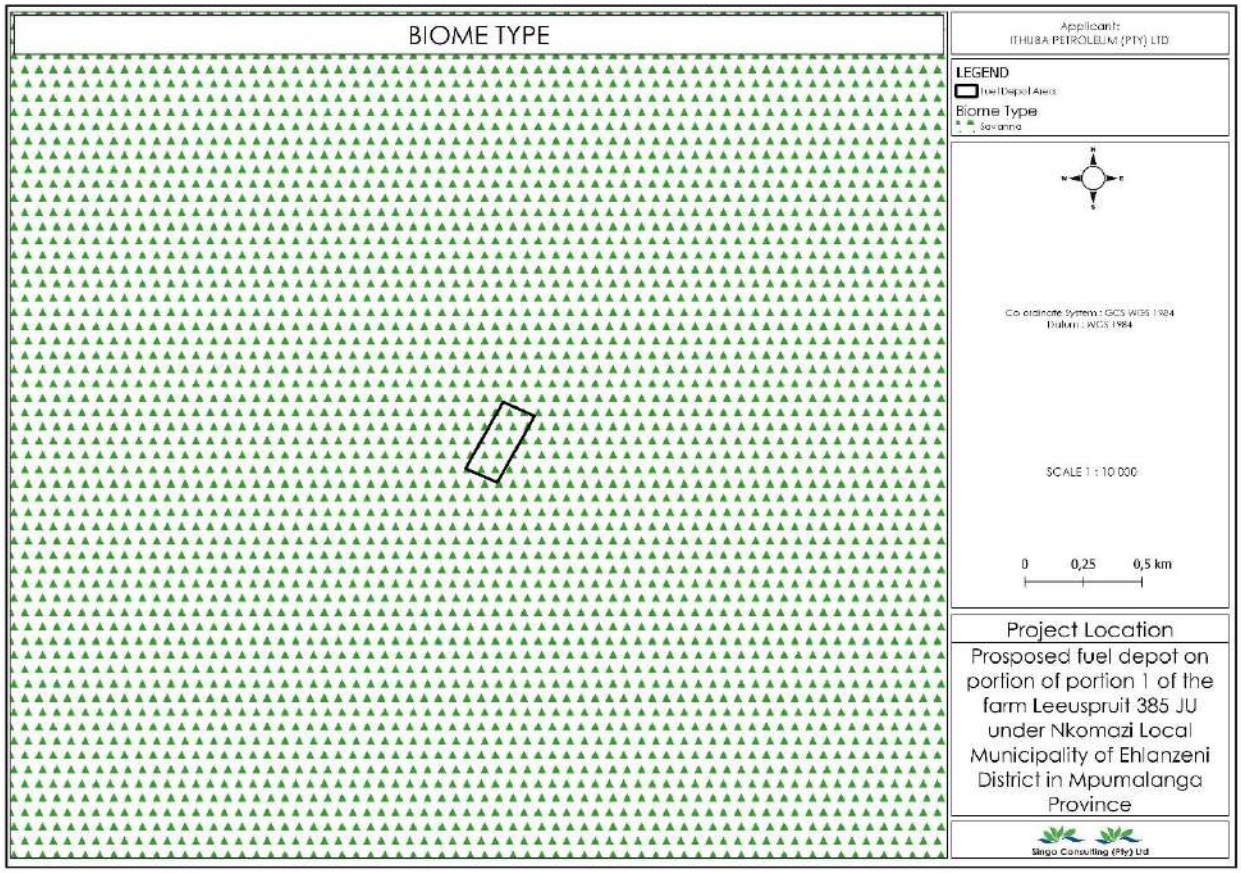

Figure 8: Biome Map of the proposed project area. (Singo Consulting (Pty) Ltd, 2023)

3.4. Vegetation Map

(Reference to the following section has been made from SANBI BGIS)

According to South African Vegetation Map, the proposed area falls under three vegetation group namely, **SVI 3 Granite Lowveld**.The proposed vegetation consists of 40% of Arid Lowveld, 38% of Lowveld and 61% of Mixed Lowveld Bushveld vegetation group (*Low & Rebelo,1996*). **Figure 9** below confirms that the majority of the study area falls within the Mixed Lowveld Bushveld vegetation type while the minority of the area consists of Sour Lowveld Bushveld.

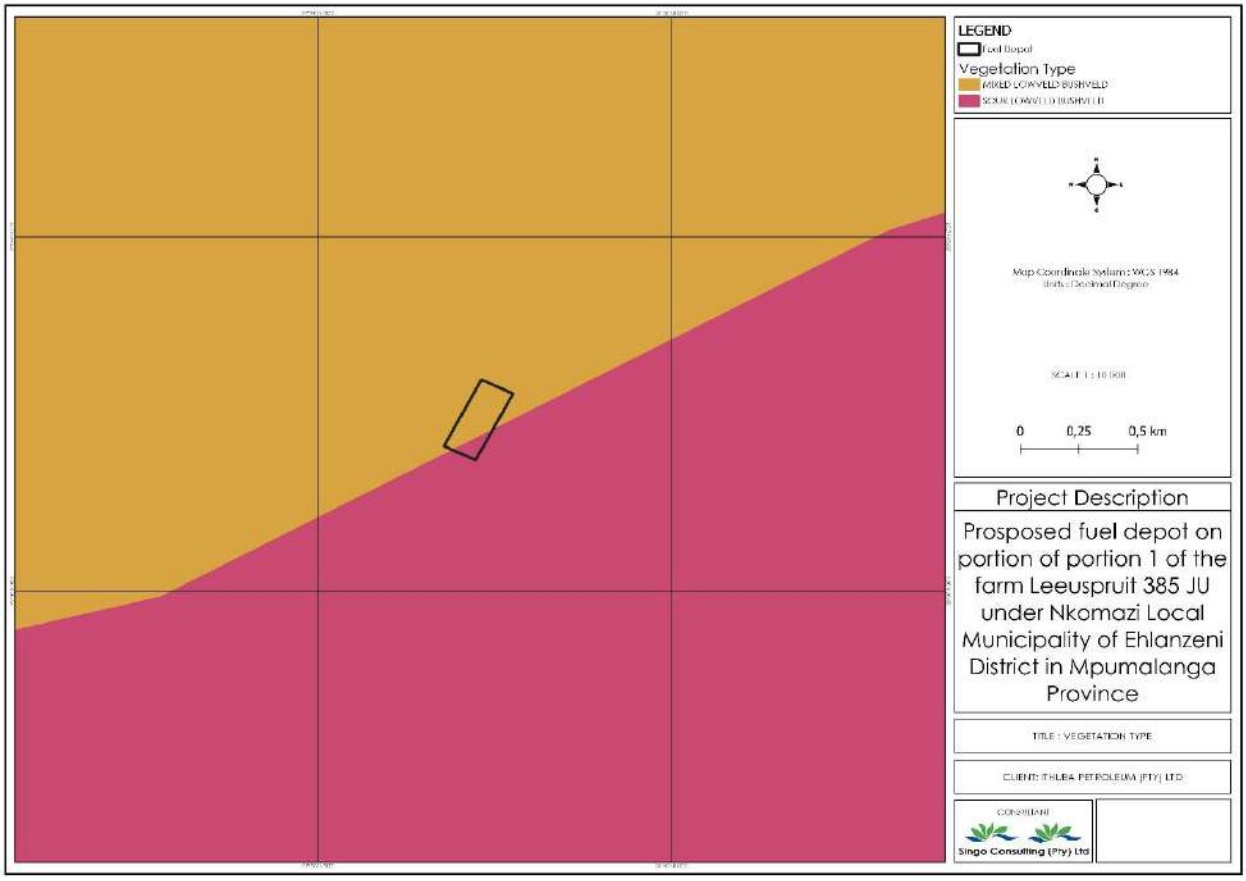

Figure 9:Vegetation type of the proposed project area. (Singo Consulting (Pty) Ltd, 2023)

Distribution: The proposed vegetation type is mainly found in Limpopo , 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. It continues further southward to the Hectorspruit

area with a narrow westward extension up the Crocodile River Valley past Malelane, Kaapmuiden and the Kaap River Valley, entering Swaziland between Jeppe's Reef in the west and the Komati River in the east, through to the area between Manzini and Siphofaneni, including the Grand Valley, narrowing irregularly and marginally entering KwaZulu-Natal near Pongola. Altitude 250–700 m.

Vegetation & Landscape Features: The vegetation type consists of Tall shrubland with few trees to moderately dense low woodland on the deep sandy uplands with *Terminalia sericea*, *Combretum zeyheri* and *C. apiculatum* and ground layer including *Pogonarthria squarrosa*, *Tricholaena monachne* and *Eragrostis rigidior*. Dense thicket to open savanna in the bottomlands with *Acacia nigrescens*, *Dichrostachys cinerea*, *Grewia bicolor* in the woody layer. The dense herbaceous layer contains the dominant *Digitaria eriantha*, *Panicum maximum* and *Aristida congesta* on fine-textured soils, while brackish bottomlands support *Sporobolus nitens*, *Urochloa mosambicensis* and *Chloris virgata*. At seep lines, where convex topography changes to concave, a dense fringe of *Terminalia sericea* occurs, with *Eragrostis gummiflua* in the undergrowth.

Geology & Soils: From north to south, the Swazian Goudplaats Gneiss, Makhutswi Gneiss and Nelspruit Suite (granite gneiss and migmatite), and further south still, the younger Mpuluzi Granite (Randian) form the major basement geology of the area. Archaean granite and gneiss weather into sandy soils in the uplands and clayey soils with high sodium content in the lowlands.

Important Taxa: **Tall Trees:** *Acacia nigrescens* (d), *Sclerocarya birrea* subsp. *caffra* (d). **Small Trees:** *Acacia nilotica* (d), *Albizia harveyi* (d), *Combretum apiculatum* (d), *C. imberbe* (d), *C. zeyheri* (d), *Ficus stuhlmannii* (d), *Peltophorum africanum* (d), *Pterocarpus rotundifolius* (d), *Terminalia sericea* (d), *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* (d), *Dichrostachys cinerea* (d), *Euclea divinorum* (d), *Strychnos madagascariensis* (d), *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* (d), *Digitaria eriantha* subsp. *eriantha* (d), *Eragrostis rigidior* (d), *Melinis repens* (d), *Panicum maximum* (d), *Pogonarthria squarrosa* (d), *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*, *Hermbstaedtia 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.*

Conservation: 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.

Remark Further research may reveal a need to differentiate the northern from the southern parts of this unit.

4. TERRESTRIAL THREATENED ECOSYSTEM

The South African National Biodiversity Institute (SANBI), in conjunction with the Department of Environmental Affairs (DEA), released a draft report in 2009 entitled “Threatened Ecosystems in South Africa: Descriptions and Maps”, to provide background information on the List of Threatened Ecosystems (SANBI, 2009). The purpose of this report was to present a detailed description of each of South Africa’s ecosystems and to determine their status using a credible and practical set of criteria.

The following criteria were used in determining the status of threatened ecosystems:

- Irreversible loss of natural habitat
- Ecosystem degradation and loss of integrity
- Limited extent and imminent threat
- Threatened plant species associations
- Threatened animal species associations

Priority areas for meeting explicit biodiversity targets as defined in a systematic conservation plan in terms of section 52 (1) (a), of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA), a new national list of ecosystems that are threatened and in need of protection was gazette on 9 December 2012 (Government Notice 1002 (Driver et. al., 2004). The list classified all threatened or protected ecosystems in South Africa in terms of four categories, namely Critically Endangered (CR), Endangered (EN), Vulnerable (VU), or protected. The purpose of categorizing these ecosystems is to prioritize conservation areas to reduce the rates of ecosystem and species extinction, as well as preventing further degradation and loss of structure, function, and composition of these ecosystems. It is estimated that threatened ecosystems make up 9.5% of South Africa, with CR and EN ecosystems accounting for 2.7%, and VU ecosystems 6.8% of the land area. It is therefore vital that Threatened Terrestrial Ecosystems inform proactive and reactive conservation and planning tools, like Biodiversity Sector Plans, municipal Strategic Environmental Assessments (SEAs) and Environmental Management Frameworks (EMFs), EIAs and other environmental applications (Mucina et al., 2006)

5. LIMITATIONS

The following limitations apply to this report:

1. There is limited literature on the study area, making it difficult to compile a detailed report about the proposed site.
2. No faunal and floral species of conservation concern was observed during site assessment, and this might be because of the heavily modified of some areas due to cultivation and livestock farming.
3. Some areas of the proposed site are covered with flourishing natural vegetation, so it was not easy to identify spoor, fur, faeces, burrow, bones, and dead bodies of species which might be present onsite.
4. Singo Consulting reserves the right to amend this report, recommendations and/or conclusions at any stage should any additional or otherwise significant information come to light.

6. METHODOLOGY AND SITE ASSESSMENT

The information provided in this ecology report is based mainly on the observations that were made during the field survey and a review of the available reports that contain known and predicted biodiversity and wetland information on the study area. A wide range of spatial data sets were interrogated, and relevant information was extracted for the study area. A basic ecological sensitivity analysis was performed to identify areas of special interest or concern. The various approaches used, and aspects considered are detailed in this section.

- Desktop study

A desktop survey was conducted, during which maps, and other aerial images, reports, and photography were reviewed to assemble background information on the different features of and vegetation present in the proposed project are. The site was assessed between 16th of June 2023 to record the present features and species.

- Vegetation

A desktop study of the habitats of the red and orange-listed species was conducted prior to site assessment. The vegetation types identified by Mucina, and Rutherford (2012) were used as reference, but where necessary vegetation communities were named according to the recommendations for a standardised South African syntaxonomic nomenclature system (Brown., et al, 2013). By combining the available literature, stratification of vegetation communities was possible.

- Fauna survey

Most mammals and reptiles are very secretive, nocturnal, hibernate (reptiles), migrate (birds) or prefer specific habitats, so sampling and identification proved difficult. So, a virtual museum website was used to assist with fauna species within the proposed area.

- Mammals

Mammals are nocturnal, secretive, or seasonal. Their specific habitats, walking trails, faeces, spoor, fur, bones, and carcasses were assessed to document mammal species that are associated with the proposed site. The site assessment was conducted using direct and indirect methods, including mammal sightings, identification of burrows and holes, and verification using literature (*Skinner and Chimimba, 2005*).

- Ecological and faunal sensitivity analysis

Following the site visit, an ecological sensitivity analysis of the site was conducted based on the screening report and biodiversity maps that show Critical Biodiversity Areas (CBAs) and Ecological Support Areas.

The ecological sensitivity of the different units identified in the sensitive analysis procedure was rated according to the following scales:

1. **Low:** Units with a low sensitivity where there is likely to be a negligible impact on ecological processes and terrestrial biodiversity. This category is reserved specifically for areas where the natural vegetation has already been transformed, usually for intensive agricultural purposes like cropping. Most types of development can proceed within these areas with little ecological impact.
2. **Medium:** Areas of natural or previously transformed land where the impacts are likely to be largely local and the risk of secondary impact like erosion low. Development in these areas can proceed with relatively little ecological impact provided that appropriate mitigation measures are taken.
3. **High:** Areas of natural or transformed land where a high impact is anticipated due to the high biodiversity value, sensitivity, or important ecological role of the area. Development in these areas is highly undesirable and should only proceed with caution as it may not be possible to mitigate all impacts appropriately.
4. **Very high:** Critical and unique habitats that serve as habitat for rare/endangered species or perform critical ecological roles. These areas are essentially no-go areas from a developmental perspective and should be avoided at all costs.

a) Methodology adapted in assessing impacts.

Impact significance will be assessed using the following descriptors:

Table 2: Impact assessment table.

Nature of the impact		
Positive	+	Impact will be beneficial to the environment (a benefit).
Negative	-	Impact will not be beneficial to the environment (a cost).
Neutral	0	Where a negative impact is offset by a positive impact, or mitigation measures, to have no overall effect.
Magnitude		
Minor	2	Negligible effects on biophysical or social functions / processes. Includes areas / environmental aspects which have already been altered significantly and have little to no conservation importance (negligible sensitivity*).
Low	4	Minimal effects on biophysical or social functions / processes. Includes areas / environmental aspects which have been largely modified, and / or have a low conservation importance (low sensitivity*).

Moderate	6	Notable effects on biophysical or social functions / processes. Includes areas / environmental aspects which have already been moderately modified and have a medium conservation importance (medium sensitivity*).
High	8	Considerable effects on biophysical or social functions / processes. Includes areas / environmental aspects which have been slightly modified and have a high conservation importance (high sensitivity*).
Very high	10	Severe effects on biophysical or social functions / processes. Includes areas / environmental aspects which have not previously been impacted upon and are pristine, thus of very high conservation importance (very high sensitivity*).
Extent		
Site only	1	Effect limited to the site and its immediate surroundings.
Local	2	Effect limited to within 3-5 km of the site.
Regional	3	Activity will have an impact on a regional scale.
National	4	Activity will have an impact on a national scale.
International	5	Activity will have an impact on an international scale.
Duration		
Immediate	1	Effect occurs periodically throughout the life of the activity.
Short term	2	Effect lasts for a period 0 to 5 years.
Medium term	3	Effect continues for a period between 5 and 15 years.
Long term	4	Effect will cease after the operational life of the activity either because of natural process or by human intervention.
Permanent	5	Where mitigation either by natural process or human intervention will not occur in such a way or in such a time span that the impact can be considered transient.
Probability of occurrence		
Improbable	1	Less than 30% chance of occurrence.
Low	2	Between 30 and 50% chance of occurrence.
Medium	3	Between 50 and 70% chance of occurrence.
High	4	Greater than 70% chance of occurrence.

Definite	5	Will occur, or where applicable has occurred, regardless or despite any mitigation measures.

Once the impact criteria have been ranked for each impact, the significance of the impacts will be calculated using the following formula:

Significance Points (SP) = (Magnitude + Duration + Extent) x Probability

The significance of the ecological impact is therefore calculated by multiplying the severity rating with the probability rating. The maximum value that can be reached through this impact evaluation process is 100 SP (points). The significance for each impact is rated as High (SP≥60), Medium (SP = 31-60) and Low (SP<30) significance as shown in the Table 3.

Table 3: Definition of significance rating.

Significance of predicted NEGATIVE impacts		
Low	0-30	Where the impact will have a relatively small effect on the environment and will require minimum or no mitigation and as such have a limited influence on the decision
Medium	31-60	Where the impact can have an influence on the environment and should be mitigated and as such could have an influence on the decision unless it is mitigated.
High	61-100	Where the impact will have an influence on the environment and must be mitigated, where possible. This impact will influence the decision regardless of any possible mitigation.
Significance of predicted POSITIVE impacts		
Low	0-30	Where the impact will have a relatively small positive effect on the environment.
Medium	31-60	Where the positive impact will counteract an existing negative impact and result in an overall neutral effect on the environment.
High	61-100	Where the positive impact will improve the environment relative to baseline conditions.

7. ASSESSMENT RESULTS

a) Plant species of conservation concern

Species of conservation concern (SCC) are either categorized as Red Data Listed species (RDL species), according to specific scientifically researched criteria and administered by the South African National Biodiversity Institute (SANBI), as protected trees by the National Forests Act (NFA)(Act No. 84 of 1998), or as Protected Trees and Plants by The NEMBA Threatened or Protected Species Regulations 152 of 2007 ("TOPS Regulations") and the Lists of Critically Endangered, Vulnerable and Protected Species (TOPS Lists).

A desktop study, the screening report shows that the proposed project area is of medium sensitivity with the following floral species: *Caesalpinia rostrata*, Nesaea *alata* and *Barleria oxyphylla*.

During site assessment, it was observed that some areas of the proposed site are covered with natural vegetation that include **(A)** *Euphorbia cooperi N.E.Br. ex A.Berger,* **(B)** *Trichilia emetica* Vahl **(C)** *Gomphocarpus fruticosus* and **(D)** *Senna spectabilis* were observed (see **Figure 10**).

Sensitivity aspects:

1. The area has an ecological functioning and conservation importance of medium to high as it is within the undisturbed zone.

2. The suitability of this community for red data/protected species is considered medium to high and red data species were recorded during site assessment.

Regardless of the fact that no conservation species were observed onsite, if found onsite, according to the list of protected species under Schedule 11; no person may cut, disturb, damage, or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate, or in any other manner acquire or dispose of any protected plant unless he or she is the holder of a permit which authorises him or her to do so.

Figure 10: Species of conservation concern within the proposed project area. (Singo Consulting (Pty) Ltd, 2023)

Table 4: Plant species identified onsite.

Scientific names	Common names	Threat Status (SANBI, 2017)	SA Endemic
Hyparrhenia hirta (L) Stapf	South African bluestem	Least concern	Not Endemic
Euphorbia cooperi	Bushveld Tree Euphorbia	Least concern	Not Endemic
Trichilia emetica Vahl	Christmas Bells	Least concern	Not Endemic
Senna spectabilis	Cassia spectabilis	Least concern	Not Evaluated
Searsia pyroides	Rhus flexuosa Diels	Least concern	Not Endemic
Combretum vendae	Bushwillow	Least concern	S.A endemic
Opuntia ficus-indica	Prickly Pear	Not Evaluated	Naturalized exotics
Euphorbia cooperi N.E.Br. ex A.Berger	Bushveld Candelabra Tree	Least concern	Not Endemic
Ceratotheca triloba	African Foxglove	Least concern	Not Endemic
Aloe marlothii	Mountain Aloe	Least concern	Not Endemic
Dichrostachys cinerea	Sekelbos	Least concern	Not Endemic
Solanum lichtensteinii Willd	Large Yellow Bitter Apple	Least concern	Not Endemic
Cynodon dactylon (L) pers	Bermuda Grass	Least concern	Not Endemic
Bidens Pilosa	Blackjack	Not Evaluated	Naturalized exotics
Zinnia peruviana	Redstar Zinnia	Not Evaluated	Naturalized exotics
Combretum zeyheri Sond	Klapper	Least concern	Not Endemic
Opuntia ficus-indica (L.) Mill	Sweet prickly pear	Not Evaluated	Naturalized Exotics
Sporobolus Africanus	Ratstailgrass	Least concern	Not Endemic
Diospyros Lycioides Desf	bluebush	Least concern	Not Endemic
Themeda triandra	Red Grass	Least concern	Not Endemic
Cymbopogon excavatus	Common turpentine grass	Least concern	Not Endemic
Leonotis nepetifolia (L.)R.Br	Klipa Dagga	Least concern	Not Endemic
Imperata cylindrica	Bedding Grass	Least concern	Not Endemic
Gomphocarpus fruticosus (L.) Aiton f. subsp. fruticosus	Cotton Milkweed	Least concern	Not Endemic
Terminalia sericea	Silverboom	Least concern	Not Endemic
Paspalum dilatatum pior	Dalli's grass	Least concern	Not Endemic

b) Alien invasive plants

Declared weeds and invaders have the tendency to dominate or replace the herbaceous layer of natural ecosystems, thereby transforming the structure, composition, and function of natural ecosystems. It is important that all these transformers be eradicated and controlled by means of an eradication and monitoring programme. Some invader plants may degrade ecosystems through superior competitive capabilities to exclude native plant species (Henderson, 2001).

The NEM:BA is the most recent legislation pertaining to alien invasive plant species. In August 2014, the list of alien invasive species was published in terms of the NEM:BA. The Alien and Invasive Species Regulations were published in the Government Gazette No. 43726 on 18 September 2020. The legislation calls for the removal and/or control of alien invasive plant species (Category 1 species). In addition, unless authorised thereto in terms of the National Water Act, 1998 (Act No. 36 of 1998), no land user shall allow Category 2 plants to occur within 30 m of the 1:50 year flood line of a river, stream, spring, natural channel in which water flows regularly or intermittently, lake, dam, or wetland. Category 3 plants are also prohibited from occurring close to a watercourse. The following describes the three categories in terms of the NEM:BA:

- Category 1a: Invasive species requiring compulsory control. Remove and destroy. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.
- Category 1b: Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.
- Category 2: Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy, or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones.
- Category 3: Invasive species regulated by activity. An individual plant permit is required to undertake any of the restricted activities (import, possess, grow, breed, move, sell, buy, or accept as a gift) involving Category 3 species. No permits will be issued for Category 3 plants to exist in riparian zones.

According to the regulations, a person who has under their control a Category 1b listed invasive species must immediately:

- Notify the competent authority in writing
- Take steps to manage the listed invasive species in compliance with:
    - Section 75 of the Act
    - The relevant invasive species management programme developed in terms of regulation 4
    - Any directive issued in terms of section 73(3) of the Act.

During ground truthing, eight species categorised as Category 1b and two species NEMBA Category 2 were recorded onsite. Other exotic plants not listed under NEMBA were also recoded. **Table 5** lists exotic floral species identified during ground truthing. **Figure 11** depicts invader species listed under NEMBA categories observed onsite, namely **(A)** *Acacia mearnsii,*

Table 5: Alien and invader species recorded in the study area.

Common names	Scientific names	Threat Status (SANBI, 2017)	SA Endemism	Alien Category
Blackjack	*Bidens Pilosa*	Not Evaluated	Naturalized Exotics	
Black Wattle	*Acacia mearnsii*	Least Concern	Naturalized Exotics	NEMBA Category 2
Rhus lancea	*Searsia lancea*	Least Concern	Not Evaluated	
Eagle Fern	*Pteridium aquilinum*	Least Concern	Not Endemic	
Long-leaved wattle	*Acacia longifolia*	Not Evaluated	Naturalized Exotics	NEMBA Category 1b
Populus alba	*White poplar*	Not Evaluated	Naturalized Exotics	NEMBA Category 2
Red River Gum	*Eucalyptus camaldulensis*	Not Evaluated	Not Indigenous	NEMBA Category 1b
Bur Weed	*Xanthium strumarium*	Not Evaluated	Naturalized exotics	NEMBA Category 1b
Thorny poinciana	*Caesalpinia decapetala (Roth) Alston*	Not Evaluated	Naturalized exotics	NEMBA Category 1b
Tall Verbena	*Verbena bonariensis*	Not Evaluated	Naturalized exotics	NEMBA Category 1b
Xanthium strumarium L.	*Large cocklebur*	Not Evaluated	Naturalized exotics	NEMBA Category 1b
Cluster Pine	*Pinus pinaster Aiton*	Not Evaluated	Naturalized exotics	NEMBA Category 1b
Cirsium vulgaren	spear thistle	Not Evaluated	Naturalized exotics	NEMBA Category 1b
Acacia dealbata Link	Silver wattle	Least Concern	Not Endemic	NEMBA Category 2

Figure 11: Invader plant species recorded onsite. *(Singo Consulting (Pty) Ltd, 2023)*

c) Description of Critical Biodiversity Areas

Critical Biodiversity Areas (CBAs) are terrestrial and aquatic features in the landscape that are critical in retaining biodiversity and supporting continued ecosystem functioning and services (SANBI, 2007). These form the key output of a systematic conservation assessment and are the biodiversity sector inputs into multi-sectoral planning and decision-making tools.

The primary purpose of CBAs is to inform land-use planning and land-use guidelines attached to its aim to promote sustainable development by avoiding loss or degradation of important natural habitat and landscapes in these areas. CBAs can be used to inform protected area expansion and development plans. The use of CBAs here follows the definitions laid out in the guideline for publishing bioregional plans (Anon, 2008):

1. “Critical biodiversity areas (CBAs) are areas of the landscape that need to be maintained in a natural or near-natural state to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. In other words, if these areas are not maintained in a natural

or near-natural state then biodiversity conservation targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity-compatible land uses and resource uses".

2. "Ecological support areas (ESA's) are areas that are not essential for meeting biodiversity representation targets/thresholds but which nevertheless play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. The degree of restriction on land use and resource use in these areas may be lower than that recommended for critical biodiversity areas."

The guideline for bioregional plans defines three basic CBA categories based on three high-level land management objectives.

Table 6: A framework for linking spatial planning categories (CBAs) to land-use planning and decision-making guidelines based on a set of high-level land biodiversity management objectives.

CBA category	Land management objective
PA & CBA 1	Natural landscapes: 1. Ecosystems and species fully intact and undisturbed. 2. Areas with high irreplaceability or low flexibility in terms of meeting biodiversity pattern targets. If the biodiversity features targeted in these areas are lost, targets will not be met. 3. Landscapes that are at or past their limits of acceptable change.
CBA 2	Near-natural landscapes: 1. Ecosystems and species largely intact and undisturbed. 2. Areas with intermediate irreplaceability or some flexibility in terms of area required to meet biodiversity targets. There are options for loss of some components of biodiversity in these landscapes without compromising target achievement. 3. Landscapes that are approaching but have not passed their limits of acceptable change.
Ecological Support Areas (ESA)	Functional landscapes: 1. Ecosystems moderately to significantly disturbed but still able to maintain basic functionality. 2. Individual species or other biodiversity indicators may be severely disturbed or reduced. 3. Areas with low irreplaceability with respect to biodiversity pattern targets only.
Other Natural Areas (ONA) and transformed	Production landscapes: manage land to optimise sustainable utilisation of natural resources.

During desktop study, the terrestrial biodiversity map shows that the proposed project area consists of other natural areas (see **Figure 12**). However, the screening report shows that the proposed project area has low sensitivity when coming to terrestrial biodiversity (see **Appendix 1**).

During ground truthing, it was observed that the project area consists of natural vegetation and some wetland in close proximity of the project area (**Figure 13**). The natural areas characterised by natural vegetation should be avoided to avoid unnecessary disturbance of sensitive areas. The area consists of natural vegetation and support ecological function of the proposed area. The only area that is modified is due to the sand mining next to the project area that is been conducted by the adjacent landowner. The heavily modified areas are disturbed to an extent that they cannot be reinstated to their natural state (see **Figure 14**).

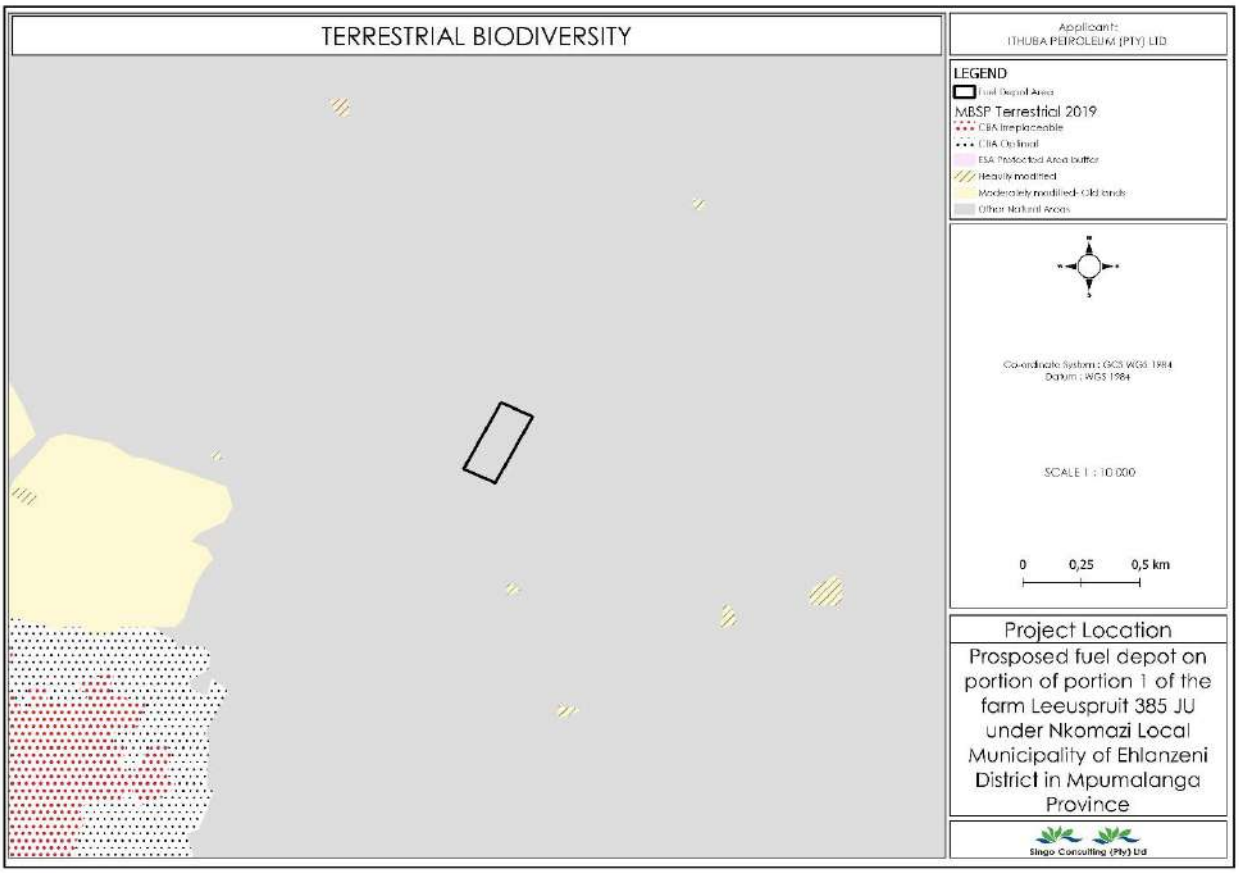

Figure 12: Terrestrial Biodiversity Map. *(Singo Consulting (Pty) Ltd, 2023)*

Figure 13:Surroundings of the proposed project area. (Singo Consulting (Pty) Ltd, 2023)

Figure 14: Heavily modified areas onsite. *(Singo Consulting (Pty) Ltd, 2023)*

During desktop study, the screening report shows that the proposed project area is of very high sensitivity for aquatic biodiversity with ESA: Important subcatchments (see **Appendix 1**). Hydrology map depicts that in proximity of the proposed project area the is a non-perennial, and artificial wetland **(see Figure 15)**. During site assessment a wetland was observed approximately 93 m away from the project area (see **Figure 15**). These are the most sensitive habitats in the project area where ecological impacts will be most significant. The applicant must ensure that there is no disturbance of water resources identified onsite during construction activities. Buffer zones should be implemented, and construction activities should be conducted 100m away from the identified rivers and 500m away from the wetlands. Water resources should be protected for the services they render to the environment. The non-parennial rivers and wetlands observed onsite provide habitat for aquatic animals and form part of the sources of freshwater in South Africa.

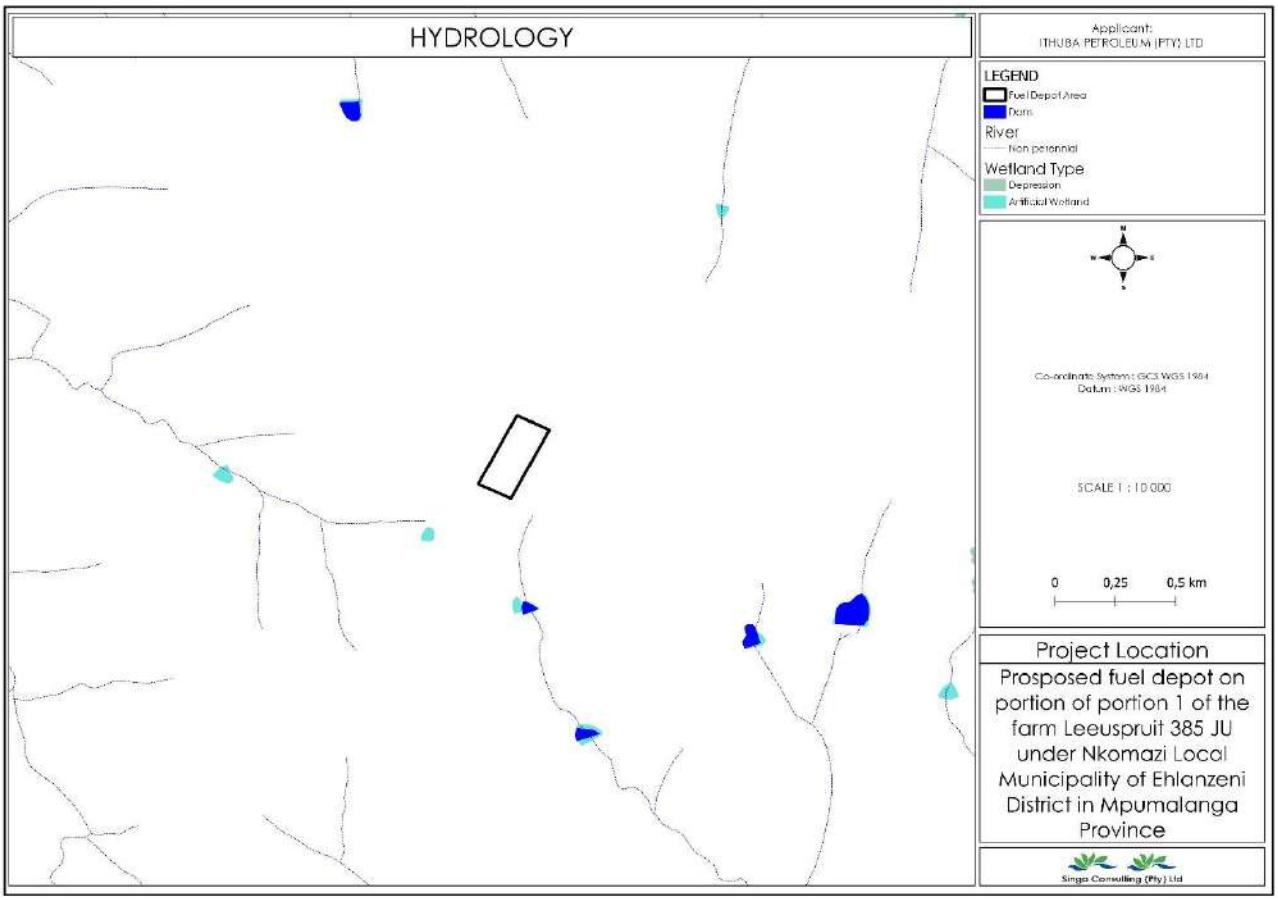

Figure 15: Hydrology Map. (Singo Consulting (Pty) Ltd, 2023)

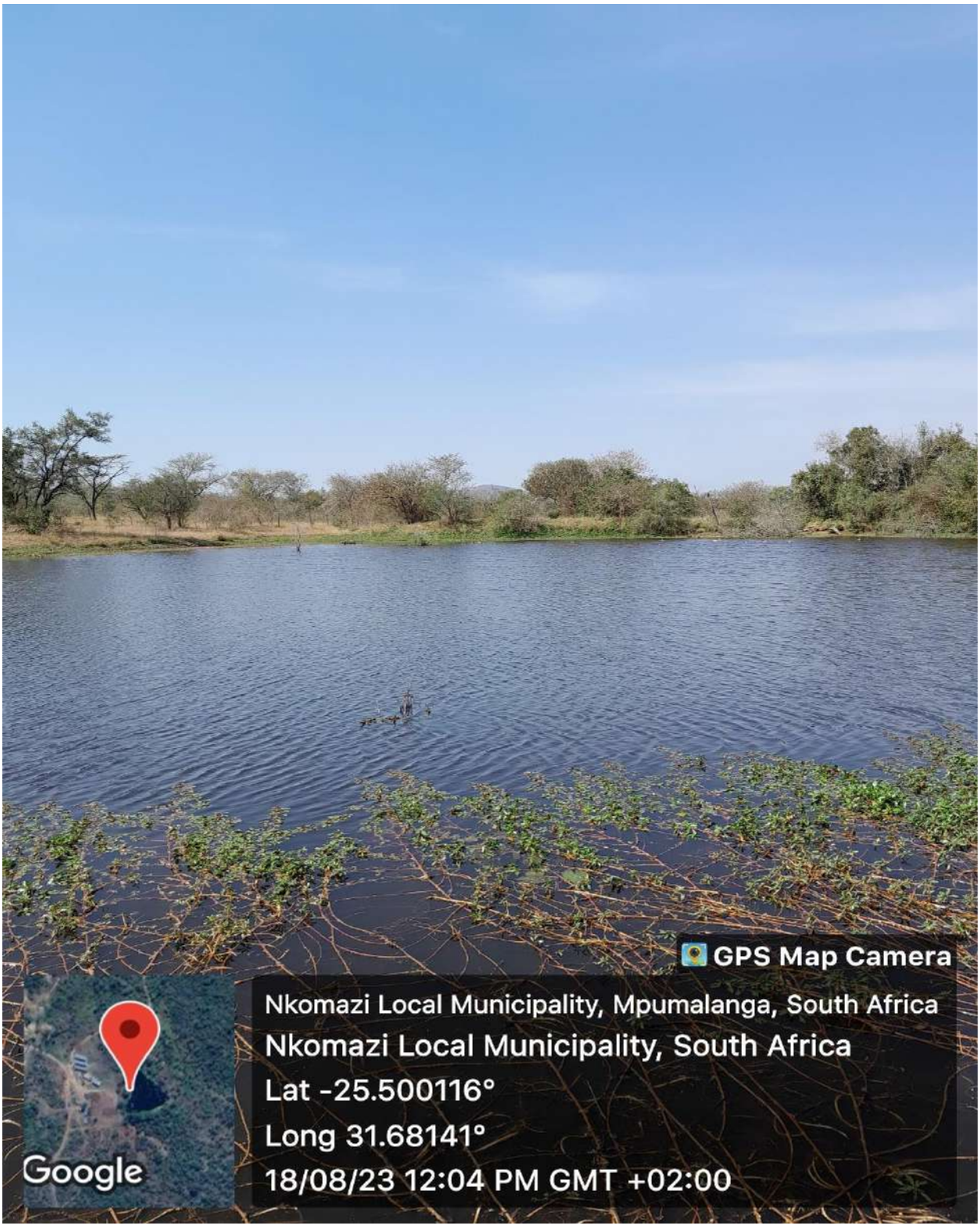

Figure 16: Water bodies in close proximity with the project area. (Singo Consulting (Pty) Ltd, 2023)

d) Mammals

During desktop study, the screening report shows that the proposed project area is of medium sensitivity with the following mammal species: *Mammalia-Crocidura maquassiensis, Mammalia-Dasymys robertsii and Mammalia-Lycaon pictus* (see **Appendix 1**). During site assessment, no mammal species of conservation concern were observed onsite; however, it was mentioned that the animals from the nearby nature reserve such as Impala and Wildebeest cross over to the proposed project area. The VMUS website displays a list of mammal species that are present within the grid number **2531 BC** which includes the project area and the most recent mammal species recorded includes Steenbok, Greater Kudu, Black-backed Jackal and Vervet Monkey and other species, refer to **Appendix 3.** The Natural areas covered with natural vegetation should be avoided during project activities as the areas provide habitat to wild animals which might be available onsite.

e) Avifauna

Birds are considered good ecological indicators, since their presence or absence are indicative of whether the ecosystem is functioning properly or not. Bird communities and ecological conditions are linked to land cover; as the land cover changes, the types of bird species in the area also change. During desktop study, screening report shows that the proposed project area has the bird species with high sensitivity namely *Aves-Terathopius ecaudatus, Aves-Torgos tracheliotos, Aves-Polemaetus bellicosus, Aves-Bucorvus leadbeateri* and *Aves-Aquila rapax* (**Appendix 1**).

During ground truthing, no bird's species were observed namely. Due to their erratic flight patterns and short sighting intervals, birds can be challenging to photograph, however for other birds' species that may be present within the proposed project area, please refer to **Appendix 2**.

Bird communities and ecological condition are linked to land cover, as the types of bird species in the area change when land cover changes. Habitat-specific species are sensitive to environmental change, with habitat destruction being the leading cause of species decline worldwide. It is widely accepted that vegetation structure, rather than the actual plant species, influences bird species distribution and abundance (Harrison et al., 1997).

f) Herpetofauna

Herpetofauna diversity onsite is considered medium, with no reptile or amphibian species observed during ground truthing.This is likely due to the inherently secretive nature of reptile species, and seasonality. However, when conducting a desktop search, the VMUS website displays a list of potential reptile species that may be present in the area that is being suggested for construction. The most recent reptile species to be recorded is Trachylepis varia on the 08th of July 2022, refer to **Appendix 4**. The termitaria should not be disturbed during construction activities as they provide habitats to termites and support ecological function of the area.

8. IMPACT ASSESSMENT

Introduction

The regulations in Chapter 5 of the NEMA requires a description of the potential impacts the proposed development will have on the environment. **Table 7** presents details of the potential impacts of the proposed project activities, as well as their proposed mitigation measures.

Pending the outcome of such a review, it is theoretically possible for the Ithuba Petrolium to operate without significant impacts to the whole area if all mitigation measures are implemented and best practice construction is undertaken.

Vegetation species

Table 7: Loss of vegetation and natural habitat during construction.

Impact phase	Construction phase				
Possible impact	Loss of vegetation and natural habitat				
Type of impact	Direct and indirect impact				
Rating criteria	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**
Calculation	3	5	10	5	**High (61-90)**
Can the impact be reversed					No
Will impact cause irreplaceable loss of resources					Yes
Can impact be avoided, managed, or mitigated					Yes

Impact mitigation measures

- Limit vegetation clearing to what is necessary for construction activities.
- Prioritise development in low sensitive/already disturbed areas.
- Offer environmental awareness and training before construction commences.
- Implement a biodiversity action plan prior to construction and ensure adherence thereto.
- Fence-off construction site to demark working extent and prevent construction impacts on biodiversity.
- Minimise areas affected during construction and establish buffer zones.
- Use available farm roads to avoid unnecessary disturbance of natural and indigenous vegetation.
- Supervise (to be done by an ecologist) the rescue operation to ensure its success.
- Disturbed areas must be rehabilitated with indigenous plants as soon as construction concludes.

Alien invasive species

Table 8: Introduction of alien invasive species during rehabilitation.

Impact phase	Rehabilitation phase after construction activities				
Possible impact	Introduction of alien invasive species				
Type of impact	Direct and indirect impact				
Rating criteria	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**
Calculation	2	5	8	4	Medium (30-60)
Can the impact be reversed					No
Will impact cause irreplaceable loss of resources					Yes
Can impact be avoided, managed, or mitigated					Yes
Impact mitigation measures • Establish buffer zones and implement strict measures to prevent construction in these zones. Do not clear vegetation in buffer zones. • The best mitigation measure for alien and invasive species is early detection and eradication of these species using a monitoring programme. • An alien invasive management programme should be developed and implemented to control alien invasive species. • Disturbed area should be rehabilitated with indigenous plant species to avoid colonisation of the area by invasive species.					

Birds

Table 9: Impacts of construction on birds and its associated roosting site.

Impact phase	Construction phase				
Possible impact	The fragmentation, clearing, and alteration of natural habitat have a huge impact on birds breeding and roosting sites.				
Type of impact	Direct Impact				
Rating criteria	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**
Calculation	4	5	10	5	High (61-90)
Can the impact be reversed					No
Will impact cause irreplaceable loss of resources					Yes
Can impact be avoided, managed, or mitigated					Yes
Impact mitigation measures					

- Ensure that there is no-alteration of vegetation patches that will provide space for breeding and roosting site for birds.
- Ensure that there is no disturbance to bird species, nests, breeding sites if identified and create artificial site for birds.
- Prohibit activities like trapping, hunting, and killing of birds onsite during construction.
- ECO to conduct regular site inspections and remove any snares erected onsite.
- A conservation-orientated plan should be developed personally for contractors so that there will be a penalty clause for non-compliance.

Mammals

Table 10: Loss of mammals due to construction.

Impact phase	Construction phase				
Possible impact	Loss of mammals due to habitat fragmentation and degradation				
Type of impact	Direct Impact				
Rating criteria	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**
Calculation	3	5	8	4	High (61-90)
Can the impact be reversed					No
Will impact cause irreplaceable loss of resources					Yes
Can impact be avoided, managed, or mitigated					Yes

Impact mitigation measures

- Pre-construction walk to be carried out onsite to ensure the absence of mammal habitats.
- Hunting weapons are prohibited onsite.
- Dogs are prohibited on the worksite as they are threats to wild animals.
- A low-speed limit should be enforced onsite to reduce animal-vehicle collisions
- No animals should be intentionally killed/poached if identified, and hunting is not permitted on site.
- Relocate any threatened mammal species identified before commencement of construction.
- Offer environmental induction for all employees to raise awareness on the value of wild animals (if identified) and the importance of their conservation.
- ECO to conduct regular site inspections and remove any traps erected onsite.
- Contractual fines to be imposed and contract employees to be immediately dismissed if found attempting to snare or otherwise harm faunal species identified.
- Ensure that sensitive mammal habitats like drainage lines and wetlands area avoided.

Sensitive areas

Table 11: Impacts of the construction on sensitive areas.

Impact phase	Construction phase				
Possible impact	Destruction of streams and wetlands and its associated vegetation				
Type of impact	Direct Impact				
Rating criteria	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**
Calculation	5	5	10	5	High (61-90)
Can the impact be reversed					No
Will impact cause irreplaceable loss of resources					Yes
Can impact be avoided, managed, or mitigated					Yes

Impact mitigation measures

- No disturbance in drainage lines, rivers, and wetlands, including construction across wetlands and rivers, fill dumping, road construction, and all forms of temporary disturbance.
- Construction activities to be approved by water use license (WUL) and carefully monitored to avoid unnecessary impacts on waterbodies/riparian areas (particularly in-stream habitat).
- Storm water and erosion control measures to be implemented and monitored as per EMPr to prevent siltation or erosion of sensitive environment identified onsite.
- No construction activities may occur within 100 m of drainage lines or wetland without determining conditions for WUL from the DWS.
- Do not lower the original stream bed/profile of the wetland, as this may result in scouring in an upstream direction and further alteration of bed conditions.
- Prioritise development in low sensitive/already disturbed areas.
- Immediately and appropriately clean any accidental chemical, fuel, and oil spill from machines.
- Store all materials appropriately to prevent contamination of sensitive sites.
- Relocate the project area from the protected environment and to the area that is heavily modified.

Potential erosion

Table 12: Potential erosion of the site and its surroundings during construction.

Impact phase	Construction phase				
Possible impact	Potential erosion of the construction area				
Type of impact	Direct Impact				
Rating criteria	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**
Calculation	2	4	8	5	High (61-90)
Can the impact be reversed					No
Will impact cause irreplaceable loss of resources					Yes
Can impact be avoided, managed, or mitigated					Yes
Impact mitigation measures • Rehabilitate the disturbed areas after construction. • Conduct construction only on the low sensitive area of the proposed site. • Implement erosion and storm water runoff management measures according to EMP requirements to prevent erosion on the prospected areas and surroundings. • Monitor the mined areas for signs of erosion and implement erosion rectification and prevention measures if required.					

Waste generation

Table 13: Waste generation during construction.

Impact phase	Construction phase				
Possible impact	Pollution due to oil and fuel spills, erosion, and ablution facilities.				
Type of impact	Direct Impact				
Rating criteria	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**
Calculation	3	4	6	5	High (61-90)
Can the impact be reversed					No
Will impact cause irreplaceable loss of resources					Yes
Can impact be avoided, managed, or mitigated					Yes

Impact mitigation measures

- Monitor all construction activities and ensure alignment with the pollution prevention strategies in place.
- Collect and dispose of all the waste generated during construction in accordance with the waste management plan (WMP).
- Recycle or reuse waste where possible.
- Enforce low speed limits to reduce dust and noise.
- Implement regular dust suppression during construction.
- Provide proper ablution and storage facilities onsite during construction.
- Implement proper Standard Operating Procedures to regulate refueling and other pollution.
- Implement a rehabilitation strategy as part of EMPr, like a clean-up plan/strategy if spills occur and proper facilities (ablution) to ensure no sewage spills into drainage lines and streams.
- Prohibit illegal waste dumping to avoid contamination of waterbodies which might impact mammals using waterbodies.

9. CONCLUSION AND RECOMMENDATIONS

The conducted site assessment showed that the proposed project area consists of natural vegetation and also a pond wetland was observed, and the identified waterbodies were found to have medium ecological importance and high conservation importance as they provide livestock with drinking and grazing area, habitat for aquatic animals and form part of the sources of freshwater in South Africa. The wetlands are considered highly sensitive areas where ecological impacts would be more significant. All the proposed buffer-zones should be applied in the regulated or sensitive areas to avoid unnecessary disturbance of water resources. The proposed area is covered with floral species of both high and medium conservation status. The area is covered with natural vegetation and has a high ecological function because the area has not yet been disturbed and it provides suitable habitat and feeding area for the livestock. The most dominant floral species of the area covered with natural vegetation are grass species and acacia species.

Natural Vegetation should not be cleared, as it leads to habitat loss, degradation and fragmentation including, inter alia, exotic species encroachment and dust generation. The applicant must ensure that animals should not be intentionally killed/poached if identified onsite. There should be a relocation of any threatened mammal species identified onsite before commencement of construction activities. These impacts can be mitigated through correct and active management. Proper rehabilitation and aftercare of the area needs to take place to prevent the colonization of the areas by invader species. It is recommended that the management measures stipulated in this report will be included in the proposed project's official EMP and that these be assessed for efficacy during all phases of the project and adapted accordingly to ensure minimal disturbance of the study area ecology.

Other specific conclusions and recommendations include:

1. Construction in the undisturbed Environment is recommended due to its sensitivity.
2. Given the sensitivity and strategic importance of the Environment, a strong precautionary approach is recommended to prevent damage from occurring that cannot be mitigated.
3. Pending the outcome of such a review, it is theoretically possible for the Ithuba Petrolium to operate without significant impacts to the whole area if all mitigation measures are implemented and best practice is undertaken.
4. All facilities must be placed far away from the waterbodies.
5. An alien and invasive management plan, as well as emergency preparedness plan during spillages must be always adhered to.
6. Excavated areas must be rehabilitated to avoid or limit erosion.

The destruction of the natural habitat in the proposed area is inevitable. The significance of the impacts will be determined by the success of the mitigation measures implemented and the rehabilitation programme for the development area.

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APPENDICCES

Appendix 1: Screening report

SCREENING REPORT FOR AN ENVIRONMENTAL AUTHORIZATION AS REQUIRED BY THE 2014 EIA REGULATIONS – PROPOSED DEVELOPMENT FOOTPRINT ENVIRONMENTAL SENSITIVITY

EIA Reference number: New Application

Project name: Fuel Depot Development

Project title: on a portion of portion 1 of the farm Leeuspruit 385 JU, under Nkomazi Local Municiaplity of Ehlanzeni District Municipality in Mpumalanga Province

Date screening report generated: 02/08/2023 15:30:36

Applicant: Ithuba Petroleum (Pty) Ltd

Compiler: Singo Consulting (Pty) Ltd

Compiler signature: .....

Application Category: Infrastructure|Localised infrastructure|Storage|Dangerous Goods|Hydrocarbon|Petroleum

Appendix 2: Bird species found on the proposed project area (SABAB 2)

NO.	Common group	Common species	Genus	FP (n)	Latest FP
1		Bateleur	Terathopius	7	2016-11-13
2		Brubru	Nilaus	20	2022-11-21
3		Hamerkop	Scopus	11	2022-05-08
4		Neddicky	Cisticola	4	2015-02-13
5		Ruff	Calidris	4	2022-11-21
6		Shikra	Accipiter	0	-
7	Apalis	Bar-throated	Apalis	1	2022-11-21
8	Apalis	Yellow-breasted	Apalis	32	2022-05-08
9	Babbler	Arrow-marked	Turdoides	25	2022-05-09
10	Barbet	Acacia Pied	Tricholaema	8	2022-11-21
11	Barbet	Black-collared	Lybius	43	2022-11-21
12	Barbet	Crested	Trachyphonus	17	2022-11-21
13	Batis	Chinspot	Batis	36	2022-11-21
14	Bee-eater	European	Merops	20	2022-11-21
15	Bee-eater	Little	Merops	5	2022-09-26
16	Bee-eater	Southern Carmine	Merops	1	2022-01-07
17	Bee-eater	White-fronted	Merops	18	2022-09-26
18	Bishop	Southern Red	Euplectes	8	2022-01-26
19	Bittern	Dwarf	Ixobrychus	1	2022-01-26
20	Bittern	Little	Ixobrychus	1	2015-11-27
21	Boubou	Southern	Laniarius	14	2022-11-21
22	Brownbul	Terrestrial	Phyllastrephus	6	2022-09-26
23	Bulbul	Dark-capped	Pycnonotus	51	2022-11-21
24	Bunting	Cinnamon-breasted	Emberiza	4	2021-12-05
25	Bunting	Golden-breasted	Emberiza	20	2022-09-26
26	Bushshrike	Gorgeous	Telophorus	10	2022-09-26
27	Bushshrike	Grey-headed	Malaconotus	38	2022-11-21
28	Bushshrike	Orange-breasted	Chlorophoneus	30	2022-11-21
29	Bustard	Black-bellied	Lissotis	2	2020-12-15
30	Buttonquail	Common	Turnix	1	2019-08-08
31	Buzzard	Common	Buteo	10	2022-11-21
32	Buzzard	Lizard	Kaupifalco	4	2022-05-09
33	Camaroptera	Green-backed	Camaroptera	38	2022-11-21
34	Canary	Yellow-fronted	Crithagra	46	2022-11-21
35	Chat	Mocking Cliff	Thamnolaea	2	2015-03-27
36	Cisticola	Croaking	Cisticola	2	2022-01-26
37	Cisticola	Lazy	Cisticola	2	2022-01-26
38	Cisticola	Rattling	Cisticola	47	2022-11-21
39	Cisticola	Red-faced	Cisticola	18	2022-05-03
40	Cisticola	Rufous-winged	Cisticola	1	2020-11-26
41	Cisticola	Zitting	Cisticola	3	2022-01-26
42	Cormorant	Reed	Microcarbo	15	2022-11-21
43	Cormorant	White-breasted	Phalacrocorax	4	2021-12-05
44	Coucal	Burchell's	Centropus	26	2022-11-21
45	Courser	Bronze-winged	Rhinoptilus	2	2016-05-08
46	Crake	Black	Zapornia	11	2022-11-21
47	Crombec	Long-billed	Sylvietta	28	2022-11-21
48	Crow	Pied	Corvus	23	2022-05-03
49	Cuckoo	African	Cuculus	2	2022-11-21
50	Cuckoo	Black	Cuculus	2	2022-11-21

51	Cuckoo	Diederik	Chrysococcyx	20	2022-11-21
52	Cuckoo	Jacobin	Clamator	12	2022-11-21
53	Cuckoo	Klaas's	Chrysococcyx	10	2013-09-27
54	Cuckoo	Levaillant's	Clamator	5	2016-02-24
55	Cuckoo	Red-chested	Cuculus	11	2022-11-21
56	Cuckoo-Hawk	African	Aviceda	1	2016-02-24
57	Cuckooshrike	Black	Campephaga	11	2017-10-14
58	Darter	African	Anhinga	8	2022-09-26
59	Dove	Cape Turtle	Streptopelia	33	2022-11-21
60	Dove	Emerald-spotted Wood	Turtur	47	2022-11-21
61	Dove	Laughing	Spilopelia	40	2022-11-21
62	Dove	Namaqua	Oena	1	2012-04-29
63	Dove	Red-eyed	Streptopelia	34	2022-11-21
64	Dove	Rock	Columba	2	2015-11-27
65	Dove	Tambourine	Turtur	7	2022-09-26
66	Drongo	Fork-tailed	Dicrurus	50	2022-11-21
67	Duck	Knob-billed	Sarkidiornis	2	2020-11-26
68	Duck	White-faced Whistling	Dendrocygna	7	2022-05-08
69	Eagle	African Fish	Haliaeetus	12	2022-11-21
70	Eagle	Black-chested Snake	Circaetus	1	2015-02-06
71	Eagle	Brown Snake	Circaetus	6	2022-09-26
72	Eagle	Lesser Spotted	Clanga	2	2020-12-15
73	Eagle	Long-crested	Lophaetus	1	2010-08-13
74	Eagle	Martial	Polemaetus	2	2020-12-15
75	Eagle	Tawny	Aquila	1	2012-04-29
76	Eagle	Wahlberg's	Hieraaetus	10	2022-11-21
77	Egret	Great	Ardea	2	2022-09-26
78	Egret	Intermediate	Ardea	1	2014-12-08
79	Egret	Little	Egretta	6	2022-09-26
80	Egret	Western Cattle	Bubulcus	10	2022-01-07
81	Eremomela	Burnt-necked	Eremomela	1	2010-08-13
82	Eremomela	Yellow-bellied	Eremomela	3	2012-07-10
83	Finch	Cut-throat	Amadina	22	2022-05-08
84	Firefinch	African	Lagonosticta	3	2021-09-03
85	Firefinch	Jameson's	Lagonosticta	22	2022-04-28
86	Firefinch	Red-billed	Lagonosticta	25	2022-11-21
87	Fiscal	Southern	Lanius	0	-
88	Flycatcher	African Dusky	Muscicapa	1	2022-01-26
89	Flycatcher	African Paradise	Terpsiphone	30	2022-11-21
90	Flycatcher	Ashy	Muscicapa	11	2022-11-21
91	Flycatcher	Pale	Melaenornis	2	2019-08-08
92	Flycatcher	Southern Black	Melaenornis	42	2022-11-21
93	Flycatcher	Spotted	Muscicapa	18	2018-01-03
94	Francolin	Crested	Dendroperdix	12	2022-05-08
95	Go-away-bird	Grey	Crinifer	20	2022-09-26
96	Goose	Egyptian	Alopochen	17	2022-11-21
97	Goose	Spur-winged	Plectropterus	1	2015-02-06
98	Goshawk	African	Accipiter	11	2022-01-07
99	Goshawk	Dark Chanting	Melierax	7	2022-01-26
100	Goshawk	Gabar	Micronisus	1	2012-03-14
101	Greenbul	Sombre	Andropadus	49	2022-11-21

102	Greenbul	Yellow-bellied	Chlorocichla	1	2022-11-21
103	Greenshank	Common	Tringa	4	2020-12-15
104	Guineafowl	Helmeted	Numida	24	2022-11-21
105	Harrier-Hawk	African	Polyboroides	2	2016-10-05
106	Hawk-eagle	African	Aquila	3	2022-04-28
107	Helmetshrike	Retz's	Prionops	11	2022-11-21
108	Helmetshrike	White-crested	Prionops	38	2022-05-09
109	Heron	Black-crowned Night	Nycticorax	2	2020-11-26
110	Heron	Black-headed	Ardea	1	2022-05-03
111	Heron	Goliath	Ardea	2	2016-05-08
112	Heron	Grey	Ardea	13	2022-11-21
113	Heron	Purple	Ardea	2	2022-01-26
114	Heron	Squacco	Ardeola	0	-
115	Heron	Striated	Butorides	11	2022-11-21
116	Honeyguide	Greater	Indicator	6	2022-05-03
117	Honeyguide	Lesser	Indicator	8	2022-05-08
118	Hoopoe	African	Upupa	23	2022-09-26
119	Hornbill	African Grey	Lophoceros	4	2017-10-14
120	Hornbill	Crowned	Lophoceros	4	2022-05-03
121	Hornbill	Southern Ground	Bucorvus	3	2022-09-26
122	Hornbill	Southern Red-billed	Tockus	2	2022-05-08
123	Hornbill	Southern Yellow-billed	Tockus	18	2022-04-28
124	Hornbill	Trumpeter	Bycanistes	8	2014-07-01
125	Ibis	African Sacred	Threskiornis	3	2022-09-26
126	Ibis	Glossy	Plegadis	1	2022-11-21
127	Ibis	Hadada	Bostrychia	35	2022-11-21
128	Indigobird	Dusky	Vidua	4	2022-01-26
129	Indigobird	Purple	Vidua	5	2022-01-07
130	Indigobird	Village	Vidua	5	2022-01-07
131	Jacana	African	Actophilornis	8	2022-11-21
132	Kingfisher	African Pygmy	Ispidina	1	2015-03-14
133	Kingfisher	Brown-hooded	Halcyon	48	2022-11-21
134	Kingfisher	Giant	Megaceryle	5	2022-11-21
135	Kingfisher	Malachite	Corythornis	2	2014-12-08
136	Kingfisher	Pied	Ceryle	11	2022-09-26
137	Kingfisher	Striped	Halcyon	17	2022-11-21
138	Kingfisher	Woodland	Halcyon	20	2022-01-07
139	Kite	Black-winged	Elanus	5	2022-01-26
140	Kite	Yellow-billed	Milvus	15	2022-01-07
141	Korhaan	Red-crested	Lophotis	9	2021-12-05
142	Lapwing	African Wattled	Vanellus	11	2022-11-21
143	Lapwing	Blacksmith	Vanellus	18	2022-11-21
144	Lapwing	Crowned	Vanellus	10	2021-09-03
145	Lapwing	Senegal	Vanellus	6	2020-11-26
146	Lark	Dusky	Pinarocorys	1	2016-02-24
147	Lark	Flappet	Mirafra	6	2022-09-26
148	Lark	Monotonous	Mirafra	1	2016-02-24
149	Lark	Sabota	Calendulauda	3	2017-10-14
150	Longclaw	Yellow-throated	Macronyx	10	2022-09-26
151	Mannikin	Bronze	Spermestes	30	2022-05-03
152	Mannikin	Red-backed	Spermestes	5	2022-05-09
153	Martin	Brown-throated	Riparia	1	2014-07-01
154	Martin	Common House	Delichon	1	2020-11-26

155	Moorhen	Common	Gallinula	1	2022-01-07
156	Moorhen	Lesser	Paragallinula	2	2022-01-26
157	Mousebird	Red-faced	Urocolius	30	2022-11-21
158	Mousebird	Speckled	Colius	31	2022-09-26
159	Myna	Common	Acridotheres	26	2022-11-21
160	Nicator	Eastern	Nicator	9	2022-11-21
161	Nightjar	Fiery-necked	Caprimulgus	9	2022-01-07
162	Nightjar	Square-tailed	Caprimulgus	2	2020-11-26
163	Oriole	Black-headed	Oriolus	52	2022-11-21
164	Oriole	Eurasian Golden	Oriolus	4	2015-02-06
165	Osprey	Western	Pandion	1	2022-01-26
166	Ostrich	Common	Struthio	3	2021-09-03
167	Owl	Western Barn	Tyto	12	2017-10-14
168	Owlet	Pearl-spotted	Glaucidium	2	2016-05-08
169	Oxpecker	Red-billed	Buphagus	22	2022-05-08
170	Painted-snipe	Greater	Rostratula	0	-
171	Parrot	Brown-headed	Poicephalus	3	2020-12-15
172	Pigeon	African Green	Treron	24	2017-10-14
173	Pigeon	Speckled	Columba	2	2016-02-24
174	Pipit	African	Anthus	7	2021-09-03
175	Pipit	Bushveld	Anthus	3	2019-08-08
176	Plover	Common Ringed	Charadrius	1	2020-12-15
177	Plover	Grey	Pluvialis	1	2020-11-26
178	Plover	Kittlitz's	Charadrius	4	2020-12-15
179	Plover	Three-banded	Charadrius	12	2022-09-26
180	Pratincole	Collared	Glareola	2	2020-12-15
181	Prinia	Tawny-flanked	Prinia	39	2022-11-21
182	Puffback	Black-backed	Dryoscopus	50	2022-11-21
183	Pytilia	Green-winged	Pytilia	6	2020-12-15
184	Quail	Harlequin	Coturnix	2	2021-12-05
185	Quelea	Red-billed	Quelea	13	2022-09-26
186	Robin-Chat	White-browed	Cossypha	39	2022-11-21
187	Robin-Chat	White-throated	Cossypha	9	2022-11-21
188	Roller	Broad-billed	Eurystomus	1	2020-11-26
189	Roller	European	Coracias	2	2015-03-14
190	Roller	Lilac-breasted	Coracias	26	2022-11-21
191	Sandgrouse	Double-banded	Pterocles	0	-
192	Sandpiper	Common	Actitis	8	2022-11-21
193	Sandpiper	Green	Tringa	4	2022-11-21
194	Sandpiper	Marsh	Tringa	3	2020-12-15
195	Sandpiper	Wood	Tringa	14	2022-11-21
196	Scimitarbill	Common	Rhinopomastus	21	2022-05-08
197	Scrub Robin	Bearded	Cercotrichas	4	2021-12-05
198	Scrub Robin	White-browed	Cercotrichas	41	2022-11-21
199	Shrike	Lesser Grey	Lanius	3	2022-01-07
200	Shrike	Magpie	Urolestes	3	2017-10-14
201	Shrike	Red-backed	Lanius	22	2022-11-21
202	Shrike	Southern White-crowned	Eurocephalus	0	-
203	Sparrow	House	Passer	20	2022-11-21
204	Sparrow	Southern Grey-headed	Passer	33	2022-11-21
205	Sparrow	Yellow-throated Bush	Gymnoris	12	2021-09-03

206	Sparrowhawk	Black	Accipiter	2	2013-06-09
207	Sparrowhawk	Little	Accipiter	4	2022-04-28
208	Spoonbill	African	Platalea	4	2022-05-08
209	Spurfowl	Natal	Pternistis	20	2022-11-21
210	Spurfowl	Swainson's	Pternistis	1	2012-02-12
211	Starling	Burchell's	Lamprotornis	5	2021-12-05
212	Starling	Cape	Lamprotornis	31	2022-11-21
213	Starling	Greater Blue-eared	Lamprotornis	28	2022-09-26
214	Starling	Red-winged	Onychognathus	2	2012-12-15
215	Starling	Violet-backed	Cinnyricinclus	21	2022-11-21
216	Starling	Wattled	Creatophora	3	2020-12-15
217	Stilt	Black-winged	Himantopus	4	2020-11-26
218	Stint	Little	Calidris	5	2020-12-15
219	Stork	Marabou	Leptoptilos	1	2012-10-06
220	Stork	Saddle-billed	Ephippiorhynchus	2	2022-05-08
221	Stork	White	Ciconia	1	2011-02-12
222	Stork	Woolly-necked	Ciconia	1	2016-02-24
223	Stork	Yellow-billed	Mycteria	7	2022-09-26
224	Sunbird	Amethyst	Chalcomitra	16	2022-01-26
225	Sunbird	Collared	Hedydipna	16	2022-11-21
226	Sunbird	Marico	Cinnyris	26	2022-09-26
227	Sunbird	Purple-banded	Cinnyris	3	2021-09-03
228	Sunbird	Scarlet-chested	Chalcomitra	39	2022-05-09
229	Sunbird	White-bellied	Cinnyris	46	2022-11-21
230	Swallow	Barn	Hirundo	29	2022-09-26
231	Swallow	Grey-rumped	Pseudhirundo	7	2022-04-28
232	Swallow	Lesser Striped	Cecropis	33	2022-01-26
233	Swallow	Red-breasted	Cecropis	5	2022-11-21
234	Swallow	Wire-tailed	Hirundo	14	2021-09-03
235	Swift	African Black	Apus	2	2014-12-08
236	Swift	African Palm	Cypsiurus	38	2021-09-03
237	Swift	Horus	Apus	5	2013-08-31
238	Swift	Little	Apus	13	2022-11-21
239	Swift	White-rumped	Apus	22	2022-09-26
240	Tchagra	Black-crowned	Tchagra	39	2022-11-21
241	Tchagra	Brown-crowned	Tchagra	26	2022-05-08
242	Thick-knee	Spotted	Burhinus	3	2022-09-26
243	Thick-knee	Water	Burhinus	15	2022-11-21
244	Thrush	Groundscraper	Turdus	23	2022-11-21
245	Thrush	Kurrichane	Turdus	37	2022-11-21
246	Tinkerbird	Yellow-fronted	Pogoniulus	6	2015-03-25
247	Tit	Grey Penduline	Anthoscopus	5	2021-09-03
248	Tit	Southern Black	Melaniparus	32	2022-09-26
249	Tit-Flycatcher	Grey	Myioparus	16	2022-01-26
250	Turaco	Purple-crested	Gallirex	26	2022-11-21
251	Vulture	Hooded	Necrosyrtes	1	2015-02-06
252	Vulture	Lappet-faced	Torgos	1	2012-03-14
253	Vulture	White-backed	Gyps	15	2022-04-28
254	Vulture	White-headed	Trigonoceps	0	-
255	Wagtail	African Pied	Motacilla	21	2022-11-21
256	Wagtail	Cape	Motacilla	2	2013-08-31
257	Warbler	Little Rush	Bradypterus	1	2022-01-07
258	Warbler	Marsh	Acrocephalus	1	2010-01-21

259	Warbler	Willow	Phylloscopus	10	2022-01-26
260	Waxbill	Blue	Uraeginthus	43	2022-11-21
261	Waxbill	Common	Estrilda	27	2022-11-21
262	Waxbill	Orange-breasted	Amandava	1	2011-03-27
263	Weaver	Lesser Masked	Ploceus	17	2022-09-26
264	Weaver	Red-billed Buffalo	Bubalornis	7	2022-11-21
265	Weaver	Red-headed	Anaplectes	14	2022-01-07
266	Weaver	Southern Masked	Ploceus	23	2022-11-21
267	Weaver	Spectacled	Ploceus	37	2022-11-21
268	Weaver	Thick-billed	Amblyospiza	13	2022-01-07
269	Weaver	Village	Ploceus	19	2022-05-08
270	White-eye	Cape	Zosterops	14	2022-04-28
271	Whydah	Long-tailed Paradise	Vidua	9	2022-01-26
272	Whydah	Pin-tailed	Vidua	15	2022-11-21
273	Widowbird	Fan-tailed	Euplectes	1	2010-01-21
274	Widowbird	Red-collared	Euplectes	1	2013-02-09
275	Widowbird	White-winged	Euplectes	15	2022-09-26
276	Wood Hoopoe	Green	Phoeniculus	27	2022-04-28
277	Woodpecker	Bearded	Chloropicus	16	2022-05-03
278	Woodpecker	Cardinal	Dendropicos	30	2022-09-26
279	Woodpecker	Golden-tailed	Campethera	25	2022-11-21
280	Wren-Warbler	Stierling's	Calamonastes	9	2016-02-24

Appendix 3: Mammals species found on the proposed project area.

NO.	Family	Scientific name	Common name	Red list category	Number of records	Last recorded
1		ORDER Carnivora	Unidentified Carnivora		31	2014-03-01
2		ORDER Chiroptera	Unidentified bat		6	2022-03-20
3		ORDER Primates	Unidentified Primate		2	2014-01-02
4	Bathyergidae	Cryptomys hottentotus	Southern African Mole-rat	Least Concern (2016)	31	1997-01-27
5	Bathyergidae	Cryptomys hottentotus natalensis			3	
6	Bovidae	Aepyceros melampus	Impala	Least Concern	3347	2022-07-18
7	Bovidae	Alcelaphus buselaphus	Hartebeest		5	2013-11-22
8	Bovidae	Alcelaphus buselaphus lichtensteinii	Lichtenstein's Hartebeest	Least Concern ver 3.1, 2008	1	2012-10-12
9	Bovidae	Antidorcas marsupialis	Springbok	Least Concern (2016)	1	2012-06-06
10	Bovidae	Cephalophus natalensis	Red Duiker	Near Threatened (2016)	45	2014-06-01
11	Bovidae	Connochaetes sp.	African Antelopes and Gnus		58	2013-12-18
12	Bovidae	Connochaetes gnou	Black Wildebeest	Least Concern (2016)	4	2013-07-10
13	Bovidae	Connochaetes taurinus	Blue Wildebeest	Least Concern (ver 3.1, 2017)	8	2021-09-14
14	Bovidae	Connochaetes taurinus taurinus		Least Concern (2016)	366	2013-12-29
15	Bovidae	Damaliscus lunatus lunatus	(Southern African) Tsessebe	Vulnerable (2016)	17	2013-12-26
16	Bovidae	Damaliscus pygargus phillipsi	Blesbok	Least Concern (2016)	4	
17	Bovidae	Damaliscus pygargus pygargus	Bontebok	Vulnerable (2016)	3	2013-05-20
18	Bovidae	Hippotragus equinus	Roan Antelope	Endangered (2016)	1	1915-06-18
19	Bovidae	Hippotragus niger	Sable Antelope	Least Concern	8	2019-07-03

				(ver 3.1, 2017)		
20	Bovidae	Hippotragus niger niger		Vulnerable (2016)	97	2014-02-08
21	Bovidae	Kobus ellipsiprymnus	Waterbuck	Least Concern (ver 3.1, 2016)	36	2022-10-15
22	Bovidae	Kobus ellipsiprymnus ellipsiprymnus		Least Concern (2016)	185	2014-01-22
23	Bovidae	Neotragus moschatus	Suni		1	2013-08-10
24	Bovidae	Oreotragus oreotragus	Klipspringer	Least Concern (2016)	36	2021-09-13
25	Bovidae	Oryx gazella	Gemsbok	Least Concern (2016)	3	2013-06-23
26	Bovidae	Ourebia ourebi	Oribi	Endangered	3	2013-12-26
27	Bovidae	Pelea capreolus	Vaal Rhebok	Near Threatened (2016)	5	2013-10-08
28	Bovidae	Philantomba monticola	Blue Duiker	Vulnerable (2016)	1	2011-07-30
29	Bovidae	Raphicerus campestris	Steenbok	Least Concern (2016)	128	2022-10-16
30	Bovidae	Redunca sp.	Reedbucks		6	2013-12-30
31	Bovidae	Redunca arundinum	Southern Reedbuck	Least Concern (2016)	36	2018-11-07
32	Bovidae	Redunca fulvorufula	Mountain Reedbuck	Least Concern	16	2021-10-12
33	Bovidae	Sylvicapra sp.	Common Duiker		5	2006-07-27
34	Bovidae	Sylvicapra grimmia	Bush Duiker	Least Concern (2016)	103	2022-07-22
35	Bovidae	Syncerus caffer	African Buffalo	Least Concern (2008)	1021	2022-10-16
36	Bovidae	Taurotragus oryx	Common Eland	Least Concern (2016)	8	2013-08-13
37	Bovidae	Tragelaphus angasii	Nyala	Least Concern (2016)	53	2020-11-04
38	Bovidae	Tragelaphus scriptus	Bushbuck	Least Concern	130	2021-11-24
39	Bovidae	Tragelaphus strepsiceros	Greater Kudu	Least Concern (2016)	785	2022-10-16
40	Canidae	Canis sp.	Jackals and Wolves		2	2013-12-06
41	Canidae	Canis adustus	Side-striped Jackal	Least Concern (2016)	56	2014-06-01

42	Canidae	Canis mesomelas	Black-backed Jackal	Least Concern (2016)	72	2022-07-21
43	Canidae	Lycaon pictus	African wild dog	Endangered (2016)	789	2020-10-25
44	Cercopithecidae	Chlorocebus pygerythrus	Vervet Monkey	Least Concern (2016)	63	2022-10-15
45	Cercopithecidae	Chlorocebus pygerythrus pygerythrus	Vervet Monkey (subspecies pygerythrus)	Least Concern (2008)	9	2016-12-14
46	Cercopithecidae	Papio ursinus	Chacma Baboon	LC (IUCN, 2016)	132	2022-07-21
47	Chrysochloridae	Amblysomus septentrionalis	Highveld Golden Mole	Near Threatened (2016)	2	1998-03-24
48	Chrysochloridae	Neamblysomus julianae	Juliana's Golden Mole	Endangered (2016)	5	1988-12-02
49	Elephantidae	Loxodonta africana	African Bush Elephant	Vulnerable A2a (2008)	1747	2022-10-15
50	Emballonuridae	Taphozous (Taphozous) mauritianus	Mauritian Tomb Bat	Least Concern	20	2021-02-16
51	Equidae	Equus sp.	Asses and Zebras		781	2014-01-06
52	Equidae	Equus grevyi	Grévy's Zebra		8	2014-01-10
53	Equidae	Equus quagga	Plains Zebra	Near Threatened (IUCN, 2016)	131	2022-10-16
54	Equidae	Equus zebra	Mountain Zebra		1	2013-08-10
55	Equidae	Equus zebra zebra	Cape Mountain Zebra	Least Concern (2016)	3	2014-01-19
56	Erinaceidae	Atelerix frontalis	Southern African Hedgehog	Near Threatened (2016)	1	2006-10-13
57	Felidae	Acinonyx jubatus	Cheetah	Vulnerable (2016)	747	2021-10-27
58	Felidae	Caracal caracal	Caracal	Least Concern (2016)	9	2014-01-12
59	Felidae	Felis nigripes	Black-footed Cat	Vulnerable (2016)	1	2013-09-27
60	Felidae	Felis silvestris	Wildcat	Least Concern (2016)	11	2018-05-27
61	Felidae	Leptailurus serval	Serval	Near Threatened (2016)	63	2014-08-02
62	Felidae	Panthera leo	Lion	Least Concern (2016)	3149	2022-07-22
63	Felidae	Panthera pardus	Leopard	Vulnerable (2016)	1992	2022-10-16

64	Galagidae	Galago moholi	Mohol Bushbaby	Least Concern (2016)	7	2022-07-09
65	Galagidae	Otolemur crassicaudatus	Brown Greater Galago	Least Concern (2016)	9	2018-04-17
66	Giraffidae	Giraffa giraffa giraffa	South African Giraffe	Least Concern (2016)	1135	2022-10-17
67	Gliridae	Graphiurus (Graphiurus) microtis	Large Savanna African Dormouse	Least Concern (2016)	2	1969-10-06
68	Gliridae	Graphiurus (Graphiurus) murinus	Forest African Dormouse	Least Concern	9	2007-04-02
69	Herpestidae	Atilax paludinosus	Marsh Mongoose	Least Concern (2016)	7	2014-06-01
70	Herpestidae	Helogale parvula	Common Dwarf Mongoose	Least Concern (2016)	36	2022-07-22
71	Herpestidae	Herpestes sanguineus	Slender Mongoose	Least Concern (2016)	30	2023-03-30
72	Herpestidae	Ichneumia albicauda	White-tailed Mongoose	Least Concern (2016)	31	2014-06-01
73	Herpestidae	Mungos mungo	Banded Mongoose	Least Concern (2016)	9	2022-07-23
74	Herpestidae	Rhynchogale melleri	Meller's Mongoose	Least Concern (2016)	12	2015-10-18
75	Herpestidae	Suricata suricatta	Meerkat	Least Concern (2016)	1	2013-09-10
76	Hippopotamidae	Hippopotamus amphibius	Common Hippopotamus	Least Concern (2016)	263	2022-10-17
77	Hipposideridae	Cloeotis percivali	Percival's Short-eared Trident Bat	Endangered (2016)	12	2010-07-28
78	Hipposideridae	Hipposideros caffer	Sundevall's Leaf-nosed Bat	Least Concern (2016)	101	2010-07-10
79	Hyaenidae	Crocuta crocuta	Spotted Hyaena	Near Threatened (2016)	565	2022-07-18
80	Hyaenidae	Hyaena brunnea	Brown Hyena	Near Threatened (2015)	5	2014-06-23
81	Hystricidae	Hystrix africaeaustralis	Cape Porcupine	Least Concern	27	2021-11-03
82	Leporidae	Lepus saxatilis	Scrub Hare	Least Concern	13	2014-10-25
83	Leporidae	Pronolagus crassicaudatus	Natal Red Rock Hare	Least Concern (2016)	4	

84	Leporidae	Pronolagus randensis	Jameson's Red Rock Hare	Least Concern (2016)	1	2013-09-02
85	Macroscelididae	Petrodromus tetradactylus	Four-toed Elephant Shrew	Near Threatened (2016)	1	2017-07-31
86	Manidae	Smutsia temminckii	Ground Pangolin	Vulnerable (2016)	5	2013-08-10
87	Molossidae	Chaerephon pumilus	Little Free-tailed Bat	Least Concern (2016)	226	2012-10-14
88	Molossidae	Mops (Mops) condylurus	Angolan Free-tailed Bat	Least Concern	50	2010-07-10
89	Molossidae	Tadarida sp.	Tadarine Free-tailed Bats		3	1920-03-30
90	Molossidae	Tadarida aegyptiaca	Egyptian Free-tailed Bat	Least Concern (2016)	7	2013-04-20
91	Muridae	Aethomys ineptus	Tete Veld Aethomys	Least Concern (2016)	102	2016-08-08
92	Muridae	Aethomys namaquensis	Namaqua Rock Mouse	Least Concern	50	1993-07-19
93	Muridae	Dasymys incomtus	Common Dasymys	Near Threatened (2016)	9	1978-12-13
94	Muridae	Dasymys robertsii	Water Rat	Vulnerable (2016)	2	
95	Muridae	Gerbilliscus leucogaster	Bushveld Gerbil	Least Concern (2016)	71	2013-11-19
96	Muridae	Grammomys dolichurus	Common Grammomys	Least Concern (2016)	1	1978-07-12
97	Muridae	Lemniscomys rosalia	Single-Striped Lemniscomys	Least Concern (2016)	52	2021-10-11
98	Muridae	Mastomys sp.	Multimammate Mice		1	1997-07-07
99	Muridae	Mastomys coucha	Southern African Mastomys	Least Concern (2016)	11	2013-11-13
100	Muridae	Mastomys natalensis	Natal Mastomys	Least Concern (2016)	121	2011-06-01
101	Muridae	Mus (Nannomys) minutoides	Southern African Pygmy Mouse	Least Concern	45	2012-06-29
102	Muridae	Mus (Nannomys) neavei	Neave's Mouse	Data Deficient	1	2016-07-04
103	Muridae	Otomys angoniensis	Angoni Vlei Rat	Least Concern (2016)	18	1997-02-06
104	Muridae	Otomys auratus	Southern African Vlei Rat (Grassland type)	Near Threatened (2016)	5	1998-04-14

105	Muridae	Otomys laminatus	KwaZulu Vlei Rat	Near Threatened (2016)	1	
106	Muridae	Rattus rattus	Roof Rat	Least Concern	6	1994-07-22
107	Muridae	Rhabdomys pumilio	Xeric Four-striped Grass Rat	Least Concern (2016)	20	1995-01-18
108	Muridae	Thallomys paedulcus	Acacia Thallomys	Least Concern (2016)	4	1987-06-27
109	Mustelidae	Aonyx capensis	African Clawless Otter	Near Threatened (2016)	11	2016-04-11
110	Mustelidae	Ictonyx striatus	Striped Polecat	Least Concern (2016)	2	2012-11-07
111	Mustelidae	Mellivora capensis	Honey Badger	Least Concern (2016)	77	2014-01-22
112	Nesomyidae	Dendromus melanotis	Gray African Climbing Mouse	Least Concern (2016)	5	1979-03-07
113	Nesomyidae	Dendromus mystacalis	Chestnut African Climbing Mouse	Least Concern (2016)	16	2009-07-18
114	Nesomyidae	Saccostomus campestris	Southern African Pouched Mouse	Least Concern (2016)	26	2009-07-24
115	Nesomyidae	Steatomys pratensis	Common African Fat Mouse	Least Concern (2016)	32	2009-04-09
116	Nycteridae	Nycteris sp.	Slit-faced Bats		1	2006-03-30
117	Nycteridae	Nycteris thebaica	Egyptian Slit-faced Bat	Least Concern (2016)	65	2010-04-17
118	Orycteropodidae	Orycteropus afer	Aardvark	Least Concern (2016)	19	2013-10-14
119	Procaviidae	Procavia capensis capensis	Cape Rock Hyrax	LC (IUCN 2015, global sp. level)	2	2013-06-11
120	Pteropodidae	Epomophorus sp.	Epauletted Fruit Bats		14	2017-08-24
121	Pteropodidae	Epomophorus crypturus	Epomophorus crypturus	Least Concern (2016)	108	1978-12-13
122	Pteropodidae	Epomophorus gambianus	Gambian Epauletted Fruit Bat		12	1973-03-19
123	Pteropodidae	Epomophorus wahlbergi	Wahlberg's Epauletted Fruit Bat	Least Concern (2016)	30	2010-04-17

124	Pteropodidae	Micropteropus pusillus	Peters's Lesser Epauletted Fruit Bat	Least Concern (2016)	1	2018-02-03
125	Rhinolophidae	Rhinolophus blasii	Blasius's Horseshoe Bat	Near Threatened (2016)	3	1920-03-28
126	Rhinolophidae	Rhinolophus clivosus	Geoffroy's Horseshoe Bat	Least Concern (2016)	106	2008-10-22
127	Rhinolophidae	Rhinolophus cohenae	Cohen's Horseshoe Bat	Vulnerable (2016)	20	2013-10-26
128	Rhinolophidae	Rhinolophus darlingi	Darling's Horseshoe Bat	Least Concern (2016)	61	2004-10-26
129	Rhinolophidae	Rhinolophus hildebrandtii	Hildebrandt's Horseshoe Bat	Near Threatened	2	
130	Rhinolophidae	Rhinolophus simulator	Bushveld Horseshoe Bat	Least Concern (2016)	89	2004-10-25
131	Sciuridae	Paraxerus cepapi	Smith's Bush Squirrel	Least Concern (2016)	25	2022-07-18
132	Soricidae	Crocidura cyanea	Reddish-gray Musk Shrew	Least Concern (2016)	9	2002-06-17
133	Soricidae	Crocidura flavescens	Greater Red Musk Shrew	Least Concern (2016)	2	1998-03-15
134	Soricidae	Crocidura fuscomurina	Bicolored Musk Shrew	Least Concern (2016)	2	1988-02-14
135	Soricidae	Crocidura hirta	Lesser Red Musk Shrew	Least Concern (2016)	41	2009-09-09
136	Soricidae	Crocidura silacea	Lesser Gray-brown Musk Shrew	Least Concern (2016)	2	2007-04-02
137	Soricidae	Myosorex sp.	Mouse Shrews		1	1997-03-19
138	Soricidae	Myosorex varius	Forest Shrew	Least Concern (2016)	6	1996-12-01
139	Soricidae	Suncus infinitesimus	Least Dwarf Shrew	Least Concern (2016)	1	1997-01-13
140	Soricidae	Suncus lixus	Greater Dwarf Shrew	Least Concern (2016)	3	2009-05-14
141	Suidae	Phacochoerus africanus	Common Warthog	Least Concern (2016)	433	2022-07-22
142	Suidae	Potamochoerus porcus	Red River Hog		53	2014-06-01
143	Thryonomyidae	Thryonomys swinderianus	Greater Cane Rat	Least Concern (2016)	8	2015-08-07
144	Vespertilionidae	Cistugo seabrae	Angolan Wing-gland Bat	Near Threatened (2016)	1	2005-01-08

145	Vespertilionidae	Eptesicus sp.	Serotines		1	1974-02-15
146	Vespertilionidae	Hypsugo anchietae	Anchieta's Pipistrelle	Near Threatened	1	2007-01-03
147	Vespertilionidae	Miniopterus sp.	Long-fingered Bats		9	2006-10-25
148	Vespertilionidae	Miniopterus fraterculus	Lesser Long-fingered Bat	Least Concern (2016)	11	2005-01-08
149	Vespertilionidae	Miniopterus inflatus	Greater Long-fingered Bat	Near Threatened (2016)	1	
150	Vespertilionidae	Miniopterus natalensis	Natal Long-fingered Bat	Least Concern (2016)	43	2010-04-17
151	Vespertilionidae	Miniopterus schreibersii	Schreibers's Long-fingered Bat	Near Threatened	38	2004-10-25
152	Vespertilionidae	Myotis sp.	Myotises (Mouse-eared Bats, Hairy Bats)		1	2005-01-08
153	Vespertilionidae	Myotis bocagei	Rufous Hairy Bat	Data Deficient	7	2010-03-27
154	Vespertilionidae	Myotis tricolor	Temminck's Myotis	Least Concern (2016)	28	2008-10-22
155	Vespertilionidae	Myotis welwitschii	Welwitsch's Myotis	Least Concern (2016)	7	2002-12-21
156	Vespertilionidae	Neoromicia sp.			2	2007-01-03
157	Vespertilionidae	Neoromicia capensis	Cape Serotine	Least Concern (2016)	29	2007-01-03
158	Vespertilionidae	Neoromicia nana	Banana Pipistrelle	Least Concern	75	2010-04-17
159	Vespertilionidae	Nycticeinops schlieffeni	Schlieffen's Twilight Bat	Least Concern (2016)	19	2007-01-03
160	Vespertilionidae	Pipistrellus sp.	Pipistrelles		2	1966-12-13
161	Vespertilionidae	Pipistrellus (Pipistrellus) hesperidus	Dusky Pipistrelle	Least Concern	8	2010-04-17
162	Vespertilionidae	Pipistrellus kuhlii	Kuhl's Pipistrelle		2	1916-06-17
163	Vespertilionidae	Pipistrellus (Pipistrellus) rusticus	Rusty Pipistrelle	Near Threatened	4	
164	Vespertilionidae	Pipistrellus zuluensis	Zulu Serotine	Least Concern	4	2007-01-03
165	Vespertilionidae	Scotophilus sp.	House Bats		2	1920-03-28
166	Vespertilionidae	Scotophilus dinganii	Yellow-bellied House Bat	Least Concern (2016)	45	2010-04-17
167	Vespertilionidae	Scotophilus nigrita	Giant House Bat	Near Threatened (2016)	16	2005-08-26

168	Vespertilionidae	Scotophilus viridis	Green House Bat	Least Concern (2016)	2	2013-01-10
169	Viveridae	Genetta maculata	Common Large-spotted Genet	Least Concern	5	2015-12-20
170	Viverridae	Civettictis civetta	African Civet	Least Concern (2016)	29	2017-08-04
171	Viverridae	Genetta genetta	Common Genet	Least Concern (2016)	1	2022-07-21
172	Viverridae	Genetta maculata	Rusty-spotted Genet (Common Large-spotted Genet)	Least Concern (2016)	1	
173	Viverridae	Genetta tigrina	Cape Genet (Cape Large-spotted Genet)	Least Concern (2016)	60	2014-06-01
					21226	**2013-07-10* 2012-12-21****

Appendix 4:Herpetofauna species found on the proposed project area.

Reptiles

No.	Family	Scientific name	Common name	Red list category	Number of records	Last recorded
1	Agamidae	Acanthocercus atricollis	Southern Tree Agama	Least Concern (SARCA 2014)	18	2015-09-24
2	Amphisbaenidae	Zygaspis violacea	Violet Dwarf Worm Lizard		1	1919-10-02
3	Chamaeleonidae	Chamaeleo dilepis	Common Flap-neck Chameleon	Least Concern (SARCA 2014)	6	2011-03-27
4	Colubridae	Crotaphopeltis hotamboeia	Red-lipped Snake	Least Concern (SARCA 2014)	13	1919-10-04
5	Colubridae	Dasypeltis scabra	Rhombic Egg-eater	Least Concern (SARCA 2014)	8	2005-02-01
6	Colubridae	Dipsadoboa aulica	Marbled Tree Snake	Least Concern (SARCA 2014)	5	1985-02-22
7	Colubridae	Dispholidus typus viridis	Northern Boomslang	Least Concern (IUCN 2021, sp. level)	6	2014-04-26
8	Colubridae	Philothamnus hoplogaster	South Eastern Green Snake	Least Concern (IUCN 2021)	1	1900-06-15
9	Colubridae	Philothamnus semivariegatus	Spotted Bush Snake	Least Concern (IUCN 2021)	10	2006-08-20
10	Colubridae	Telescopus semiannulatus semiannulatus	Eastern Tiger Snake	Least Concern (SARCA 2014)	10	1919-10-07
11	Colubridae	Thelotornis capensis capensis	Southern Twig Snake	Least Concern (IUCN 2021, sp. level)	8	2014-07-12
12	Cordylidae	Cordylus jonesii	Jones' Girdled Lizard	Least Concern (SARCA 2014)	6	1981-01-24
13	Cordylidae	Platysaurus intermedius wilhelmi	Wilhelm's Flat Lizard	Least Concern (SARCA 2014)	1	2011-04-20

14	Crocodylidae	Crocodylus niloticus	Nile Crocodile	VU (SARCA 2014); LC (global, IUCN 2019)	19	2021-09-14
15	Elapidae	Aspidelaps scutatus intermedius	Intermediate Shield Cobra	Least Concern (SARCA 2014)	2	1911-08-24
16	Elapidae	Dendroaspis polylepis	Black Mamba	Least Concern (SARCA 2014)	4	1989-11-28
17	Elapidae	Naja annulifera	Snouted Cobra	Least Concern (SARCA 2014)	3	1913-10-19
18	Elapidae	Naja mossambica	Mozambique Spitting Cobra	Least Concern (SARCA 2014)	10	1985-02-20
19	Gekkonidae	Chondrodactylus turneri	Turner's Gecko	Least Concern (SARCA 2014)	12	1919-10-09
20	Gekkonidae	Hemidactylus mabouia	Common Tropical House Gecko	Least Concern (SARCA 2014)	5	1981-01-24
21	Gekkonidae	Homopholis wahlbergii	Wahlberg's Velvet Gecko	Least Concern (SARCA 2014)	5	1919-10-09
22	Gekkonidae	Lygodactylus capensis	Common Dwarf Gecko	Least Concern (SARCA 2014)	15	2021-07-03
23	Gekkonidae	Pachydactylus punctatus	Speckled Gecko	Least Concern (SARCA 2014)	3	1981-01-24
24	Gerrhosauridae	Broadleysaurus major	Rough-scaled Plated Lizard	Least Concern (SARCA 2014)	10	2008-11-21
25	Gerrhosauridae	Gerrhosaurus flavigularis	Yellow-throated Plated Lizard	Least Concern (SARCA 2014)	2	1919-10-07
26	Gerrhosauridae	Gerrhosaurus intermedius	Eastern Black-lined Plated Lizard	Least Concern (SARCA 2014)	3	2013-01-09
27	Gerrhosauridae	Matobosaurus validus	Common Giant Plated Lizard	Least Concern	6	2015-09-24

				(SARCA 2014)		
28	Lacertidae	Meroles squamulosus	Common Rough-scaled Lizard	Least Concern (SARCA 2014)	6	1919-10-04
29	Lacertidae	Nucras intertexta	Spotted Sandveld Lizard	Least Concern (SARCA 2014)	2	1911-01-04
30	Lacertidae	Nucras ornata	Ornate Sandveld Lizard	Least Concern (SARCA 2014)	2	1900-06-15
31	Lamprophiidae	Amblyodipsas polylepis polylepis	Common Purple-glossed Snake	Least Concern (SARCA 2014)	2	1900-06-15
32	Lamprophiidae	Aparallactus capensis	Black-headed Centipede-eater	Least Concern (IUCN 2021)	3	1916-06-19
33	Lamprophiidae	Atractaspis bibronii	Bibron's Stiletto Snake	Least Concern (SARCA 2014)	2	1914-06-02
34	Lamprophiidae	Boaedon capensis	Brown House Snake	Least Concern (SARCA 2014)	9	1914-06-02
35	Lamprophiidae	Gracililima nyassae	Black File Snake	Least Concern (SARCA 2014)	2	1900-06-15
36	Lamprophiidae	Hemirhagerrhis nototaenia	Eastern Bark Snake	Least Concern (SARCA 2014)	5	1914-06-02
37	Lamprophiidae	Lamprophis guttatus	Spotted House Snake	Least Concern (SARCA 2014)	1	2003-11-25
38	Lamprophiidae	Limaformosa capensis	Common File Snake	Least Concern (SARCA 2014)	3	1911-08-24
39	Lamprophiidae	Lycodonomorphus rufulus	Brown Water Snake	Least Concern (SARCA 2014)	2	1900-06-15
40	Lamprophiidae	Lycophidion capense capense	Cape Wolf Snake	Least Concern (SARCA 2014)	4	1911-12-19
41	Lamprophiidae	Prosymna bivittata	Two-striped Shovel-snout	Least Concern (IUCN 2020)	4	1912-04-24

42	Lamprophiidae	Prosymna lineata	Lined Shovel-snout	Least Concern (IUCN 2020)	3	1913-10-10
43	Lamprophiidae	Prosymna stuhlmannii	East African Shovel-snout	Least Concern (SARCA 2014)	7	2002-10-14
44	Lamprophiidae	Psammophis mossambicus	Olive Grass Snake	Least Concern (SARCA 2014)	9	1989-10-23
45	Lamprophiidae	Psammophis subtaeniatus	Western Yellow-bellied Sand Snake	Least Concern (SARCA 2014)	6	1984-11-21
46	Lamprophiidae	Psammophylax tritaeniatus	Striped Grass Snake	Least Concern (SARCA 2014)	18	1984-09-30
47	Lamprophiidae	Pseudaspis cana	Mole Snake	Least Concern (SARCA 2014)	5	1919-10-04
48	Lamprophiidae	Rhamphiophis rostratus	Rufous Beaked Snake	Least Concern (SARCA 2014)	3	2008-01-12
49	Leptotyphlopidae	Leptotyphlops distanti	Distant's Thread Snake	Least Concern (IUCN 2022)	6	1914-06-02
50	Leptotyphlopidae	Leptotyphlops incognitus	Incognito Thread Snake	Least Concern (IUCN 2021)	3	1916-06-09
51	Leptotyphlopidae	Myriopholis longicauda	Long-tailed Thread Snake	Least Concern (IUCN 2021)	4	1919-10-07
52	Pelomedusidae	Pelusios sinuatus	Serrated Hinged Terrapin	Least Concern (SARCA 2014)	12	2021-12-06
53	Pythonidae	Python natalensis	Southern African Python	Least Concern (SARCA 2014)	2	1900-06-15
54	Scincidae	Acontias plumbeus	Giant Legless Skink	Least Concern (SARCA 2014)	11	2020-03-03
55	Scincidae	Mochlus sundevallii	Sundevall's Writhing Skink	Least Concern (SARCA 2014)	4	1919-10-02
56	Scincidae	Scelotes mossambicus	Mozambique Dwarf	Least Concern	2	1911-11-07

			Burrowing Skink	(SARCA 2014)		
57	Scincidae	Trachylepis margaritifera	Rainbow Skink	Least Concern (SARCA 2014)	19	2022-07-03
58	Scincidae	Trachylepis striata	Striped Skink	Least Concern (SARCA 2014)	9	2015-09-24
59	Scincidae	Trachylepis varia sensu lato	Common Variable Skink Complex	Least Concern (SARCA 2014)	6	1989-07-10
60	Scincidae	Trachylepis varia sensu stricto	Common Variable Skink		1	2022-07-08
61	Testudinidae	Kinixys spekii	Speke's Hinged Tortoise	Least Concern (SARCA 2014)	9	2020-01-24
62	Testudinidae	Stigmochelys pardalis	Leopard Tortoise	Least Concern (SARCA 2014)	7	2019-12-08
63	Typhlopidae	Afrotyphlops bibronii	Bibron's Blind Snake	Least Concern (IUCN 2022)	3	1913-10-10
64	Typhlopidae	Afrotyphlops schlegelii	Schlegel's Beaked Blind Snake	Least Concern (IUCN 2021)	13	2018-12-11
65	Typhlopidae	Rhinotyphlops lalandei	Delalande's Beaked Blind Snake	Least Concern (SARCA 2014)	1	1900-06-15
66	Varanidae	Varanus albigularis albigularis	Rock Monitor	Least Concern (SARCA 2014)	2	1900-06-15
67	Varanidae	Varanus niloticus	Water Monitor	Least Concern (SARCA 2014)	15	2020-11-27
68	Viperidae	Bitis arietans arietans	Puff Adder	Least Concern (IUCN 2014)	11	2022-07-03
69	Viperidae	Causus defilippii	Snouted Night Adder	Least Concern (IUCN 2021)	10	1984-12-05
					440	**1981-01-24* 1911-12-19****

Frogs

No.	Family	Scientific name	Common name	Red list category	Number of records	Last recorded
1	Arthroleptidae	Leptopelis mossambicus	Brownbacked Tree Frog	Least Concern	2	1914-06-02
2	Brevicipitidae	Breviceps adspersus	Bushveld Rain Frog	Least Concern	3	1995-01-17
3	Bufonidae	Poyntonophrynus fenoulheti	Northern Pygmy Toad	Least Concern	2	1995-01-17
4	Bufonidae	Schismaderma carens	Red Toad	Least Concern	3	1999-12-08
5	Bufonidae	Sclerophrys garmani	Olive Toad	Least Concern (IUCN, 2016)	3	2021-07-03
6	Bufonidae	Sclerophrys gutturalis	Guttural Toad	Least Concern (IUCN, 2016)	1	1981-01-24
7	Hyperoliidae	Afrixalus aureus	Golden Leaf-folding Frog	Least Concern (2013)	7	2009-11-29
8	Hyperoliidae	Hyperolius marmoratus	Painted Reed Frog	Least Concern (IUCN ver 3.1, 2013)	4	2013-05-13
9	Hyperoliidae	Hyperolius tuberilinguis	Tinker Reed Frog	Least Concern	1	2010-02-14
10	Hyperoliidae	Kassina senegalensis	Bubbling Kassina	Least Concern	2	1995-01-17
11	Microhylidae	Phrynomantis bifasciatus	Banded Rubber Frog	Least Concern	7	2021-07-05
12	Phrynobatrachidae	Phrynobatrachus mababiensis	Dwarf Puddle Frog	Least Concern (IUCN, 2014)	1	1981-01-24
13	Phrynobatrachidae	Phrynobatrachus natalensis	Snoring Puddle Frog	Least Concern (IUCN, 2013)	2	1981-01-24
14	Ptychadenidae	Ptychadena anchietae	Plain Grass Frog	Least Concern	4	1995-01-17
15	Ptychadenidae	Ptychadena mossambica	Broadbanded Grass Frog	Least Concern	1	1995-01-17
16	Pyxicephalidae	Amietia delalandii	Delalande's River Frog	Least Concern (2017)	3	1914-06-02
17	Pyxicephalidae	Cacosternum boettgeri	Common Caco	Least Concern (2013)	3	1995-01-17
18	Pyxicephalidae	Pyxicephalus edulis	African Bull Frog	Least Concern	2	1995-01-17
19	Pyxicephalidae	Tomopterna cryptotis	Tremelo Sand Frog	Least Concern	3	1995-01-17

20	Pyxicephalidae	Tomopterna marmorata	Russetbacked Sand Frog	Least Concern	2	1995-01-17
21	Pyxicephalidae	Tomopterna natalensis	Natal Sand Frog	Least Concern	2	1911-11-07
22	Rhacophoridae	Chiromantis xerampelina	Southern Foam Nest Frog	Least Concern (2013)	9	2011-04-20
					67	**1995-01-17* 1913-10-10****

FUEL DEPOT STATION DEVELOPMENT

HYDROGEOLOGICAL STUDY

HYDROGEOLOGICAL INVESTIGATION REPORT FOR PROPOSED FUEL DEPOT STATION DEVELOPMENT ON PORTION OF PORTION 1 OF THE FARM LEEUSPRUIT 385 JU WITHIN THE MAGISTERIAL DISTRICT OF NKOMAZI IN THE NKOMANZI LOCAL MUNICIPALITY, MPUMALANGA PROVINCE.

REPORT PREPARED BY:

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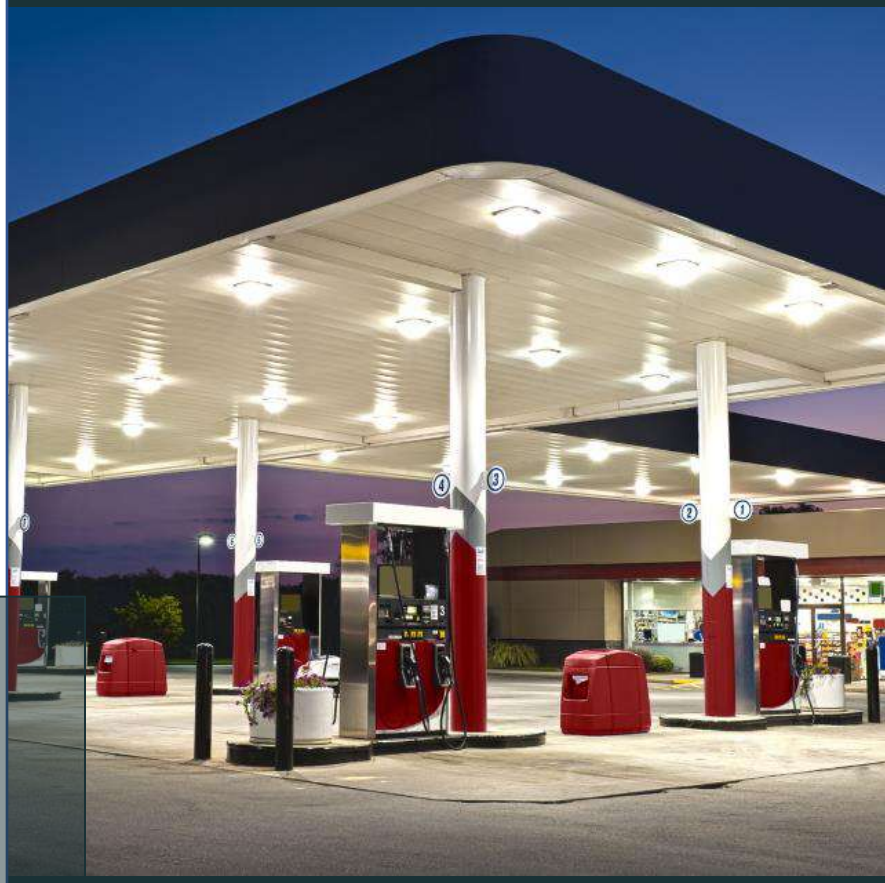

ITHUBA PETROLEUM (PTY) LTD

DARDLEA Ref Number: 1/3/1/16/1E-470 and DWS ref No: CT26052

Report Credentials.

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Project details

Report type	**Hydrogeological Study for a fuel depot development**
Project title	Hydrogeological Study For Proposed Fuel Depot Station Development On Portion Of Portion 1 Of The Farm Leeuspruit 385 Ju Within The Magisterial District Of Nkomazi In The Nkomanzi Local Municipality, Mpumalanga Province
Client	Ithuba Petroleum (Pty) Ltd
Site location	Portion Of Portion 1 Of The Farm Leeuspruit 385 Ju Within The Magisterial District Of Nkomazi, Mpumalanga Province., South Africa
Version	1 (Draft)
Date	08 September 2023

		Electronic signatures
Compiled by	Mutshidzi Munyai (Hydrogeologist) Singo Consulting (Pty) Ltd (Water Resources Science (Professional Natural Scientist), Environment Science (Candidate Natural Scientist) (SACNASP Registration Number 122464)	
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1 INTRODUCTION

1.1 Project Background Information

Ithuba Petroleum (Pty) Ltd appointed Singo Consulting (Pty) Ltd as an independent environmental consulting firm to conduct a preliminary Geohydrological investigation and risk assessment for the proposed Ithuba Petroleum (Pty) Ltd fuel depot.

The study's main goals were to assess groundwater conditions on the site in terms of quantity and quality. Based on the Source-Pathway-Receptor Principle, provide feedback on the potential risk(s) of the development to groundwater quality and quantity. Implement a water monitoring program for the site and make recommendations on how to proceed.

1.2 Proposed Activities

Site Application has been submitted for a **Fuel Depot** on the property mentioned above. Project site GPS coordinates: 31.671934 E,-25.491063 S and located at the corner of the Jeppe's Reef Road and Strydom Block Road, within Ward 7, approximately 6 km South of Hectorspruit and 16 km East of Malelane in Nkomazi local municipality, Mpumalanga Province. See Figure 1.

The proposed fuel depot will consist of the following infrastructures: Ablution facility (Mobile Toilets, Septic tank), LDV Parking Area, MDV/HDV Parking Area, Aboveground tanks, Diesel Pump, Convenient shop, boreholes, and offices.

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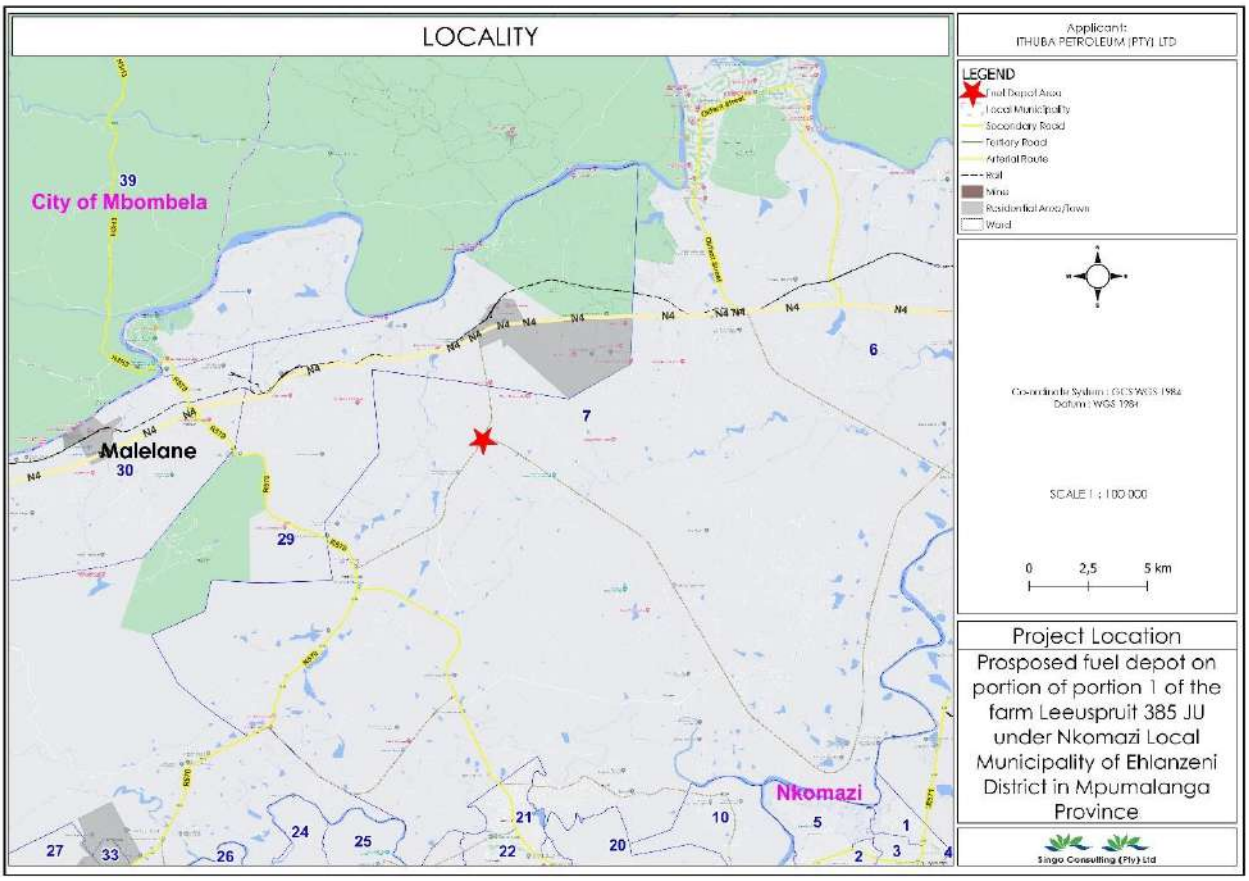

Figure 1: Proposed project location

1.3 Scope of Work

The scope of work can be defined as follows:

- Desktop study to study the geology and groundwater regime
- Hydro-census of existing boreholes and surface water bodies in a radius around the planned development area.
- To evaluate hydrogeological conditions within the site area in terms of groundwater quality.
- Conduct a preliminary risk assessment of the proposed development to groundwater quality and quantity
- Taking water samples from an existing borehole or surface water body if available and correctly situated within and around filling station site for quality analyses.
- Chemical water quality assessment for the samples taken.

- Compilation of a hydrogeological study report which will contain the hydro-census information, geological description, groundwater flow directions, surface water bodies and boreholes.
- Groundwater monitoring network and monitoring programme for long term monitoring of the groundwater regime.
- Provide technical recommendations based on the site conditions.

2 TERMS OF REFERENCE

The baseline geohydrological assessment for the project area is mainly constructed by a combination of desktop study and site-specific field study. Most of the information used for this study was compiled with an aid of nearby study sites information and experience from similar geohydrological settings. All collected data will be compiled to construct a conceptual geohydrological model.

The objective of the study is to collect hydrogeological and geochemical baseline information to address the subsequent environmental impact assessment for the Tondzi Fuels. Management and mitigation measures for identified impacts should be outlined for the operational phase of the project and associated monitoring, management and mitigation measures recommended.

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The following aspects were covered in this hydrogeological study:

Table 1: Aspects of the hydrogeological study

Aspect	Description
Desktop Study	➢ Project Initiation and Data Collection ➢ Review available site specific hydrogeological and hydrological information to conceptualize the different aquifer systems and their interaction with surface water features in the area.
Site visits	➢ Site visit is the most significant part of the investigation, a site visit was conducted to collect water samples and conducting hydrocensus at the surrounding firms (within 2kms) of the project area.
Groundwater levels	➢ A water level meter was used to measure the water level at all the boreholes within the study site
Aquifer classification	➢ Aquifers will be classified into either minor or major aquifer types and dominant water source will be identified
Groundwater recharge	➢ Groundwater recharge will be calculated using the chloride method
Hydrogeological Modelling	➢ Interpret geochemical analyses of water samples conducted by Regen waters Lab ➢ Numerical Groundwater Flow and Transport Model o Model inputs o Model Calibration o Scenario Modelling o Hydrogeological Impact Assessment o Use the model to predict potential filling station impacts on the shallow and deep groundwater flow systems, groundwater seepages and spring discharges

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Reporting	Writing a comprehensive geohydrological report outlining all the findings and existing environment of the proposed project area. This groundwater specialist report compiles all methodologies, findings, quantitative analysis (geochemical assessment and modelling outcomes), impact assessments, recommendations (proposed monitoring programme and recommended mitigation measures for predicted impacts) and conclusions. Appendices to the specialist report will include laboratory results.

3 METHODOLOGY

3.1 Hydrocensus

The Hydrocensus main objective is to record the groundwater data available i.e., counting the number of boreholes if present, recording their names, conditions, coordinates as well as measuring the water levels. This helps to identify the baseline groundwater use and users within the study area. A detailed Hydrocensus was conducted within the project area to obtain a representative population of the boreholes in the area. During the Hydrocensus, all available details of boreholes, conditions and water samples were collected and recorded.

3.2 Sampling and Chemical Analysis

Various tools were used in collecting the data such as Water level meter, handheld GPS, measuring tape and a bailer. These tools were used on various boreholes on the site. The hand GPS was used to determine the longitudinal, latitude and elevation for each borehole that was being observed. After recording the GPS coordinates, the measuring tape was used in taking all collar height measurements of the boreholes. The level meter together with a measuring tape were used in order to get the water levels.

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3.2.1 Surface water sampling

- Sampling using sampling vessel

Before sampling, the sampler must make sure that they rinse the sampling vessel on site with water about 3-4 times. In order to prevent contaminating water for sampling during rinsing, caution must be taken. Submerge the collecting vessel gently, fill it with the water sample and seal it firmly. Leave some room for expansion equal to about 10 percent of the sampling vessel if the collected water sample can be frozen (Singh, 2015).

3.2.2 Groundwater sampling

- Bailer

A bailer is a hollow tube used to collect samples of groundwater from wells for monitoring. Bailers are tied to and lowered into the water column by a piece of rope or a piece of wire. When lowered, the bailer uses a simple ball check valve to seal a sample of the groundwater table at the bottom to raise it up. The bailers are made of polyethylene, PVC, FEP or stainless steel and can be disposable or reusable (Singh, 2015).

Bailers are easy and relatively inexpensive devices to use. In addition, bailers can be lowered to any depth although the depth of the well is sharply limited by pumps. Aeration of the water when the sample is collected, which could release volatile organic compounds that need to be tested, is the main downside to using bailers. This can also conflict with the proper seating of the ball check valve if there is a high volume of sediment or turbidity (Singh, 2015).

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Figure 2: Stainless steel bailer, picture extracted from *(Solist, n.d.)*. A bailer uses a simple ball check valve to seal a sample of the groundwater table at the bottom to raise it up

3.3 Groundwater modelling

The chosen software is MODFLOW. During model setup, the conceptual model is translated into a numerical model. This stage entails selecting the model domain, defining the model boundary conditions, discretizing the data spatially and over time, defining the initial conditions, selecting the aquifer type, and preparing the model input data. The above conditions together with the input data are used to simulate the groundwater flow in the model domain for pre steady state conditions

Conceptual model

A conceptual model is a simplification of the complex real system down to familiar aspects that can easily be solved. This conceptual model is just a step prior to a solution model which can either be analytical or numerical.

Numerical model

Numerical groundwater modelling consists of flow and transport modelling types. Groundwater flow modelling can be represented by finite difference method or finite element. In this project finite difference method is used.

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3.4 Groundwater availability assessment

Fractured Aquifer System

All groundwater movement in this study area occurs along secondary structures such as fractures, cracks and joints in the rock. These structures are best developed in intruded bedrocks where cracks are formed hence the better water yielding properties.

Dolerite sills and dykes are generally impermeable to water movement, except in the weathered state. In terms of water quality, the fractured aquifer always contains higher salt loads than the upper weathered aquifer. The higher salt concentrations are attributed to a longer contact time between the water and rock (IGS, 2008).

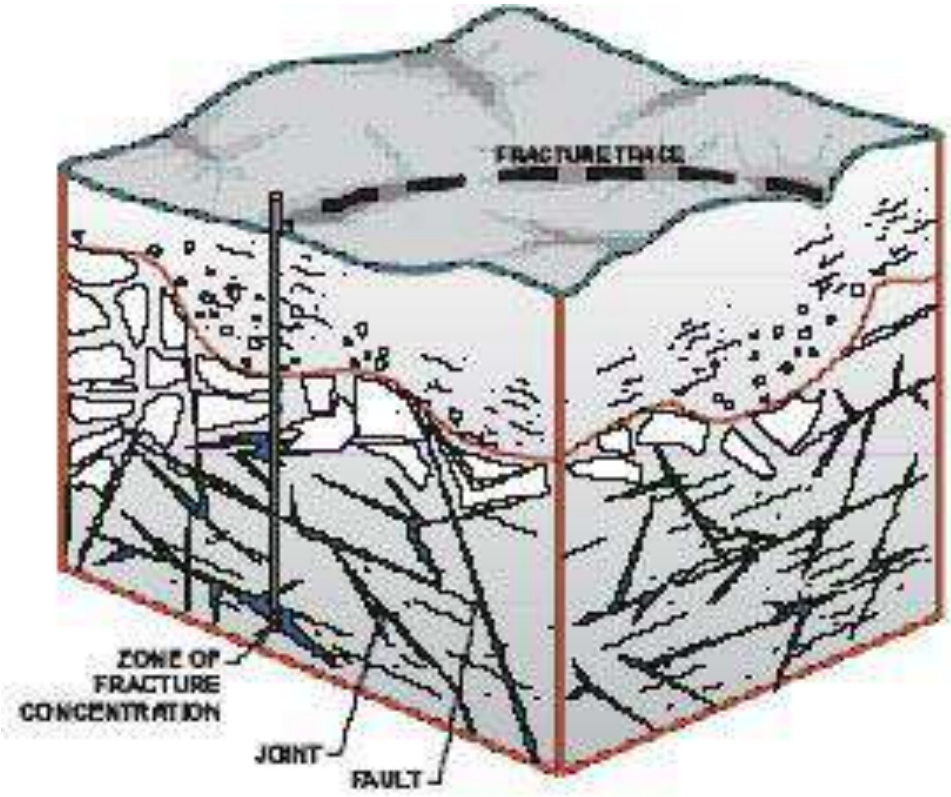

Figure 3: Fractured rock aquifer regime (Source: *(Krautkramer & Noble, n.d.)*)

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3.5 Potential Contaminants

The potential contaminants associated with the general Ithuba Petroleum could be both organic and inorganic: Car Wash and fuel and oil handling facilities are likely sources of hydrocarbon related contaminants. Oils, grease, and other hydrocarbon products (such as petrol and diesel) handled in these areas may contaminate the environment by spillages and leakages. Oils and greases are removed and collected in oil traps.

Surface water bodies and groundwater may be contaminated by run-off (contained with hydrocarbons) by entering the storm water system when is not collected. Septic tanks and sewage treatment plants potentially contaminate groundwater. Contaminants associated with these plants include coliforms (e.g., E. coli), bacteria viruses, ammonia, phosphate, sulphate, and nitrate. Effluent from these systems usually contains elevated concentrations of organic matter which may lead to elevated COD and BOD. Waste disposal areas may source a wide range of contaminants, ranging from metals, organic matter, hydrocarbons, phosphates, etc.

Figure 4 below illustrates the movement of Light Non-aqueous phase liquids as well as Dense non-aqueous liquids. The most common contaminant that can be observed in this operation is the LNAPLs, these LNAPLs will float on water and move with groundwater to the nearest receptors.

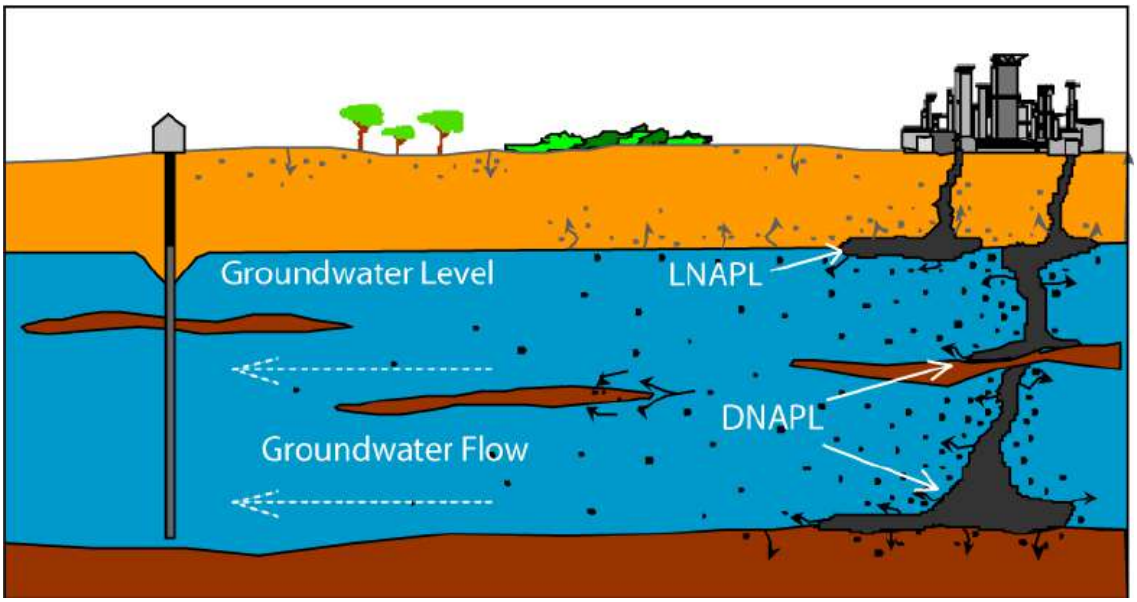

Figure 4: A conceptual model illustrating the movement of LNAPLs and DNAPLs (Source: *(Liu & Haderlein, 2013)*

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3.6 Groundwater recharge calculations

Chloride mass balance (CMB)

The method compares total chloride deposition (through precipitation) at the surface with chloride concentrations in groundwater as measured in samples from wells/boreholes. Chloride in the precipitation originates from sea salt. Chloride inputs from atmospheric deposition are conserved in the soil zone and concentrated due to loss of moisture by evapotranspiration.

Chloride ion is often used as a tracer for the investigation of water and solute movement in the unsaturated zone and aquifers. Tracers should be conservative behaviour, i.e. the tracer movement is not slowed or decreased in concentration by interaction with the solid phase and that it is not produced in the soil nor introduced by external sources.

Assumptions:

- All chloride in groundwater is derived from precipitation, no any other sources
- Chloride is concentrated by evaporation prior to recharge.
- Chloride is conservative in the system
- Runoff after precipitation is negligible (most the precipitation that reaches the ground recharges infiltrates into the unsaturated zone contributing to recharge)

Basic equation for chloride mass balance method (Wood and Sanford, 1995)

$$q = P \times \frac{Clwap}{Clgw}$$

Where:

q is the flux recharge (units of precipitation);

P is the average annual precipitation.

Clwap - is the weight-average chloride concentration in precipitation (a conservative value of 1 mg/l is often assumed) and

Clgw – chloride concentration in the groundwater.

Recharge is often expressed as % of rainfall.

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4 PHYSIOGRAPHICAL AND GEOLOGICAL SETTING

4.1 Project Location

Project site GPS coordinates: 31.671934 E,-25.491063 S and located at the corner of the Jeppe's Reef Road and Strydom Block Road, within Ward 7, approximately 6 km South of Hectorspruit and 16 km East of Malelane in Nkomazi local municipality, Mpumalanga Province.

4.2 Climate

The climate of Nkomazi varies monthly. In January Temperature hovers around 31°c and at night it feels like 22°c. In January, Nkomazi gets 136.12mm of rain and approximately 21 rainy days in the month. Humidity is close to 76%. February Temperature hovers around 31°c and at night it feels like 22°c. In February, Nkomazi gets 135.91mm of rain and approximately 19 rainy days in the month. Humidity is close to 77%. March Temperature hovers around 31°c and at night it feels like 21°c. In March, Nkomazi gets 101.78mm of rain and approximately 19 rainy days in the month. Humidity is close to 77%. April temperature hovers around 29°c and at night it feels like 19°c. In April, Nkomazi gets 48.96mm of rain and approximately 14 rainy days in the month. Humidity is close to 74%. May Temperature hovers around 28°c and at night it feels like 18°c. In May, Mbuzini gets 11.08mm of rain and approximately 7 rainy days in the month. Humidity is close to 70%

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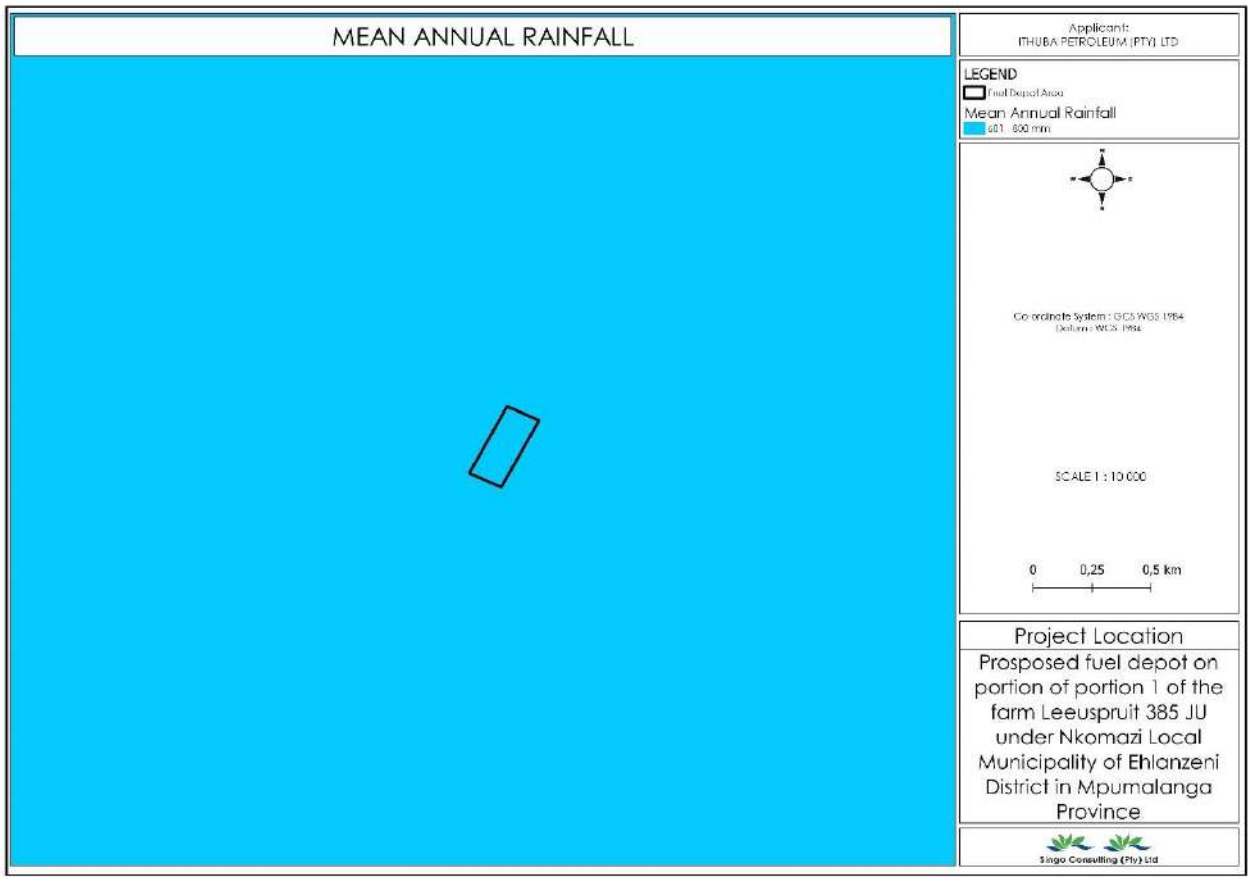

Figure 5: Mean annual rainfall within the proposed project

4.3 Drainage and Topography

The topographical map illustrates that the proposed Ithuba petroleum project area is situated in a region generally characterized by a flat-lying topography with the project area situated at 340 m above the mean sea level as depicted on the topography map below. The non-perennial river is exists nearby the proposed fuel depot on the southern side.

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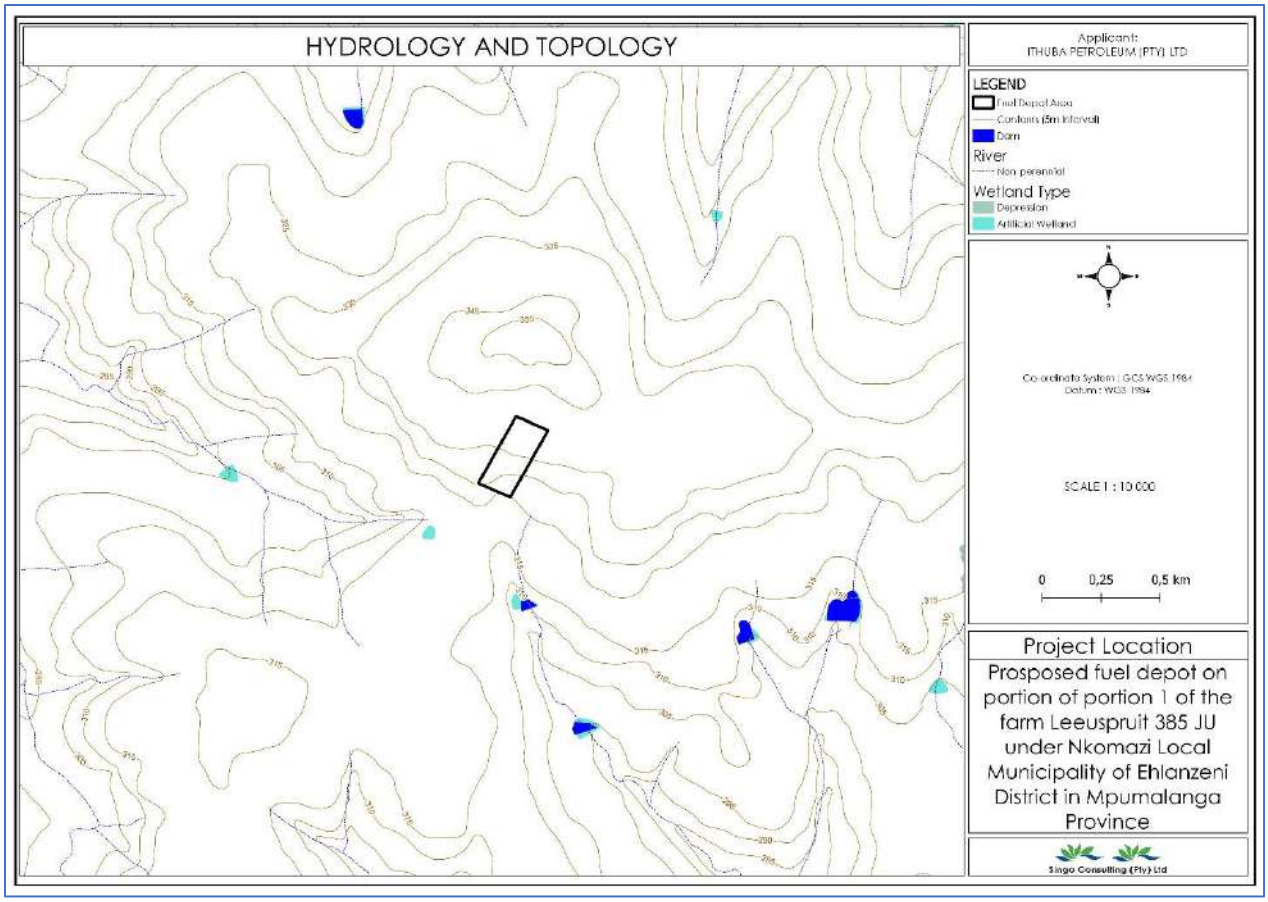

Figure 6: Topography and Hydrology within the proposed project

4.4 Catchment Description

South Africa's water resources are divided into quaternary catchments, which are the country's primary water management units (DWAF 2011). In a hierarchical classification system, a quaternary catchment is a fourth order catchment below the primary catchments. The primary drainages are further classified as Water Management Areas (WMA) and Catchment Management Agencies (CMA) (CMA). In accordance with Section 5 subsection 5(1) of the National Water Act, 1998, the Department of Water and Sanitation (DWS) has established nine WMAs and nine CMAs as outlined in the National Water Resource Strategy 2 (2013). (Act No. 36 of 1998). The purpose of establishing these WMAs and CMAs is to improve water governance in various regions of the country, ensuring a fair and equal distribution of the Nation's water resources while ensuring resource quality is maintained.

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The proposed site is located in the Quaternary Catchment Region X13K under the Inkomazi-Usuthu Water Management Area. The proposed site is crossed by a drainage channel. The drainage channel is a non-perennial that is recharged by surface water run-off from elevated residential and mountain areas during rainy periods. On a regional scale, rainfall within the Quaternary Catchment boundaries will recharge groundwater in the project area. Although geological structures such as weathered and fractured zones will create preferred pathways for groundwater flow, the general flow direction, particularly in the weathered unsaturated zone, is expected to follow surface gradients.

Table 2: Quaternary catchment information (WR, 2012)

Quaternary Catchment	**S-Pan Evaporation**		**Rainfall**	
	Evaporation Zone	**MAE (mm)**	**Rainfall Zone**	**MAP (mm)**
X13L	5A	1466.6	X1H	611

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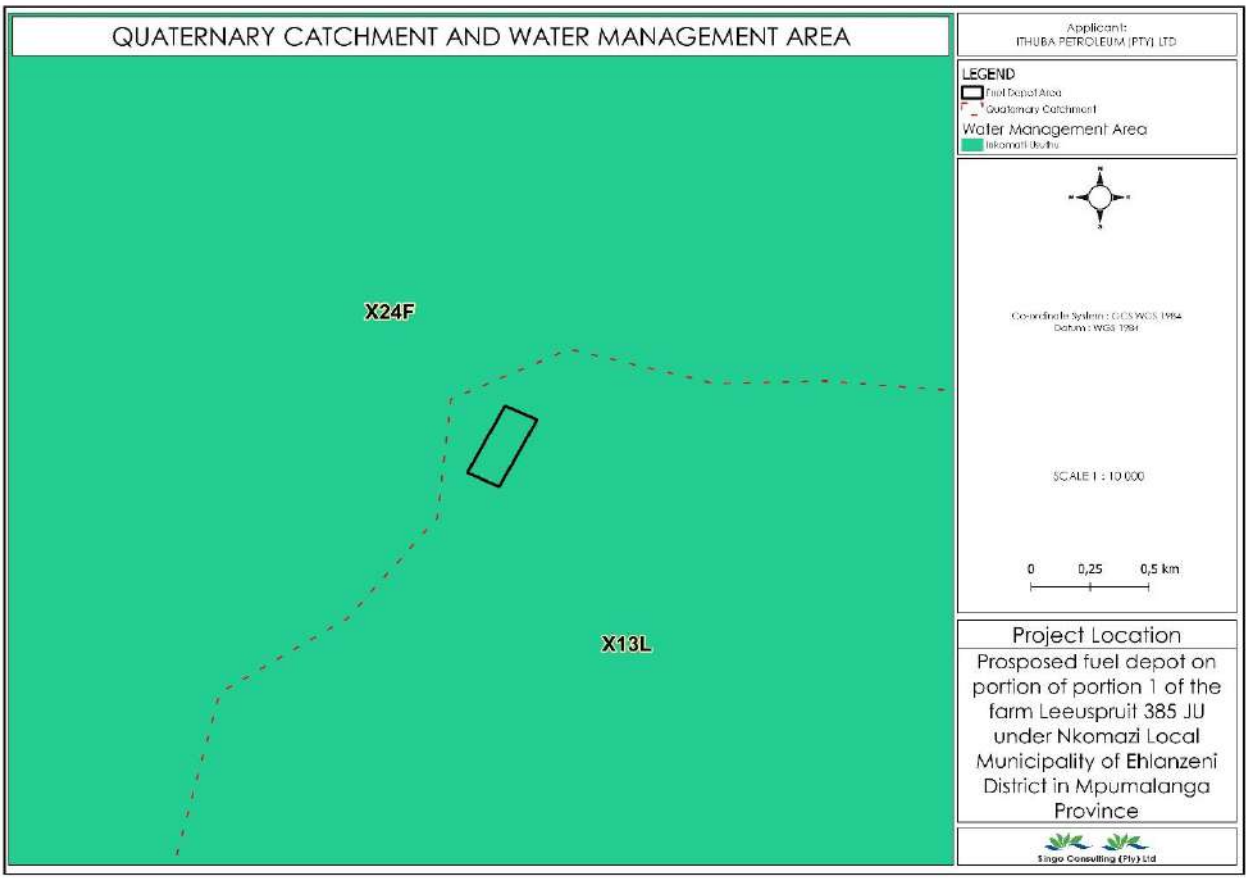

Figure 7: Quaternary catchment and Water Management Area

4.5 Geology

The Lebombo Group consists of a series of basic and acidic lavas (SACS, 1980). The Drakensberg Formation was associated with these lavas in the 1970 edition of South Africa's geological map (Geological Survey, 1970). However, due to uncertainties in their correlation, independent formation names for the three main lithological units of the Lebombo Group have been assigned (SACS, 1980). The Letaba Formation is made up of the lower basalt unit (SACS, 1980, Geological Survey, 1985a, Geological Survey, 1985b). The rhyodacite acid unit is known as the Jozini Formation (SACS, 1980; Geological Survey, 1985a; Geological Survey, 1985b). The third unit, the Movene Formation, is almost entirely restricted to Mozambique.

The Letaba Formation extends from the Limpopo River in the north all the way down through Mpumalanga and Swaziland. In KwaZulu-Natal, it extends south to the Mfolozi River, forming the common border with Swaziland. The formation can be traced all the way to the north of South

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Africa. The common border with Mozambique is formed by the Letaba Formation and an acid rhyolite volcanic member. The Letaba Formation also covers a large portion of the Springbok Flats in the Northern Province. The formation encompasses approximately 840 000 hectares, while it encompasses 197 600 hectares within KwaZulu-Natal.

The geology of the area of the immediate study area is dominated by the Jurassic basalt of the Lebombo Group. According to on-site observations, the immediate top colluvial soils are made up of a dark grey and very dark grey silty clay that is hard to stiff, fissured and fractured, and slightly sandy. This basalt-derived colluvial material is anticipated to be very active. the According to on-site observations, the immediate top colluvial soils are made up of a dark grey and very dark grey silty clay that is hard to stiff, fissured and fractured, and slightly sandy. Cotton soils are colluvial materials generated from basalt that are expected to be extremely active.

Soil profiles from the Letaba Formation were the only ones sampled in this study. As a result, the remaining two units are not considered further. The basalt exposures of the Letaba Formation east of the Lebombo Mountains are thought to be of Post African II age, partly planed, and of Late Pliocene age (Partridge and Maud, 1987). The Lebombo Mountains are said to have exerted significant structural control over this surface. The Springbok Flats basalt exposures are thought to be part of an Early Miocene post-African surface (Partridge and Maud, 1987).

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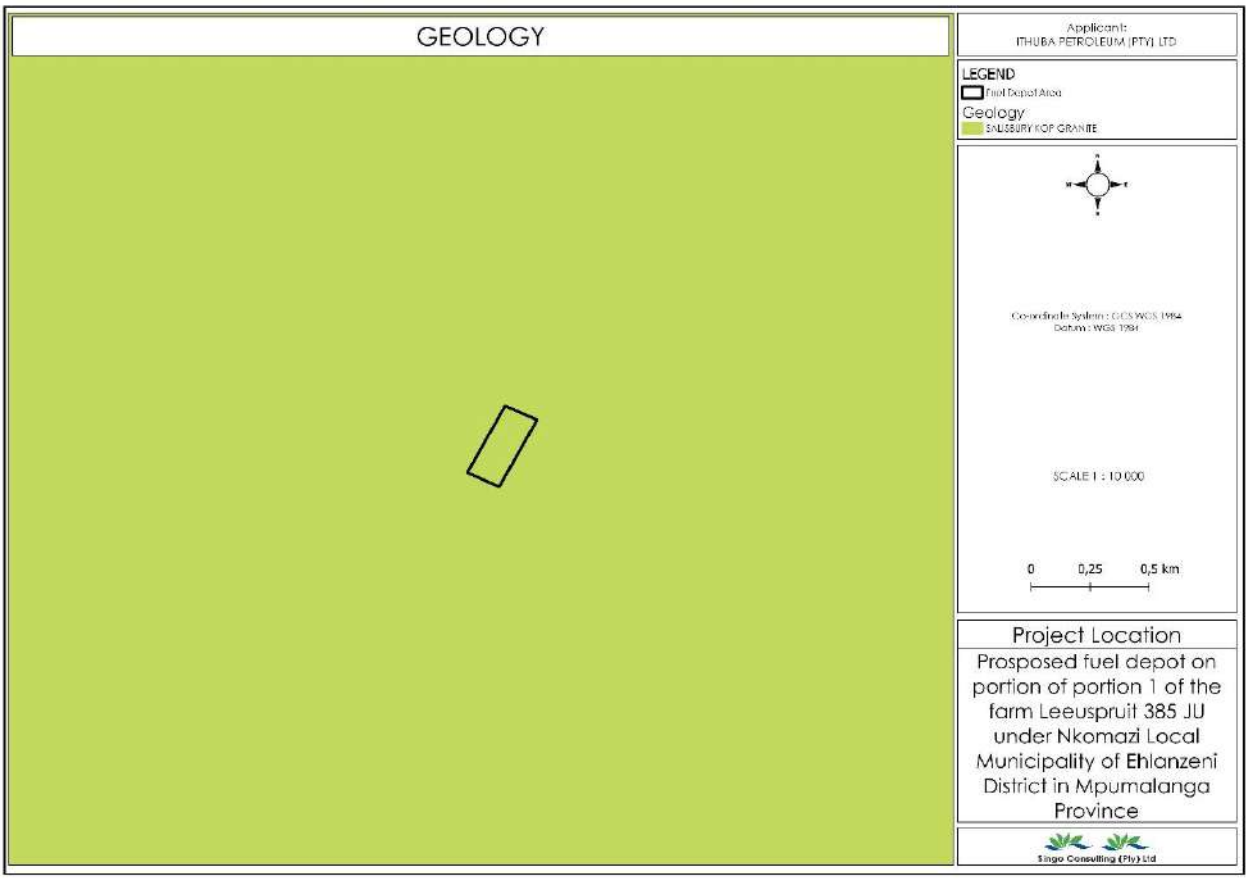

Figure 8: Geological map

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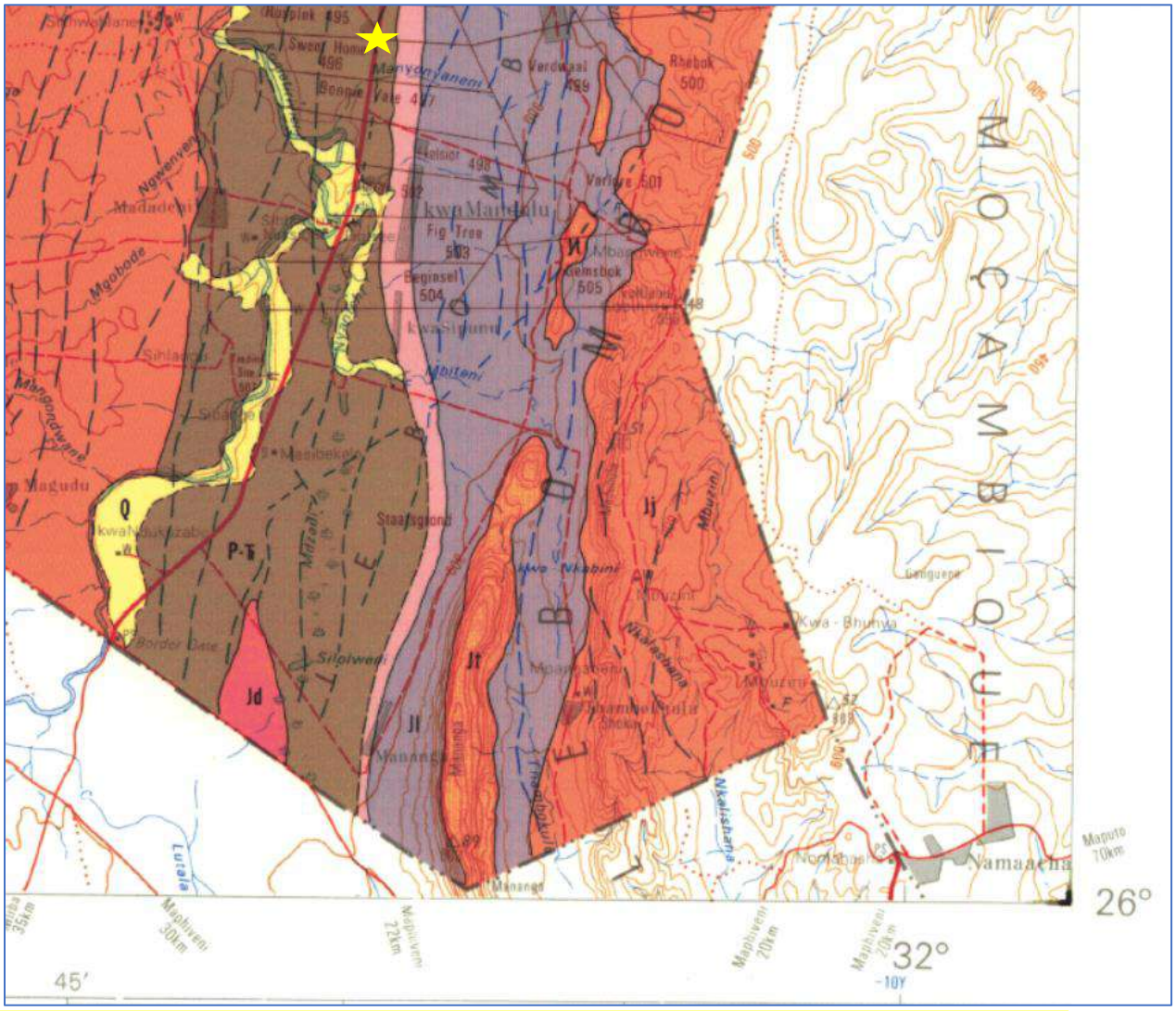

Jj Red to light-brown, fine-grained rhyolitic lava, porphyritic rhyolite and tuff
Rooi tot ligbruin, fynkorrelrige riolitiese lawa, porfiritiese rioliet en tuf

Figure 9: Structural geological map

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5 GROUNDWATER INVESTIGATION

5.1 Hydrogeology

5.1.1 Regional hydrogeology

Typically five distinct aquifer types:

1. Basement (fractured Achaean-Proterozoic igneous/ metamorphic)
2. Hard-rock (e.g. Table Mountain TMG, Waterberg and Natal Groups sandstone; fractured)
3. Karst/ dolomite (dissolution)
4. Karoo (fractured and influenced by dykes)
5. Porous (intergranular Quaternary alluvial, coastal, Aeolian and other surficial unconsolidated deposits)

The study area falls under **Hard-rock (e.g. Table Mountain TMG, Waterberg and Natal Groups sandstone; fractured)**. The boreholes must target the fracture zones in this area for effective borehole yields.

The groundwater potential of the formations located in the project area is limited in their pristine state due to low permeability, storage, and transmissivity. Secondary processes, such as weathering, fracturing, etc., are required to enhance the groundwater potential.

Regional Groundwater Occurrence and Aquifers

Based on the geology within the study area, the structural geology, and the geomorphology, the following conditions can arise to enhance aquifer development within the study area:

- The fractured transition zone between weathered and fresh bedrock
- Fractures along contact zones between the host rocks due to heating and cooling of rocks involved with the intrusions
- Contact zones between sedimentary rocks of different types
- Interbed or bedding plane fracturing
- Openings on discontinuities formed by fracturing
- Faulting due to tectonic forces.
- Stratigraphic unconformities

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- Zones of deeper weathering
- Fractures related to tensional and decompressional stresses due to off-loading of overlying material
- Groundwater occurs within the joints, bedding planes and along dolerite contacts.

The fractured Karoo aquifer consists of the various lithologies of rhyolites. The pores of the geological units are generally well cemented, and the principle flow mechanism is fractured flow along secondary structures e.g. faults, bedding plane fractures etc. The intrusion of the fractured aquifer by dolerite dykes and sills has led to the formation of preferential flow paths along the contacts of these lithologies due to the formation of cooling joints. The dykes may act as permeable or semi-permeable features to impede flow across the dykes.

The fractured pre-Karoo aquifer is separated from the overlying fractured Karoo aquifer by Dwyka tillites which act as an aquiclude where present. The flow mechanism is fracture flow as can be expected from the crystalline nature of the granite rocks. The water quality is generally characterised by high fluoride levels which limits exploitation of this aquifer in combination with the general low yields, deep (expensive) drilling and the low recharge (Grobbelaar et al, 2004. Below is a summary of the geohydrological system.

6 AQUIFER CHARACTERIZATION

6.1 Groundwater vulnerability

Aquifer Systems

Two distinct and superimposed groundwater systems are present in the geological formations of South Africa, as described by Hodgson and Grobbelaar (1999). They are the upper weathered aquifer and the system in the fractured rock below (Golder 2018).

Weathered Aquifer System

The upper aquifer is associated with the weathered horizon. The aquifer is recharged by rainfall. Rainfall that infiltrates into the weathered rock reaches impermeable layers of solid rock underneath the weathered zone. Movement of groundwater on top of the solid rock is lateral and in the direction of the surface slope.

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This water reappears on surface at fountains, where barriers such as dolerite dykes, paleo-topographic highs in the bedrock obstruct the flow paths, or where the surface topography cuts into the groundwater level at streams.

The weathered zone is generally low yielding, because of its insignificant thickness. Few farmers therefore tap this water by boreholes. The quality of the water is normally excellent and can be attributed to many years of dynamic groundwater flow through the weathered sediments. Leachable salts in this zone have been washed from the system long ago (IGS2008).

Fractured Aquifer System

The fractured aquifer system (~ 15 to 40m) present in the fresh rock below the weathered zone are well cemented, and do not allow significant water flow. All groundwater movement therefore occurs along secondary structures such as fractures, cracks and joints in the rock. These structures are best developed in sandstone and quartzite; hence the better water yielding properties of the latter rock type.

Dolerite sills and dykes are generally impermeable to water movement, except in the weathered state. In terms of water quality, the fractured aquifer always contains higher salt loads than the upper weathered aquifer. The higher salt concentrations are attributed to a longer contact time between the water and rock (IGS, 2008).

6.2 Aquifer classification

The figure below illustrates aquifer classification of different areas in South Africa. It can be deduced that the project area comprises of minor aquifers and the dominant water source is surface water. Table below interprets the meaning of the aquifer classification and when an area is said to have a minor aquifer it means that the aquifer is a moderately yielding aquifer of acceptable quality or high yielding aquifer of poor-quality water.

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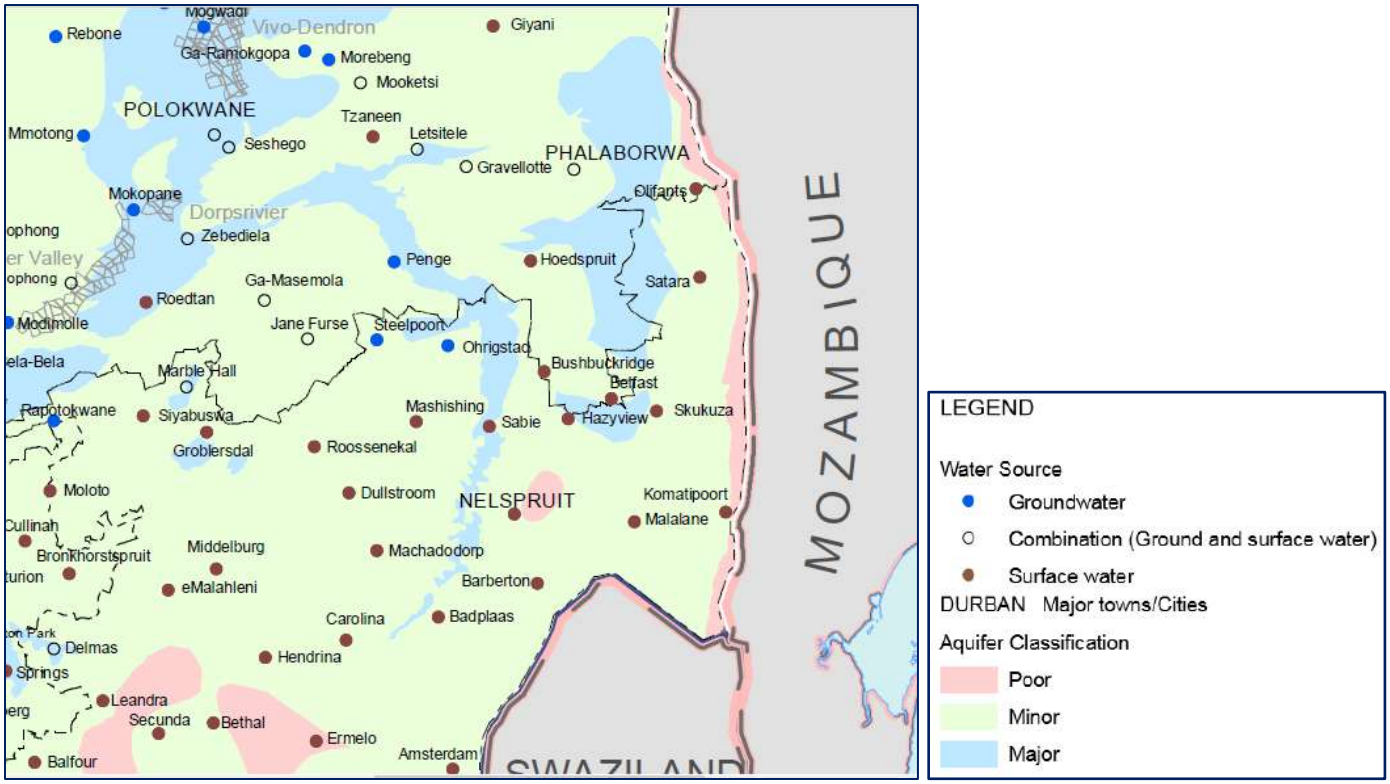

Figure 10: Aquifer classification

Table 3: Aquifer characterisation

Aquifer	Description
Sole source aquifer	An aquifer used to supply 50% or more of urban domestic water for a given area, for which there are no reasonably available alternative sources should this aquifer be impacted upon or depleted.
Major aquifer region	High-yielding aquifer of acceptable quality water.
Minor aquifer region	Moderately yielding aquifer of acceptable quality or high yielding aquifer of poor-quality water.
Poor aquifer region	Insignificantly yielding aquifer of good quality or moderately yielding aquifer of poor quality, or aquifer that will never be utilised for water supply and that will not contaminate other aquifers.
Special aquifer region	An aquifer designated as such by the Minister of Water

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7 GROUNDWATER MODELLING

7.1 Software model choice

MODFLOW software is the chosen software to model groundwater flow and contaminant transport in this situation. The finite difference numerical model was created using the US Department of Defence Groundwater Modelling System (GMS9.2) as Graphical User Interface (GUI) for the well-established MODFLOW and MT3DMS numerical codes.

MODFLOW is a 3D, cell-centred, finite difference, saturated flow model developed by the United States Geological Survey. MODFLOW can perform both steady state and transient analyses and has a wide variety of boundary conditions and input options. It was developed by McDonald and Harbaugh of the US Geological Survey in 1984 and underwent eight overall updates since. The latest update (MODFLOW-NWT) incorporates several improvements extending its capabilities considerably, the most important being the introduction of the Newton formulation of MODFLOW. This dramatically improved the handling of dry cells that has been a problematic issue in MODFLOW in the past.

MT3DMS is a 3-D model for the simulation of advection, dispersion, and chemical reactions of dissolved constituents in groundwater systems. MT3DMS uses a modular structure similar to the structure utilized by MODFLOW and is used in conjunction with MODFLOW in a two-step flow and transport simulation. Heads are computed by MODFLOW during the flow simulation and utilized by MT3DMS as the flow field for the transport portion of the simulation.

Elevation data is crucial for developing a credible numerical model, as the groundwater table in its natural state tends to follow topography. The best currently available elevation data is derived from the SRTM (Shuttle Radar Tomography Mission) DEM (Digital Elevation Model) data. The SRTM consisted of a specially modified radar system that flew on board the Space Shuttle Endeavour during an 11-day mission in February of 2000, during which elevation data was obtained on a near-global scale to generate the most complete high-resolution digital topographic database of Earth. Data is available on a grid of 30 meters in the USA and 90 meters in all other areas.

7.2 Model set-up and boundaries

During model setup, the conceptual model is translated into a numerical model. This stage entails selecting the model domain, defining the model boundary conditions, discretizing the data

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spatially and over time, defining the initial conditions, selecting the aquifer type, and preparing the model input data. The above conditions together with the input data are used to simulate the groundwater flow in the model domain for pre steady state conditions.

7.2.1 Overview of the Problem

An aquifer system with one stratigraphic unit is bounded by no-flow boundaries on the West and East sides, which are in full hydraulic contact with the aquifer. The hydraulic heads on the west and east boundaries are 5m and 10m above reference level, respectively.

The aquifer system is unconfined and anisotropic. The horizontal hydraulic conductivities of the first stratigraphic units is 0.0001 m/s. Vertical hydraulic conductivity is assumed to be 10 percent of the horizontal hydraulic conductivity. The effective porosity is 25 percent. The elevation of the ground surface is 30m. A constant recharge rate is applied to the aquifer.

A numerical model has to be developed for this site to calculate groundwater flow field; we will use MT3D to simulate the contaminant transport. To demonstrate the use of the transport models, we assume that the pollutant is dissolved into groundwater at a rate of 1×10-4 µg/s/m2.

The initial concentration, molecular diffusion coefficient, and decay rate are assumed to be zero. We will calculate the concentration distribution after a simulation time of 10,50,100 and 500 years.

7.3 Groundwater sources and sinks

The conceptual model was transformed into a numerical model following the characterization of the aquifers, contaminant sources and groundwater receptors, so that the groundwater flow conditions, and mass transport can be solved numerically. A conceptual model is a simplified, but representative description of the groundwater system that illustrates the interaction of the sources, pathways, and receptors at the site.

- Any entity that contributes to the groundwater quantity and/or quality is represented by the **sources**.
- Aquifers through which the groundwater and contaminants migrate would be the **pathways** and
- The **receptors** are humans, rivers or natural ecosystems that depend on the groundwater and will be impacted negatively if the water is depleted by dewatering or is contaminated.

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As illustrated in the figure below, an environmental **risk** exists only if the three components of a conceptual model (source, pathway, and receptor) are linked.

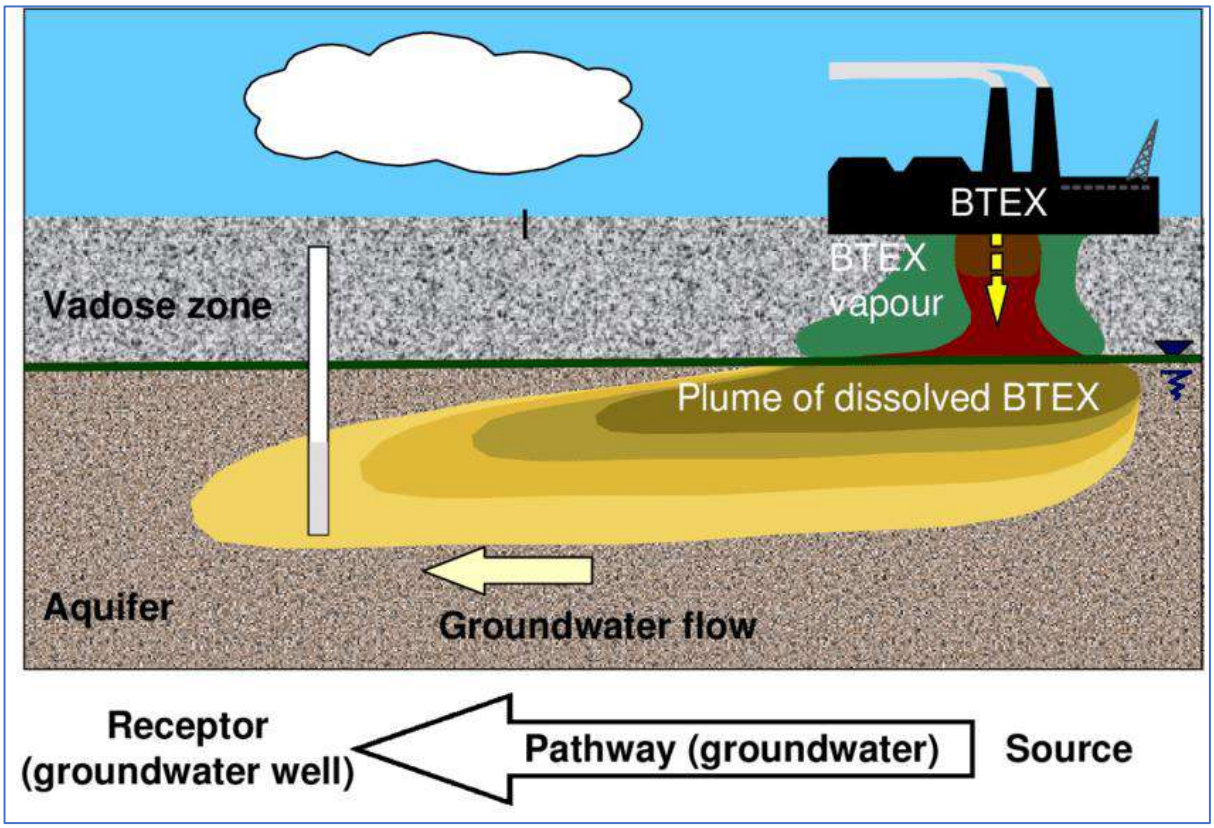

Figure 11: Risk conceptual model (Source: (Bardos, et al., 2000))

7.3.1 Source

It is unlikely that there is residual soil impact in this area as there are no filling stations within 15km from the study area. However the proposed filling station in this context will be the anticipated possible source of contamination.

7.3.2 Pathway

A pathway is a means for contaminants to be transported from a source to a receptor(s). Potential contaminant pathways have been considered for groundwater and residual impact in soil. This groundwater study depicted that LNAPL has not been observed in sampled wells. Potential pathways of concern considered during assessments at the site are presented in Table 4.

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However, the investigation conducted by Singo Consulting at the filling station shows that the monitoring wells shows presence of LNAPLS, as potential contaminant of concern.

Table 4: Pathways of Concern

Source	Description of pathway	Comments
Soil (adsorbed- and vapour-phase hydrocarbons)	Hydrocarbon adsorbed in soil transported as vapours to Indoor and Outdoor areas	Inhalation of hydrocarbon vapours volatilised from residual hydrocarbons in the subsurface
	Hydrocarbon adsorbed in soil transported in the form of dust	Inhalation of dust with residual adsorbed hydrocarbons
	Incidental ingestion/dermal contact	Soil with residual adsorbed hydrocarbons
Groundwater (dissolved phase hydrocarbons)	Indoor inhalation of vapours Outdoor inhalation of vapours	Hydrocarbon vapours volatilised from dissolved-phase hydrocarbons

7.3.3 Receptor

Table 5: Potential Receptors

Receptor	**Description**
Workers and customers on-site	Employees and customers working in- and out-doors at the Tondzi Fuels filling station
Workers and customers off-site	Employees and customers working in- and out-doors at the adjacent commercial properties
Ecological receptors	Non-Perennial stream sediment, water and biota
Crops on agricultural land	Crops grown on the agricultural land
Construction workers on- and off-site	Construction workers undertaking intrusive works in impacted areas.

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8 HYDROGEOLOGICAL IMPACT ASSESSMENT

The following preliminary impact assessment is based on the information collected during the desktop study, literature review and field work assessment. There are a number of ways to assess hydrogeological risk and the "Waste Aquifer Separation Principle" (WASP, WRC Report No 485/1/94) and the G4 Impact. The G4 PBG make special reference to the "Source-Pathway-Receptor" principle which is a simple and practical way to assess risk and impacts on the hydrogeology for a given project and area.

8.1 Identified sources

The sources to groundwater contamination for the development can be grouped into those associated with the Operation Phase of the Fuel depot station.

8.1.1 Operation Phase

There are a number of potential groundwater pollutants that may potentially emanate from an operational filling station site. Underground storage of fuel where the potential always exists that spillages and seepages from diesel and petrol storage facilities may occur. Parking areas where oil and grease may leak from cars and washed into nearby water courses during rain events. General industrial and workshop related spillages. Sewage and domestic related loads on the environment, however, it is anticipated that domestic waste will be transported away from site to an existing facility.

8.2 Pathways

In the context of the study and with respect to the potential impacts on groundwater and surface that may be caused by the proposed filling station would typically be as follows:

- The shallow weathered aquifer where infiltration of contaminated water will take place and topography that will favour runoff.
- Water courses during rainfall seasons that will channel contaminated water into the receiving surface water resources such as streams and rivers.
- Although the geology of the area has the ability to attenuate the potential risk of contaminants entering groundwater if a low permeable rocks unit exist below the site, the

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proposed site is situated on the weathered granite and the weathering of granites normally results in high permeable coarse grain sand with very low clay content.

8.3 Receptor

As the final component of the impact assessment, the receptor in the context of this study will be the following water resources:

- Groundwater
- Rivers and streams

Risk to groundwater is high if the source of pollution is in contact with the aquifer with no mitigation plans in place.

8.4 Recommended mitigation plans

In order to mitigate the risks of groundwater contamination from the filling station, this study should include the local groundwater assessment such groundwater level at the site, geological logging of the underlying lithology at the site and the hydraulic properties of the underlying aquifer. This can be achieved by drilling boreholes and undertaking the pumping test of those boreholes. The information obtained from these tests can then be used to determine the likelihood for the impact to occur and the level of the risk. Methods to mitigate the risk can then be established based on the level of the risk.

8.5 Risk assessment

This generic risk assessment is based on the available information gathered during the desktop study and field assessment. The following limitation were encountered during the study:

- No geological logs obtained for the proposed site.
- No aquifer parameters obtained at the site.

It is recommended that these limitation be addressed and the relevant information be obtained to fully assess the risks of the proposed filling station on groundwater and surface water resources.

Underground fuel storage tanks and septic tanks are normally above the groundwater table. It is assumed that prior to any construction of such facilities, groundwater levels at the site were determined and understood properly. Shallow groundwater areas will be avoided for the

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construction of the underground fuel storage tanks and septic tanks, however, shallow groundwater conditions are not anticipated within the site.

Oil and fuel spillages from the parking areas may be washed by rainfall into the surrounding environment. It is anticipated that stormwater management plans will be in place and will separate stormwater from clean areas and contaminated water from areas will potential for oil and fuel spillages.

In summary, the impacts of the filling station and related facilities on groundwater and related surface water bodies depends on the underlying geology and the nature of the potential impacts listed above. The impact will be high in the case of shallow groundwater and permeable aquifer conditions. The impact will be low in the case of deep groundwater and low permeability material such as unfractured bedrock. The impacts of the proposed filling station site and related facilities on regional groundwater can be considered low to medium; however, with the mitigation strategies put in place impact can be further reduced to low impact.

8.5.1 Assessment and rating

The impact assessments for the Ithuba Petroleum site are based on the guidelines provided in Table 6 below. The impact assessment will focus on groundwater and surface water quality over the life cycle of the filling station. Table 7 shows the risk assessment and ratings for the identified sources of pollution without and with mitigation measures. It can be seen from the table that the development has medium risk to the environment if there are mitigation measures, however, with mitigation measure in place the risk is reduced to low and according to Table 6 low risk is acceptable.

Table 6: Impact Assessment Criteria Description and Rating System

Score	Rating	Description
Impact Importance (Imp)		
5	High	The affected systems are near pristine and/or have numerous qualities which make them extremely valuable from an ecological and/or social (resource) perspective (i.e. the ecosystem services and goods provided are of high to very high importance).
4	Medium-High	The affected systems have qualities which make them highly valuable from an ecological and/or social (resource) perspective (i.e. the ecosystem services and goods provided are of moderately-high importance).
3	Medium	The affected systems have certain qualities which make them ecologically and/or socially valuable (i.e. the ecosystem services and goods provided are of moderate importance).
2	Medium-Low	The affected systems are of mild (moderately-low) importance in terms of ecological and/or social (resource) importance (i.e. the ecosystem services and goods provided are of mild/moderately low importance).
1	Low	The affected systems have very little value in terms of ecological and/or social (resource) importance (i.e. the ecosystem services and goods provided are of low importance).

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Intensity (I)		
5	High	Impact affects the continued viability of the systems/components and the quality, use, integrity and functionality of the systems/components permanently ceases and are irreversibly impaired (system/population collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
4	Medium-High	Impact affects the continued viability of the systems/components and the quality, use, integrity and functionality of the systems/components are severely impaired and may temporarily cease. High costs of rehabilitation and remediation, but possible.
3	Medium	Impact alters the quality, use and integrity of the systems/components but the systems/ components still continue to function but in a moderately modified way (integrity impaired but functionality and major key processes/drivers maintained).
2	Medium-Low	Impact alters the quality, use and integrity of the systems/components but the systems/ components still continue to function in a slightly modified way and maintain original integrity (no/limited impact on integrity).
1	Low	Impact affects the quality, use and integrity of the systems/components in a way that is barely perceptible.
Duration (D)		
5	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).
4	Long-term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (30 – 100 years).
3	Medium-term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (10 – 30 years).
2	Medium-short	The impact and its effects will continue or last for the period of a relatively long construction period and/or a limited recovery time after this construction period, thereafter it will be entirely negated (5 – 10 years).
1	Short-term	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 5 years).
Scale / Extent (S)		
5	National & International	Effects of an impact experienced within a large geographic area beyond national boundaries and occurring at national scale (500km radius of the site).
4	Municipal & Provincial	Effects of an impact experienced within the region beyond municipal and provincial boundaries and occurring at a municipal and provincial scales (e.g. between a 100km to 500km radius of the site).
3	Town & Suburban	Effects of an impact experienced within the local town or suburban area (e.g. between a 5km to 50km radius of the site).
2	Local	Effects of an impact experienced within the local area (within 5km radius of the site).
1	Site & Surrounds	Effects of an impact are experienced within or in close proximity (100m) to the project site. However, the size of the site needs to be taken into account.
Probability / Likelihood (P)		
5	Definite	Impact will certainly occur (Greater than 90% chance of occurrence).
4	Probable	The impact will likely occur (Between a 70% to 90% chance of occurrence).
3	Possible	The impact may/could occur and has occurred elsewhere under the same conditions (Between a 40% to 70% chance of occurrence).
2	Unlikely	The chance of the impact occurring is moderately-low (Between a 20% and 40% chance of occurrence).
1	Improbable	The chance of the impact occurring is extremely low (Less than a 20% chance of occurrence).
Status of Impact		
+	Positive	
-	Negative	
N	Neutral	
SIGNIFICANCE = (I+D+S+P) x Imp		
>72	High	Totally unacceptable. Impact should be avoided and limited opportunity for offsets.
60 - 72	Medium-High	Generally to totally unacceptable. Ideally impact should be avoided unless offset by positive gains in other aspects of the environment that are of very to critically high importance i.e. national or international importance.
45 - 59	Medium	Undesirable to generally unacceptable. Ideally impact should be avoided unless offset by positive gains in other aspects of the environment that are of moderately-high to high importance.
32 - 44	Medium-Low	Acceptable.
4 - 31	Low	Acceptable.

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Table 7: Impact Assessment and Risk ratings

POTENTIAL ENVIRONMENTAL IMPACT	DEVELOMENT PHASES	IDENTIFIED POLLUTION SOURCES	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								ACTION PLAN	FREQUENCY	PERSON
			I	D	S	P	Imp	TOTAL	STATUS	SP		I	D	S	P	Imp	TOTAL	STATUS	SP			
Operation Phase																						
There are a number of potential groundwater pollutants that may potentially emanate from an operational filling station site. Underground storage of fuel where the potential always exist that spillages and seepages from diesel and petrol storage facilities may occur. Parking areas where oil and grease may leak from cars and washed into nearby water courses during rain events. General industrial and workshop related spillages. Sewage and domestic related loads on the environment, however, it is anticipated that domestic waste will be transported away from site to an existing facility.	CONSTRUCTION & OPERATION PHASE	Underground fuel storage tanks, fuel and oil leakages from parking areas, General industrial and workshop related spillages, Sewage and domestic related loads on the environment	4	3	3	3	4	52	-	M	Waste Aquifer Seperation Principle (WASP) needs to be applied here by paving and cementing all the areas with potential for fuel and oil spillages. have a stormwater management system seperates dirty water from clean areas and channel it to the properper storage. Put in place a propoer monitoring system to detect changes in groundwater chemistry around the site. Further monitoring may be required around potential pollution sources, such as sewage systems and domestic waste storage areas during occupation Phase. Shallow aquifer piezometers can be installed to monitor any shallow aquifer seepage from these sources.	2	2	1	2	2	14	-	L	Have monitoring system around the site. Adhere to the mitigation measures.	low to zero	Tondzi Fuels Environmental officer

9 GROUNDWATER MONITORING PLAN

9.1 Major Pollutants

Total Petroleum Hydrocarbons (TPH) are a term used to describe a large family of several hundred chemical compounds that originally come from crude oil (Adeniyi and Owoade, 2010). Crude oil is used to make petroleum products, which can contaminate the environment. Because there are so many different chemicals in crude oil and in other petroleum products, it is not practical to measure each one separately. However, it is useful to measure the total amount of TPH at a site. TPH is a mixture of chemicals, but they are all made mainly from hydrogen and carbon, called hydrocarbons. Scientists divide TPH into groups of petroleum hydrocarbons that act alike in soil or water (Iturbe et al, 2004). These groups are called petroleum hydrocarbon fractions. Each fraction contains many individual chemicals. Some chemicals that may be found in TPH are hexane, jet fuels, mineral oils, benzene, toluene, xylenes, naphthalene, and fluorine, as well as other petroleum products and gasoline components. However, it is likely that samples of TPH will contain only some, or a mixture, of these chemicals.

9.1.1 Petroleum Hydrocarbons Analysis

When petroleum hydrocarbons (PHCs) is released into the environment through accidents, releases from industries, or as a by-product from commercial or private uses and/or into the soil through spills or leaks, it moves from the soil to the groundwater and some organisms found may break down some of the contaminants into smaller fractions while some may evaporate into the atmosphere, others will stay in the soil for a longer time and will be broken down by other organisms found in the soil causing hazardous health effect (ATDSR, 1999) . PHCs releases into the environment will threaten public health and safety by contaminating drinking water, causing fire and explosion hazards, diminishing air and water quality, compromising agriculture, destroying recreational areas, destroying habitats and food, and wasting non-renewable resources. Once the soil and water are polluted by petroleum hydrocarbons (PHCs) the recovery may take several years.

9.2 Groundwater monitoring system

A monitoring system must be in place to monitor potential environmental impacts such as surface and groundwater quality in the area surrounding the filling station site. A monitoring system's primary goal should be to detect potential leaks before they harm the environment. A monitoring system must be installed on-site systems such as storage tanks and fuel lines.

Instead of detecting fuel in the aquifer outside the system, these systems must be able to detect a faulty system. A double tank system that detects leaks within the second tank is preferable to one that detects leaks outside the system. Zenzele Secondary School's borehole must be used as a groundwater monitoring station.

The frequency and parameters to be monitored in groundwater are described in Table 8. Monitoring programs must be site-specific and tailored to a specific set of requirements or expectations (DWA 1998). This monitoring protocol was created in accordance with the DWAF Best Practice Guideline – G3: Water Monitoring Systems (DWA, 2006b)

9.3 Monitoring objectives

The key activities of the monitoring program are monitoring, measuring, evaluating, and reporting. These actions are meant to assess potential changes in the physical and chemical nature of the aquifer and geosphere, as well as predict and detect potential impacts on ground water. The primary goals of monitoring groundwater changes are as follows:

- To provide reliable groundwater data that can be used for management purposes.
- The early detection of changes in groundwater quality and quantity.
- To provide an on-going performance record on the efficiency of the Water Management Plan
- To obtain information that can be used to redirect and refocus the Water Management Plan.
- To determine compliance with environmental laws, standards and the water use licence and other environmental authorizations.
- To refine the conceptual and numerical (management) models.

This ensures that management is alerted to potential problems and unexpected consequences in a timely manner, allowing them to implement mitigation measures at an early stage.

9.4 Possible pollution sources

Potential pollution sources include the following:

- Fuel storage tanks.
- Dirty water from the paved surface of the filling station.

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9.5 Receiving environment

The following hydrological units may be impacted by the project and related activities:

- The aquifer below the filling station site and the regional aquifer downstream of the filling station.
- Non-perennial river located to the east of the filling station site.

9.5 Monitoring network

Groundwater contamination

Quarterly monitoring of groundwater levels and quality is possible. To detect any changes or trends in groundwater flow direction, water levels can be measured using an electrical contact tape or pressure transducer. Hydrocarbon spills can contaminate the underlying aquifers. The proposed monitoring boreholes should be built to track groundwater levels and quality changes near the Underground Storage Tanks area, where the contamination plume is flowing.

9.6 Monitoring frequency

Because groundwater is a slow-moving medium, drastic changes in groundwater composition are usually not detected within days; therefore, groundwater monitoring should be done on a quarterly basis. Samples should be collected by an independent groundwater consultant following best practice guidelines and analyzed by a SANAS accredited laboratory. To detect any changes or trends in groundwater levels, groundwater levels must be recorded quarterly with an accuracy of 0.1m using an electrical contact tape, float mechanism, or pressure transducer.

9.7 Sampling parameters

Key samples must be analyzed by a laboratory that is accredited and has the necessary quality assurance. Blanks, standards, duplicates, caution-anion balances, and other quality control measures should be in place. This will ensure monitoring consistency as well as data verification and validation. To perform trend analysis and waste load calculations, data from groundwater quality monitoring must be electronically stored together.

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Table 8: Groundwater monitoring parameters

Class	Parameter	Frequency	Motivation
Physical	Static groundwater levels	Monthly	Time dependent data is required for transient calibration of numerical flow models. Changes in static water levels may give early warnings of dewatering in the area.
	Rainfall	Daily	Recharge to the saturated zone is an important parameter for assessing groundwater vulnerability. Time dependent data is required for transient calibration of numerical flow models.
	Groundwater abstraction rates (if present)	Monthly	Response of groundwater levels to abstraction rates can be used to calculate aquifer storativity, which is important for groundwater management.
Chemical	Major chemical parameters: Ca, Mg, Na, K, NO3, SO4, Cl, Fe, Alkalinity, pH, EC TPH (Total Petroleum Hydrocarbons)	Quarterly	Background information is crucial to assess impacts during and after operations. Changes in chemical composition may indicate areas of groundwater contamination and can be used as an early warning system to implement management/remedial actions. Legal requirement. Groundwater chemistry forms an integral part of the development of conceptual models.
	Minor chemical constituents Full scan of trace metals	Quarterly	Changes in chemical composition may indicate areas of groundwater contamination and can be used as an early warning system to implement management/remedial actions. Legal requirement
	Other Stable isotopes	Ad-hoc basis	The monitoring program should allow for research and refinement of the conceptual geohydrological model. This may, from time to time, require special analyses like stable isotopes (O^{18}/O^{16}, H)

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9.8 Sampling Procedures

The sampling procedure for groundwater should be done according to the protocol by Weaver, 1992. The actions can be summarised as follows:

- To avoid prior sample container contamination affecting sample integrity, sample bottles will be rinsed three (3) times with sample water prior to sampling
- Each sample container's lids will also be rinsed with sample water three (3) times.
- Remove the cap of the plastic 1 litre sample bottle, but do not contaminate the inner surface of the cap or the neck of the sample bottle with your hands. Fill the sample bottle without letting it rise.
- Use glass bottle for BTEXN and TPH sample.
- Leave sample air space in the bottle (at least 2.5 cm) to facilitate mixing by shaking before examination.
- Replace the cap immediately.
- Finish the sample label with a water-resistant marker and attach it to the sample bottle's neck with a string or rubber band. The label should include the following information:
    - A unique sample number and description
    - The date and time of sampling
    - The name of the sampler
- After collecting the sample, immediately place it in a cooled container (e.g., a cool box). Maintain a dust-free environment and keep the container out of direct sunlight. Samples should not be frozen.

As soon as possible, ensure that the sample is delivered to the appropriate laboratory. Chemical analysis samples should be delivered to the laboratory as soon as possible, ideally within seven days. Samples of BTEXN and TPH must be delivered to the laboratory within 8 hours of collection.

9.8.1 Sampling Methods and Preservation

Required apparatus:

- Plastic bottles (1L)
- Glass bottles
- Dip meter
- Steel bailer
- Cooler box

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- EC and Ph meter
- Marking pens

9.8.2 Methods and preservation

Most sampling exercises require one-litre plastic bottles with unlined plastic caps; however, glass bottles are required when testing for organic constituents. The borehole name, date of sampling, water level depth, and sampler's name must be clearly marked on sample bottles. Prior to taking the sample, water levels (mbgl) should be measured with a dip meter. Purging must be performed on each borehole that needs to be sampled in order to ensure that the aquifer is sampled rather than stagnant water in the casing. In the case of a small diameter borehole, a submersible pump or a clean disposable polyethylene bailer is used for purging.

At least three borehole volumes of water should be removed during purging and continuous water quality monitoring until the electrical conductivity value stabilizes. To remove clay suspensions from metal samples, they must be filtered in the field. Daily calibration of the pH and EC meters used for field measurements should be performed using standard solutions obtained from the instrument supplier. To ensure proper preservation, samples should be kept cool in a cooler box in the field and kept cool before being submitted to the laboratory.

9.8.3 Groundwater sampling Bailer

A bailer is a hollow tube used to collect groundwater samples from wells for monitoring. Bailers are attached to and lowered into the water column by a length of rope or wire. When lowered, the bailer seals a sample of the groundwater table at the bottom with a simple ball check valve to raise it up. Bailers can be disposable or reusable and are made of polyethylene, PVC, FEP, or stainless steel (Singh, 2015). Bailers are simple and inexpensive devices to use. Furthermore, bailers can be lowered to any depth, despite the fact that the depth of the well is severely limited by pumps. Aeration of the water when the sample is collected, which may result in the release of volatile organic compounds that need to be tested, is the main downside to using bailers. This can also conflict with the proper seating of the ball check valve if there is a high volume of sediment or turbidity (Singh, 2015).

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Figure 12: Stainless steel bailer, picture extracted from (Solist, n.d.).

9.8.4 Water levels measuring

When sampling groundwater, it is critical to measure the depth of the water. Water levels can aid in determining the level of the water table. To obtain an accurate measurement of the water level, it is necessary to use an effect water level meter every time before sampling or purging the borehole. The equipment listed below is useful in open-hole boreholes that are not surrounded by pumping equipment.

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Figure 13: Water level Meter

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10 CONCLUSION AND RECOMMENDATIONS

10.1 Conclusion and Summary

The proposed Filling Station is located at Goba village on the Remaining extent of the farm gemsbok 505 JU, along road D2951, Nkomazi local municipality, Mpumalanga province. It can be concluded that the filling station may have some environmental impacts, but the impacts will be minimal as long as proper management procedures are in place. The filling station does provide long-term employment, which benefits the social environment economically.

No impact had a "no-go" implication for certain aspects of the project during the impact rating and ranking procedure, and all impacts can be mitigated, and all personnel trained to counteract them.

Due to the presence of heavy machinery on site during the construction phase, hydrocarbon contamination is possible. Spillages can occur, affecting both the soil and groundwater environments.

Potential contamination may occur during the operational phase as a result of leaking Underground Storage Tanks (USTs). If these tanks leak, the lost product could have a negative impact on the underlying soil and aquifer.

According to the Aquifer Classification Map of South Africa, the aquifer underlying the area is classified as a minor aquifer with moderate vulnerability and medium susceptibility to groundwater impact. The nearest surface water body is an unnamed non-perennial stream traversing the site on the south boundary.

The groundwater resources for the site are characterized by intergranular and fractured aquifer system.

The risk assessment conducted for the site indicate medium impacts of the development to the environment. This is when there are no mitigation measures taken into account, however, with mitigation plans taken into account, the risk is reduced to low and acceptable. Based on the findings of this study, risk assessment and mitigation measures recommended, the development has low to zero impacts on the environment.

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10.2 Recommendations

Based on the significance of the impact caused by the hydrocarbons contamination, it is recommended that the Tondzi Fuels drill additional monitoring boreholes to monitor the contamination capture zone.

The following sub-chapters outlines the recommended procedures to be conducted when spillages and leaks takes place.

10.2.1 Spills and Leaks

Inevitably spills and leaks do sometimes occur and then employees should react immediately. To minimise the risk of a spill or a leak which has occurred within his premises resulting in the environment becoming polluted the customer should follow the following procedures:

- Spill and leak prevention
- Spill response procedures
- Spill reporting
- Leak response procedures
- Leak reporting

Procedure	Comments
Spill and leak prevention	All personnel who have anything to do with fuel or oil use and tank systems should know their individual responsibilities for controlling and/or reducing pollution. Employees should be well informed to apply the appropriate techniques. All employees involved in spillages or leaks must be informed about the spill/leak emergency response plan and must know how to act in the event of a spillage or leak. Equipment installed or used to avoid pollution should be operated efficiently and will be maintained. Spill clean up equipment, like absorbing fibres, squeegees, sandbags, etc. should be located in a clean, dry and easily accessible storage facility. Spill fighting material should be kept near places where spills and leaks are most likely to occur, i.e. near pumps.

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	▪ Customers should have materials like absorbing fibres and sandbags in place. The proposed procedure: ▪ Place two 200L bins at each area: bin to be used for storage of unused fibres, bin to be used for receiving the used fibres. ▪ Apply the fibres as per the instructions as soon as the spill occurs. ▪ Used fibres should be disposed of in an environmentally friendly way by either burning or dispatching to a class 1 waste dump. ▪ Ensure that Emergency Spill/Leak Response Plans and the necessary associated equipment are appropriate for your operation and are the subject of regular exercises, where possible in conjunction with the industry and/or local authorities. Provide regular training for key response employees in dealing with emergencies
Spill response procedures	➢ It is not possible to give detailed recommendations on how to clean up specific kinds of spillages as the method and materials used will depend on the type of product handled, the amount ➢ involved, the wind, the weather, equipment available, etc. However, all spills, minor or major, should be cleaned up as soon as they occur. Whatever the spill there are five basic steps in ➢ dealing with spillages: ➢ Limit the spillage ➢ Contain the spillage ➢ Remove the spilled product ➢ Final clean up and soil rehabilitation ➢ Complete a spillage report ➢ Containment of the oil near the point of spillage localizes the problem, minimises pollution and makes it easier to remove the pollution. Cleaning of the spill

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	area depends on whether there is a major spill or a minor spill and whether there is a spill on paving or on soil. A major spill is any spill where more than 200 L of product is involved. Minor spillage (less than 200L): Soak up the spill with unused fibres. If the spill has soaked into the ground the soil should be ploughed to allow aeration. Collect the used fibres in the bin for used fibres. Major spillage of oil or fuel on paving or non-permeable surfaces: Wherever possible, try to limit the spillage by turning off all activities that caused the spill, i.e. closing a valve that has been accidentally opened, plugging the hole where the product is leaking or stop pumping through a ruptured pipeline, hose or overflowing tank. Contain spill immediately with absorbing fibres, sandbags, sand or soil. Prevent any of the spilt oil substance from entering your drain, storm water systems, septic tanks or from contaminating any natural water systems by forming a barrier from soil, sand, sandbags or absorbing material. ➢ If any of the spill enters the storm water system, the flow must be intercepted before it can contaminate other environments ➢ If natural water systems are contaminated, use straw bales, absorbent, booms, and sandbag dams for containment of and absorption. Mop up as much of the spillage as possible by using absorbing materials **Contact your Oil Company Field manager.** ➢ Major spillage of oil or fuel on soil or permeable surface: ➢ Wherever possible, limit the spillage by turning off all activities that cause the spill. ➢ Contain the spill and prevent spread of the substance by using sandbags, sand or soil, absorbent booms or planking to divert flow.

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	➢ Prevent any of the oil substances from entering your drains, storm water systems or septic tanks, or from contaminating any natural water systems by forming a barrier from soil, sand, sandbags or absorbing material. ➢ Prevent any of the oil substances from contaminating groundwater. It may be necessary to remove contaminated soil for disposal or rehabilitation. ➢ Remove and mop up as much as possible by using spill fighting materials. ➢ Plough soil for aeration and apply fertilizer/suitable neutralising chemicals if viable.
Spill reporting	The Tondzi Fuels manager should be notified whenever a spill in excess of 200L occurs. For oil spill incidents of lesser magnitude with impact on water sources, rivers, streams, etc., or that are likely to attract public or press attention, the oil company should be notified. For every major spill (over 200L of product) that occurs, the Incident Report Form must be completed. Investigate spill cause and implement Recommendations for preventing reoccurrence. If water courses and ground water are contaminated, then the Local Department of Water Affairs must be notified. Site operating staff should check regularly, if the tank system, pipework and equipment are in good condition. Inform the oil company when tank systems, pipework or equipment need maintenance.
Leak response procedures	If the Stock Monitoring and Control Procedures are used properly it will be possible to detect a leak at an early stage. Damage to the environment and cleaning costs will then be minimised. If an above ground tank is leaking it will be possible to detect the leakage by visual inspection of the tank. If the tank has a bund wall ensure draining outlets are closed. The procedure to be followed is: ➢ Shut down all activities from the leaking tank.

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	➢ If possible, try to stop product from leaking out of the tank. ➢ Notify Oil Company immediately. ➢ Any loss or suspected loss must be confirmed in a letter addressed to your Tondzi Fuels manager. ➢ For product pouring out of the tank, the Spill Response Procedure (section 7.2) has to be followed.
Leak reporting	Notify the oil company immediately of any suspected leaks in a tank system or malfunctioning of their equipment. Any loss or suspected loss must be confirmed in writing. For every suspected leak in above ground or underground tanks the Incident Report Form must be completed. Investigate leak cause (in co operation with the oil company) and implement recommendations for preventing re-occurrence.

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APPENDICES

Appendix A: Specialists Qualifications

Available upon request

Office No. 870, 5 Balalaika Street, Tasbet Park Ext 2, Witbank, 1035.
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SCREENING REPORT FOR AN ENVIRONMENTAL AUTHORIZATION AS REQUIRED BY THE 2014 EIA REGULATIONS – PROPOSED DEVELOPMENT FOOTPRINT ENVIRONMENTAL SENSITIVITY

EIA Reference number: New Application

Project name: Fuel Depot Development

Project title: on a portion of portion 1 of the farm Leeuspruit 385 JU, under Nkomazi Local Municiaplity of Ehlanzeni District Municipality in Mpumalanga Province

Date screening report generated: 02/08/2023 15:30:36

Applicant: Ithuba Petroleum (Pty) Ltd

Compiler: Singo Consulting (Pty) Ltd

Compiler signature: .....

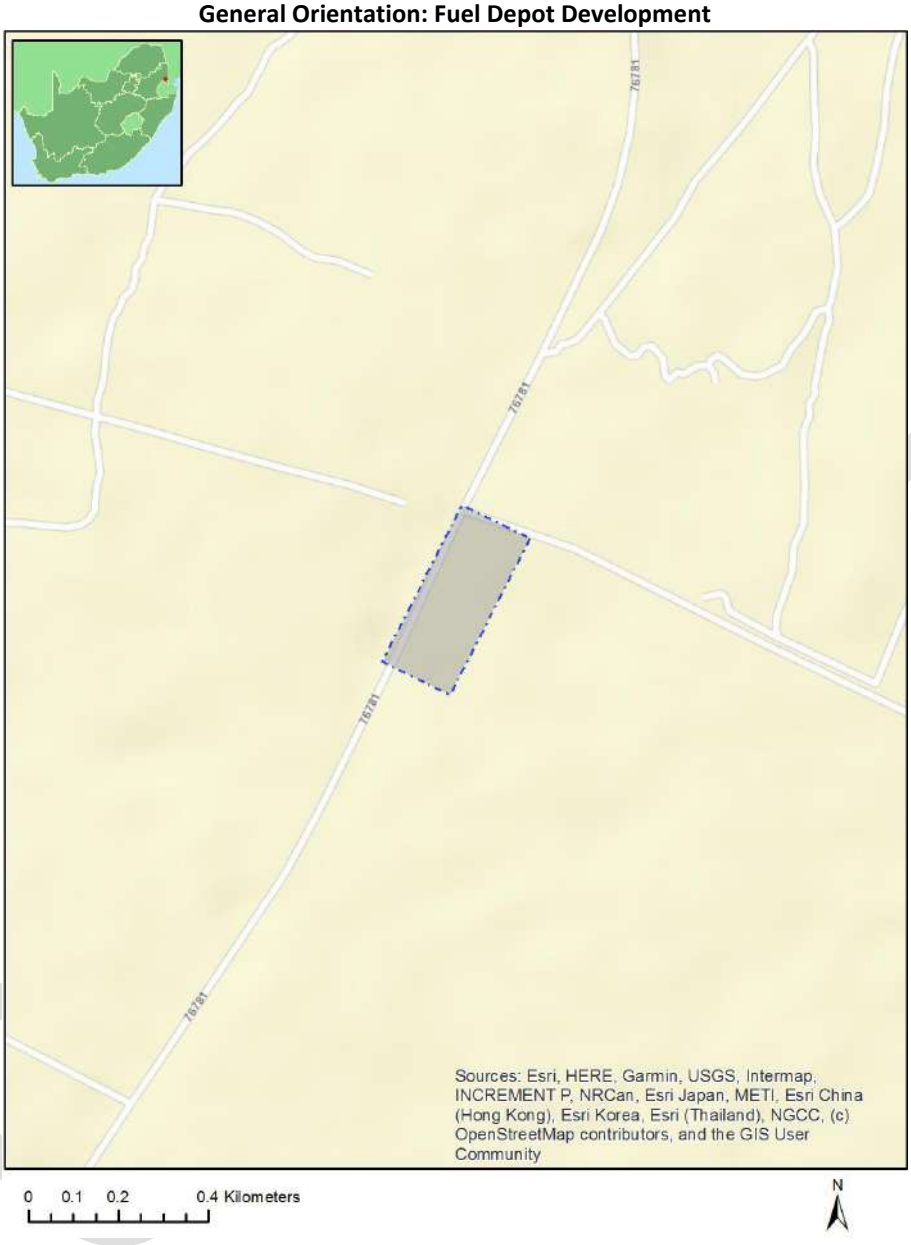
Application Category: Infrastructure|Localised infrastructure|Storage|Dangerous Goods|Hydrocarbon|Petroleum

Table of Contents

Proposed Project Location

Orientation map 1: General location

General Orientation: Fuel Depot Development



02/08/2023

Map of proposed site and relevant area(s)

Cadastral details of the proposed site

Property details:

No	Farm Name	Farm/ Erf No	Portion	Latitude	Longitude	Property Type
1	RE/LEEUSPRUIT	385	0	25°30'27.18S	31°40'29.39E	Farm
2	RE/LEEUSPRUIT	385	1	25°30'20.95S	31°40'20.1E	Farm Portion

Development footprint[1] vertices:

Footprint	Latitude	Longitude
1	25°29'27.82S	31°40'18.96E
1	25°29'29.96S	31°40'23.8E
1	25°29'40.08S	31°40'18.07E
1	25°29'37.95S	31°40'13.24E
1	25°29'27.82S	31°40'18.96E

Wind and Solar developments with an approved Environmental Authorisation or applications under consideration within 30 km of the proposed area

No nearby wind or solar developments found.

[1] "development footprint", means the area within the site on which the development will take place and incudes all ancillary developments for example roads, power lines, boundary walls, paving etc. which require vegetation clearance or which will be disturbed and for which the application has been submitted.

Environmental Management Frameworks relevant to the application

No intersections with EMF areas found.

Environmental screening results and assessment outcomes

The following sections contain a summary of any development incentives, restrictions, exclusions or prohibitions that apply to the proposed development footprint as well as the most environmental sensitive features on the footprint based on the footprint sensitivity screening results for the application classification that was selected. The application classification selected for this report is:
Infrastructure|Localised infrastructure|Storage|Dangerous Goods|Hydrocarbon|Petroleum.

Relevant development incentives, restrictions, exclusions or prohibitions

The following development incentives, restrictions, exclusions or prohibitions and their implications that apply to this footprint are indicated below.

Incentive, restriction or prohibition	Implication
Strategic Gas Pipeline Corridors-Phase 8: Rompco Pipeline Corridor	https://screening.environment.gov.za/ScreeningDownloads/DevelopmentZones/Combined_GAS.pdf

Proposed Development Area Environmental Sensitivity

The following summary of the development footprint environmental sensitivities is identified. Only the highest environmental sensitivity is indicated. The footprint environmental sensitivities for the proposed development footprint as identified, are indicative only and must be verified on site by a suitably qualified person before the specialist assessments identified below can be confirmed.

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Agriculture Theme		X		
Animal Species Theme		X		
Aquatic Biodiversity Theme	X			
Archaeological and Cultural Heritage Theme				X
Civil Aviation Theme		X		
Defence Theme				X
Paleontology Theme			X	
Plant Species Theme			X	
Terrestrial Biodiversity Theme				X

Specialist assessments identified

Based on the selected classification, and the known impacts associated with the proposed development, the following list of specialist assessments have been identified for inclusion in the assessment report. It is the responsibility of the EAP to confirm this list and to motivate in the

assessment report, the reason for not including any of the identified specialist study including the provision of photographic evidence of the footprint situation.

No	Specialist assessment	Assessment Protocol
1	Agricultural Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Agriculture_Assessment_Protocols.pdf
2	Archaeological and Cultural Heritage Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf
3	Palaeontology Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf
4	Terrestrial Biodiversity Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Terrestrial_Biodiversity_Assessment_Protocols.pdf
5	Aquatic Biodiversity Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Aquatic_Biodiversity_Assessment_Protocols.pdf
6	Hydrology Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf
7	Noise Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Noise_Impacts_Assessment_Protocol.pdf
8	Traffic Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf
9	Geotechnical Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf
10	Socio-Economic Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf
11	Plant Species Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Plant_Species_Assessment_Protocols.pdf
12	Animal Species Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Animal_Species_Assessment_Protocols.pdf

Results of the environmental sensitivity of the proposed area.

The following section represents the results of the screening for environmental sensitivity of the proposed footprint for relevant environmental themes associated with the project classification. It is the duty of the EAP to ensure that the environmental themes provided by the screening tool are comprehensive and complete for the project. Refer to the disclaimer.

MAP OF RELATIVE AGRICULTURE THEME SENSITIVITY

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

Sensitivity	Feature(s)
High	Land capability;09. Moderate-High/10. Moderate-High

MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY

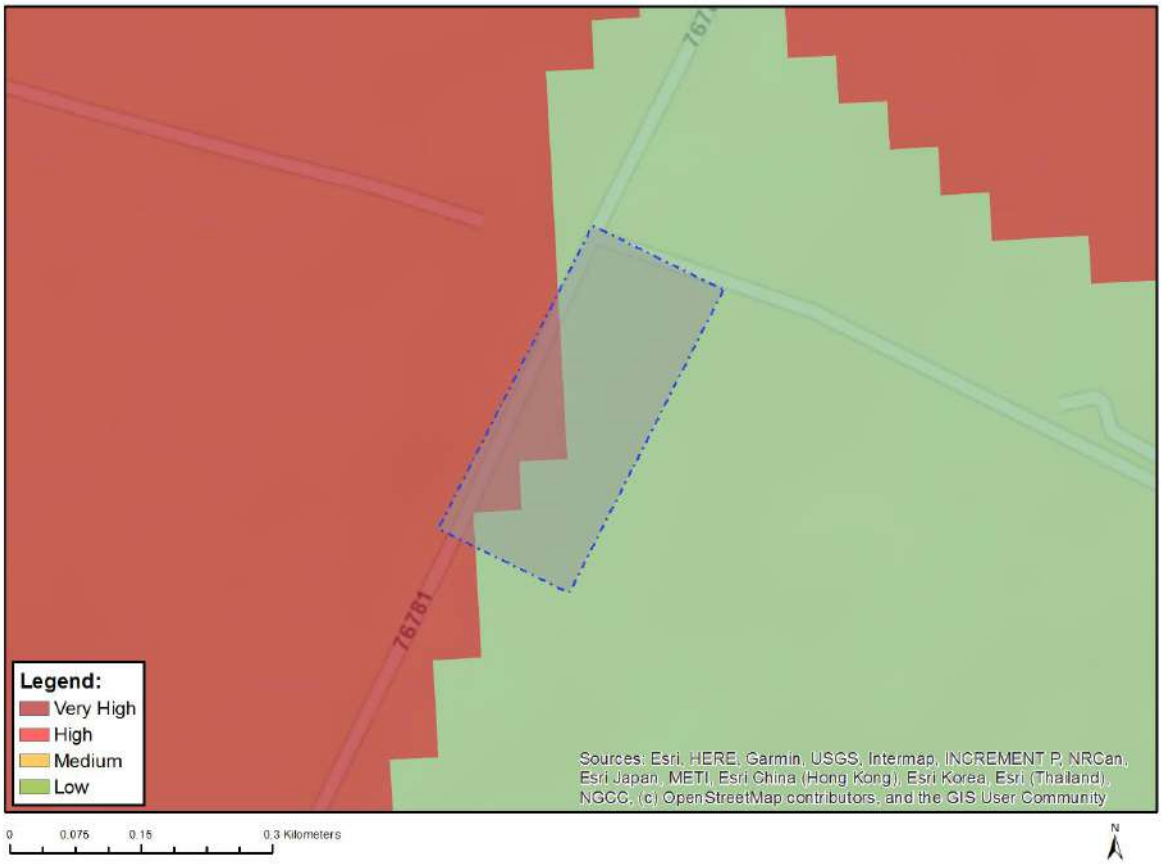
Where only a sensitive plant unique number or sensitive animal unique number is provided in the screening report and an assessment is required, the environmental assessment practitioner (EAP) or specialist is required to email SANBI at eiadatarequests@sanbi.org.za listing all sensitive species with their unique identifiers for which information is required. The name has been withheld as the species may be prone to illegal harvesting and must be protected. SANBI will release the actual species name after the details of the EAP or specialist have been documented.

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

Sensitivity	Feature(s)
High	Aves-Terathopius ecaudatus
High	Aves-Torgos tracheliotos
High	Aves-Polemaetus bellicosus
High	Aves-Bucorvus leadbeateri
High	Aves-Aquila rapax
High	Sensitive species 21
Medium	Aves-Stephanoaetus coronatus
Medium	Sensitive species 5
Medium	Mammalia-Crocidura maquassiensis
Medium	Mammalia-Dasymys robertsii
Medium	Mammalia-Lycaon pictus

MAP OF RELATIVE AQUATIC BIODIVERSITY THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity
Very High	ESA: Important subcatchments

MAP OF RELATIVE ARCHAEOLOGICAL AND CULTURAL HERITAGE THEME SENSITIVITY

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity

MAP OF RELATIVE CIVIL AVIATION THEME SENSITIVITY

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

Sensitivity	Feature(s)
High	Within 8 km of other civil aviation aerodrome

MAP OF RELATIVE DEFENCE THEME SENSITIVITY

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity

MAP OF RELATIVE PALEONTOLOGY THEME SENSITIVITY

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Medium	Features with a Medium paleontological sensitivity

MAP OF RELATIVE PLANT SPECIES THEME SENSITIVITY

Where only a sensitive plant unique number or sensitive animal unique number is provided in the screening report and an assessment is required, the environmental assessment practitioner (EAP) or specialist is required to email SANBI at eiadatarequests@sanbi.org.za listing all sensitive species with their unique identifiers for which information is required. The name has been withheld as the species may be prone to illegal harvesting and must be protected. SANBI will release the actual species name after the details of the EAP or specialist have been documented.

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Medium	Sensitive species 1252
Medium	Caesalpinia rostrata
Medium	Sensitive species 274
Medium	Nesaea alata
Medium	Barleria oxyphylla
Medium	Sensitive species 1204

MAP OF RELATIVE TERRESTRIAL BIODIVERSITY THEME SENSITIVITY

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity