BASIC ASSESSMENT REPORT & ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

Prospecting Right Application for Coal on portions RE, RE/1, 3, RE/4, RE/5, RE/6, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, RE/20 & 21 of the farm Elandspoort 85 HS situated in the Pixley ka Isaka Seme Local Municipality, under Volksrust Magisterial District, Mpumalanga Province.

DMRE REF: MP 30/5/1/1/2/ 17127 PR

2022

PREPARED BY

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BAZIL TECHNOLOGIES
Building Africa For Difference

PREPARED FOR

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BASIC ASSESSMENT REPORT

AND

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

Project applicant:	**Bazil Technologies (Pty) LTD**		
Registration no (if any):	2014 / 220284 / 07		
Trading name (if any):	**Bazil Technologies (Pty) LTD**		
Responsible Person, (e.g. Director, CEO, etc):	Director		
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FILE REFERENCE NUMBER SAMRAD: DMRE Ref: MP 30/5/1/1/2/ 17127 PR.

1 IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002 as amended), the Minister must grant a prospecting or mining right if among others the mining "will not result in unacceptable pollution, ecological degradation or damage to the environment".

Unless an Environmental Authorization can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of section 16(3)(b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17 (1) (c) the competent Authority must check whether the application has taken into account any minimum requirements applicable, or instructions or guidance provided by the competent authority to the submission of applications.

It is therefore an instruction that the prescribed reports required in respect of applications for an environmental authorization for listed activities triggered by an application for a right or a permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore, please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorization being refused.

It is furthermore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the applicant.

2 OBJECTIVE OF THE BASIC ASSESSMENT PROCESS

The objective of the basic assessment process is to, through a consultative process—

(a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;

(b) identify the alternatives considered, including the activity, location, and technology alternatives;

(c) describe the need and desirability of the proposed alternatives,

(d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine:

   i. the nature, significance, consequence, extent, duration and probability of the impacts occurring to; and

   ii. the degree to which these impacts—

      a. can be reversed;

      b. may cause irreplaceable loss of resources; and

      c. can be managed, avoided or mitigated;

(e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—

   i. identify and motivate a preferred site, activity and technology alternative;

   ii. identify suitable measures to manage, avoid or mitigate identified impacts; and

   iii. identify residual risks that need to be managed and monitored.

DOCUMENT CONTROL	
Document Title	Basic Assessment Report and Environmental Management Programme Prospecting Right Application for Coal on portions RE, RE/1, 3, RE/4, RE/5, RE/6, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, RE/20 & 21 of the farm Elandspoort 85 HS situated in the Local Municipality of Dr Pixley Ka Isaka Seme, under Volksrust Magisterial District, Mpumalanga Province.
Report Reference Number	DMRE Ref: MP 30/5/1/1/2/ 17127 PR
Version	0.1
Date	2022
Submitted to	Mpumalanga Department of Mineral Resources & Energy
Distribution	Interested and Affected Parties, Stakeholders, Library

QUALITY CONTROL			
	Originated By	**Reviewed By**	**Approved By**
Name	Masindi Nefale		
Designation	Junior Environmental Consultant		
Signature			
Date	2022		

DISCLAIMER

of it may result in severe civil and criminal penalties, and violators will be prosecuted to the maximum extent possible under law.

EXECUTIVE SUMMARY

Bazil Technologies (Pty) Ltd (the Applicant) has applied for a Prospecting Right in terms of Section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA) and an Application for Environmental Authorization in terms of Chapter 6 of GNR 326 promulgated under the National Environmental Management Act (Act 107 of 1998) (NEMA) to prospect for coal mineral.

Singo Consulting (Pty) Ltd has been appointed as an independent Environmental Assessment Practitioner (EAP) by Bazil Technologies (Pty) Ltd to undertake the Environmental Authorisation application process, by conducting Environmental Impact Assessment, Public Participation and to compile Basic Assessment Report (BAR)and Environmental Management Programme Report (EMPr) for the proposed prospecting project in the Gert Sibande District Municipality, within the Local Municipality of Pixley Ka Isaka Seme , Mpumalanga Province. The prospecting is proposed on portions RE, RE/1, 3, RE/4, RE/5, RE/6, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, RE/20 & 21 of the farm Elandspoort 85 HS, Mpumalanga Province (the study area), constituting a total area extent of approximately 3 703.950 hectares (ha). The study area is located approximately, is situated approximately 12 km South of Amersfoort, approximately 20 km North of Volksrust and West of Daggakraal

The proposed project will aim to ascertain if economically viable mineral deposit exists within the application area. To undertake prospecting activities, Bazil Technologies (Pty) Ltd Projects will require a Prospecting Right in terms of the Mineral and Petroleum Resources Development Act (MPRDA, Act No.28 of 2002). The Applicant is also required to obtain an Environmental Authorisation (EA) in terms of the National Environmental Management Act (NEMA, Act No. 107 of 1998) which involves the submission of a Basic Assessment Report (BAR) and Environmental Management Programme Report (EMPr).

This report has been designed to meet the requirements for a BAR and EMPr as stipulated in the 2014 EIA Regulations promulgated under the NEMA. The adjudicating authority for this Application will be the Department of Mineral Resources and Energy (DMRE), and this report has been compiled in accordance with the applicable DMRE guidelines and reporting template.

The proposed prospecting site covered by a Critical Biodiversity Area (CBA), ESA, heavily modified, moderately modified and Other Natural Area. Environmental sensitivity of the area is classified as the Critical Biodiversity Area 1 (CBA1), Critical Biodiversity Area 2 (CBA2), Ecological support area: local corridor, FEPA Sub catchments, and Protected Areas Expansion Strategy. Proposed prospecting area comprises of wetlands and moist sandy Highveld grassland (as seen in figure below) which play an important role as microhabitat for avifauna species that may use the surrounding grassland for foraging and roosting.

The area comprises of very high intensity of agricultural activities such as farming and cultivation. Cattle farming, crop cultivation and livestock grazing is again a large cultural practice within the area. There is a settlement nearby the proposed project area. The area is capable for grazing is also capable of being used to grow crops (Arable)

The possible environmental impacts associated with the proposed prospecting are considered insignificant. A diamond core drill rig will be used for drilling. The drill team will require temporarily infrastructures. There are impacts associated with the heritage resources and river located onsite. During the pegging phase for each borehole buffer zone should be avoided to prevent negative impacts on heritage sites, rivers and/or streams that were identified

LIST OF ABBREVIATIONS	
BAR	Basic Assessment Report
BID	Background Information Document
CA	Competent Authority
CBA	Critical Biodiversity Area
CV	Curriculum Vitae
CSA	Constitution of South Africa
DFFE	Department of Forestry, Fisheries, and the Environment
DMRE	Department of Mineral Resources and Energy
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment

EIR	Environmental Impact Report
EMPR	Environmental Management Programme
ESA	Ecological Support Area
ESM	Environmental Site Manager
GDP	Gross Domestic Product
GN	Government Notice
GIS	Geographic Information System
GPS	Global Positioning System
GSDM	Gert Sibande District Municipality
GVA	Gross Value Added
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
LC	Least Concern
Mamsl	Metres above mean sea level
MHSA	Mine Health and Safety Act
MPRDA	Mineral and Petroleum Resources Development Act
NEMA	National Environmental Management Act
NEMAQA	National Environmental Management: Air Quality Act
NEMBA	National Environmental Management: Biodiversity Act
NEMWA	National Environmental Management: Waste Act
MTPA	Mpumalanga Tourism and Parks Agency.
NT	Near Threatened
PPP	Public Participation Process
PWP	Prospecting Work Programme
SAWS	South African Weather Service
SCC	Species of Conservation Concern
VU	Vulnerable
WMA	Water Management Area

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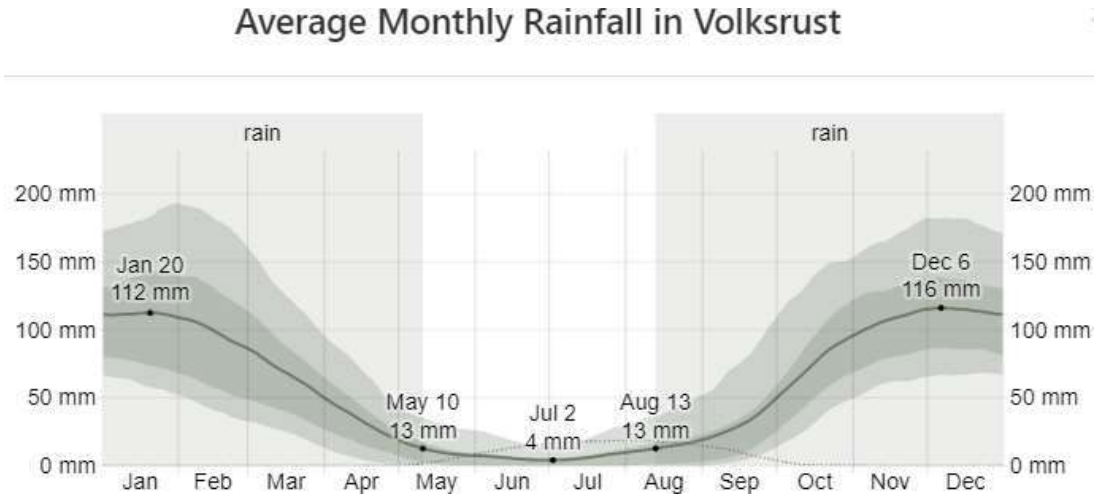
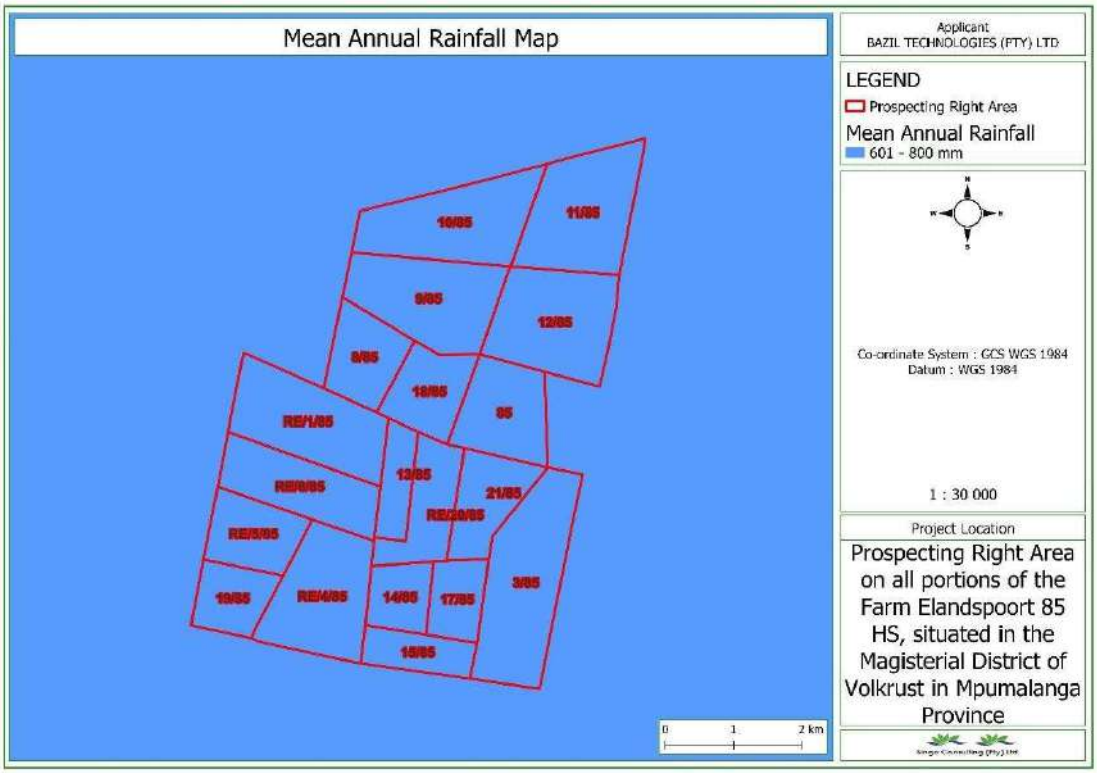
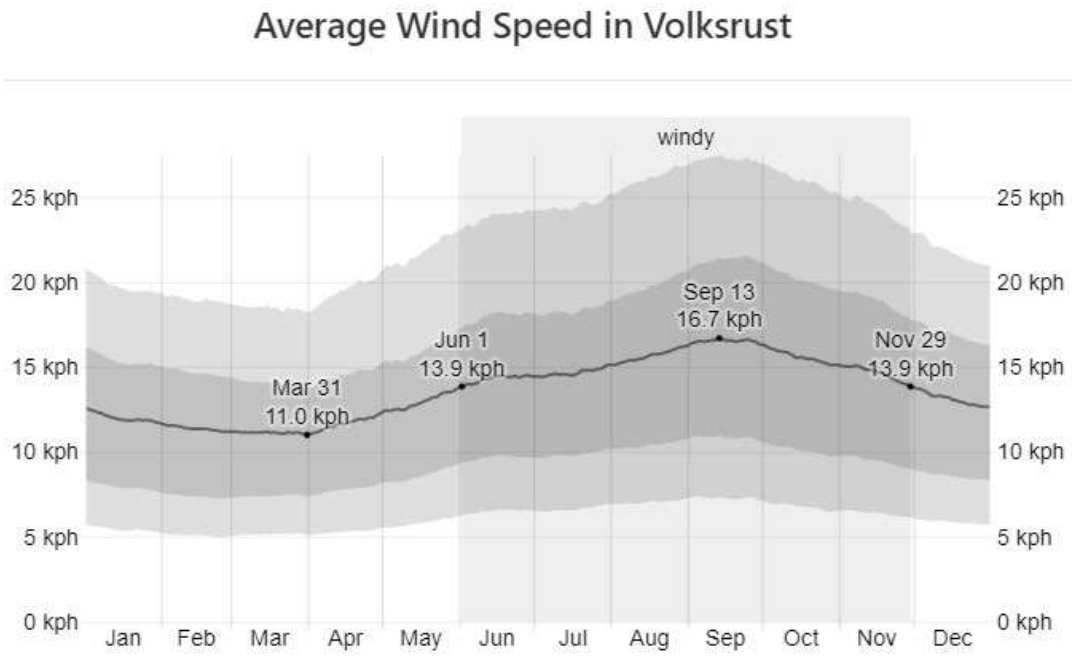


The average rainfall (solid line) accumulated over the course of a sliding 31-day period centered on the day in question, with 25th to 75th and 10th to 90th percentile bands. The thin dotted line is the corresponding average snowfall.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall	112.1mm	100.1mm	68.4mm	33.8mm	10.4mm	5.5mm	5.9mm	13.7mm	29.1mm	76.0mm	107.4mm	114.9mm





The average of mean hourly wind speeds (dark gray line), with 25th to 75th and 10th to 90th percentile bands.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind Speed (kph)	12.0	11.4	11.2	11.7	13.0	14.3	14.7	15.7	16.5	15.6	14.6	13.1

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PART A

SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

3 Contact Person and correspondence address

a) Details of

3.1 APPLICANT: BAZIL TECHNOLOGIES (PTY) LTD

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3.2 The EAP of who Prepared and Review the Report

JUNIOR CONSULTANT CONTACT DETAILS

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PRINCIPAL EAP CONTACT DETAILS

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3.3 Expertise of the EAP who prepared and Review the BAR and EMPr

a) Expertise of the EAP who prepared the Report

- **Ms Masindi Nefale**

University of Venda, Bachelor of Earth Sciences in Mining and Environmental Geology.

Please refer to Appendix K for the EAP's qualifications and Curriculum Vitae.

b) Expertise of the EAP who Review the Report.

- **Dr Kenneth Singo**

University of Johannesburg, PhD (Applied Environmental Mineralogy & Geochemistry).

(Attach the EAP's curriculum vitae as Appendix k)

c) Summary of the appointed consulting firm

In the year 2008, Singo Consulting (Pty) Ltd was established as an Independent Consulting Company focused to create opportunities within the Mining and Environmental Industry. With time, Singo Consulting (Pty) Ltd has diversified its services, it provides high value Geological, Hydrological, Environmental, Cleaning and

Rehabilitation specialized services to clients across a range of industries that are primarily natural resource based.

The company aims to be a consulting firm that communicates sound environmental services solutions. Singo Consulting (Pty) Ltd takes pride in the fact that it holds no equity in any project and is owned by the staff, enabling it to offer clients objective support on crucial issues.

4 Location of the Activity

b) Location of the overall Activity.

Table 1: Location of the activity

Farm Name:	Portions RE, RE/1, 3, RE/4, RE/5, RE/6, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, RE/20 & 21 of the farm Elandspoort 85 HS			
Application area (Ha)	Approximately 3 703.950 Ha			
Magisterial district:	Volksrust			
Local Municipality	Pixley Ka Isaka Seme			
Distance and direction from nearest town	The proposed project area is situated approximately 12 km South of Amersfoort, approximately 20 km North of Volksrust and West of Daggakraal			
21 Digit Surveyor General Code for each farm portions	**Farm Name**	**Farm Number**	**Portion Number**	**SG Code**
	Elandspoort	85 HS	RE	T0HS00000000008500000
			RE/1	T0HS00000000008500001
			3	T0HS00000000008500003
			RE/4	T0HS00000000008500004
			RE/5	T0HS00000000008500005
			RE/6	T0HS00000000008500006
			8	T0HS00000000008500008
			9	T0HS00000000008500009
			10	T0HS00000000008500010
			11	T0HS00000000008500011
			12	T0HS00000000008500012

			13	T0HS00000000008500013
			14	T0HS00000000008500014
			15	T0HS00000000008500015
			17	T0HS00000000008500017
			18	T0HS00000000008500018
			19	T0HS00000000008500019
			RE/20	T0HS00000000008500020
			21	T0HS00000000008500021

c) Locality map

(Show nearest town, scale not smaller than 1:250000).

The proposed project area as seen in figure 1, 2 and 3 below, is on portions RE, RE/1, 3, RE/4, RE/5, RE/6, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, RE/20 & 21 of the farm Elandspoort 85 HS, situated in the Local Municipality of Pixley Ka Isaka Seme , which falls within the jurisdiction of the Volksrust Magisterial District, under Gert Sibande District Municipality, Mpumalanga Province, with DMRE Ref: MP 30/5/1/1/2/ 17127 PR.

The proposed prospecting project area is situated approximately 12 km South of Amersfoort, approximately 20 km North of Volksrust and West of Daggakraal.

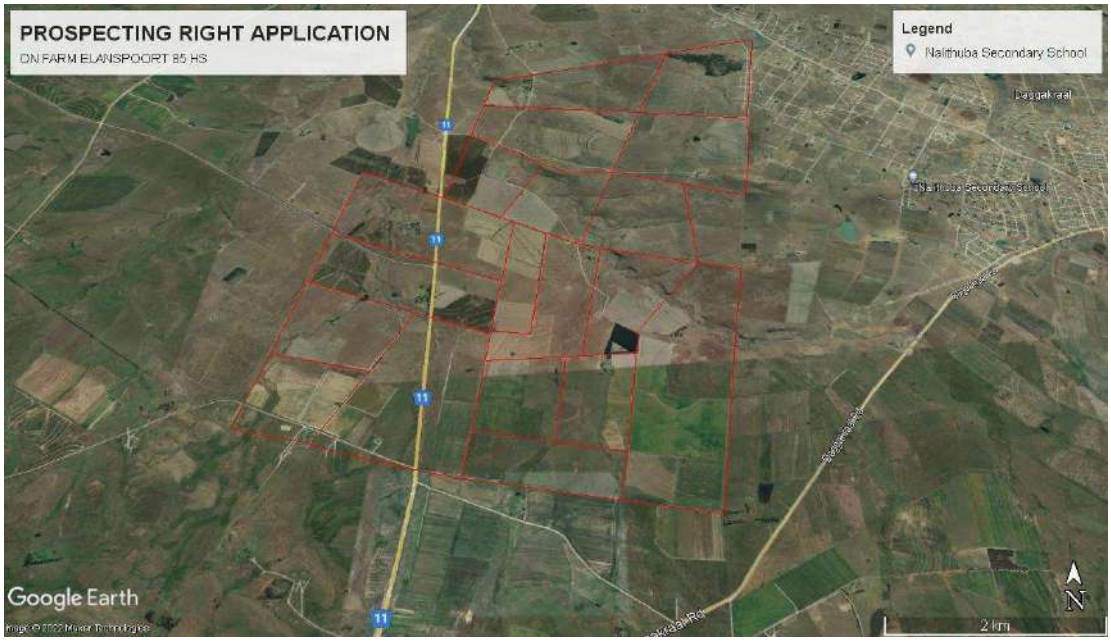


Figure 1: Google Earth View Map of the prospecting application (Indicated by Red colour polygon).

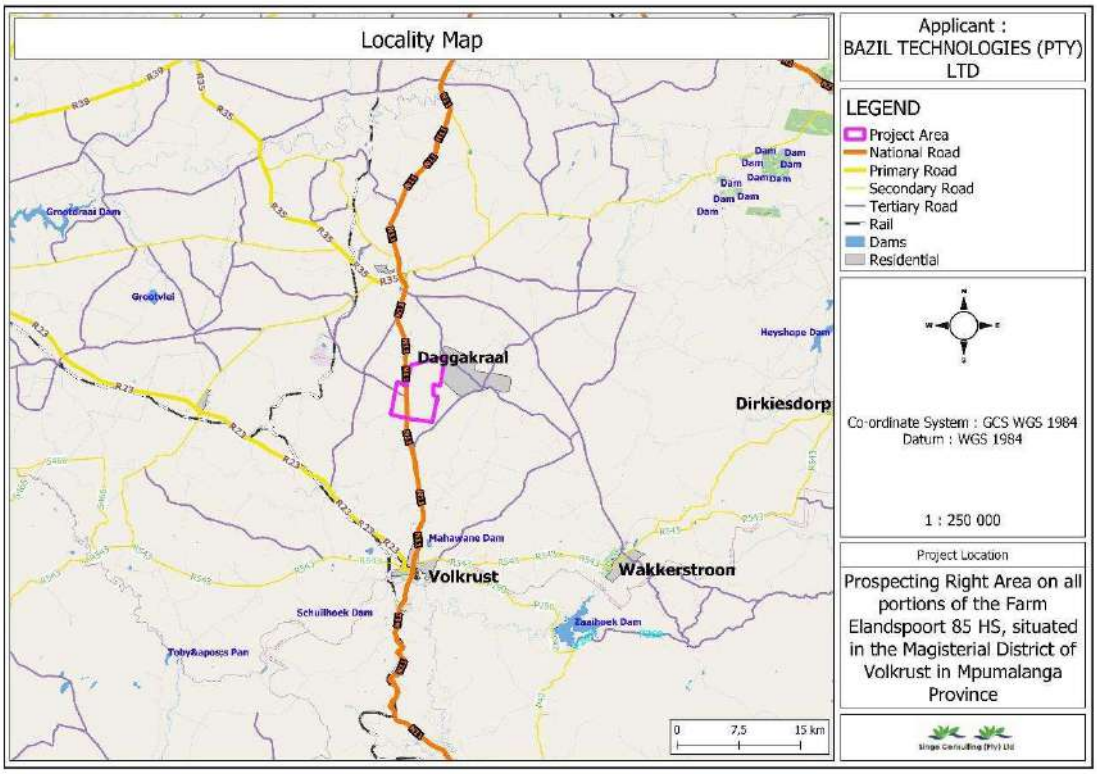


Figure 2: Locality map of the proposed project.

There is N11 National route which traverses through the proposed project area, linking Volksrust and Amersfoort Town in Mpumalanga Province in the South Africa.

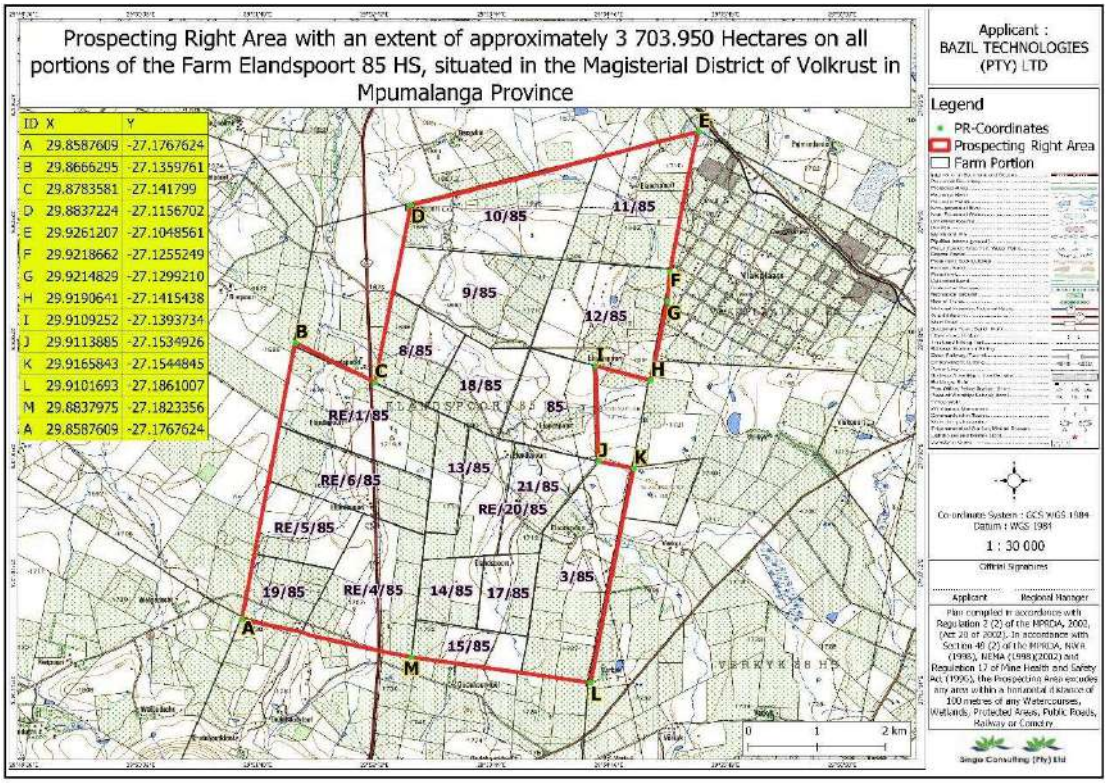


Figure 3: Regulation 2(2) map showing locality of the proposed project area

d) Description of the scope of the proposed overall activity.

(Provide a plan drawn to a scale acceptable to the competent authority but not less than 1: 10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site).

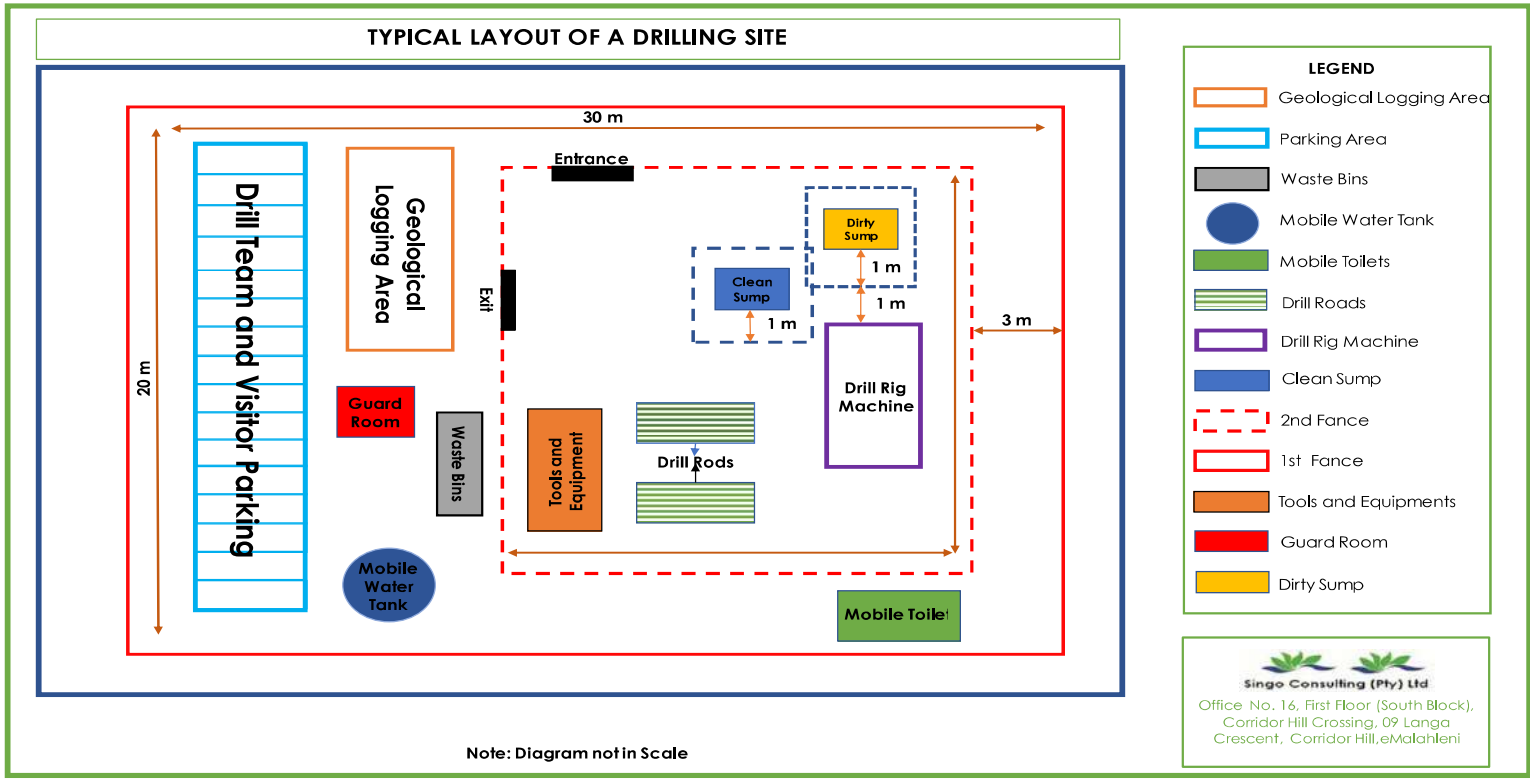


Figure 4: The drill site layout plan showing areas where specific activities will take place in the project area.

As part of the prospecting phase, physical prospecting is planned to be conducted on site and will involve the use of diamond core drilling to investigate the existence of the expected mineralization, the thickness of the orebodies and its distribution. Drill core will be logged and sampled on site as per figure 4 seen above, and the samples will be taken to the Laboratory of applicant's choice. An estimated 15 boreholes will be drilled, one at a time at various locations within the proposed project area. The depths of the drill holes will average 300 m and will be determined onsite whilst the drilling programme is underway as influenced by the depths and dips measured in other holes. A buffer of 500m will be kept from identified wetlands and non-perennial streams. A buffer of 100 meters will be kept from public roads.

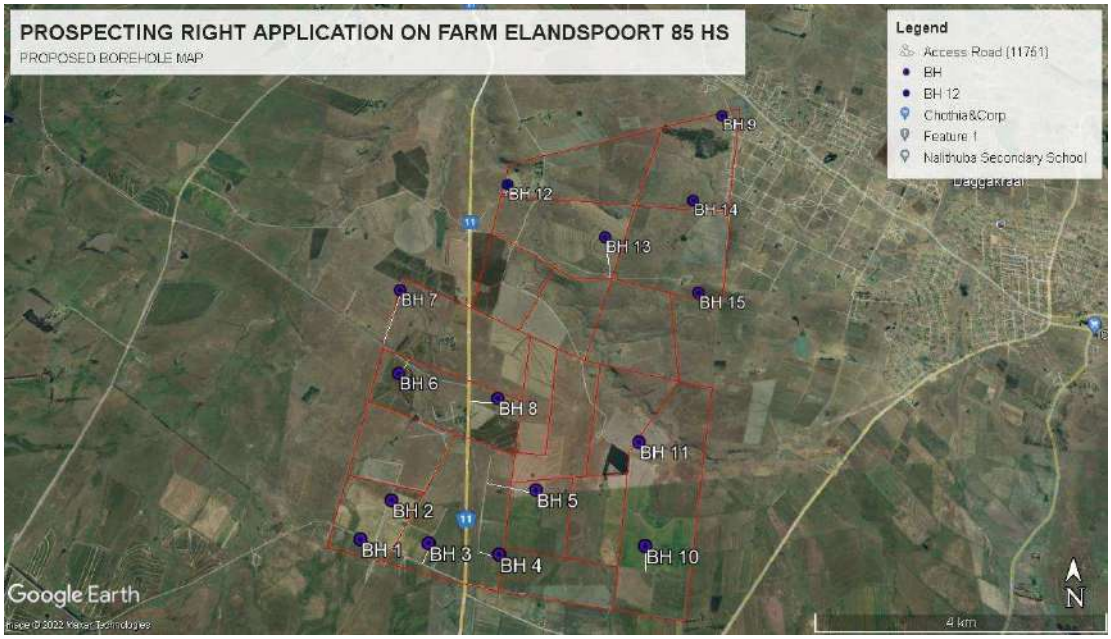


Figure 5: Proposed boreholes map of the anticipated project area.

The operation site will be temporary fenced off, cleared and drilled. Rehabilitation will occur immediately after drilling. As a site is drilled, it will be rehabilitated, and the drilling crew will move onto the next planned hole. This procedure will be followed until all the holes are drilled. Drilling commitments date, time frame and compensation will be communicated with Landowners. No other excavations, bulk sampling or pitting is planned throughout prospecting phase.

5 DESCRIPTION OF ACTIVITY

i. Listed and specified activities

Any activity including the operation of that activity which requires a prospecting right in terms of section 16 of the Mineral and Petroleum Resource Development Act,2002. (Act No. 28 of 2002), including—

(a) associated infrastructure, structures and earthworks, directly related to prospecting of a mineral resource [,]; or [including activities for which an exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)]

(b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in Listing Notice 2 applies.

Table 2: NEMA-Triggered Activities

NAME OF ACTIVITY **(E.g. For prospecting** - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route **etc.…etc.…etc.**	**Aerial extent of the Activity Ha or m²**	**LISTED ACTIVITY Mark with an X where applicable or affected.**	**APPLICABLE LISTING NOTICE (GNR 517)**
Prospecting for the above-mentioned mineral by means of diamond drilling of 15 boreholes. Extent of application area	3 703.950 ha of the entire prospecting area (Disturbed area - 0.06 ha per hole x 15 boreholes = 0.9 ha)	X	GNR 517 Listing Notice 1 Activity 20
Vegetation clearance for drilling programme that includes the drill site Invasive prospecting for the above-mentioned mineral by means of diamond drilling of 10 boreholes.	0.9 ha (Total Disturbed area) of 3 703.950 ha (Extent of	X	N/A

The holes will be drilled to an average depth 300 m. The demarcated working area (total area to be disturbed) per site is 30 m x 20 m = 600 m^2 (0.06 Ha). Then 600 m^2 x 15 boreholes = 9 000 m^2 Therefore, the total area to be disturbed is 9 000 m^2 /15 000 = 0.9 ha	application area)		

ii. Description of the activities to be undertaken

(Describe Methodology or technology to be employed, including the type of commodity to be prospected/mined and for a linear activity, a description of the route of the activity).

Coal prospecting activities will be conducted over a period of five years in the following phases:

5.1 Phase 1: Non-Invasive Prospecting

Phase 1A: Data collection and review.

This phase includes data collection and review of all available information relating to the project, such as property description, tenure and permitting, accessibility, climate, environmentally sensitive areas, historical work, and geology. Ground true thing will be conducted during this phase.

Phase 1B: Field Mapping

Geological mapping involves plotting the location and altitude of the various rock units, faults, and folds on a base map. Geological maps are used to investigate geological hazards, mineral resources, groundwater aquifers, and plain science. This method includes ground mapping of geological features including rock outcrops, lithological contact zones, any geological structural features, surface depressions.

Phase 1C: Data review report and analysis.

This phase involves confirming adequacy of baseline project data available to support preparation of a Bankable Feasibility Study (BFS). Upon gap analysis completion, recommendations will be made to fill the shortfall in any technical or study area that may directly impact the quality of the Bankable Feasibility study. Phase 1A and 1B (combined) will be conducted for about 1–2 months.

5.2 Phase 2: Geology and resources.

This phase includes drilling, geochemical sample analysis, data verification and mineral resource estimation according to international reporting codes, such as the South African Code for Reporting of Exploration Results, Mineral Resources and Mineral Reserves (SAMREC). Data acquisition and test work in the form of diamond or directional drilling (for geochemical assay and metallurgical test work) is required to support the study. Once the geochemical analytical results have been obtained, the generation of a geological and resource model and resulting SAMREC-compliant (or similar) mineral resource estimate may be completed. The drilling program will include at least 15 (Fifteen) boreholes (Table 3) mainly aimed at verifying the acquired historical data by obtaining reliable samples from different depths below surface. The potential drilling method are described in the following. Bazil Technologies will appoint the drilling contractor and they must inform the drilling contractor that is required to comply with all the environmental measures specified in the BAR & EMPr.

Diamond core drilling

Diamond core drilling comprises a drill bit studded with diamond, which is mounted on a cylindrical rotating shaft. A hydraulic or mechanical chuck holds the drill shaft and mounted drill bit firmly, allowing it to rotate at the desired speed. The feed frame applies the necessary force to exert the right pressure on the bit for effective cutting. The flush pump passes water or other flushing fluids down the rod string and past the core barrel and core bit. This cools the bit and carries the cutting up to the surface outside the drill rod, reducing friction between the drill string and the borehole wall. The bit cuts out a core of rock, which moves up into the core barrel until the barrel is filled. When full, the rod string is hoisted until the core barrel reaches the surface where it can be emptied.

Figure 6: Typical example of Diamond Core drill rig and drill bits.

Table 3: Proposed drilling programme

Drilling method	Diamond core drilling
Number of boreholes	15
Depth of boreholes	300 m
Duration of drilling	A borehole takes about 3 days to complete; 15 boreholes will take about 45 days.
Demarcated working area	600 m^2 (600 m^2 per drilling site based on a 30 m x 20 m grid) which is equals to 0.06 ha per site
Total area to be disturbed	6000 m^2 (600 m^2 x 15 boreholes = 9 000 m^2 (**0.9 ha)**)

5.3 Phase 3: Topographic survey

This phase includes a topographic survey. A detailed Digital Elevation Model (DEM) with 2m accuracy contour levels is required (existing LIDAr survey results to 5cm in the xyz space with a 1cm ortho-image is available).

5.4 Phase 4: Geophysical investigations

This phase involves collection of sub-surface information relative to the Karoo Supergroup stratigraphy; this will affirm the exact location of the and its depth; the nature and effects of other formation intrusions; and the characteristics of the bed rock and overburden. Geophysical survey results will be interpreted with geological and drilling data to provide a firm basis for analysis of the Coal characteristics and its potential of being converted from resource to reserves.

5.5 Phase 5: Mineral processing and metallurgical testing

This phase involves following standard procedures for Feasibility studies to obtain test work results to determine the Run of Mine (RoM) ore quality. RoM ore quality is needed to establish basic beneficiation plant design criteria and start with basic engineering, layout planning, preliminary tendering and cost estimates of initial capital costs for each of the main components, production planning and operating cost estimates.

5.6 Phase 6: Reporting

This phase includes review, interpretation, peer review, conclusions and recommendations, and the compilation of the final BFS report signed off by the

Competent Person. The Mineral and Ore Reserve Report produced during this phase, will be SAMREC-compliant.

5.7 Equipments

The equipments to be used during prospecting process as follows:

- Drill Equipments
- Mechanical Shovel
- Temporary Fencing
- Wooden pegs
- Safety Cones
- Field vehicles
- Spades
- First aid kit
- Oil spill kit
- Sample bags
- PPE (dust mask; gloves; goggles, reflector vest, and Safety Boots)

Equipments will be stored at the active drill site.

5.8 Auxiliary Activities

5.8.1 Access roads

There is an existing access farm roads and gravel road which is adjacent to the tar road that traverse through the proposed project area, which gives all project personnel easy access to the drill site. As such, no new access roads will be constructed for the current proposed activity. however, should the need arise once the prospecting right has been granted, the applicant will negotiate access with the landowner(s) to conduct a detailed technical evaluation of the prospecting area. A contract will be drawn up and negotiated with the landowner(s) regarding access and the suitability and time of year that is preferred for prospect drilling.

Figure 7: Existing access Farm roads, gravel, and N11 road within the proposed project area.

5.8.2 Ablution facilities

Mobile toilets will be placed on site for ablution purposes, and they will be removed after the prospecting period.

Figure 8: An image showing a typical example of mobile toilets.

Portable Chemical toilet will be situated out of the 1: 100-year Floodlines of any water courses and wetlands to avoid water pollution.

5.8.3 Temporary Office Area

A temporary site office shaded area will be erected at the drill sites. No on - site electricity generation through the use of generators will be undertaken. Meals will be provided to the staff and workers as no heating and / or cold storage facilities will be available. A shaded eating area will be provided.

Figure 9: Typical example of Gazebo for temporary offices/shaded Area.

5.8.4 Accommodation

Accommodation for staff and workers including Security will not be provided on site, but in nearby towns around the proposed project area as there are Lodges and guest house. Night security staff will be employed once equipment has been established on site.

5.8.5 Blasting

As Prospecting Works Programme (PWP)of this proposed prospecting project does not allow for bulk sampling, no blasting will take place.

5.8.6 Storage of dangerous goods

During drilling activities, limited quantities of diesel fuel, oil and lubricants will be transported to the site daily.

Figure 10: Typical example of fuel transport to the site.

5.8.7 Temporary Fences

Temporary Fences will be erected on the boundaries of prospecting target areas prior to commencement of works at the target footprint areas to prevent unauthorised entry and animals. Fences are to always remain maintained, and gates are not to be left open at any time. Signs indicating the risks involved in unauthorised entry must be displayed at each entrance.

6 LEGAL FRAMEWORK

e) Policy and Legislative Context.

The following context includes the legislations that are associated with prospecting processes.

Table 4: Applicable legislation to this application.

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the policy and legislative context
A description of the policy and legislative context within which the development is proposed, including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.		E.g. In terms of the National Water Act a Water Use License has/ has not been applied for.
Legislation		
NEMA, No. 107 of 1998 (as amended) Listing Activity 20 of Listing Notice 1 in terms of Regulation 983 of 2014	Prospecting activities	In terms of the NEMA, No. 107 of 1998 (as amended), an application for Environmental Authorization was submitted to the DMRE. The DMRE, as the administrator, requests the submission of the Basic Assessment Report and EMP within 90 days of the acknowledgement letter. Bazil Technologies (Pty) Ltd appointed Singo Consulting as an independent EAP to undertake the Basic Assessment Process associated with the Prospecting Right Application. All potential impacts of the proposed prospecting activities have been assessed. The EMPr includes mitigation measure implementation, which will apply throughout prospecting.
As per the Constitution of South Africa, specifically, everyone has a right to: an environment	Prospecting activities	An EMPr for proposed prospecting activities has been drafted to ensure that prospecting activities are

that is not harmful to their health or wellbeing; and have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that: prevent pollution and ecological degradation promote conservation secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.		conducted in such a manner that significant environmental impacts are avoided. Where significant impacts cannot be avoided, they will be minimized and mitigated to protect the environmental right of South Africans.
MPRDA, No. 28 of 2002 Section 16 (as amended)	Prospecting activities	The applicant submitted a Prospecting Right Application to the DMRE, which the DMRE accepted Ref: (MP 30/5/1/1/2/ (17127 PR)). The conditions and requirements attached to the granting of the prospecting right will apply to the prospecting activities.
NEMA Biodiversity Act, 2004	Prospecting activities	The BAR & EMPr will regulate the applicant's implementation of biodiversity management measures. This is particularly relevant to all species of the Moist clay/ Moist sandy highveld Grassland (Grassland Biome) family, and the Critical Biodiversity Area (CBA)and ESA in which the project area falls.
National Water Act (NWA), Act 36 of 1998	N/A	No water use license is required for this application. If water required for drilling activities, it will be obtained from a legal source in the area or brought in via a mobile water tanker. Appropriate dust extraction/ suppression equipment will be a condition imposed on the drill contractor for drill rigs.
National Environmental Management: Waste Act, act 59 of 2008 (NEMWA) (as amended)	Management measures environmental awareness plan	Waste generation will be minimized by ensuring employees of the drilling contractor are subjected to the appropriate environmental awareness campaign before drilling commences. All waste generated during the drilling activities will be disposed of in a responsible legal manner. Proof of legal

		disposal will be maintained on site.
National Heritage Resources Act (NHRA), 25 of 1999	Management measures	Should archaeological artefacts or skeletal material be discovered in the area during development activities, activities will be stopped, and the South African Heritage Resource Agency (SAHRA) will be notified for an investigation and evaluation of the discoveries.
The Occupational Health and Safety Act (Act No. 9 of 1997)	Management measures	The Occupational Health and Safety Act, 1993 (No.85 of 1993) provides for the health and safety of people at work as well as the health and safety of individuals who use plants and machinery. During the construction and operating phases of the proposed project, the applicant would be expected to fulfil the specifications of the OHS Act.
National Environmental Management Air Quality Act NEM: AQA), 39 of 2004)	Prospecting activities	The proposed prospecting activities will not trigger any of the activities listed under the above-mentioned Regulations, however, Bazil Technologies (Pty) Ltd will ensure that emissions from their activities complies with the standards as set in the above-mentioned regulations. Dust Control Regulations describe the measures for control and monitoring of dust, including penalties. These regulations will be applicable during the construction phase.
Conservation of Agricultural Resources Act (Act No. 43 OF 1983)	Management measures	It needs riparian vegetation management and includes a list of invasive alien vegetation to be managed or eliminated. Control of invasive vegetation has been discussed in the Environmental Management Plan (EMPr).
Municipal plans and policies		
Gert Sibande District Municipality Bioregional Plan (2018)		The prospecting and mining of key minerals like Coal is highlighted in Bioregional Plan.
Municipality Spatial Development Framework (SDF)		The applicant acknowledges the need to maximize economic benefit from mining, industrial, business, agricultural

		and tourism development in the area and promote a climate for economic development in line with the municipal development frameworks.
Standards, guidance and spatial tools		
South African National Biodiversity Institute (SANBI) Biodiversity GIS (bgis.sanbi.org)	Baseline environmental description.	Used during desktop research to identify sensitive environments in the prospecting rights area.
QGIS Desktop: Version 3.16.2.	Baseline environmental description and mapping.	Used during desktop research to map the locality and sensitive environments in the prospecting rights area.

7 NEED AND DESIRABILITY

f) Need and desirability of the proposed activities.

(Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location).

Prospecting activities does not offer many tangible current benefits as it is the initial phase of mining. Prospecting precedes mining; however, it is during the prospecting phase that findings were established on whether the available mineral reserves can be mined at an economic gain. It is understood that the mining plays an important role in South African economy and boast a large labour force; hence a greater significance is placed on prospecting for realization of mining benefits.

Mining in South Africa directly contributed to the establishment of the Johannesburg Stock Exchange in the late 19th century, and today it still accounts for a large portion of its market capitalization. From this, it is clear that mining in South Africa has shaped the country politically, culturally, and economically and that the South African mining sector has provided the critical mass for a number of industries that are either suppliers to the mining industry, or users of its products. These include, but are not limited to, energy, financial services, water and engineering services, and specialist seismic geological and metallurgical services. The proposed Coal prospecting right will not only contribute directly to the South African economy but will also contribute to the development and growth of other industries supporting the mining sector.

The proposed prospecting right in search for Coal resources that is prior to mining project, will contribute to favorable economic impacts on both a local, regional and national scale. This will result in numerous job creation and skills development opportunities and provide an economic injection in the region.

Although prospecting activities are not labour intensive, few people will be hired to assist with general activities. The services required can also be sourced locally depending on their availability thus growing the economy of Pixley Ka Isaka Seme intends to start mining after the prospecting right application has been granted. Confirm and obtain additional information concerning potential targets through non-invasive (e.g., desktop studies) and minimally invasive (e.g., drilling) activities.

Assess if the resource can be extracted in an environmentally, socially and economically viable manner. Prospecting activities should prove that there are feasible minerals to allow mining, a new mine may be developed, which would generate extensive employment opportunities in an area where employment is required.
Very little natural vegetation needs to be disturbed in order to establish the prospecting area (0,9 ha). as most of the area has agricultural activities.

As maintenance and servicing of the equipment will be done at an off-site workshop the amount of hazardous waste to be produced at the site will be minimal and will mainly be as a result of accidental oil or diesel spillages. Contaminated soil will be removed to the depth of the spillage and contained in sealed bins until removed from site by a hazardous waste handling contractor to be disposed of at a registered hazardous waste handling site and more information will be discussed after the granting of the prospecting right.

8 ALTERNATIVES

Motivation for the overall preferred site, activities, and technology alternative.

Geophysical surveys, and drilling are the only major methods used in exploring for deposits of this type and also for resource definition and evaluation. The technology to be used cannot be replaced by any other methods thus these are the preferred activities. There is no other site alternative available for the current applicant as the

other properties have existing applications. The current property provides the ideal geological formation for the presence of the minerals applied for. Little natural vegetation will be disturbed (total area to be disturbed is 0.9 ha as compared to 3 703.950 ha of prospecting area) to establish the invasive activities as some of the area has already been heavily modified due to the agricultural activities within the proposed project area.

As maintenance and servicing of the equipment will be done at an off-site workshop the amount of hazardous waste to be produced at the site will be minimal and will mainly be because of accidental oil or diesel spillages. Contaminated soil will be removed to the depth of the spillage and contained in sealed bins until removed from site by a hazardous waste handling contractor to be disposed of at a registered hazardous waste handling site and more information will be discussed after the granting of the prospecting right.

9 Full description of the process followed to reach the proposed preferred alternatives within the site.

NB!! – This section is about the determination of the specific site layout and the location of infrastructure and activities on site, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.

There is no alternative site identified beside the project area as the property provides the ideal geological formation for the presence of the minerals applied for. Although there are non-perennial streams identified within the project area, however 500 m buffers were drawn to avoid negative impacts on the area, and it should be taken as "No Go" Area. Infrastructures and graves were identified within the site; therefore, 100 m buffer zone will be delineated to avoid negative impacts during drilling process. Drilling should not be conducted on area cover by Critical Biodiversity Area, ESA and ONA to avoid negative impacts.

i. Details of the development footprint alternatives considered.

With reference to the site plan provided as Appendix A and the location of the individual activities on site, provide details of the alternatives considered with respect to:

a. Property on which or location where it is proposed to undertake the activity;
b. Type of activity to be undertaken;
c. Design or layout of the activity;

d. Technology to be used in the activity;

e. Operational aspects of the activity; and

f. Option of not implementing the activity.

9.1 Property

Bazil Technologies (Pty) Ltd is applying for Coal Prospecting Right on the portions of RE, RE/1, 3, RE/4, RE/5, RE/6, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, RE/20 & 21 of the farm Elandspoort 85 HS, situated in the Local Municipality of Pixley Ka Isaka Seme, which falls within the jurisdiction of the Volksrust Magisterial District, under Gert Sibande District Municipality, Mpumalanga Province, with DMRE Ref: MP 30/5/1/1/2/ 17127 PR, based on existing knowledge of the geological information of that area. The site was identified based on knowledge of the Coal deposit and as such, no site alternatives have been considered for the proposed activities. The following buffers will be applied to the final site selection:

- No drill site will be positioned within 100 m of a structure
- No drill site will be positioned within 500 m of a water course or wetland
- Where possible existing access roads will be utilized to access the drill sites.

9.2 Type of Activity

Techniques were chosen based on the long-term success of the selected drilling method and prospecting process.

- A total number of 15 drill holes are proposed for the site;
- It will be possible to drill 80m-110 per day, covering about 3 days to complete one hole;
- All holes will be drilled by means of a diamond drill rig.
- The holes will be drilled to an average of 300 m and broadness (diameter) may vary between 60 mm - 75.7 mm. This will allow establishment of the thickness of the overburden.
- Holes will not be drilled closer than 500 m from any stream/river and not within 500 m from a natural wetland.
- Identified heritage sites will be marked and avoided. 250 m buffer zone will be applied
- Overburden will be recorded, and the holes filled back simultaneously.
- Drilling will take place one hole at a time. Rehabilitation will occur concurrently with drilling.

9.3 Design & Layout

Since prospecting activities are temporary in nature no permanent structures will be constructed. Negotiations and agreements will be made with the farm owners to use any existing infrastructure like boreholes and access roads. Temporary Infrastructure will be developed on site; like portable ablution facilities will be used.

- Activities will be limited to the drilling of 15 boreholes to be determined by the geological formations found during prospecting.
- It is planned to use one rig for all drill holes. Rehabilitation will be tightly controlled, and supervision will be focused.

9.4 Technology

The biggest technology intervention is the use of geophysical surveys, which makes the requirement for less holes apparent. Geophysical surveys also provide an added advantage of being done quickly and so execution can commence early. The safety factor of utilizing geophysical surveys is also apparent, as there is less time to keep people exposed to moving machinery. Drilling will be performed on a closed radius which will be fenced, and safety signs will be plugged as per the requirement of Mine Health & Safety (MHS) compliances. The targeted area for operation will be near the existing road and modified area.

9.5 Operational aspects of the activity

Drilling will be done over a period of 45 days, during daylight hours to minimise risk exposure. Due to nature of the prospecting activities no permanent infrastructures will be erected on site such as water supply, electricity or sewer facilities. The prospecting will commence with non-invasive prospecting for 1 month which will entail Multi-Spectral and Aerial Surveys providing digital raster data of the area of interest delineating the Paleo channel on a map.

Thereafter, a further literature survey will be conducted for 1 month, combining the results from phase 1 with interpreted geological report. Only then will the applicant commence with invasive prospecting with the drilling and sampling programme continuing for approximately 1 month and 2 to3 weeks, which will culminate in a report on the drill results. This will again be followed with further non-Invasive prospecting through GIS & analytical desktop studies for 1 month, producing Pre-Feasibility reports, resource statements and 3D mapping. Once this is complete, a decision will be made whether further drilling or sampling is required in specific areas of interest, prior to finalizing the Feasibility Report. The applicant shall ensure that this Environmental Management Programme Report is provided to the Prospecting Manager and any other person or organization who may work on the site.

9.6 Option of not implementing the activity

Drilling is required to investigate the potential and feasibility of a resource. It also serves as a DMRE-compliant mineral resource statement. There is no potential for any future investment in a mine without the confirmation of the mineral resources, which can only be obtained by drilling. Should the prospecting right be refused, a potential mineral resource development will be sterilized. The socio-economic benefit and future employment potential of mine development will also be lost if the prospecting activities are not implemented to determine the feasibility of a mineral deposit that occurs within the area.

10 PUBLIC PARTICIPATION PROCESS

10.1 Details of the Public Participation Process Followed

(Describe the process undertaken to consult interested and affected parties including public meetings and one on one consultation. NB: the affected parties must be specifically consulted regardless of whether they attended public meetings. Information to be provided to affected parties must include enough detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land).

South Africa, being one of the countries with the most progressive constitutions, guarantees the public's freedom to participate in decision-making. Section 57(1) of the new Constitution that provides: "The National Assembly may (b) make rules and orders concerning its business, with due regard to representative and participatory democracy, accountability, transparency and public involvement". This provision, along with several others gave rise to many new trends in South African legislation. In environmental legislation, the idea of public participation (or stakeholder engagement) features strongly and especially the National Environmental Management Act, 1998 (Act 107 of 1998, NEMA – as amended).

Public participation can be defined as "a process leading to a joint effort by stakeholders, technical specialists, the authorities and the proponent who work together to produce better decisions than if they had acted independently" (Greyling, 1999). From this definition, it can be seen that the input of the public is regarded as very important indeed.

10.1.1 Public Participation Plan in Terms of The Directions Regarding Measures to Address, Prevent and Combat the Spread of Covid-19

The restrictions enforced in terms of Government Gazette 43412 (05th June 2020) which placed the country in a national state of disaster limiting the movement of people to curb the spread of the COVID-19 virus has placed some limitations on the commencement and continuation of the public consultation as part of an EIA process. Considering these limitations, the following consultation process has been designed and will be implemented, on approval by the Department of Mineral Resource and Energy, to cater for the conducting of the Public Participation Process which includes I&APs, the competent authority, directly impacted landowners/occupiers, adjacent landowners/occupiers, relevant Organs of State departments, Municipalities, ward councillors and other key stakeholders.

On 05th June 2020, the Minister of Environment, Forestry and Fisheries issued the Disaster Management Act (Act no. 57 of 2002): Directions for alert level 3 regarding measures to address, prevent and combat the spread of COVID-19 relating to national environmental management permits and licenses in Government Gazette 43412 Government Notice 650.The purpose of these directions is to curtail the threat posed by the COVID -19 pandemic and to alleviate, contain and minimise the effects of the national state of disaster, and in particular to provide directions to ensure fair licensing processes and public participation processes.

The public participation process is deemed essential as it enhances partnerships between the government and citizens during the decision-making process. This study perused the meaning and merits of public participation, and how democracy could be enhanced through the public participation process during COVID-19 pandemic. The Democratic Decision-Making Theory and the Technological Acceptance Model underpinned the study. These theories highlighted the need to include the citizens in the decision-making process and the relevance of the South African government to support and educate the public on the usefulness of adopting information science to achieve effective governance, especially during the COVID-19 pandemic.

A qualitative study was applied in this study and data were collected from secondary sources such as articles, government legislation, textbooks, and the Internet. Major

findings depict that public participation involves a process by which the parliament and provincial legislatures refer to the citizens, individuals, government entities, and concerned organization in the decision-making process to achieve good governance

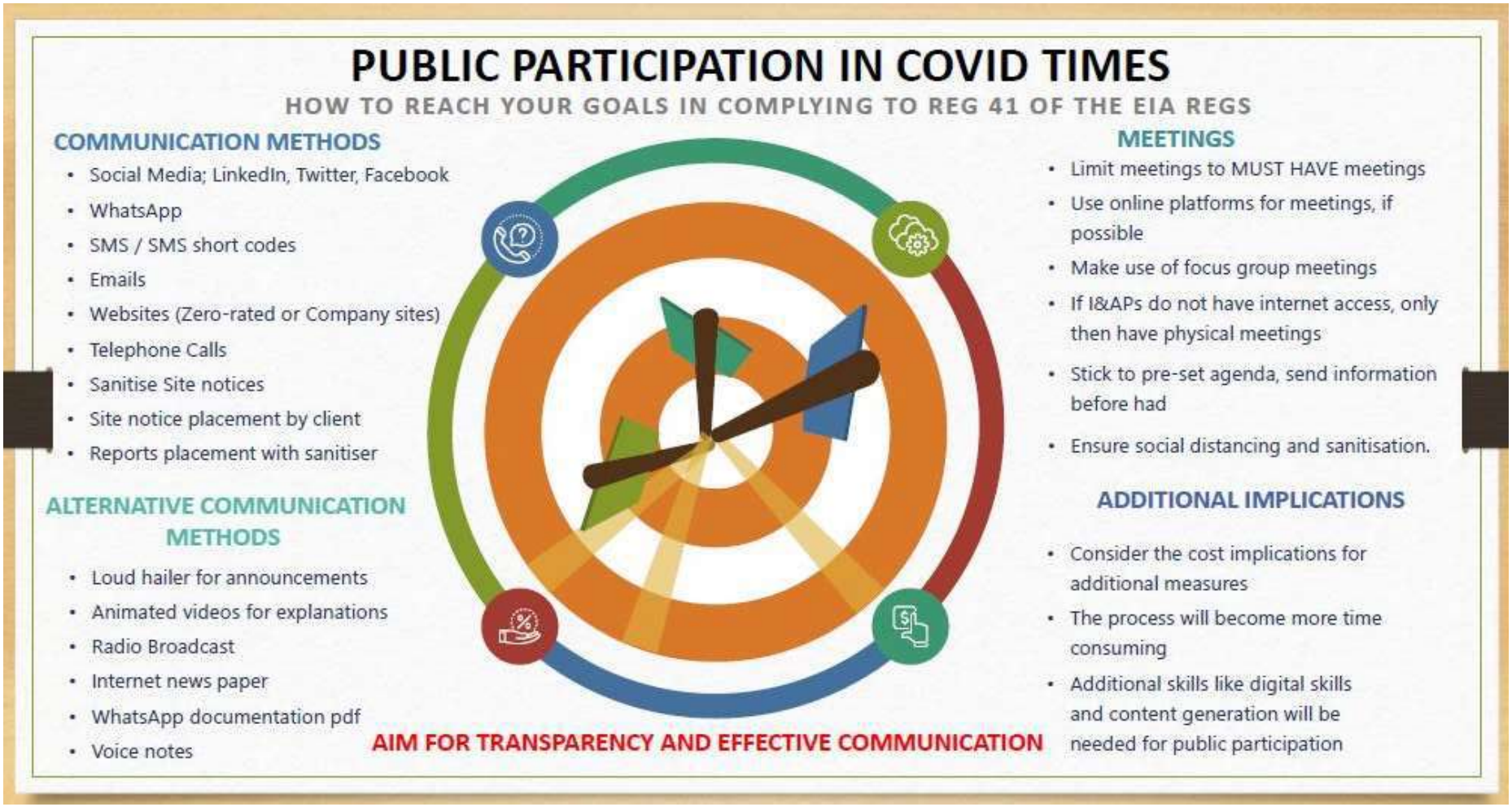


Figure 11: Public Participation During Covid-19

10.1.2 Public Participation Methodology

The Public Participation Process (PPP) is designed to provide sufficient and accessible information to Interested and Affected Parties (I&APs) in an objective manner to assist them to:

- Raise issues of concern and suggestions for enhanced benefits.
- Assist in identifying reasonable alternatives.
- Contribute relevant local information and knowledge to the environmental assessment.
- Comment on the findings of the environmental assessments.
- Obtain information on the outcome, i.e. the competent authority's decision, and how and by when the decision can be appealed.

Refer to Appendix D & E for proof of the PPP undertaken to date.

10.1.3 Identification of I&APs

The first phase of the PPP includes the identification of I&APs. An initial I&AP database was compiled using Windeed searches, internet searches and previous Basic Assessment (BA) projects in the area. The I&AP database was compiled containing the following categories of stakeholders:

- National, provincial, and local government.
- Organized business.
- Host and adjacent communities.
- Traditional Leaders
- Other organizations, clubs, communities, and unions.
- Various Non-Government Organizations (NGOs).

The identification and notification of potential stakeholders will be an ongoing process throughout the PPP, as more information is gathered and contact with people is established.

10.1.4 List of Authorities and Stakeholders Identified and Notified

The following authorities and stakeholders have been identified and notified of the proposed Prospecting Right Application and Environmental Authorisation on portions RE, RE/1, 3, RE/4, RE/5, RE/6, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, RE/20 & 21 of the farm

Elandspoort 85 HS , situated in the Local Municipality of Pixley Ka Isaka Seme , which falls within the jurisdiction of the Volksrust Magisterial District, under Gert Sibande District Municipality, Mpumalanga Province.

- Dr Pixley ka Isaka Seme Local Municipality.
- Gert Sibande District Municipality.
- Department of Agriculture, Forestry and Fisheries.
- Department of Labour
- Department of Land Restitution Commission
- Department of Public Works
- Department of Water and Sanitation.
- Department of Agricultural, Land Reform and Rural Development.
- South African National Roads Agency Ltd (SANRAL).
- South African Heritage Resources Information System (SAHRIS)
- South Africa National Biodiversity Institution
- Eskom SOC Limited.
- Transnet SOC Limited.
- Traditional Leaders
- Mpumalanga Tourism and Park Agency (MTPA)

Refer to Appendix D and E for proof of the PPP undertaken.

10.1.5 Surface Rights/Landowners Identified and Notified

The portion 13 and Remaining Extend of the farm owns by **SIYAVUKA COMMUNAL PROP ASSOC**, portions 3, 8, 12, 18, RE/20 & 21 owns by **SIZANA TRUST**, portion RE/4 owns by **KHULANI BALIMI COMMUNAL PROP ASSOC,** portions RE/5 & RE/6 owns by **SMALBERGER GUILLIAUME**, portions 8, 9 owns by **NIEKERK JACOBUS IGNATIUS VAN**, portion 11 own by **LANDLESS PEOPLE OF DAGGAKRAAL HLANGANANI TRUST**, portions 14, 15 & 17 owns by **MERWE HENDRIK CHRISTOFFEL VAN DER**, and portion 19 own by **NATIONAL GOVERNMENT OF THE REPUBLIC OF SOUTH AFRICA**, has been identified as the surface right/landowner of the area under application and has been notified of the proposed prospecting right application on portions RE, RE/1, 3, RE/4, RE/5, RE/6, , 10, 11, 12, 13, 14, 15, 17, 18, 19, RE/20 & 21 of the farm Elandspoort 85 HS, situated in the Local Municipality of Pixley Ka Isaka Seme , which falls within the jurisdiction of the Volksrust Magisterial District, under Gert Sibande District Municipality, Mpumalanga Province.

Refer to Appendix D for proof of the PPP undertaken to date.

10.2 Initial Notification

The PPP commenced in January 2022 with an initial notification and call to register. Initial notification was given in the manner described below.

10.3 Registered Letters and E-mails

Notification letters via e-mails were distributed to pre-identified I&APs including affected and adjacent surface landowners, government organizations, NGOs, Unions, relevant municipalities, and other organizations that might be affected. The notification letters included the following information:

- List of anticipated activities to be authorised.
- Scale and extent of activities to be authorised.
- Sufficient detail of the intended operation (to enable I&APs to assess/surmise what impact the activities will have on them or on the use of their land).
- The purpose of the proposed project.
- Details of the affected properties (including a map).
- Details of the MPRDA and NEMA Regulations that must be adhered to.
- Date by which any request to register as an I&AP must be forwarded through to Singo Consulting.
- Contact details of the EAP. In addition, a questionnaire was included in the registered letters, e-mails and facsimiles sent which requested the following information from I&APs:
- Information on any potential impacts from the proposed project.
- Suggestions on potential mitigation measures for the anticipated impacts.
- Details of the landowner and information (contact details) of lawful property occupiers, if any.
- Details of any other I&APs that should be notified.
- Any specific comments or concerns regarding the application.
- Anyone who may be interested or affected by the proposed project contact details space.

  Refer to Appendix D & E for proof of the PPP undertaken to date.

10.4 Background Information Document (BID)

A Background Information Document (BID) was prepared. The BID includes the following information:

- Project name.
- Applicant name.
- Project location.
- Map of affected project area.
- Description of the application process.
- Information on document review.
- Relevant Singo Consulting contact person for the project
- Comment form
- DMRE reference number

Refer to Appendix F.

10.5 Newspaper Advertisement

Newspaper advertisements in English describing the proposed project and BA process were placed on the Volksrust Recorder - News / Nuus (in English) and was published on Friday of the 28th of January 2022. The newspaper adverts included the following information:

- Project name.
- Applicant name.
- Project location.
- Nature of the activity.
- Relevant contact details of the EAP and Applicant for the proposed project

Manana Sifiso	26/01/2005	Phumzile Manana (Deceased)	Identity and whereabouts unknown	Inkwelo Farm, Charlestown
Hlatshwayo Bongizikisi	17/11/2006	Vilakazi Thembi (whereabouts unknown)	Hlatshwayo Tapelo (Deceased)	Small Kloof Farm, Volksrust
Hlatshwayo Siphokazi Lizzy	12/04/2010	Vilakazi Thembi (whereabouts unknown)	Hlatshwayo Tapelo (Deceased)	Small Kloof Farm, Volksrust
Hlatshwayo Nosipho Selinah	12/04/2010	Vilakazi Thembi (whereabouts unknown)	Hlatshwayo Tapelo (Deceased)	Small Kloof Farm, Volksrust

Figure 12: Proof of Newspaper Advertisement in Volksrust Recorder - News / Nuus (outlined with yellow polygon).

10.5.1 Site Notice Placement

A2 site notices (in English) were placed on site along road and near adjacent communities and farm Gates of the proposed project area in 1st and 10th of February 2022. The on-site notices included the following information:

- Project name.
- Applicant name.
- Project location.
- Map of proposed project area.
- Project description.
- Legislative requirements.
- Relevant contact details of the EAP and Applicant for the project.

Please refer to Figure 12 below

Figure 13: Proof of Site Notices.

Consultation Meeting with Cllr of Ward 4 under Pixley Ka Isaka Seme Local Municipality was held on Thursday 10th of February 2022 Please refer to Appendix E.

The Tittle Deed search results of portions RE, RE/1, 3, RE/4, RE/5, RE/6, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, RE/20 & 21 of the farm Elandspoort 85 HS of the proposed project are as follows:

WinDeed Database D/O Property - List

HS, 85, MPUMALANGA

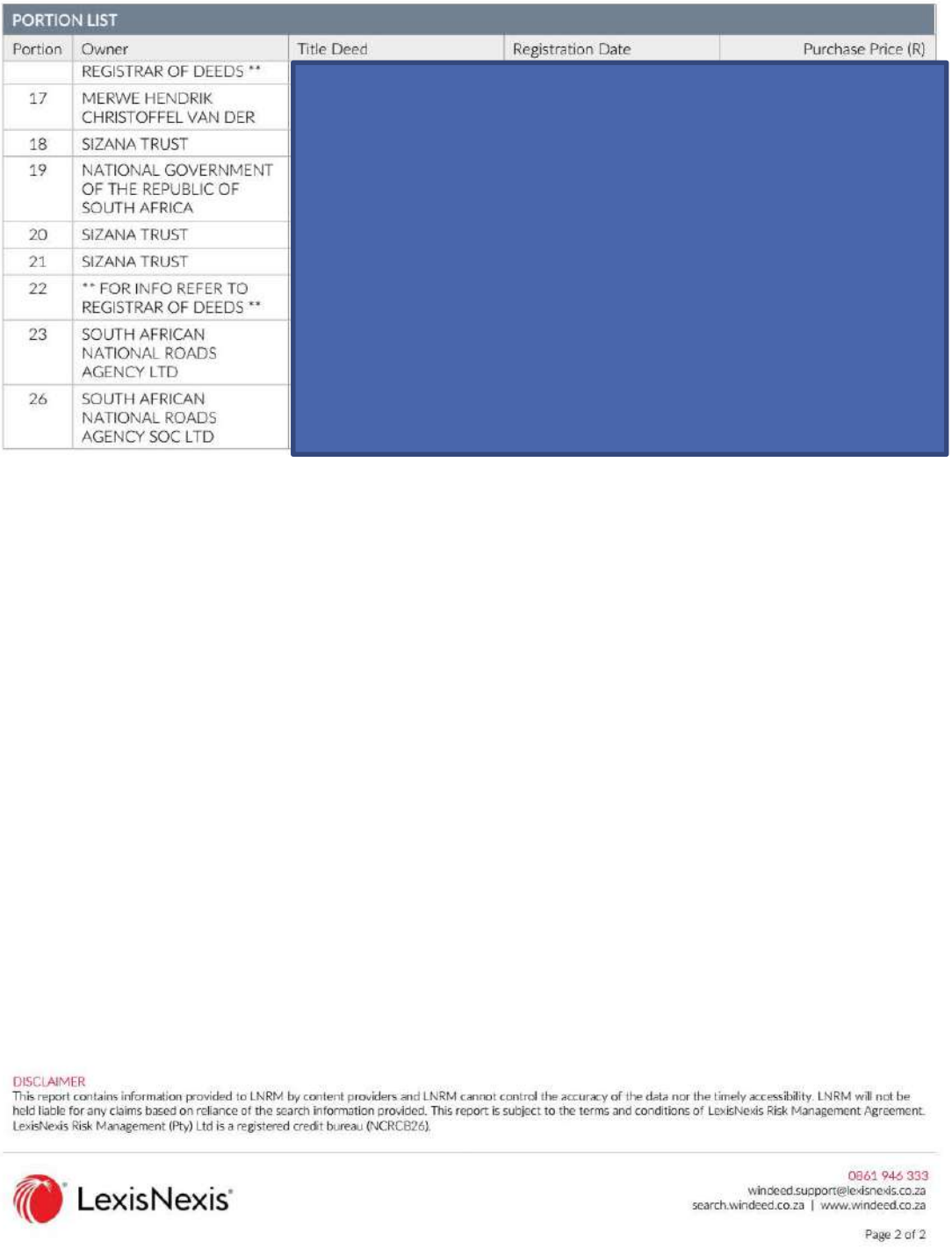
Lexis® WinDeed

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.

SEARCH CRITERIA			
Search Date	2022/01/10 10:06	Farm Number	85
Reference	-	Registration Division	HS
Report Print Date	2022/01/10 10:07	Portion Number	-
Farm Name	-	Remaining Extent	NO
Deeds Office	Mpumalanga	Search Source	WinDeed Database

PORTION LIST

Portion	Owner
0	SIYAVUKA COMMUNAL PROP ASSOC
1	** FOR INFO REFER TO REGISTRAR OF DEEDS **
2	SIZANA TRUST
3	SIZANA TRUST
4	KHULANI BALIMI COMMUNAL PROP ASSOC
5	SMALBERGER GUILLIAUME
6	SMALBERGER GUILLIAUME
7	** FOR INFO REFER TO REGISTRAR OF DEEDS **
8	SIZANA TRUST
9	NIEKERK JACOBUS IGNATIUS VAN
10	NIEKERK JACOBUS IGNATIUS VAN
11	LANDLESS PEOPLE OF DAGGAKRAAL HLANGANANI TRUST
12	SIZANA TRUST
13	SIYAVUKA COMMUNAL PROP ASSOC
14	MERWE HENDRIK CHRISTOFFEL VAN DER
15	MERWE HENDRIK CHRISTOFFEL VAN DER
16	** FOR INFO REFER TO



PORTION LIST

Portion	Owner	Title Deed	Registration Date	Purchase Price (R)
	REGISTRAR OF DEEDS **			
17	MERWE HENDRIK CHRISTOFFEL VAN DER			
18	SIZANA TRUST			
19	NATIONAL GOVERNMENT OF THE REPUBLIC OF SOUTH AFRICA			
20	SIZANA TRUST			
21	SIZANA TRUST			
22	** FOR INFO REFER TO REGISTRAR OF DEEDS **			
23	SOUTH AFRICAN NATIONAL ROADS AGENCY LTD			
26	SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LTD			

Figure 14: Windeed Search Result for the Farm Elandspoort 85 HS.

i) Summary of issues raised by I&APs

(Complete the table summarising comments and issues raised, and reaction to those responses)

Table 5: Summary of issues raised during the public comment period.

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
AFFECTED PARTIES					
Landowners/s					
SIZANA TRUST	**X**	01/02/2022 (face to face)	The landowner refuses to comment on the fact that he is unable to write.	Surface landowner consulted regarding the proposed project. BID and Landowner	See Appendix D

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
Portions **3, 8, 12, 18, 20 & 21** of the farm Elandspoort 85 HS **NIEKERK JACOBUS IGNATIUS VAN** Portions **9 & 10** of the farm Elandspoort 85 HS				Notification Letter were handed over to Farm owner.	for full consultation

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
SMALBERGER GUILLIAUME Portions **5** and **6**	**X**	01/02/20221 (face to face)	He is objecting the proposed project. The document will be handover to his legal representatives He refuses with his contact information	Landowner of portions 5 and 6 consulted regarding the proposed prospecting project. BID and maps of the project hand delivered, and Landowner notification letter left on the gate We requested contact details for further communication regarding the proposed project.	See Appendix D for full consultation

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
MERVE HENDRIK CHRISTOFFEL VAN DER Portions **14,15, & 17**	**x**				
KHULANI BALIMI COMMUNAL PROP ASSOC **Portion 4 of the farm Elandspoort 85 HS**	**x**				

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
SIYAVUKA COMMUNAL PROP ASSOC Portion 13 and Remaining Extent (RE) of the farm Elandspoort 85 HS					
LANDLESS PEOPLE OF DAGGAKRAAL HLANGANANI TRUST Portion 11 of the farm Elandspoort 85 HS					

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
NATIONAL GOVERNMENT OF THE REPUBLIC OF SOUTH AFRICA **Portion 19 of the farm Elandspoort 85 HS,**	**x**	2022/02/07(via email)		An email of consultation was sent to National Government of the Republic of South Africa	See Appendix D for full consultation
Lawful occupier/s of the Land					

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
Landowners or Lawful occupiers on adjacent properties					
Municipality					

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
Pixley Ka Isaka Seme Local Municipality Councillor of Ward 4	**X**	10/02/2022 (face to face) 2022/02/08(via email)	Where project exactly situated? What are the potential benefits of this initiative for the community?	Farm Elandspoort 85 HS after Amersfoort along N11 Road near Daggakraal community The application is for a prospecting right (coal search), not a mining right or licence. Because the prospecting project is just temporary or short-term, and prospecting operations are not labour-intensive, only a few individuals will be hired to help with general chores. After the prospecting results have established the area's coal potential, a	See appendix E for full consultation

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
			How are you going to manage the impacts on water in our area?	fresh application for a mining permit/right will be presented to the DMRE. During the mining application process, a Social Labour Plan or Community Development Plan will be developed. The activities will be taken place far with water courses. 500m buffer zone will be maintained and taken as no go area zone to avoid negative impact on identified wetland and river within the proposed project area. Prospecting will conduct	

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
				during winter season where water table is low	
			Did you consult landowners?	Yes, we manage to find the farm owner of portions 5&6, Sizana trust & 9 & 10. Our challenge is CPA and Portions 14,15, & 17.	
			We will assist with the contact details of Khulani Balimi and councilor of ward 11 as other part of project falls under ward 11.	I will appreciate your assistance	

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
				An email of consultation was sent to CLLR	
	x	2022/02/08(via email)		An email of consultation was sent to Pixley Ka Isaka Seme Local Municipality	See appendix E for full consultation

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
District Municipality					
Gert Sibande District Municipality	**X**	2022/01/27(via email)		An email of consultation was sent to Gert Sibande District Municipality	See appendix E for full consultation

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
Organs of state (Responsible for infrastructure that may be affected Roads					

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
Department, Eskom, Telkom, DWA					
DFFE Biodiversity Conservation Unit	**X**	2022/02/08(via email)	No issue raised	On 08 /02/2022an email of consultation was sent to DFFE Biodiversity Conservation Unit	See appendix E for full consultation
	X				

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
Mpumalanga Department of Economic Development Director: Local Economic Development	**x**	2022/01/27(via email)		An email of consultation was sent to Mpumalanga Department of Economic Development	See appendix E for full consultation

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
Department of Forestry, Fisheries and the environment. forestry, fisheries & the environment Department: Forestry, Fisheries and the Environment REPUBLIC OF SOUTH AFRICA	**X**	2022/01/27(via email)	No issue raised	consultation email was sent to Department of Forestry, Fisheries and the environment.	See appendix E for full consultation

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
water & sanitati Department: Water and Sanitation REPUBLIC OF SOUTH AFR	X	2022/01/27 (via email).	No issue raised	On an email of consultation was sent to Department of Water and Sanitation.	See appendix E for full consultation

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
labour Department: Labour REPUBLIC OF SOUTH AF	X	2022/01/27 (via email).	No issue raised	An email of consultation was sent to Department of Labour	See appendix E for full consultation

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
 public wor Department: Public Works REPUBLIC OF SOUTH AFI	X	2022/01/27 (via email).	No issue raised	Department of Public Works was consulted regarding the proposed project.	See appendix E for full consultation

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
Eskom	X	2022/01/27 (via email).		Eskom was consulted regarding the proposed project.	See appendix E for full consultation

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
TRANSNE	X	2022/01/27 (via email).	No issue raised	Transnet was consulted regarding the proposed project.	See appendix E for full consultation

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
SANRAL BUILDING SOUTH AFRICA THROUGH BETTER ROADS	X	2022/01/27 (via email).		SANRAL was consulted regarding the proposed project.	See appendix E for full consultation

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
Mpumalanga TOURISM AND PARKS AGENCY	X	04/02/2022(via email)	The proposed area occurs on an ESA: Strategic Water Source Area; Important sub catchments and has a number of wetlands. Please ensure that your client is mindful of any impacts on water quality and quantity. Parts of the proposed area are CBA: Irreplaceable and Optimal lands which are areas with a high biodiversity significance	All sensitivity area assessed according to MBSP; MTPA were identified and will be avoided to prevent negative impacts. Information included to the BAR & EMPr Applicant will be informed about all sensitivity of the area and to take into consideration all the recommendations and comments, including impact management	See appendix E for full consultation

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
			and are needed to meet biodiversity targets.	outlined on the BAR and EMPR that assisting to reduce or avoid negative impacts to the environment.	
Department of Rural Development and Land Reform (DRDLR)					

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
COMMISSION ON RESTITUTION OF LAND RIGHTS	X	2022/01/27(via email)	No issue raised	Email for consultation was sent on behalf DRDLR	See appendix E for full consultation

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
Traditional Leaders					
Community					
	X	22/02 /2022(via email)	I want to be part of the vacancy that you have in your organisation	Registered as an Interested and affected party for this Prospecting Right Application for coal on farm Elandspoort 85 HS. BID for detailed information sent to him.	See appendix E for full consultation

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
	x	17 February 2022(via email)	The reason why I have the interest in this project it is because I am passionate about this industry and that means I will always take grate pride in the work I do, and I am frugal when using company resources.	Registered as an Interested and affected party for the Bazil Technologies (Pty Ltd) Prospecting Right Application for coal on farm Elandspoort 85 HS. Daggakraal Community is interested and affected party of this proposed prospecting project as situated nearby proposed project area.	See appendix E for full consultation

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
			My question is that would the community of Daggakraal be part of this project or would they be hired when this project take place. Since they are situated near this project? And how the recruitment process will be taken place.	Bazil Technologies company lodged an application for prospecting right (meaning Searching of coal), not Mining Right/permit. Prospecting project is a temporary and prospecting operations are not labour intensive, a few people will be hired to assist with general duties. Once the results of the prospecting have been proven the potentials of the coal in the area, another new application mining permit/ right will be submitted to the DMRE. The Social Labour	

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issued Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
				Plan or Community Development Plan will be established during the mining application process.	
OTHER AFFECTED PARTIES					

11 DESCRIPTION OF THE ENVIRONMENT

I The Environmental attributes associated with the alternatives.

(The environmental attributed described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects)

12 Baseline Environment

In order to determine the baseline environment of the proposed location on Elandspoort, specialist investigations were initiated. The section to follow summarises these findings and recommendations.

(a) Type of environment affected by the proposed activity.

(Its current geographical, physical, biological, socio- economic, and cultural character).

12.1 Geographical Character

The regional geology of the area influences the geographical character of the area.

12.1.1 Regional Geology

The description of the geology is based on the existing knowledge and literature of the region.

12.1.1.1 Karoo Supergroup

The project area is dominated by sediments of the Karoo Supergroup, which is subdivided into four main lithostratigraphic units, which from the base up are the Dwyka, Ecca, Beaufort and Stormberg (Molteno, Elliot and Clarens formations) groups (Johnson et al., 1996; SACS, 1980). These are capped by some 1.4 km of basaltic lavas of the Drakensberg Group (Johnson et al., 1996; Veevers et al., 1994), the extrusion of which is related to the break-up of Gondwana (Cox, 1992). The basement of the Karoo Supergroup fill in both the MKB and in the northern basins is heterogeneous (Bordy et al., 2004a; Hancox, 1998; Rutherford, 2009) and this heterogeneity plays a significant control on the nature of the fill, particularly during the early phases of the deposition of the Karoo Supergroup.

12.1.1.2 Ecca group

The proposed Mining Project Area falls in the Ecca Group of the Karoo Supergroup. The Ecca Group, which is of Permian in age, comprises sixteen formations, reflecting the lateral facies changes that characterises this succession. Of these sixteen formations, one is of great interest to this study, because it occurs in the project area (mainly the Vryheid formation). In 1980 the South African Committee for Stratigraphy (SACS, 1980) introduced a formal lithostratigraphic nomenclature for the Ecca Group in the northern, distal sector of the MKB, which replaced the previously used informal Lower, Middle and Upper subdivisions with the Pietermaritzburg Shale Formation, the Vryheid Formation and the Volksrust Shale Formation.

According to the work of Cairncross (1989), the sediment dispersal and distribution of the coal seams was largely controlled by the undulating pre-Karoo topography. Extensive deposits of glacial moraines and glaciolucastrine varved sediments are evidence of glaciation dominated sedimentary processes. Subsequently to those a reworked glaciofluvial outwash plain emanated from the northward retreating ice sheets because of climatic amelioration. Immediately after this active sedimentation took place, peat accumulated on the glaciofluvial sedimentary platform (Cadle et al., 1990).

12.1.1.3 Volksrust Formation

The Volksrust formation has a general thickness of the unit is between 150-250 m and it is dominated by The Volksrust formation mainly comprises of silt-rich dark grey-green siltstones, grey to black shale containing thin, bioturbated siltstone or sandstone lenses, mudstones, with phosphatic/carbonate/sideritic concretions. Deposits of this formation interfinger laterally with the underlying Vryheid Formation and overlying Beaufort Group rock deposits. The rock sediments are fine-grained overall, indicating that the rock sediments were deposited in both lacustrine to lagoonal and shallow coastal settings. Cadle (1975) documents that the Volksrust Formation shows an overall coarsening-upward trend. Coals occur interbedded with the mudstones in places. The Volksrust Formation is postulated to have formed in shallow to deep water basinal conditions. Palaeontologically the Volksrust Formation is probably best known for its low diversity trace fossil assemblage (Tavener-Smith et al., 1988) and various organic microfossils

Karoo Dolerite

The project area is having a lot of karoo dolerite and it is said that large areas of the Ermelo Coalfield are affected by Jurassic aged dolerite intrusions, and these intrusives are probably the single most disruptive aspect of the coalfield (Barker, 1999). The dolerites form thin sub-vertical dykes and thick (30-50 m) bedding parallel sills. The

dolerite intrusions have also caused large volumes of coal to have been converted to low volatile lean bituminous or anthracitic coals. In places the coal may also have been destroyed by burning due to the dolerite intrusions. Dolerite intrusions may also be the cause of methane and water build-ups, with the coalfield known to be gassy (Paulsen and Stone, 2002).

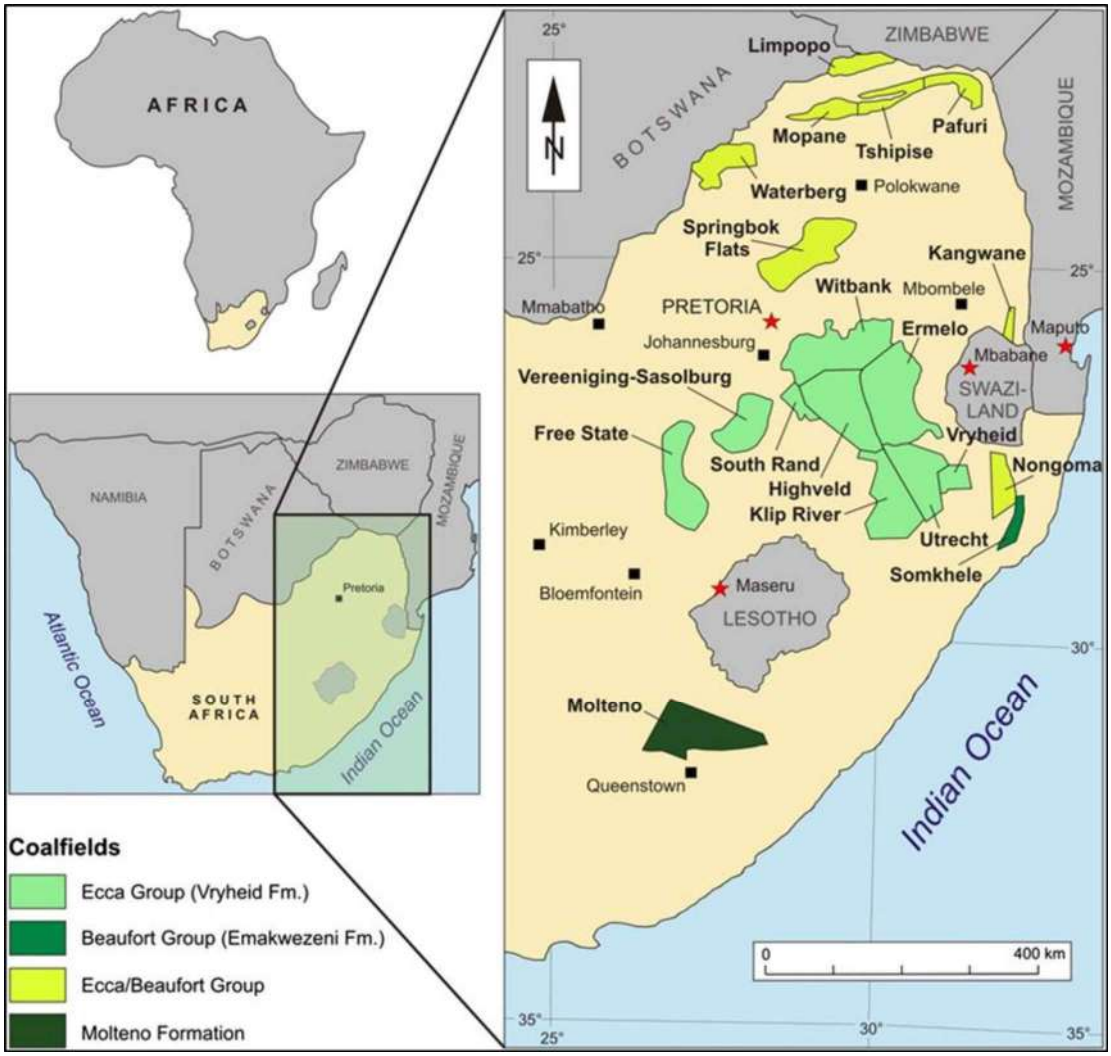


Figure 15: Coal of South Africa. (variously modified after Snyman, 1998)

12.1.2 Geology and stratigraphy

The distribution of geological formations in the project area includes rocks from the Volksrust formation in the Ecca Group of the Main Karoo Supergroup. The proposed project are falls under the Ermelo Coalfield.

12.1.2.1 Ermelo Coalfield

The Ermelo Coalfield is located in the districts of Carolina, Dirkiesdorp, Hendrina, Breyten, Davel, Ermelo and Morgenzon in the southeast Mpumalanga Province. It extends approximately 75 km east-west, and 150 km north-south, covering an area of about 11,250,000 ha. The northern and eastern boundaries of the Ermelo Coalfield are defined by the sub-outcrop of the coal-bearing strata against pre-Karoo basement. In the west, the Ermelo Coalfield shares a boundary with the Witbank and Highveld coalfields, and to the south with the Klip River and Utrecht coalfields of KZN (Greenshields, 1986).

The Coalfield generates bituminous coal. It hosts up to five coal seams within the middle Ecca Group sediments of the Karoo Supergroup, but not all are present in the various sectors. Compared to the adjacent Witbank and Highveld coalfields, the Ermelo Coalfield hosts thinner seams. Since 2004 this coalfield has however seen resurgence in exploration and mining due to the higher quality of the coals in relation to the Witbank and Highveld coalfields, as well as its proximity to the Richards Bay Coal Termina (RBCT) export coal line. The Ermelo Coalfield was previously called the Eastern Transvaal Coalfield. The Ermelo Coalfield is home to Eskom's 1600 MW capacity Camden Power Station.

Rocks of the Permian Ecca Group and Jurassic aged dolerites dominate the surface exposures of the coalfield. Five coal seams are recognised within a 80-90 m thick sedimentary succession and are named from the top to bottom (A to E seams) (Wyburgh, 1928). The basement is overlain by rocks attributable to the Dwyka Group, which throughout the Ermelo Coalfield are only poorly developed, except in the far south where the unit exhibits variable thickness (Greenshields, 1986). Where developed the Dwyka is usually confined to palaeovalleys and consists of diamictites, sandstones and siltstones, attributed to glacial deposits, such as are formed as moraines and in glacial outwash fans and lakes, and on sandur plains. Wakerman (2003) notes that on the Sheepmoor project area the Dwyka Group is between 3-30 m thick and consists of massive polymictic diamictite capped by interbedded siltstones and mudstones.

12.1.2.2 Coal Seam Geology

The coal seams in the Ermelo Coalfield are generally flat lying to slightly undulating and are separated by fine- to coarse-grained sandstones, siltstones and mudstones. The Coal field hosts up to five coal seams within an 80-90 m thick sedimentary succession

and are named from the bottom to top (E to A seams) as seen in Figure 16 below. The A, D and E seams are usually too thin to be of economic interest. However, there are three coal seams which are the most important: A Seam, B Seam, and C upper and C lower.

- Coal Seam E Seam has a thickness of up to 3 m but is of economic importance only in isolated patches in the north of the Ermelo Coalfield (Greenshields, 1986). The coal is mostly bright and banded, has a competent sandstone roof and floor and is sometimes split by a thin sandstone or carbonaceous fines parting (Greenshields, 1986). In the central and southern part of the coalfield, it is developed as a torbanite or as a carbonaceous siltstone or mudstone unit, and locally becomes too thin for mining (Greenshields, 1986).

- Coal Seam D has a thickness which ranges from 0.1 to 0.4 however, it is of good quality, but in general it is too thin to be of economic importance (Greenshields, 1986). The coal is not split by partings and it consists of large amounts of vitrain and occasional durain bands (Greenshields, 1986; Jeffrey, 2005a).

- Coal Seam C has been one of the main seam packages of economic importance throughout the Ermelo Coalfield. It is usually split by several partings which can lead to miscorrelation of the seams (Greenshields, 1986). In general, the C Seam is subdivided into the C Upper (CU) and C Lower (CL) seams. The CU Seam is well-developed over the entire coalfield and is often split by partings of different lithologies, such as sandstone, siltstone or mudstone, reaching a composite thickness of 0.7–4 m. It has historically been mined in several collieries of the Ermelo Coalfield, including the Golfview, Usutu, Goedehoop, Union, and Kobar collieries (Greenshields, 1986), as well as more recently at the Ferreira opencast mine.

The CL (C Lower) Seam is not developed throughout the entire coalfield, but where developed is between 0.5 and 2 m thick. It locally grades into carbonaceous siltstone and mudstone, which often form the roof of the seam, whereas the floor mostly consists of sandstone. It has historically been mined at the Savmore, Anthra, Ermelo, Golfview, and Wesselton mines (Greenshields, 1986; Paulson and Stone, 2002). Several other mines in and around the towns of Ermelo and Breyten have at times extracted coal from this seam including the Spitzkop, Bellevue, Grenfell, Usutu, Consolidated Marsfield, and Union collieries. The CL was also the main target seam at CCL's Ferreira opencast mine and it is also currently being mined underground at their Penumbra mine, where it occurs at an average depth of around 100 m. It is the thickest of all the coal seams

intersected here, reaching a thickness of more than 1.5 m over large parts of the project area. Locally seam floor rolls may negatively influence the thickness of the CL Seam in the Ermelo Coalfield.

- Coal seam B group varies in thickness from 1-2.7 m and may be split into three units. Greenshields (1986) terms these the B1, B and BX seams, but they are more commonly referred to as the B Lower (BL), B Upper (BU) and BX seams. Greenshields (1986). They are more commonly referred to as the B Lower Marsfield collieries, and was the seam mined at Coal's Mooiplaats Colliery, where it is between 0.6 and 2.87 m thick. The quality of the B Seam is in general inferior to that of the C Seam. The BU was mined at the end of the mine life at the old Usutu Colliery, and the BL at the Ferreira mine. At Mooiplaats the BU Seam occurs at depths of between 90 and 140 m and ranges in thickness between 0.15 m in the southeast to over 3 m in the north.

- The A Seam occurs only in the northern and central parts of the coalfield, where it varies in thickness from 0 to 1.5 m (Greenshields, 1986). Wakerman (2003) provides a weighted average thickness of 0.94 m for the seam in the Sheepmoor exploration area. Over most of the Ermelo Coalfield however this seam has been removed by erosion. Like in the Witbank and Highveld coalfields for the No. 5 Seam, the A Seam is overlain by a green glauconitic sandstone that forms a useful marker horizon and denotes the transition from a fluvio-deltaic to a marine depositional environment.

12.1.2.3 Coal Quality

Wakerman (2003) provides raw coal qualities for the A Seam in the Sheepmoor area as being 11.93 % Ash, 27.27 MJ/kg CV, 30.45 % VM, 3.85 % IM and 0.39 % TS. He notes that the most important feature of this coal was the low sulphur, which meant it could be used as a blend to reduce the higher sulphur values in the CL Seam. The BU Seam at Mooiplaats a theoretical yield of 61% can be achieved for a bituminous product with CV of 27.5 MJ/kg. The average theoretical yield for a lean coal product with an equivalent CV is somewhat lower at 47%. Average TS contents for both coal types are moderate to relatively high, ranging from about 1.4-1.8% for the washed product. The CL Seam is generally of a good bituminous quality and beneficiates well. Historically the Golfview Colliery prime export product on the CL and CU seams was a 11.3 % Ash, 32.4 % VM, 0.9 % TS coal, at 27.38 MJ/kg gross as received (GAR), and 28.11 MJ/kg gross air-dried CV.

The raw CV to the south of the project area is generally lower than 16 MJ/kg, with small and isolated areas of over 26 MJ/kg. The raw Ash of the CL Seam for most of the project

area is between 15-35%, with an isolated high reaching up to 60%. In general, the raw ash increases towards the south of the project area. The raw VM increases from the south-western portion of the project area to the northeast. In the central portion of the area the VM content reaches up to 28%

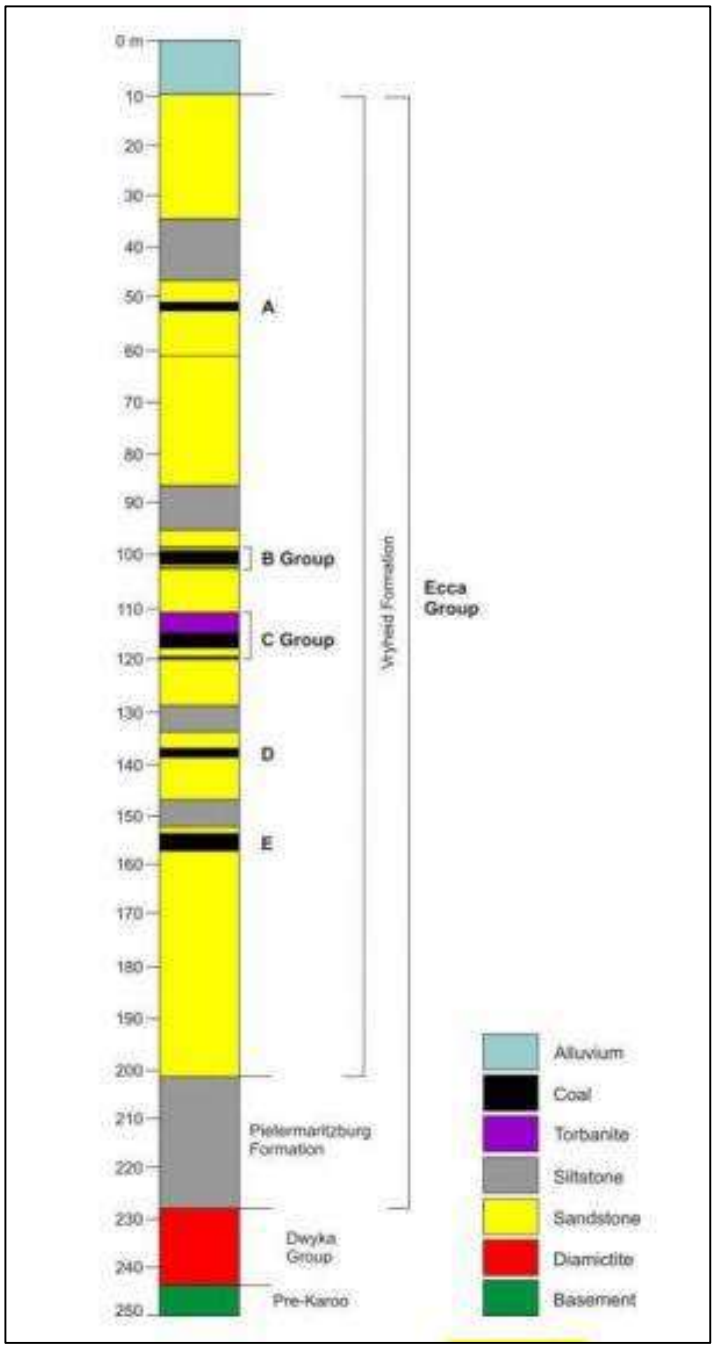


Figure 16: General stratigraphic unit of Ermelo Coalfield

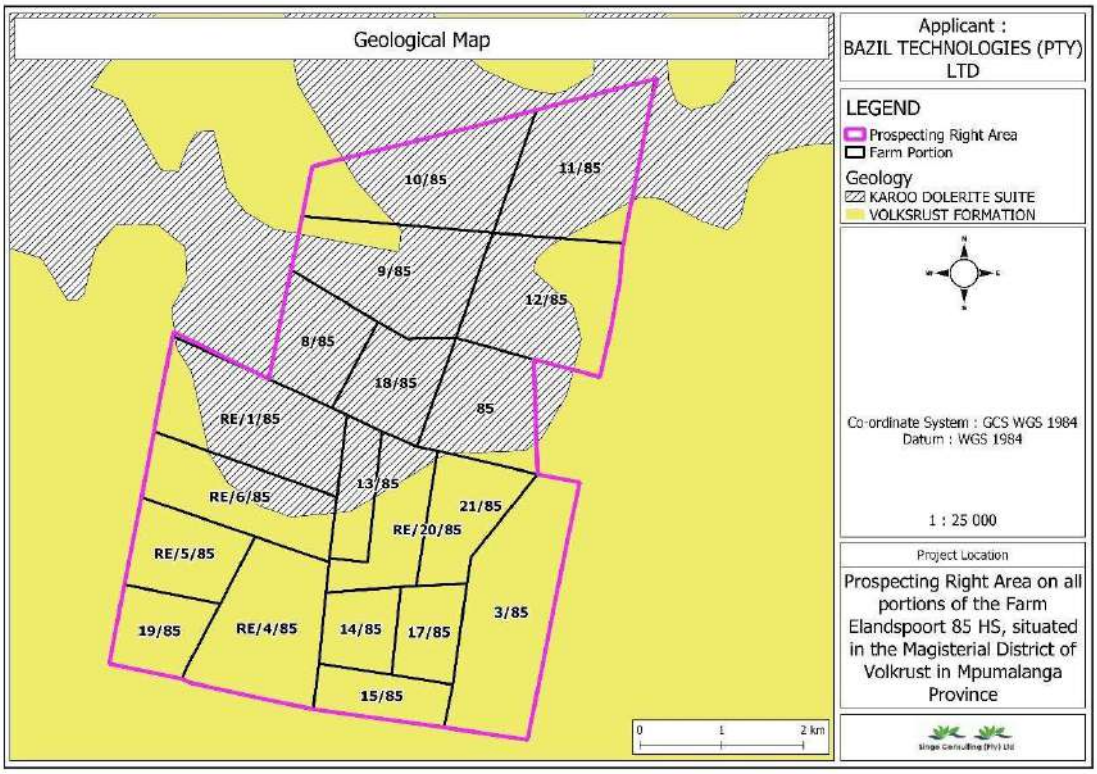


Figure 17: Geological map of the proposed project area.

12.2 Topography and drainage

Topography is the study of the shape and features of land surfaces. The topography of an area could refer to the surface shapes and features themselves, or a description (especially their depiction in maps). Topography is a field of geoscience and planetary science and is concerned with local detail in general, including not only relief but also natural and artificial features, and even local history and culture.

As indicated in Figure below, the proposed prospecting area is characterized by gentle slopes and the project area does not have mountains or hills. This can be seen on the topographical map below. During rainy seasons, water flows from high elevation to low elevation, as illustrated by contour lines. The proposed prospecting project falls within the Gert Sibande Region with topography of the project area is situated in a gentle topographical range from 1660 - 1760 mamsl.

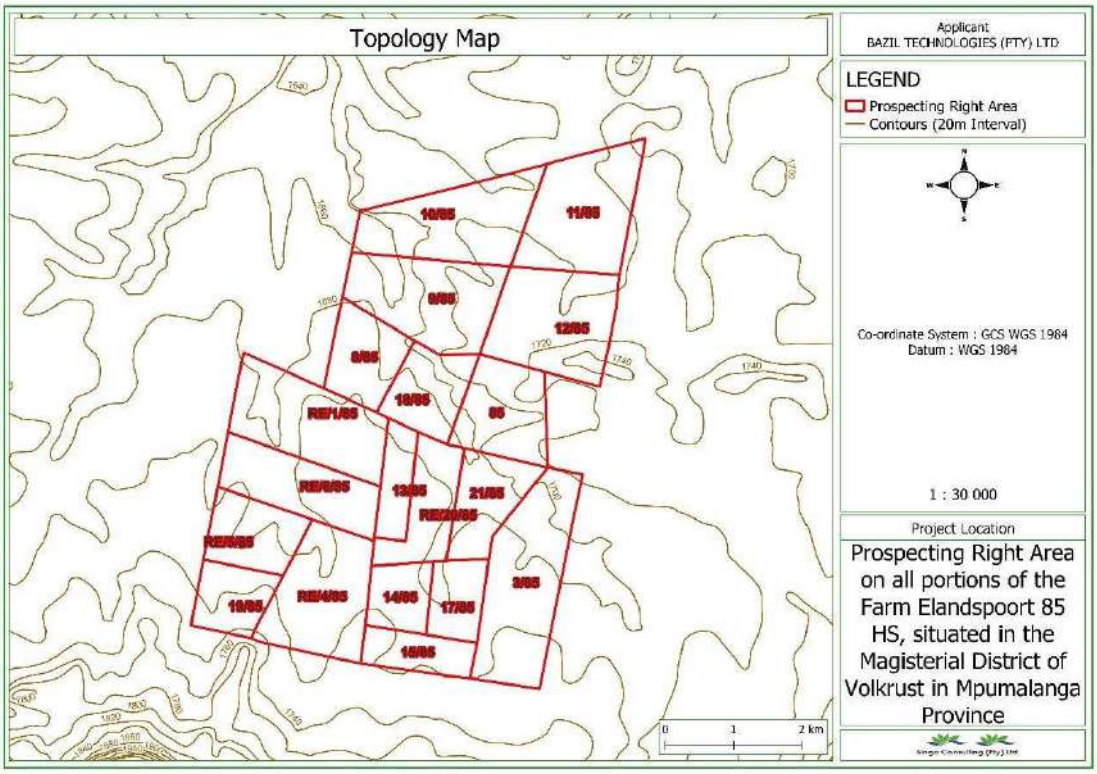


Figure 18: Topological and Hydrological map of the proposed project area.

12.3 Climate

Climate is basically the statistics of weather conditions over long periods of time. It entails patterns of temperature, humidity, wind, precipitation, atmospheric particle count in a region over long periods of time.

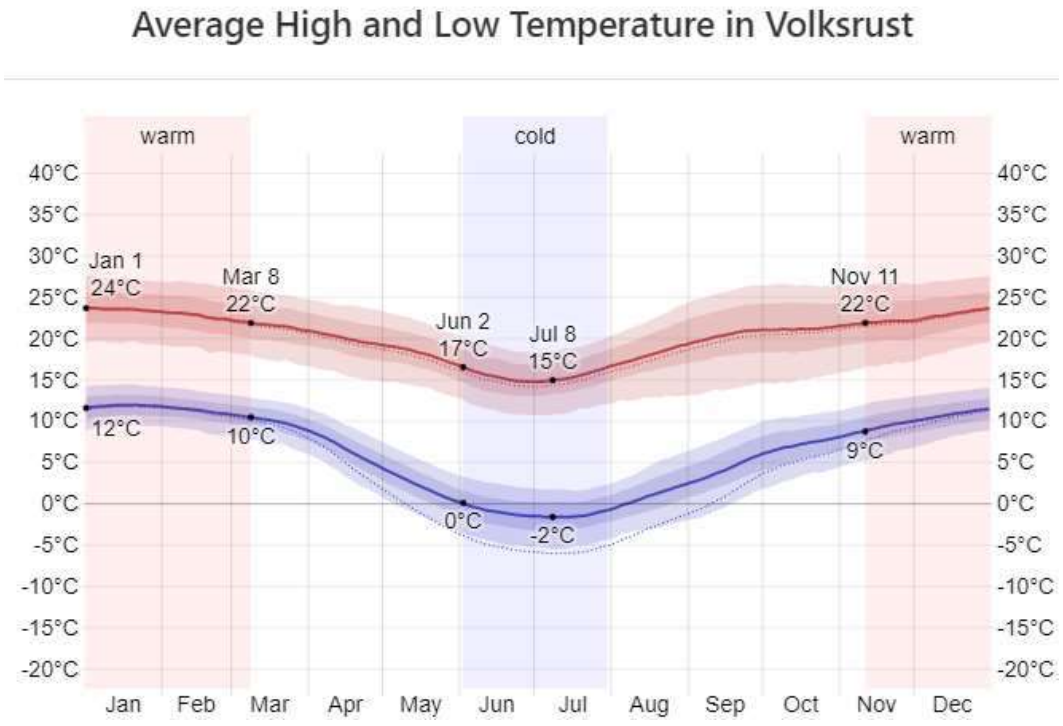
i. Average weather

Average Weather in Volksrust, the summers are comfortable, wet, and partly cloudy and the winters are short, very cold, snowy, and mostly clear. Over the course of the year, the temperature typically varies from -2°C to 24°C and is rarely below -5°C or above 28°C.

ii. Temperature

In the proposed project area, the warm season lasts for 3.9 months, from November 11 to March 8, with an average daily high temperature above 22°C. The hottest month of the year in Volksrust is January, with an average high of 24°C and low of 12°C.

The cold season lasts for 1.9 months, from June 2 to July 30, with an average daily high temperature below 17°C. The coldest month of the year in Volksrust is July, with an average low of -1°C and high of 16°C.



The daily average high (red line) and low (blue line) temperature, with 25th to 75th and 10th to 90th percentile bands. The thin dotted lines are the corresponding average perceived temperatures.

Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
High	24°C	23°C	22°C	20°C	18°C	15°C	16°C	18°C	20°C	21°C	22°C	23°C
Temp.	17°C	16°C	15°C	13°C	10°C	6°C	6°C	9°C	12°C	14°C	15°C	16°C
Low	12°C	11°C	10°C	6°C	2°C	-1°C	-1°C	1°C	4°C	7°C	9°C	11°C

Figure 19: Graph showing summary of average temperature for the proposed site.

(Source: www. weatherspark.com)

The mean minimum annual temperature for the proposed project area ranges from -1.9 Degree Celsius to 0 Celsius as seen in figure below.

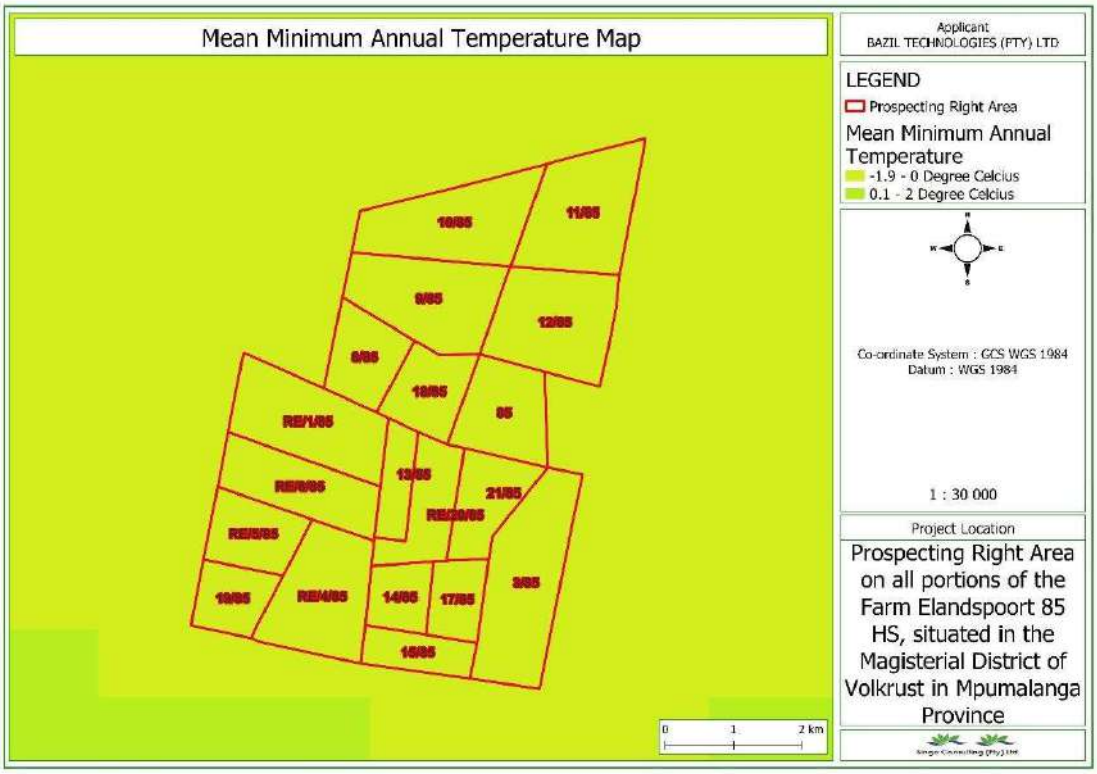


Figure 20: Map showing mean minimum annual temperature for the proposed site.

iii. Precipitation

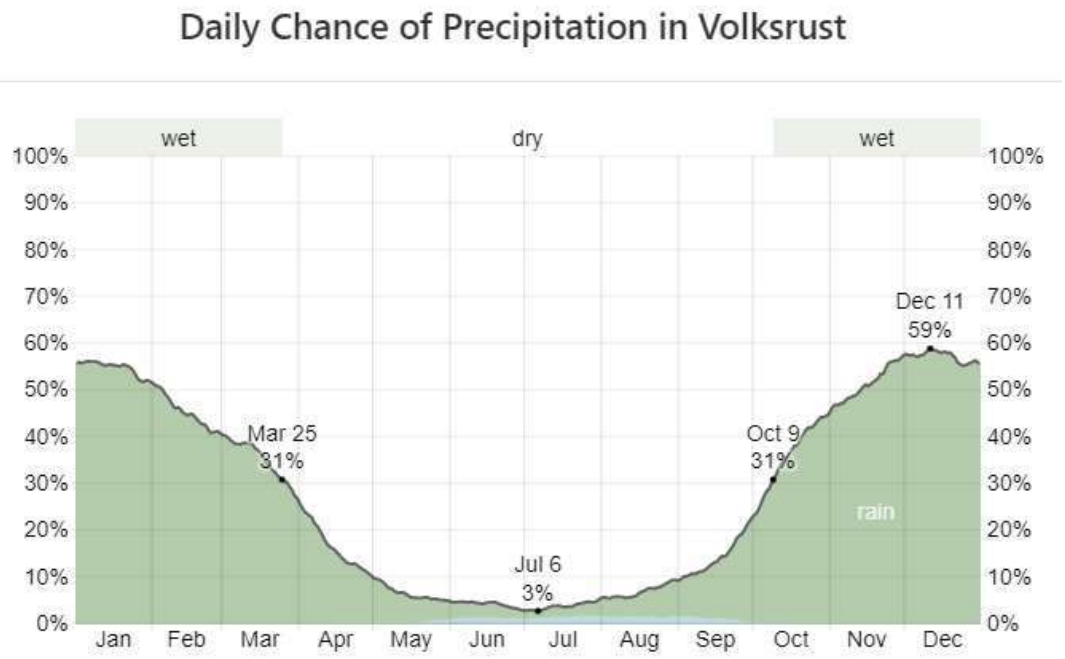
A wet day is defined as one with at least 1 millimeter of liquid or liquid-equivalent precipitation, according to meteorological forecasters. The probability of rainy days in Volksrust fluctuates dramatically throughout the year.

From October 9 to March 25, the rainier season lasts 5.5 months, with a more than 31% chance of rain on any given day. December has the most wet days in Volksrust, with 17.7 days with at least 1 millimeter of precipitation on average.

From March 25 until October 9, the drier season lasts 6.5 months. In Volksrust, July has the fewest wet days, with an average of 1.2 days with at least 1 millimeter of precipitation.

We distinguish between days with rain only, snow only, or a combination of the two types of precipitation. With an average of 17.7 days of rain every month in Volksrust, December is the month with the most rain days. Rain alone is the most common sort of

precipitation throughout the year, according to this classification, with a high chance of 59 percent on December 11.



The percentage of days in which various types of precipitation are observed, excluding trace quantities: rain alone, snow alone, and mixed (both rain and snow fell in the same day).

Days of	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rain	17.0d	12.6d	10.7d	4.8d	1.8d	0.8d	0.7d	1.7d	4.0d	11.3d	15.5d	17.7d
Mixed	0.0d	0.0d	0.0d	0.0d	0.0d	0.1d	0.1d	0.1d	0.0d	0.0d	0.0d	0.0d
Any	17.0d	12.6d	10.7d	4.8d	1.9d	1.2d	1.2d	2.1d	4.4d	11.3d	15.5d	17.7d

Figure 21: Graph showing summary of average Precipitation for the proposed site.

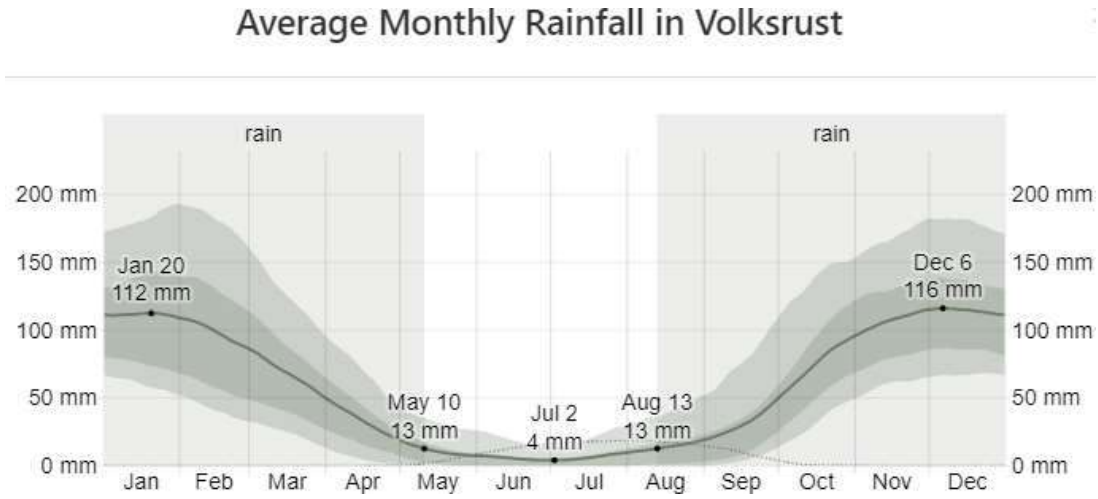
(Source: www. weatherspark.com)

iv. Rainfall

This shows the rainfall accumulated over a sliding 31-day period centered on each day of the year to show variance between the months rather than just the monthly totals. The monthly rainfall in Volksrust varies greatly depending on the season.

From August 13 to May 10, the rainy season lasts 8.9 months, with a typical 31-day rainfall of at least 13 millimeters. December is the wettest month in Volksrust, with an average rainfall of 115 millimeters.

From May 10 to August 13, the year's rainless season lasts 3.1 months. June is the driest month in Volksrust, with an average rainfall of 6 millimeters.



The average rainfall (solid line) accumulated over the course of a sliding 31-day period centered on the day in question, with 25th to 75th and 10th to 90th percentile bands. The thin dotted line is the corresponding average snowfall.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall	112.1mm	100.1mm	68.4mm	33.8mm	10.4mm	5.5mm	5.9mm	13.7mm	29.1mm	76.0mm	107.4mm	114.9mm

Figure 22: Graph showing summary of average monthly rainfall for the proposed site.

Source: www. weatherspark.com)

The proposed project area receives mean annual rainfall range from 601 mm to 800 mm as indicated in figure below.

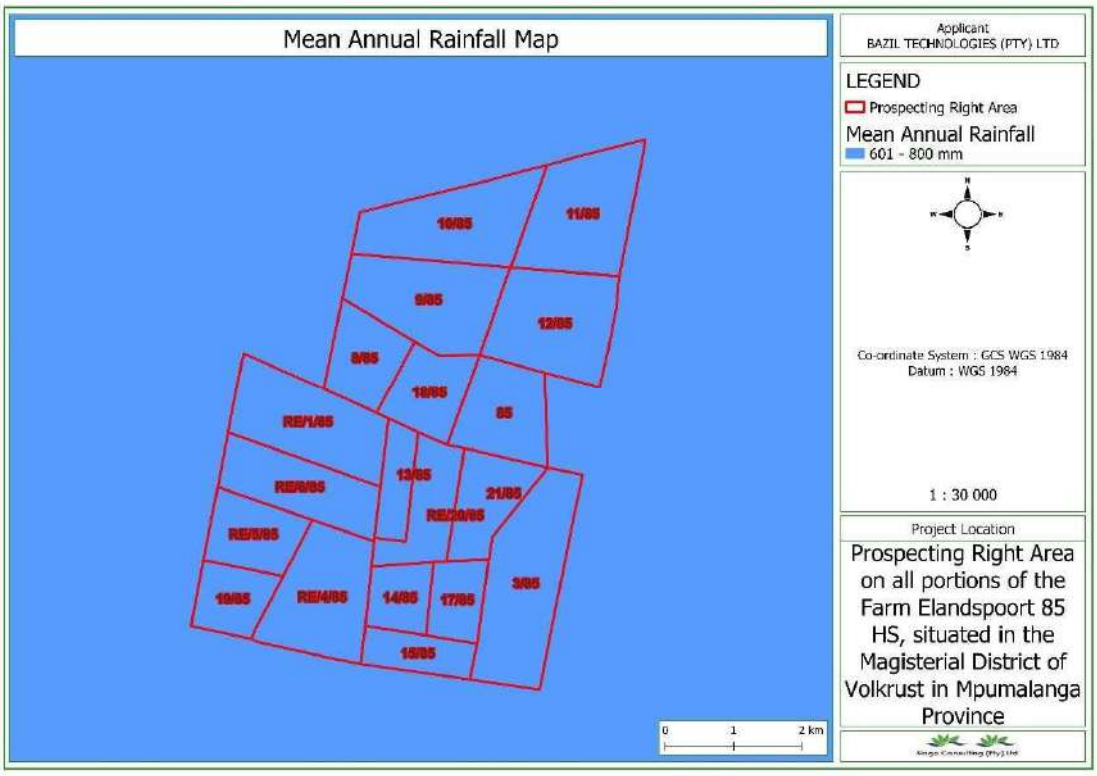


Figure 23: Map showing mean annual rainfall for the proposed site.

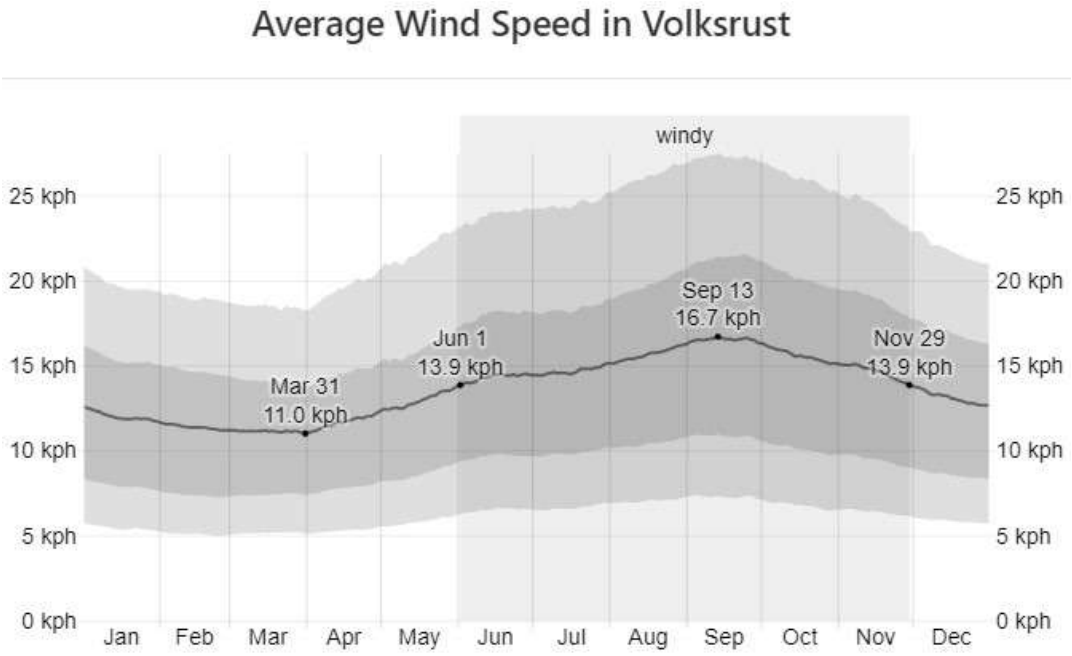
v. Wind

The hourly average wind vector (speed and direction) at 10 meters above the ground is discussed in this section. The wind at any given site is highly dependent on local topography and other factors, and immediate wind speed and direction can fluctuate significantly more than hourly averages.

Over the course of the year, the average hourly wind speed in Volksrust varies significantly by season.

From June 1 to November 29, the windier half of the year lasts 5.9 months, with average wind speeds of more than 13.9 kilometers per hour. September is the windiest month in Volksrust, with an average hourly wind speed of 16.5 kilometers per hour.

From November 29 to June 1, the calmer season lasts 6.1 months. With an average hourly wind speed of 11.2 kilometers per hour, March is the calmest month of the year in Volksrust.



The average of mean hourly wind speeds (dark gray line), with 25th to 75th and 10th to 90th percentile bands.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind Speed (kph)	12.0	11.4	11.2	11.7	13.0	14.3	14.7	15.7	16.5	15.6	14.6	13.1

Figure 24: Graph showing summary of average wind speed for the proposed site.

(Source: www. weatherspark.com)

12.4 Air Quality

The main objective of the Air Quality Impact Assessment is to determine the potential impact of emissions from the operational activities associated with the proposed Elandspoort prospecting project on ambient air quality.

The assessment of the ambient air quality is based on available ambient air quality information identified in the literature review and data supplies by the Department of Environmental Affairs (DEA) and the South African Weather Service (SAWS).

Regional Ambient Air Quality

From veld fires to industrial processes, agricultural, mining activities, electricity generation, paper and pulp processing, vehicle use, and home use of fossil fuels, Mpumalanga suffers a wide spectrum of both natural and anthropogenic sources of air pollution. Each of the following activities is linked to a variety of pollutants, ranging from volatile organic compounds and heavy metals to dust and smells.

The proposed Prospecting area is in the Mpumalanga Highveld Priority Area which has been declared by the Minister of Environment and Tourism in terms of section 18 (1) and 57 (1) of the National Environmental Management: Air Quality Act, No. 39 of 2004. Ambient air quality in Mpumalanga is strongly influenced by regional atmospheric movements, together with local climatic and meteorological conditions. The most important of these atmospheric movement routes are the direct transport towards the Indian Ocean and the recirculation over the sub-continents (Scholes, 2002) Mpumalanga suffers from a wide range of natural and anthropogenic causes of air pollution, including veld fires, industrial processes, agricultural, mining activities, electricity generation, paper and pulp manufacturing, vehicle use, and domestic use of fossil fuels. Each of the activities listed below has been connected to a variety of contaminants, ranging from VOCs and heavy metals to dust and odors.

Mpumalanga experiences distinct weather patterns in summer and winter that affect the dispersal of pollutants in the atmosphere. In summer, unstable atmospheric conditions result in mixing of the atmosphere and rapid dispersion of pollutants. Summer rainfall also aids in removing pollutants through wet deposition. In contrast, winter is characterized by atmospheric stability caused by a persistent high-pressure system over South Africa. This dominant high-pressure system results in subsidence, causing clear skies and a pronounced temperature inversion over the Highveld. This inversion layer traps the pollutants in the lower atmosphere, which results in reduced dispersion and a poorer ambient air quality. Preston-Whyte and Tyson (1988) describe the

atmospheric conditions in the winter months as highly unfavorable for the dispersion of atmospheric pollutants.

Plumes emitted at night from stacks during stable conditions can be transported up to thousands of kilometres downwind of the source before reaching ground level in a well diluted state. During daytime however, strong convection currents transport plumes upward and downward whilst drifting downwind (Mpumalanga State of Environment report, 2003). Pollutants thus reach ground level close to the point source of emission and are well diluted 45 due to convective mixing (Turner, 2001). Emissions at low levels (such as from mine residue deposits, households or vehicles) do not disperse much at night because of the atmospheric stability, resulting in high concentrations of pollutants at ground level despite the relatively low emissions quantities. During the day, these low-level emissions are readily mixed into the convective layer close to the earth's surface (Turner, 2001), which results in lower concentrations of pollutants at ground level and better air quality.

12.5 Groundwater

Groundwater is as varied as the rock types in which they occur and as intricate as the formation of the crust, through geologic time. The occurrence and movement of groundwater is controlled by several factors such as Climate, Hydrology, Geology, Topography, Ecology and Soil-distribution.

The fractured aquifer system (from 15 to 40 meters) under the weathered zone is well cemented and does not enable significant water flow. As a result, all groundwater movement occurs along secondary features in the rock, such as fractures, cracks, and joints. Sandstone and quartzite have the best development of these structures, which explains why the latter rock type has better water yielding qualities. Except when worn, dolerite sills and dikes are largely impervious to water movement. The fractured aquifer always has higher salt loading than the upper worn aquifer in terms of water quality. A prolonged contact time between the water and the rock is responsible for the increased salt concentrations (IGS, 2008).

Below is a cross sectional figure of a typical fractured aquifer. Water exists in fractures in Karoo weathered aquifers. Two important characterizations that exist in the study area is the upper weathered aquifer system and the lower fractured aquifer system. If the purpose of drilling boreholes is for the supply of water, drillers will usually be directed to drill targeting the fault zones, however in the present study where the boreholes to

be drilled are for Coal exploration, fault zones and contacts should be avoided at all costs, to minimize the impact to groundwater. The boreholes drilled must be cased to avoid clogging and contamination.

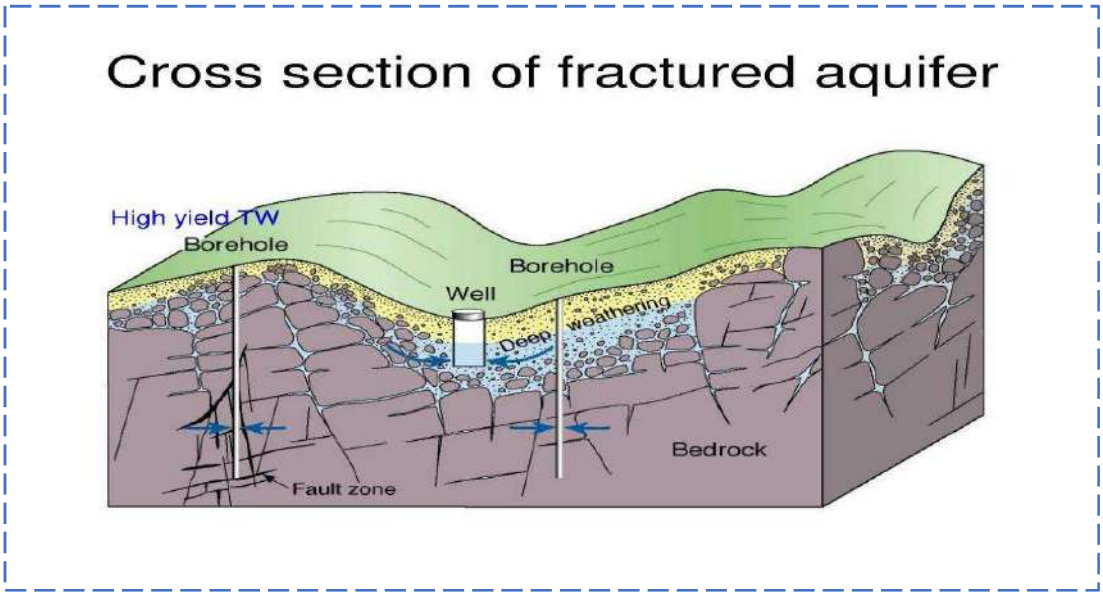


Figure 25: Cross section of a fractured aquifer

Potential contaminants

According to the specialist study, the potential contaminants for the prospecting of Coal are minimal and can be controlled easily as this activity will only take place for a short period of time. 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 (e.g., from drill rigs).

Absorbent Spill kits as seen in figure below will be made available near the drill rigs during drilling activities refer to Figure below. The oil absorbent chemicals will ensure that no oils infiltrate down to the underground to cause any groundwater contamination. Regarding soil erosion, the proposed boreholes will be located on gentle flat lying area, no drilling will take place in steeply terrains to avoid erosion, no vegetation will be removed or affected other than the only 0.6ha being applied for, whereby revegetation as part of rehabilitation will take place soon after each borehole is drilled

Figure 26: Example of Absorbent spill kits to be used.

12.6 Surface Water (Rivers)

The hydrology surrounding the proposed area is very importance during prospecting. In this context hydrology is all the surface waters appearing within and nearby the proposed project area, where a potential to be impacted upon by the project exist. The hydrology map (figure below), illustrates that the following water bodies exists within and nearby the project area:

- Perennial river
- Non-Perennial River
- Channelled valley-bottom wetland
- Depression
- Seep

These are important natural water resources that should not be disturbed by anthropogenic activities. Freshwater Ecosystem Priority Areas are located in and around the proposed site. Freshwater Ecosystem Priority Areas (FEPAs) are strategic

spatial priorities for conserving freshwater ecosystems and supporting the sustainable use of water resources for this project where prospecting right poses a risk on them, there should be measures and guidelines put in place that will protect the water resources in this area to ensure optimal conservation of water. The prospecting right will take place during dry seasons where the water percentages are exceptionally low in the water bodies. Drilling activity will not be conducted near these water resources, the exploration geologists will be advised to drill and sample away from rivers and wetlands on site.

Extreme caution should be taken during prospecting, owing to the perennial, non-perennial rivers and numerous wetlands existing nearby and within the project area. all rivers and wetlands will be buffered by 500m buffer zone as a no-go area as indicated on buffer map below (Figure 27).

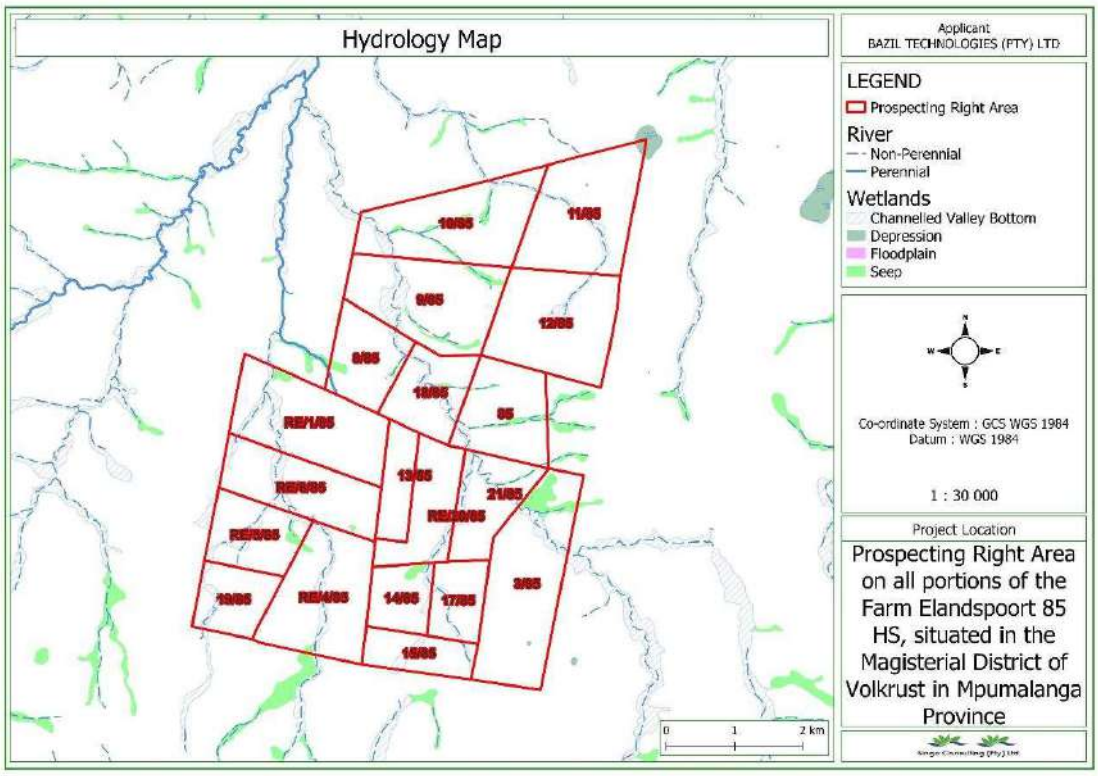


Figure 27: Hydrological map of the proposed project area.

The prospecting area falls within the Vaal Water Management Area (WMA). The farm portions of the prospecting right fall within the main quaternary catchment C11E. The C11E catchment covers an extent of 1157 km2, a mean annual evaporation (MAE) of 1400 mm, a mean annual precipitation (MAP) of 697 mm and a mean annual runoff

(MAR) of 66.87 mcm. Figure below illustrates the Quaternary catchment and the Water Management Area (WMA).

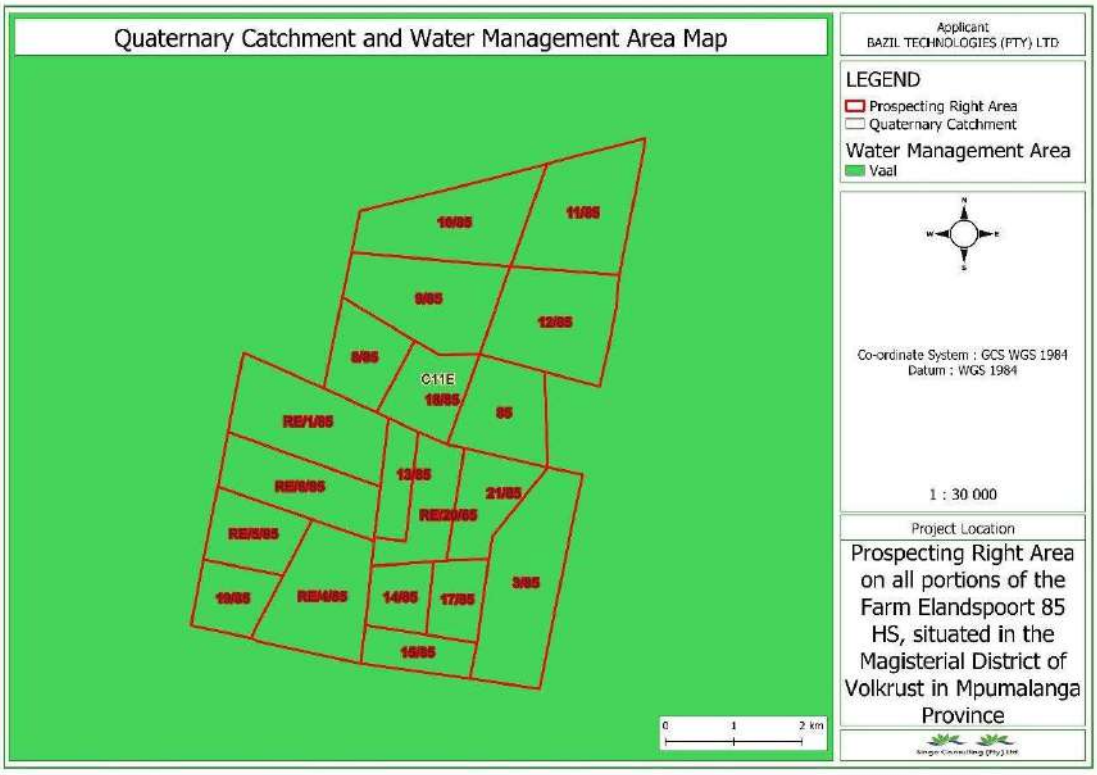


Figure 28: Quaternary Catchment and WMA of the proposed prospecting project.

According to MBSP Freshwater Assessment map as seen in figure below indicating the presence of Strategic Water Source Area and ESA Important Sub-Catchments on other portions of proposed prospecting area.

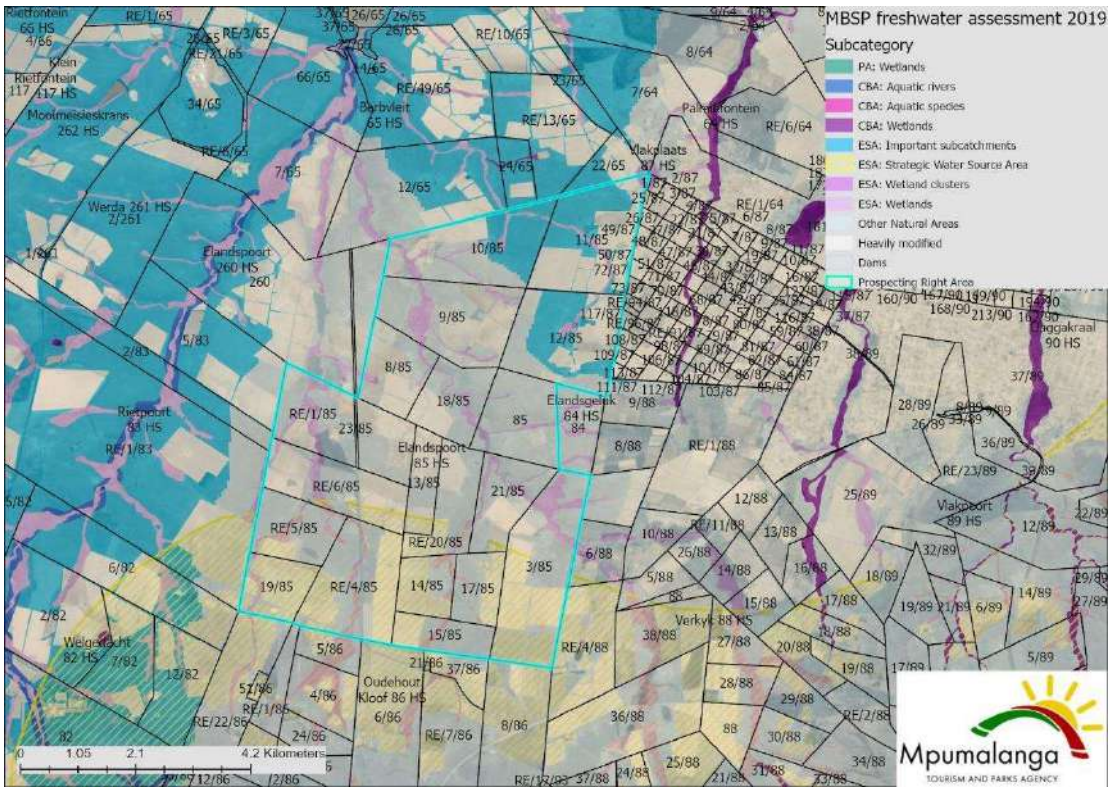
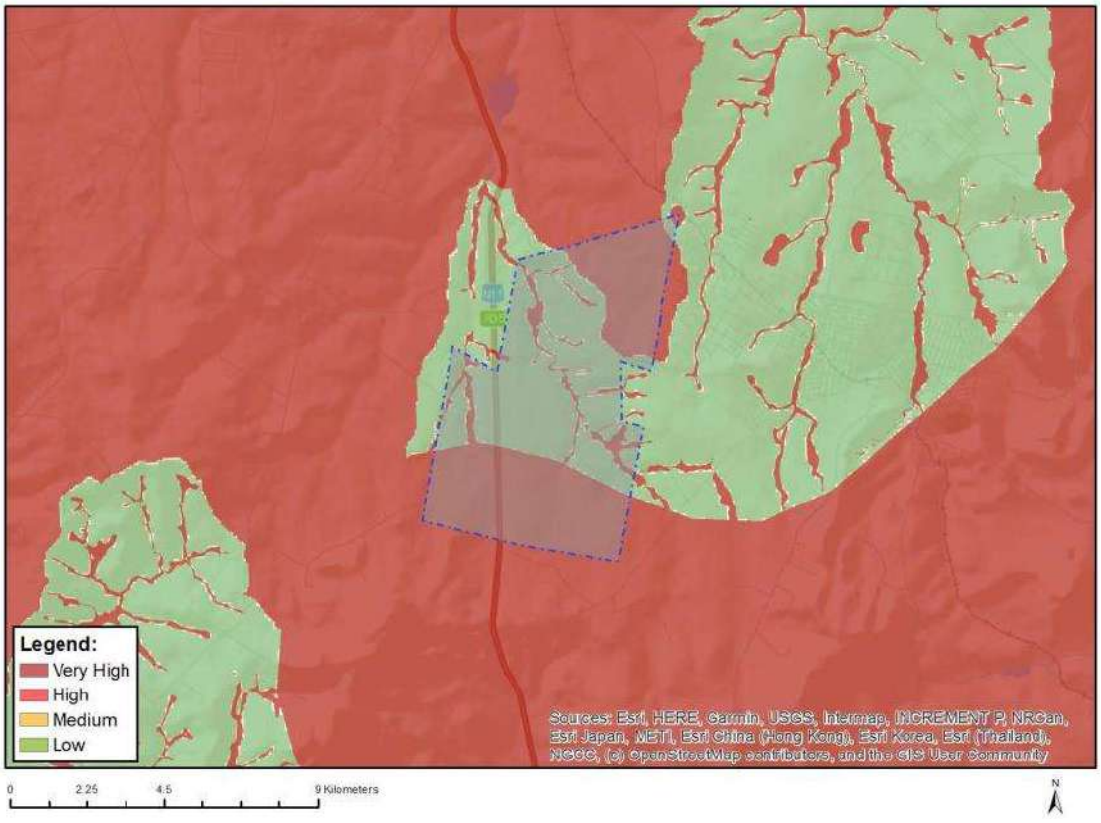


Figure 29: MBSP Freshwater Assessment on the farm Elandspoort 85 HS.

The screening report that has been developed revealed that the proposed prospecting area has an aquatic biodiversity that is of low sensitivity and very high sensitivity with features including the Strategic Water Source Area, Wetlands and Estuaries, and Freshwater ecosystem priority area quinary catchment (seen in figure below). The buffers will ensure no physical prospecting will take place on the observed water resources within the project area.

MAP OF RELATIVE AQUATIC BIODIVERSITY THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Figure 30: Map of relative aquatic biodiversity theme sensitivity. *(Source: screening report)*

A 500 m radius buffer zone from the boundary (extent) of any wetlands within the proposed project area was delineated and mapped to avoid negative impacts. Detailed information was outlined on specialist study (Hydrogeological study). Please refers to Appendix L.

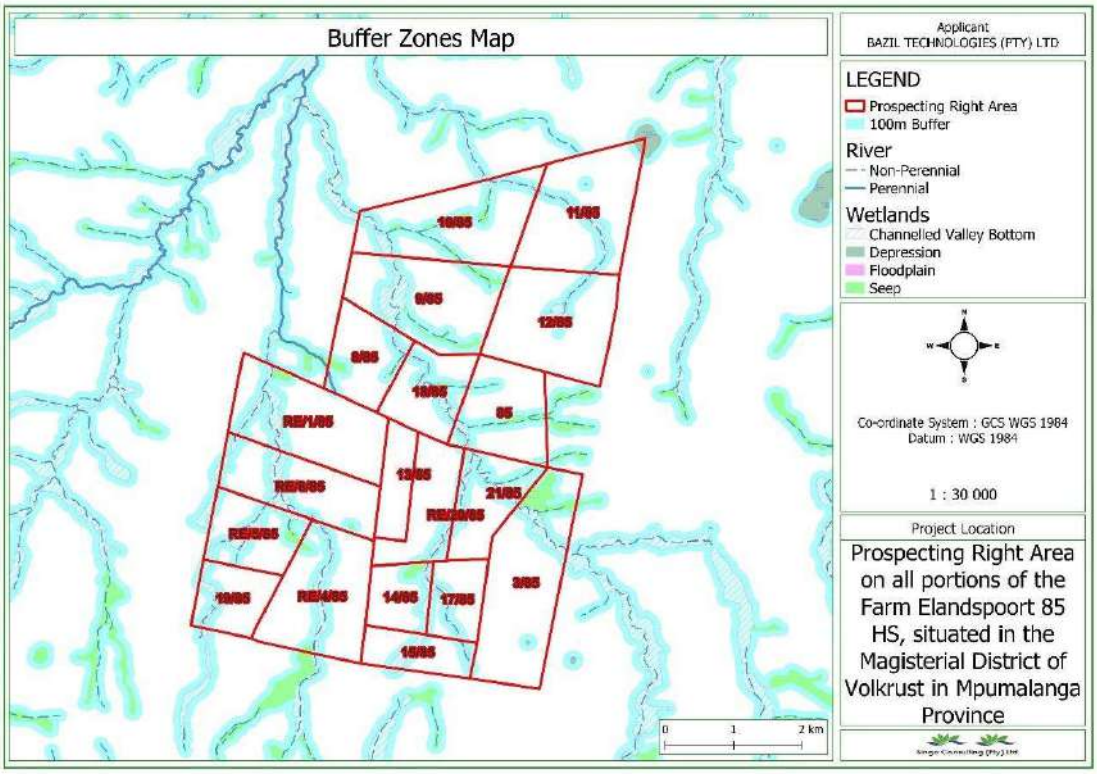


Figure 31: Buffer map of the proposed project area.

12.7 Soils

Soil is the natural medium for growth of plant species. Soil is also considered the most important as it supports plant development, fibres, food supply, drugs etc. It is important to understand soil texture as it influences "the amount of water the soil can hold, rate of water movement through the soil" and soil fertility (determines the characteristics which plays a crucial role in plant development.

As shown by figure below, the proposed project area falls within class 17 and 19 which is characterised by structure less and textural contrast soils and the Lithosols which is characterised by shallow soils on hard weathering rock. These soils have low water carrying capacity, subjected to soil erosion.

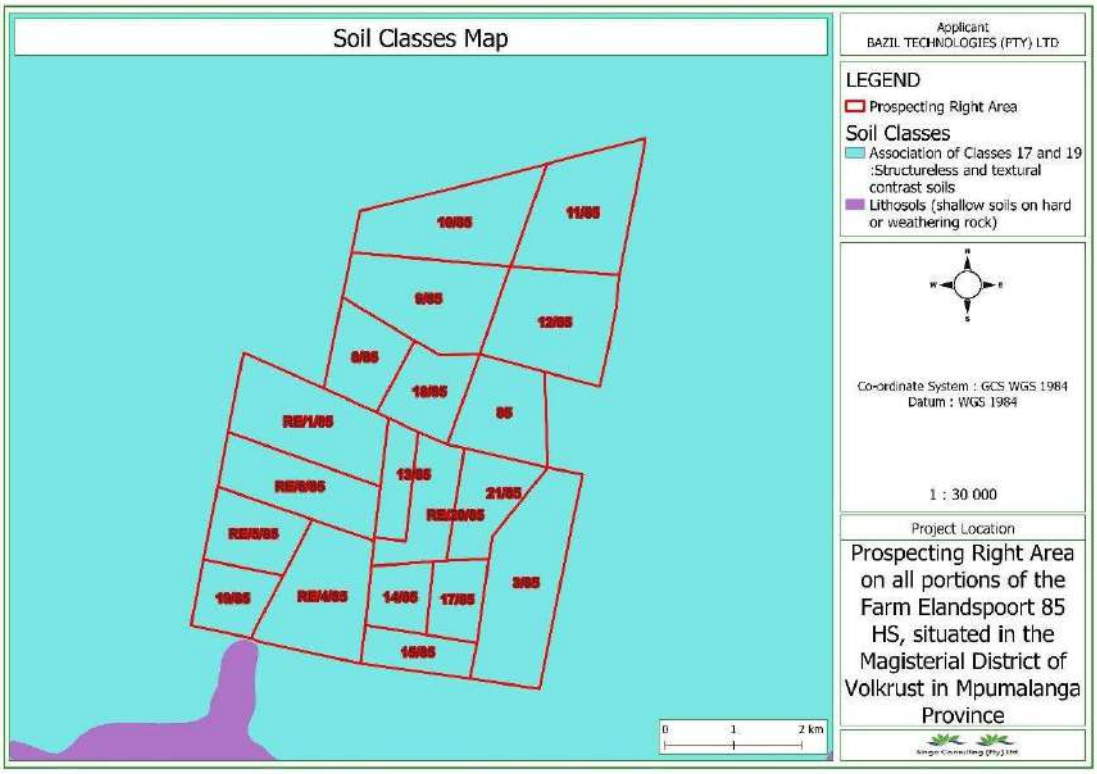


Figure 32: Soil Classes map of the proposed project area.

Figure 33: Soil type of the proposed project area.

12.8 Vegetation (Flora)

Vegetation units are present in the proposed project area are Moist Sandy Highveld Grassland (see figure below) falls within the Grassland Biome of South Africa (Mucina

& Rutherford, 2006). The Moist Sandy Highveld Grassland is found in the sandy plains west of the Belfast Carolina-Ermelo area, and north of Volksrust (Mpumalanga), at an altitude of 1,600 to 1,800 m. The grassland is dominated by *Eragrostis plana, E. curvula, Heteropogon contortus, Trachypogon spicatus and Themeda triandra. Dicotyledonous forbs* are not abundant, but many species occur in the area (Van Rooyen & Bredenkamp, 1998). The distribution of this vegetation is controlled by rainfall on the cold, frosty, eastern Mpumalanga highveld together with sandy soils. It is generally very suitable for crop production while areas of natural vegetation are heavily grazed by sheep and cattle. The conservation status is considered very poor, being restricted to patchy remnants, which are often heavily grazed.

The proposed site falls in the Grassland biome and the Mesic Highveld Grassland bioregion. The vegetation classifications describe the vegetation of the area as belonging to the Rand and Eastern Highveld Grassland vegetation types. The area has a woody species component, however, most wood species in the area (including *Pinus sp,Eucalyptus camaldulensis* and *Acacia mearnsii*) are exotic. Some of the areas in the proposed site are home to terrestrial grasslands, which have not been cultivated due to very stony soil. *Hyparrhenia dissoluta*, *Eragrostis rotifer*, *E. gummiflua*, *E. curvula*, *Pogonarthria squarrosa*, *Aristida congesta* and *Stoebe vulgaris* are common in sandy, disturbed veld (Mucina and Rutherford, 2006).

12.8.1 Moist Sandy Highveld Grassland

The vegetation comprises short, closed grassland, largely dominated by a *Sporobolus indicus (L)R. Br* often severely grazed by livestock to form a short lawn. The following floral species were recorded scattered in the grassland during ground truthing on the proposed site: *Parthenium hysterophorus L* (Santa Maria), *Hyparrhenia hirta (L) Stapf* (South African bluestem), *Cynodon dactylon (L) pers* (Bermuda Grass), *Olea europaea L.* (Olive), *Populus nigra L.* (Lombardy poplar), *Verbena rigida Spreng.* (Slender vervain), *Artemisia herba-alba Asso* (White wormwood), *Rumex crispus L* (Curly Dock), *Sporobolus indicus (L)R. Br* (Giant Parramata grass), *Stoebe vulgaris* (Slangbos), *Eragrostis plana*, *Eragrostis curvula* (Weeping lovegrass), *Heteropogon contortus* (Poaceae), *Trachypogon spicatus* (Grey-beard grass), *Themeda triandra*, (Red Grass) *Hypochaeris radicata*, *Cirsium ferox (L.) DC (Platte thistle)*, and *Ledebouria ovatifolia* (Flat-leaved African hyacinth).

The Plants species (as seen in Table below) that are important in terms of their conservation value, and which may be present within and surrounding of the study area was obtained from the Mpumalanga Tourism and Parks Agency.

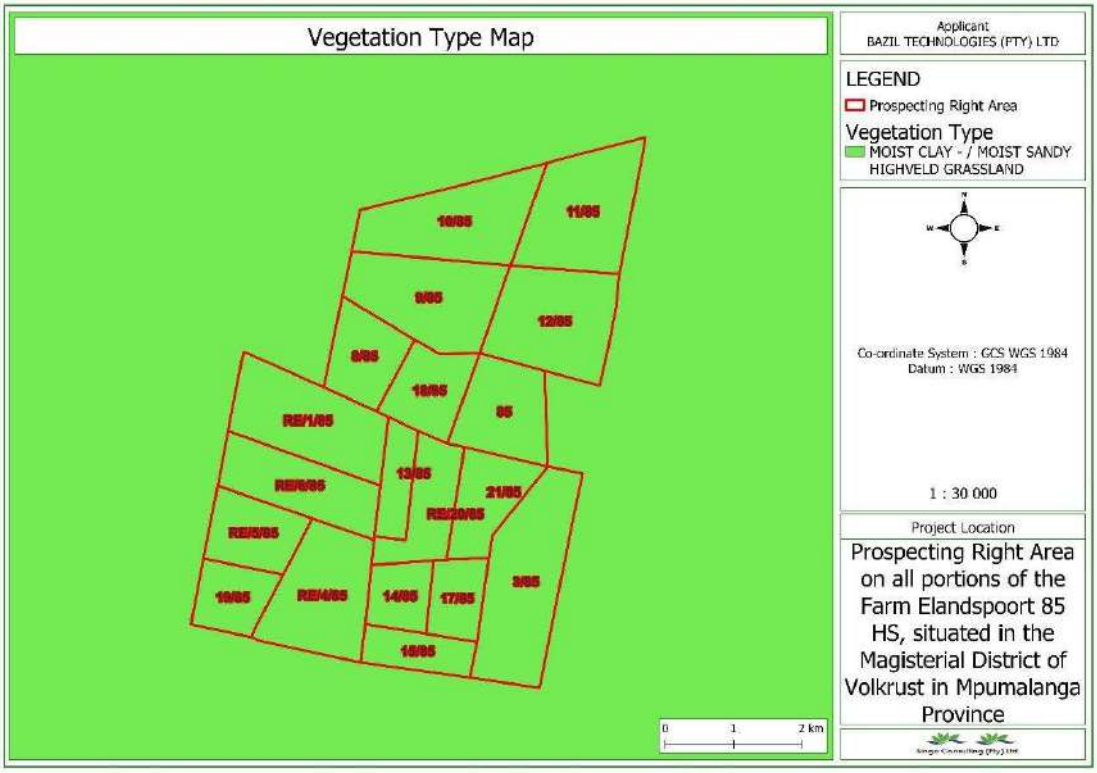


Figure 34: Vegetation type map of the proposed project area.

Figure 35: Vegetation type of the proposed project area.

12.8.2 Species of Conservation Concern

No Species of Conservation Concern (SCC) or protected species were encountered at the time of the assessment and the probability of SCC or protected species occurring within the study area is considered to be very low due to the current transformed state of the vegetation.

12.9 Animal Life (Fauna)

Fauna is all the animal life present in a particular region or time. Fauna expected to occur on site include assemblages within terrestrial and riverine ecosystems, including mammals, birds, reptiles, amphibians and invertebrates.

12.9.1 Mammals

The occurrence of mammal species is largely dependent on the availability and diversity of habitats, such as vegetated areas, rocky outcrops, arboreal, wetlands and/or rivers, within the study area, or region. Therefore, the presence or potential for mammals to occur within a specific study area can be inferred by assessing the habitat types on-site considering their known distribution ranges. The lack of habitat availability and diversity within the study area associated with this project drastically reduced the probability of occurrence and refuge identified to provide suitably sleeping, breeding, and forging for mammal species.

The proposed prospecting area comprises of wetlands, non-perennial rivers and moist Sandy Highveld grassland (as seen in figure below) which play an important role as microhabitat for avifauna species that may use the surrounding grassland for foraging and roosting.

Domestic animals like cattle, donkeys and horses were observed grazing on site during site assessment (see in figure below). In some areas of the proposed site, farmers harvest fodder for live-stock feeding A fox was also observed on site, which indicates that the area is in relatively good condition, and likely to support a diversity of mammal species. The Species Status Report from the Mpumalanga Tourism and Parks Agency confirms that there are no red/protected mammal species on site (refers to appendix L).

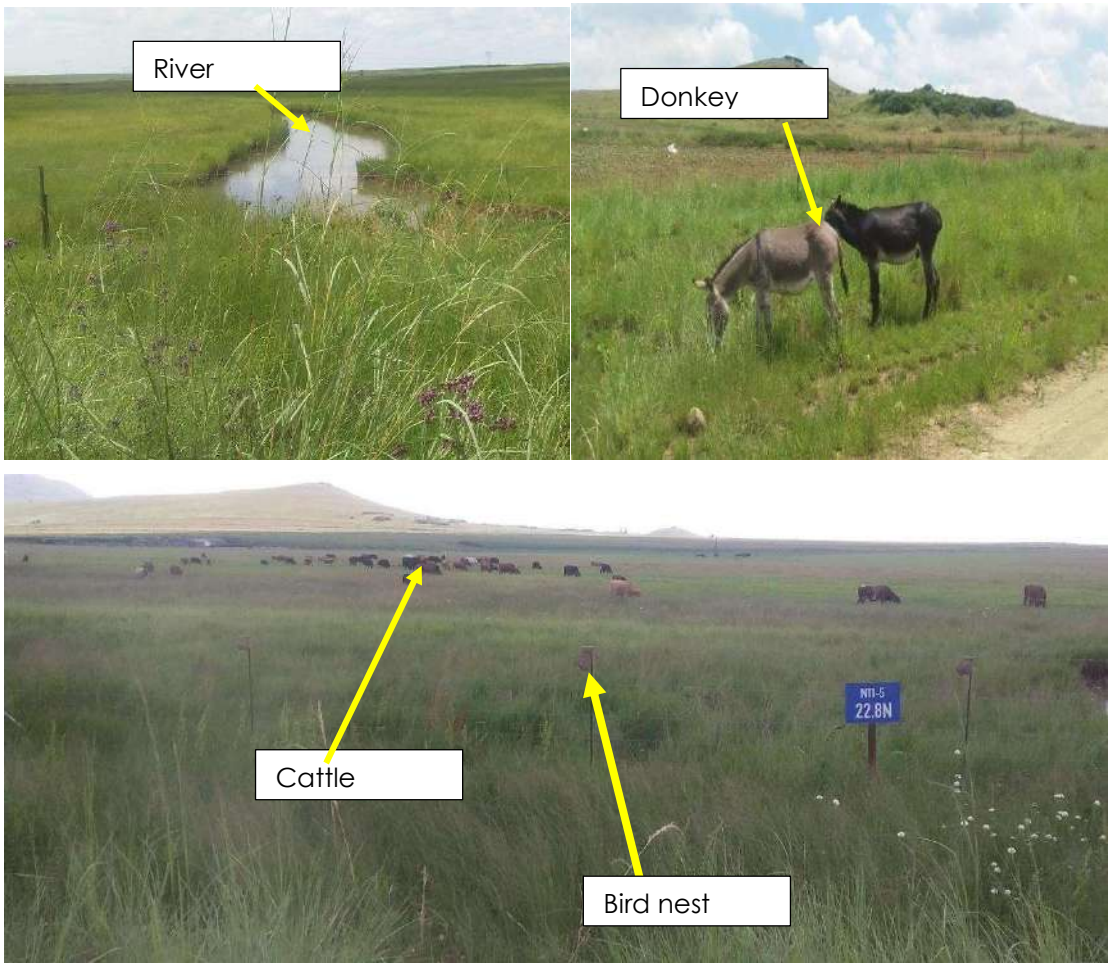


Figure 36: Animals found within the proposed project area.

As the proposed point-impact development would not result in a significant destruction of altered highly degraded habitat it would pose little risk to the sparse existing mammal population

The fauna at the site will not be impacted by the proposed processing activity, as they will be able to move away from or through the site towards unharmed area. Workers must be educated, trained, and managed to ensure that no fauna at the site is harmed. Upon commencement of the proposed processing activities, the processing area will be fenced off to prevent livestock, such as cattle, and other animals from wandering into the work areas. The high levels of transformation and cultivation disturbance has resulted in areas with transformed habitat that have a medium – low ecological function.

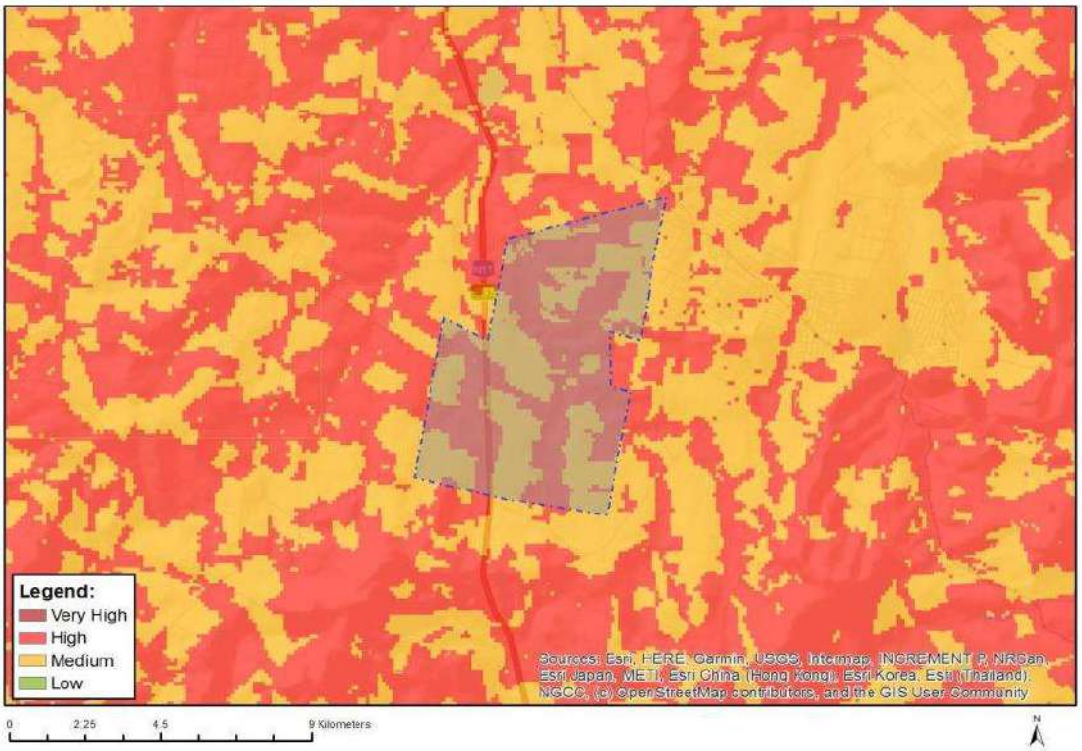
A list of Mammal species (as seen in Table below) that are important in terms of their conservation value, and which may be present within and surrounding of the study area was obtained from the Mpumalanga Tourism and Parks Agency

Table 6: Mammal species that have the probability to occur within and nearby the study area, as well as their IUCN conservation status

Common Name	Scientific Name	Conservation Status
Large Mammals		
Ourebia ourebi ourebi	*Oribi*	EN
Aonyx capensis	*Cape clawless otter*	NT
Leptailurus serval	*Serval*	NT
Orycteropus afer	*Aardvark*	LC
Proteles cristatus	*Aardwolf*	LC

The development footprint environmental sensitivity for animal species as per screening report results showed the area to be of high sensitivity due to Spizocorys fringillaris, Aves-Sagittarius serpentarius & Aves-Geronticus calvus and medium sensitivity with features including the Reptilia-Smaug giganteus, Aves-Tyto capensis, Aves-Circus ranivorus, Aves-Spizocorys fringillaris, Aves-Sagittarius serpentarius, and Sensitive species 2.

MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Figure 37: Map of relative animal species theme sensitivity *(source: screening report)*

12.9.2 Avifauna (Birds)

Ecological studies for the proposed prospecting application were done by Singo Consulting (Pty) Ltd. Birds are considered good ecological indicators, since their presence or absence indicate whether the ecosystem is functioning properly or not. Bird communities and ecological condition are linked to land cover, as the types of bird species in the area change when land cover changes. The Species Status Report from the Mpumalanga Tourism and Parks Agency indicate that no red data bird species are present on the proposed site. During ground truthing, Owl and Corvidae Crows were observed on site, but no red data species were identified. This is due to habitat destruction by cultivation activities on site. See figure below.

Figure 38: Bird nest and Corvidae Crows observed on site.

Habitat-specific species are sensitive to environmental change, with habitat destruction being the leading cause of species decline worldwide. The identified nest indicates that the area has an ecological functioning and conservation importance of high as it provides birds with roosting sites. Disturbance should not be allowed during prospecting, as it will prevent the area from supporting bird species present in the area. It is widely accepted that vegetation structure, rather than the actual plant species, influences bird species distribution and abundance (Harrison et al., 1997).

A list of bird species (as seen in Table below) that are important in terms of their conservation value, and which may be present within and surrounding of the study area was obtained from the Mpumalanga Tourism and Parks Agency.

Table 7: Conservation Important Bird Species of Mpumalanga

Common Name	Scientific Name	Conservation	
		RSA	MTPA
Bothas Lark	*Spizocorys fringillaris*	EN	EN
Southern Bald Ibis	*Geronticus calvus*	VU	VU
Denhams Bustard	*Neotis denhami*	VU	VU
Secretarybird	*Sagittarius serpentarius*	VU	VU
Blue Crane	*Anthropoides paradiseus*	NT	VU
Blue Korhaan	*Eupodotis caerulescens*	LC	NT
Grey Crowned Crane	*Balearica regulorum*	EN	EN

12.10 Biodiversity

Biodiversity describes the variety of life in an area and including the number of different species, the genetic wealth within each species, the interrelationships between them and the natural areas in which they occur. Critical Biodiversity Areas are areas required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan. Ecological Support Areas are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas and/or in delivering ecosystem services.

The proposed prospecting site falls within a Critical Biodiversity Area (CBA), ESA, heavily modified, Moderately modified and Other Natural Area.

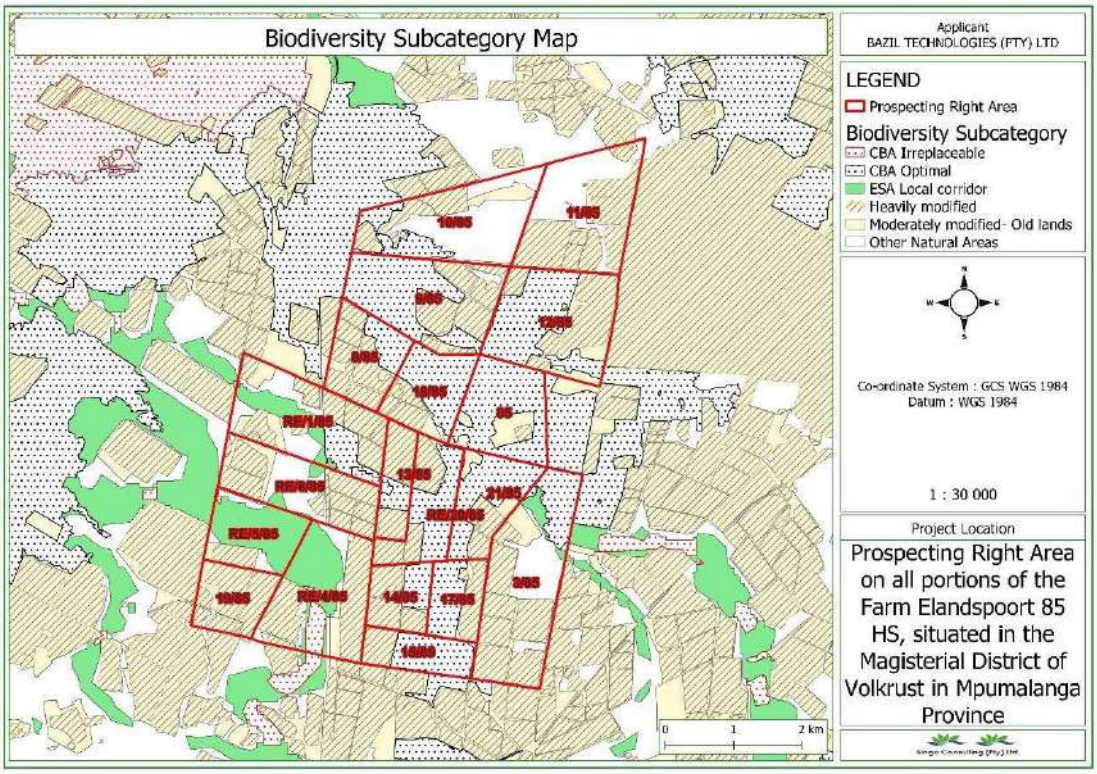


Figure 39: Critical Biodiversity map of the proposed project area.

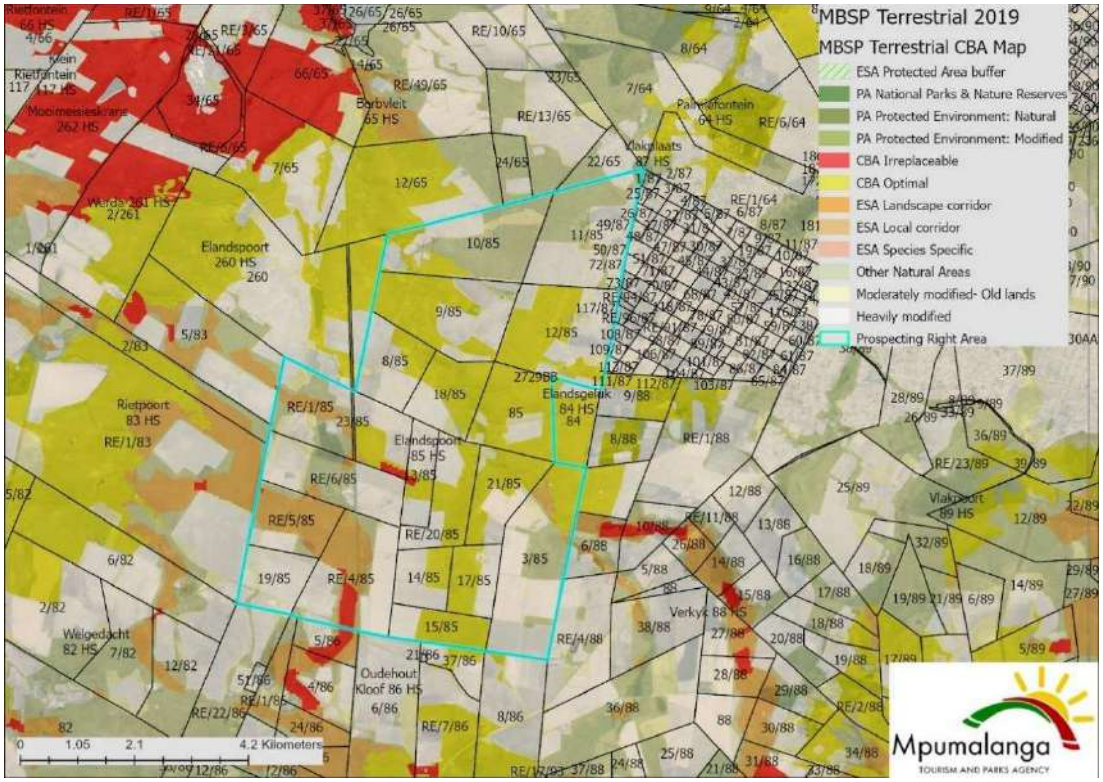
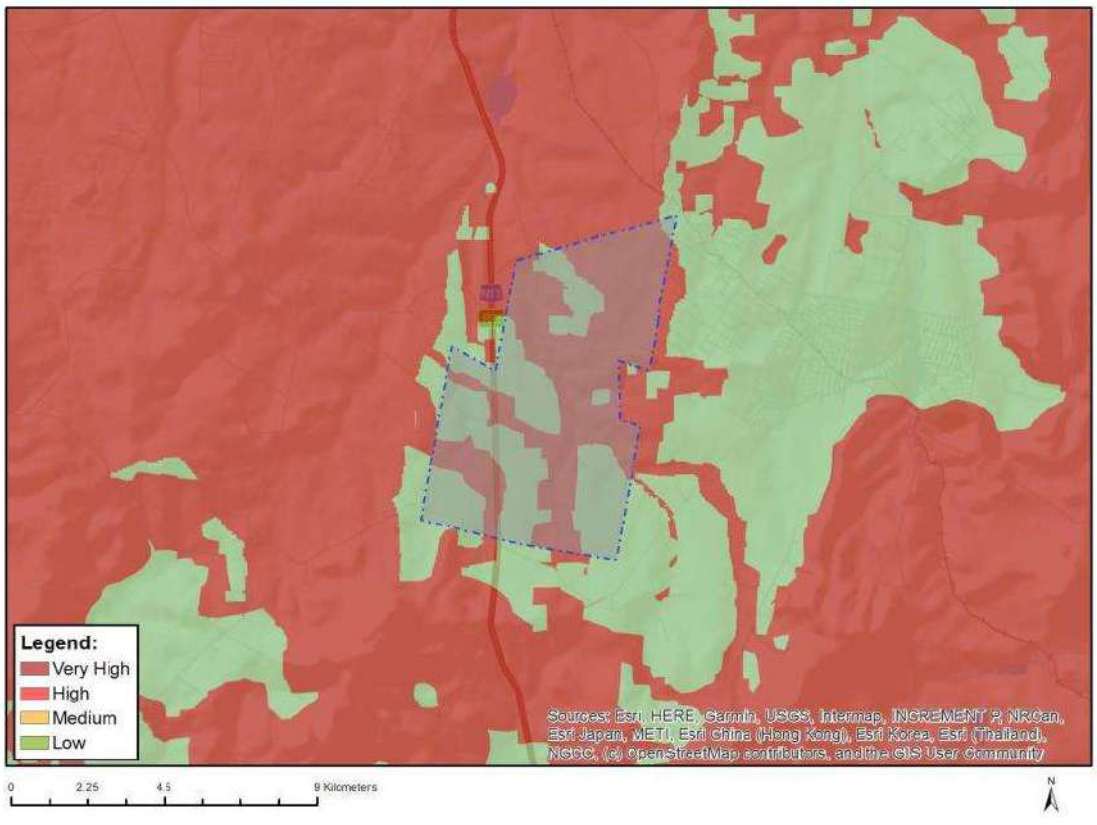


Figure 40:Terrestrial Assessment (2019) map (*source: MTPA,2019)*

During the desktop assessment Critical Biodiversity Areas (CBA), Ecological Supported Area (ESA), heavily modified, moderately modified and Other Natural Area, were identified with the proposed project area, (in figure above). Invasive activities would not be initiated on that area as it defined as CBA-optimal, ESA and Other Natural Area sites. No invasive prospecting operation should occur on Heavily modified, moderately modified. The study area comprises of Heavily or moderately modified area due to the Cultivation and farming of livestock on the other part of the project area where Invasive activities should be initiated.

According to the development footprint environmental sensitivity, the results for the Terrestrial biodiversity theme showed the area to have very high sensitivity, see Figure below. According to the results from the screening report, the area is classified within the Critical Biodiversity Area 1 (CBA1), Critical Biodiversity Area 2 (CBA2), Ecological support area: local corridor, FEPA Sub catchments, and Protected Areas Expansion Strategy.

MAP OF RELATIVE TERRESTRIAL BIODIVERSITY THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Figure 41: Terrestrial Biodiversity Theme map of the project area *(source: screening report)*.

12.11 Socio-Economic Environment

12.11.1 Population Distribution

According to the census results, the population size in 2011 at Dr. Pixley Ka Isaka Seme Local Municipality was recorded at 83 235 by Statssa and was recorded at 85 395 in the 2016 Community Survey. The population grew by 2160 between 2011 and 2016 with an economic growth rate of 0.6% (see Figure below). The graphs below show how the population has changed throughout time (Annual Growth Rate from 2011-2016).

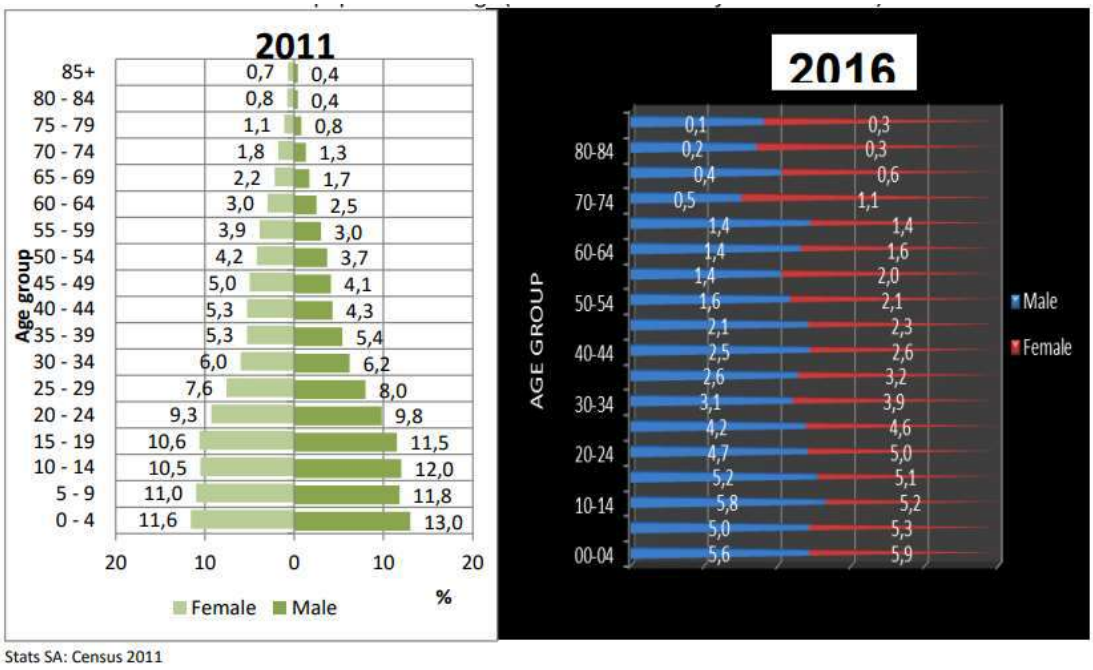


Figure 42: Population by age and gender, (Source: Pixley Ka Isaka Seme 2017 – 2022 Final IDP).

12.11.2 Ethnic group

The racial makeup of Dr Pixley Ka Isaka Seme Local Municipality is seen in the table below, with the majority of the African population concentrated in one section of the municipality. This exemplifies the municipality's deep racial divisions.

Table 8: Ethnic group (Source: Pixley Ka Isaka Seme 2017 – 2022 Final IDP).

Racial Type	Number	Percentage
Black	78628	92%
White	5690	6.7%
Coloured	758	0.9%
Indian/Asian	319	0.4%
Grand Total	**85 395**	**100%**

Source: Community Survey 2016

12.11.3 Economy and employment

Those who worked for salary, profit, or family gain for at least one hour in the previous seven days are referred to as employed. Unemployment happens when a person is eager and able to work but is unable to do so due to a lack of job opportunities. The municipality has a substantial number of people who are looking for employment by fail to acquire the right knowledge or skill due to their poverty background, financial limitations etc. despite the aforementioned challenges, the municipality has been initiating Learner ship programmes and bursaries to the citizens of the area. This is the indication that the municipality is investing in its on development by capacitating the youth and making use of their skills once they are qualified.

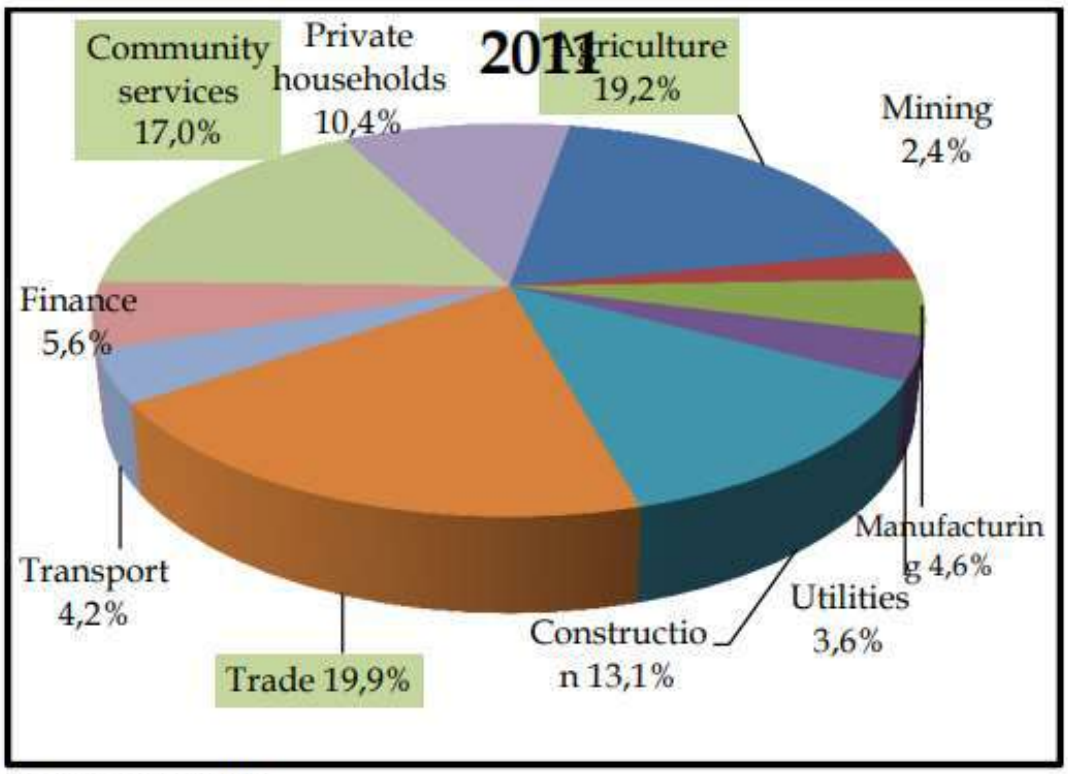


Figure 43: Sectoral Employment for Dr. Pixley Ka Isaka Seme Local Municipality in 2011

Census 2011 indicated that the leading industries in terms of employment are agriculture (20.0%), Trade (19.4%) and Community Services (17.5%). The 2016 CS shows that the largest employing industries in Dr. Pixley Ka Isaka Seme are Trade, Finance and community services, almost 60% of the total employment. This therefore means that between 2011 and 2016 there was a decline in Agricultural projects or activities within the Municipality. The High labour intensity is found in industries such as transport, manufacturing and construction (Pixley Ka Isaka Seme 2017-2022 Final IDP).

12.11.4 Education Levels

According to the 2016 CS, the population of Dr Pixley Ka Isaka Seme aged 20+ who finished grade 12 increased by more than 4.6 percent per year, from 14 184 in 2011 to 17 332 in 2016. Although the grade 12 pass percentage increased from 46.0 percent in 2011 to 60.7 percent in 2015, it remains the second lowest of Mpumalanga's municipal districts. In 2015, the area also had the second-lowest admittance rate to university/degree studies, at only 13.6 percent. Because there are few economic prospects within the Municipal Jurisdiction, the problem is to accommodate the educated young people in the area.

Table 9: Education Attainment (Source: Pixley Ka Isaka Seme 2017 – 2022 Final IDP).

	Male	Female	Grand Total
No schooling	8312	10133	18445
Grade 0 - Grade 7/Standard 5/ABET 3	11069	14519	25588
Grade 8/Standard 6/Form 1 - Grade 12/Standard 10/Form 5/Matric/NCV Level 4/ Occupational certificate NQF Level 3	17546	19083	36629
NTC I/N1 - Other	2392	1457	3849
Grand Total	**39320**	**45191**	**84511**

Source: Community Survey 2016

12.12 Heritage Resources

Heritage resources such as Stone Age sites, rock paintings and engravings; stone tools; small, inconspicuous stone walled sites from the Late Iron Age farming communities; formal and informal graveyards, etc. may occur in the project area. The National Heritage Resources Act, No. 25 of 1999 (NHRA) place specific focus on ensuring there no altering or demolition of structures older than 60 years.

There is a heritage sites or graves that were identified within the proposed prospecting area during site assessment as seen in figure below. Graves and other heritage site Identified during prospecting activities within the anticipated project area must be buffered as a "no go" area by 250 m radius. However, should any heritage resources of significance be exposed during the operational phase of the project, the South African Heritage Resources Agency (SAHRA) should be notified immediately, all development activities should be stopped, and an archaeologist accredited with the Association for Southern African Professional Archaeologist (ASAPA) should be notified to determine appropriate mitigation measures for the discovered finds. This may include obtaining the necessary authorisation from SAHRA to conduct the required mitigation measures.

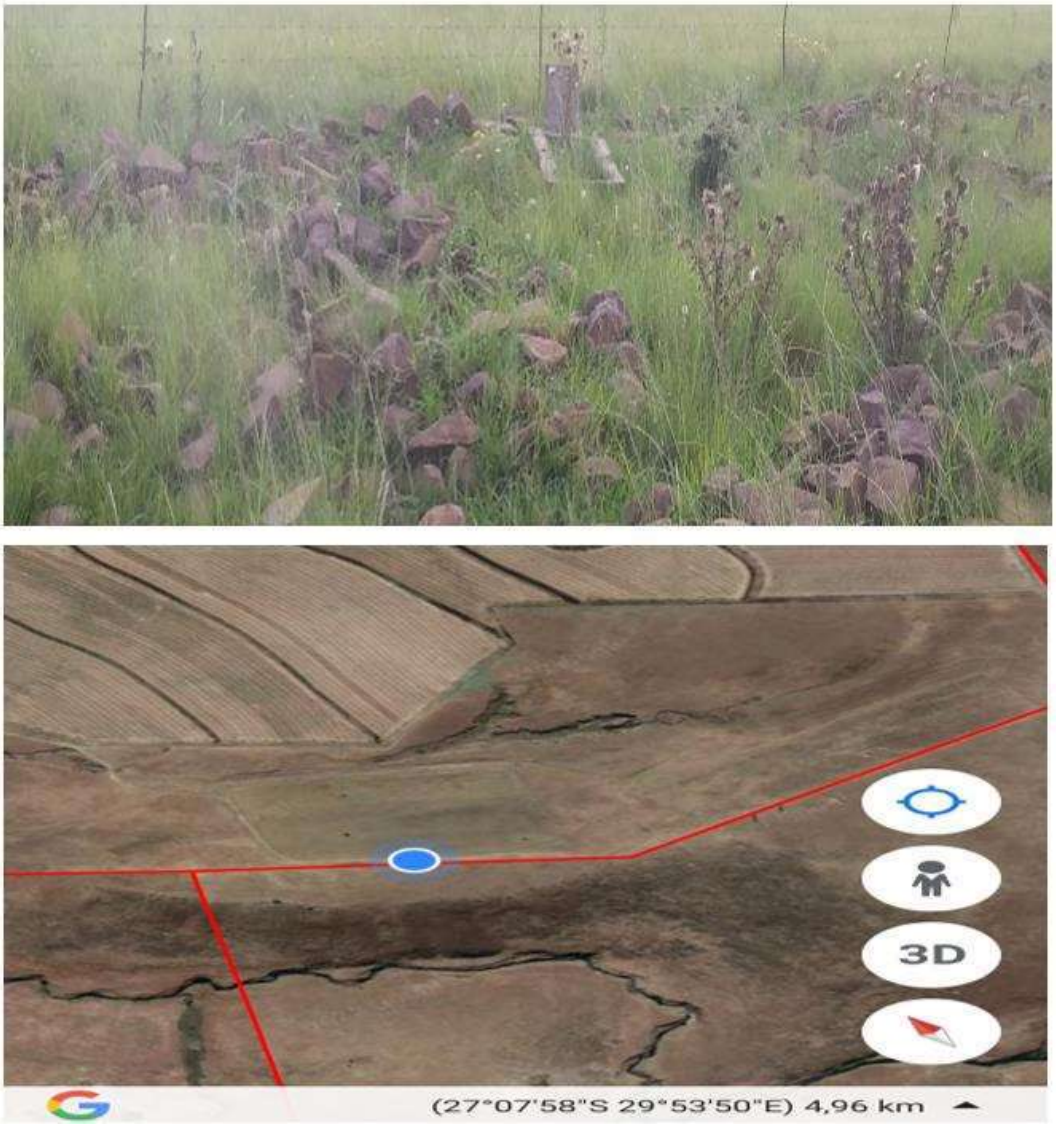
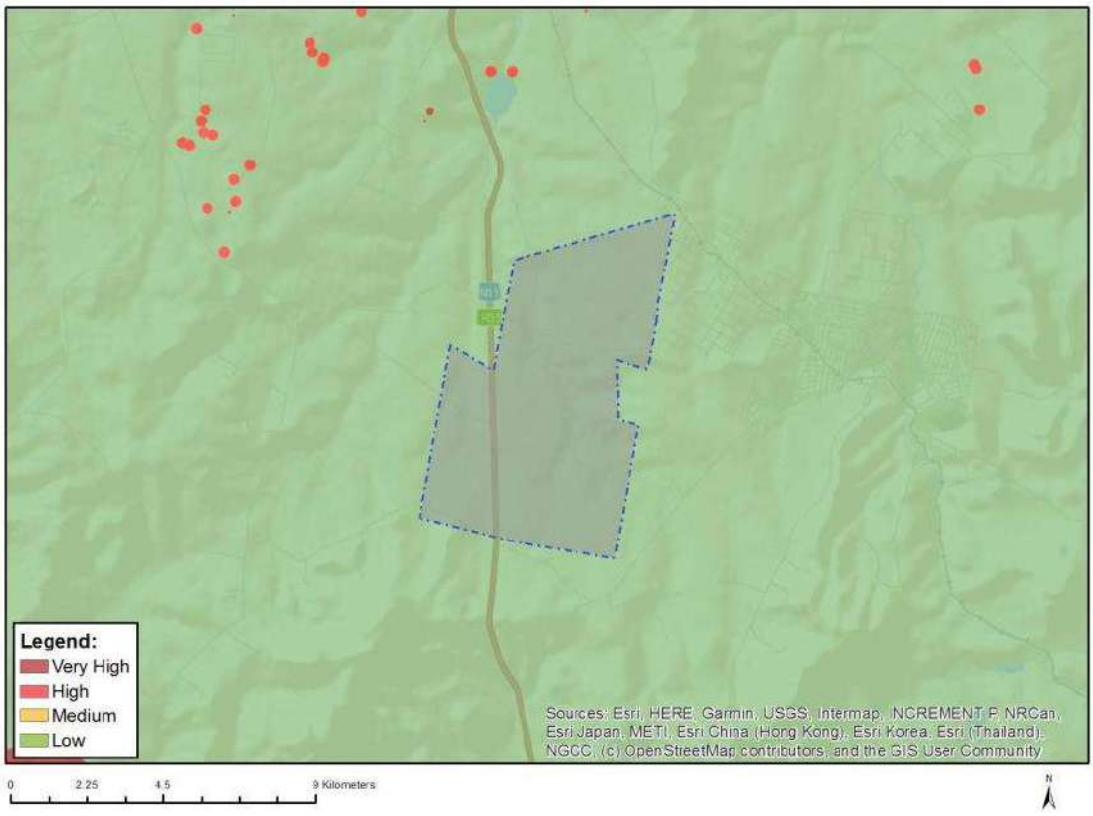


Figure 44: Identified heritage sites or graves within the proposed prospecting area.

According to the screening report, Archaeological and Cultural Heritage Theme Sensitivity of the proposed project area are low Sensitivity.

MAP OF RELATIVE ARCHAEOLOGICAL AND CULTURAL HERITAGE THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

Figure 45: Map showing Archaeological and Cultural Heritage sensitivity (source: screening report).

(b) Description of the current land use

The land use in the proposed project area comprises of very high intensity of agricultural activities such as farming and cultivation. cattle farming, crop cultivation and livestock grazing is again a large cultural practice within the area. There is a settlement nearby the proposed project area. The area is capable for grazing according to the desktop studies illustrated by the map in figure below). The surrounding land use of the proposed project area are associated with agricultural activities (Grazing and Cultivation), Mines, built-up areas, Wetlands, minimal Plantation, Waterbodies, and natural grasslands.

The land use map illustrates a variety of land uses that is currently taking place within and nearby the proposed prospecting right area. These land uses include, cultivated area, waterbodies, wetlands, mines, plantations, barren land as well as a build-up land.

The prospecting right activity possess a lower risk in these soil types as the prospecting activity is short term and no huge excavation impact will be caused by this activity.

Where the land use is currently cultivation, drilling will only take place after the reaping period is over to avoid destroying the crops or on the edge of cultivated area. Drilling will also be conducted during dry season when the water percentage is low in the wetlands and streams within and surround the project area.

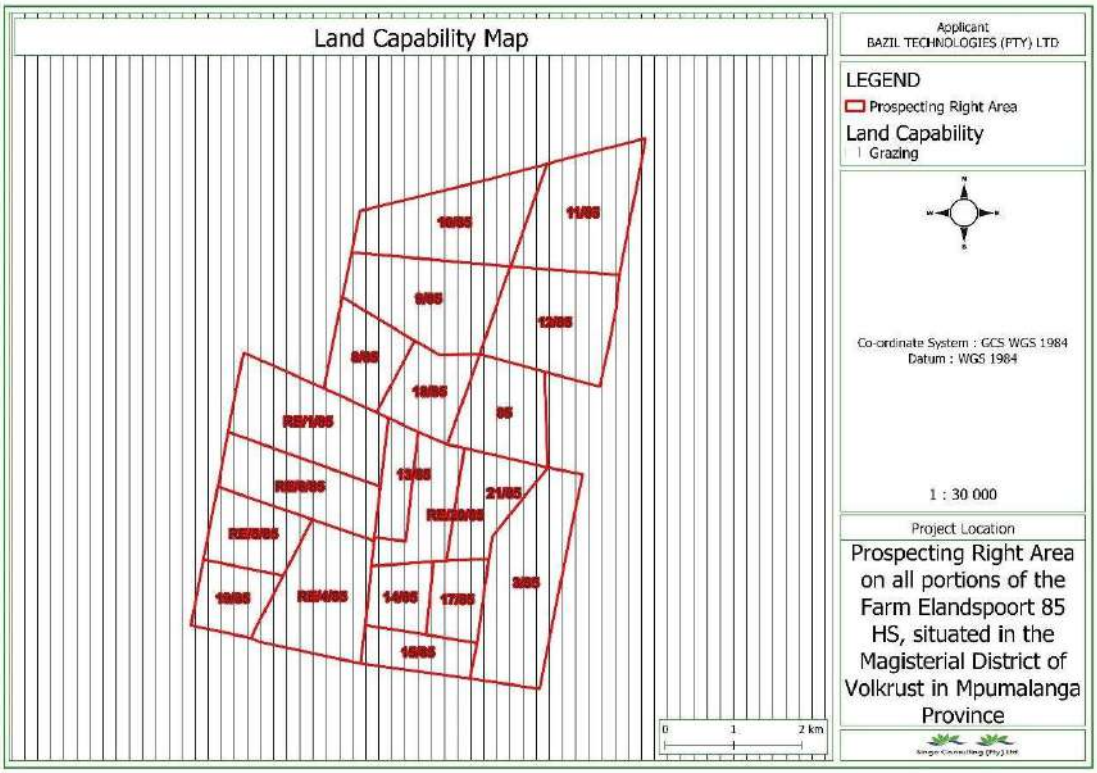
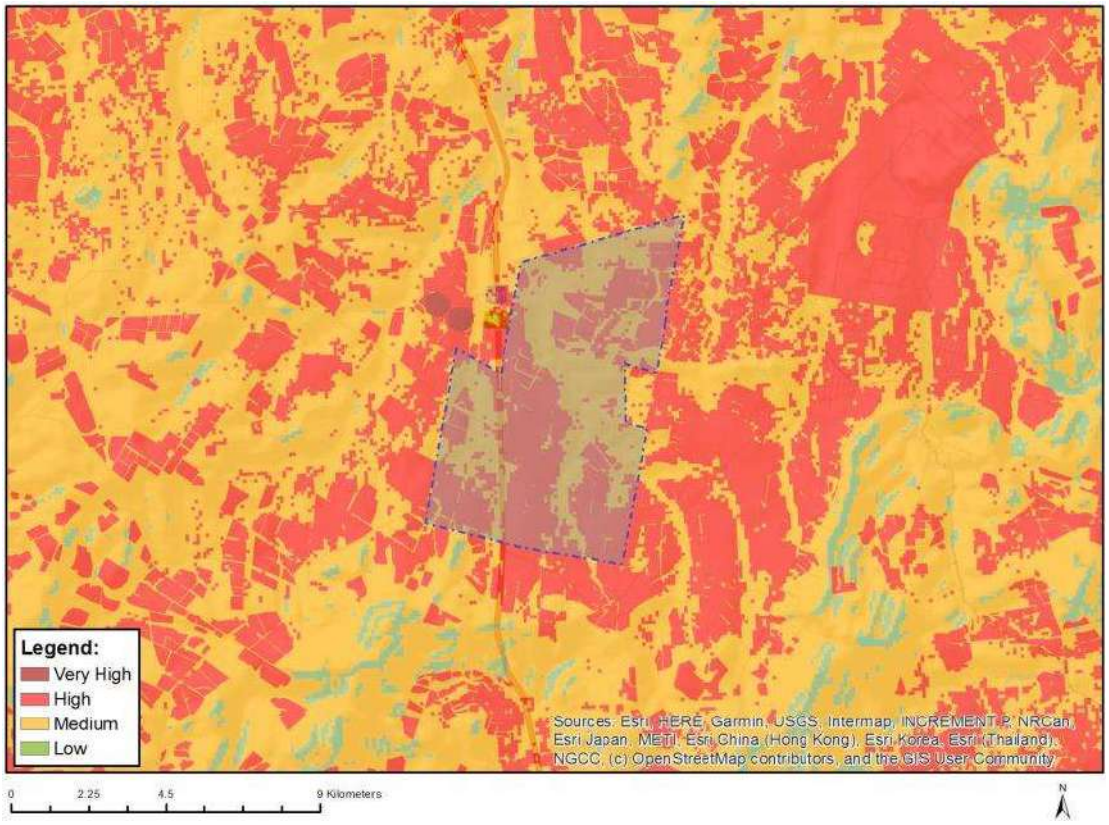


Figure 46: Land capability map of the proposed project area.

Figure 47: Current land use identified within proposed projected area.

According to the development footprint environmental sensitivity, the results for the agriculture theme showed the area to have high sensitivity, see Figure below.

MAP OF RELATIVE AGRICULTURE THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Figure 48: Map showing agricultural sensitivity theme *(source: screening report)*

(c) Description of specific environmental features and infrastructure on the site.

12.12.1 Environmental features

The proposed prospecting area situated on portions RE, RE/1, 3, RE/4, RE/5, RE/6, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, RE/20 & 21 of the farm Elandspoort 85 HS, which is situated within the Pixley Ka Seme Local Municipality under Gert Sibande District Municipality, Mpumalanga Province.

Wetlands and rivers

There is important sub catchment, strategic water source area, and wetlands within the proposed prospecting area. 500m buffer for wetland was delineated and mapped to avoid negative impacts.

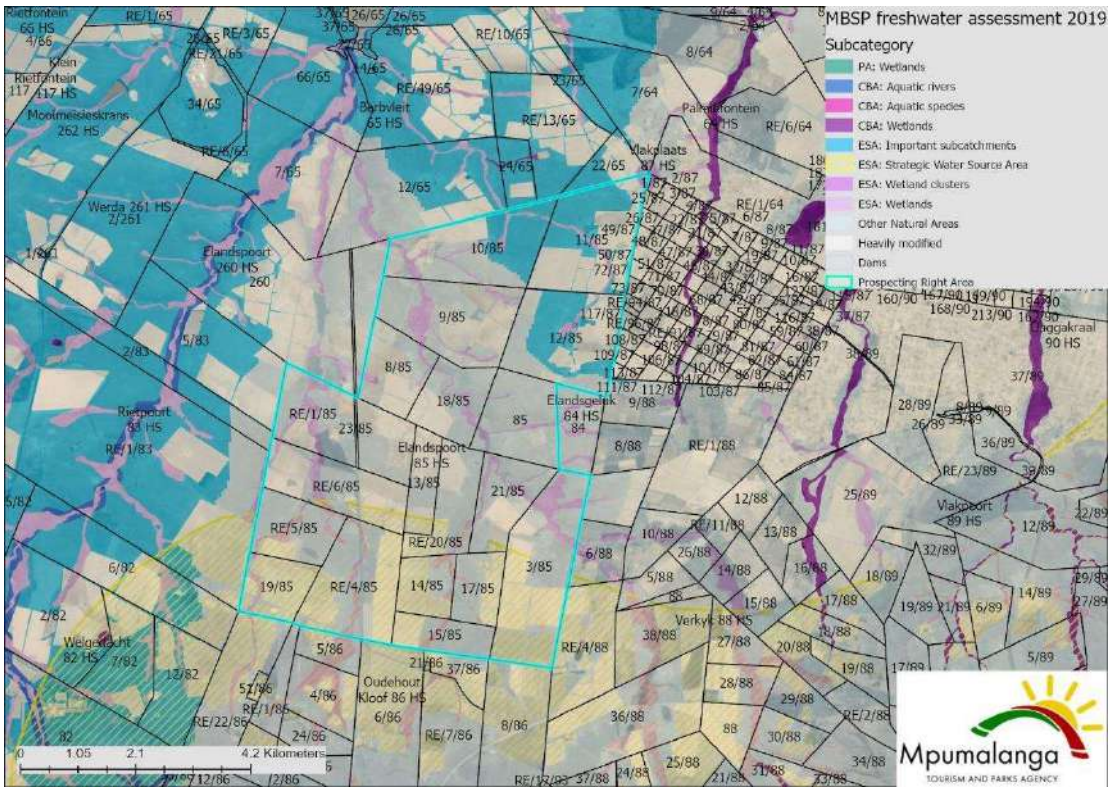


Figure 49: Map shows MBSP freshwater assessment of the study area. *(Source: MTPA-2019)*

12.12.2 Infrastructure

Infrastructure is the fundamental facilities and systems serving a country, city, or other area, including the services and facilities necessary for its economy to function. Infrastructure is composed of public and private physical improvements such as road, bridges, tunnel, water supply sewage electric grids, and telecommunications.

Roads

The N11 road passes through the proposed project area traverse from Amersfoort Town (North) to Volksrust (South). There is an existing unpaved farm roads within the proposed project area. SANRAL consulted regarding the proposed prospecting project. 100-meter buffer zone delineated. No prospecting activities will be conducted within 100 m radius from public or national road.

Figure 50: Infrastructures (Roads) identified within the proposed project area

Electric power line

There is an electric power line within the proposed project area. Eskom consulted out the prospecting right application for coal lodged by Bazil Technologies (Pty) Ltd. No prospecting activities will be conducted within 100 m radius from Eskom Power line.

Figure 51: Infrastructures (Electrical Power lines) within the proposed project area. (

(d) Environmental and current use map

(Show all environmental, and current land use features)

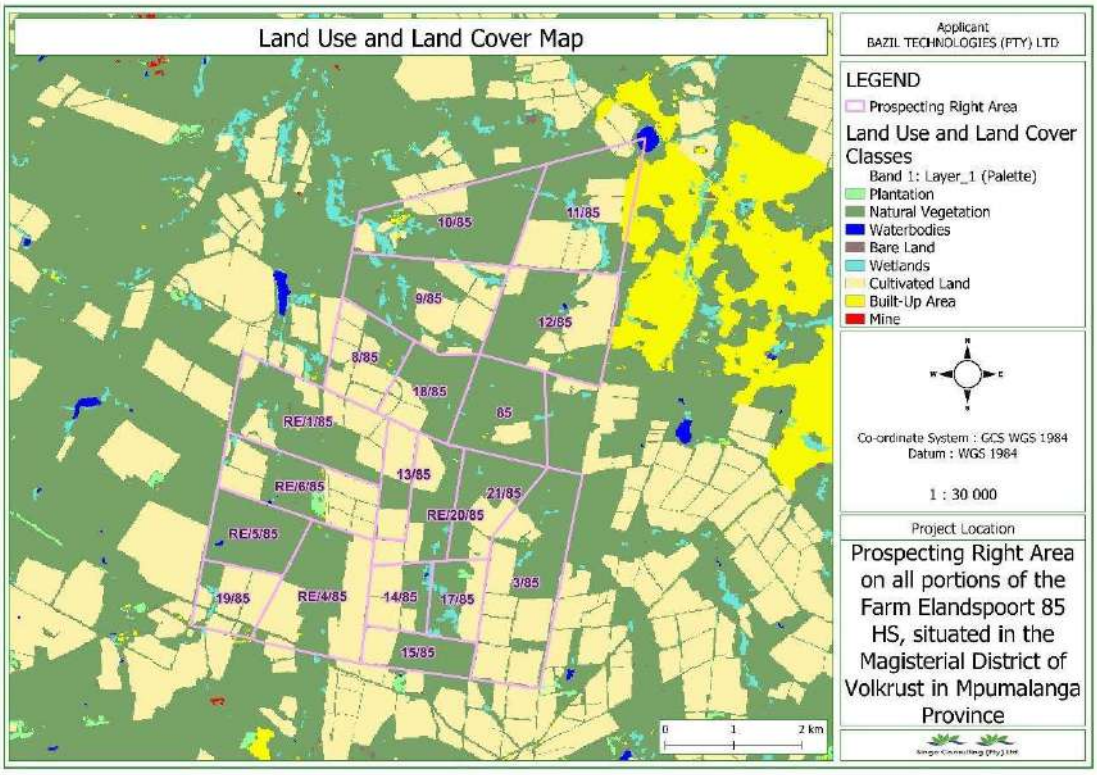


Figure 52: map showing current land use and environmental features.

13 Impact Assessment

iv) Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts

(Provide a list of the potential impacts identified of the activities described in the initial site layout that will be undertaken, as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability, and duration of the impacts. Please indicate the extent to which they can be reversed, the extent to which they may cause irreplaceable loss of resources, and can be avoided, managed or mitigated).

13.1 Impact Assessment

The impact Assessment is presented in the table below.

Table 10: Impact Assessment Table

ACTIVITIES	POTENTIAL IMPACT	Extent of impact	Duration of impact	Intensity of impact	Probability of occurrence of impact	SIGNIFICANCE if not mitigated
Vegetation clearance for establishment of drill sites	Removal of / damage to natural vegetation	2	2	1	4	16
Vegetation clearance for establishment of drill sites	Disturbance of riparian habitats, riverbanks or wetland	1	3	3	3	27
Vegetation clearance for establishment of drill sites	The stripping of soil, incorrect stockpiling, erosion and storm water run-off can lead to the loss of topsoil	1	3	3	2	18
Vegetation clearance for establishment of drill sites	Changes to the shape or form of the land	1	1	1	2	2
Vegetation clearance for establishment of drill sites	Impact on current land use	1	1	3	2	6
Vegetation clearance, Site establishment, Drilling activities & movement of	Destruction of cultural heritage sites and artefacts	3	5	3	1	45

ACTIVITIES	POTENTIAL IMPACT	Extent of impact	Duration of impact	Intensity of impact	Probability of occurrence of impact	SIGNIFICANCE if not mitigated
people and equipment on site						
Vegetation clearance for establishment of drill sites	Dust pollution	2	1	3	4	24
Vegetation clearance for establishment of drill sites	Storm water run-off from cleared areas could lead to siltation of surface water	2	2	3	2	24
Workers & material on site	Contamination of soils through spills from sanitation facilities & litter	1	1	2	4	8
Workers & material on site	Fire Hazards	2	3	3	3	54
Workers & material on site	Collection of firewood, damage to property	2	2	3	2	24
Workers & material on site	Contribution to the economy through employment	2	1	3	4	POSITIVE
Workers & material on site	Spread of HIV/Aids to farm workers and local community	2	4	3	2	48
Use of heavy machinery &	Resource consumption	2	3	2	2	24

ACTIVITIES	POTENTIAL IMPACT	Extent of impact	Duration of impact	Intensity of impact	Probability of occurrence of impact	SIGNIFICANCE if not mitigated
vehicles on site for drilling	(diesel - non-renewable resource)					
Use of heavy machinery & vehicles on site for drilling	Contamination of soils through hydrocarbon leaks and spills from machinery & equipment	1	2	3	3	18
Use of heavy machinery & vehicles on site for drilling	Use of groundwater for drilling activities	2	1	3	3	18
Use of heavy machinery & vehicles on site for drilling	Contamination of surface water through hydrocarbon leaks and spills from machinery & equipment	2	3	3	2	36
Use of heavy machinery & vehicles on site for drilling	Contamination of groundwater through hydrocarbon leaks and spills from machinery & equipment	2	3	3	1	18
Use of heavy machinery & vehicles on site for drilling	Compaction of soils through movement of heavy vehicles and	1	1	2	4	8

ACTIVITIES	POTENTIAL IMPACT	Extent of impact	Duration of impact	Intensity of impact	Probability of occurrence of impact	SIGNIFICANCE if not mitigated
	machinery on site					
Use of heavy machinery & vehicles on site for drilling	Damage to vegetation	1	2	3	4	24
Use of heavy machinery & vehicles on site for drilling	Release of gaseous emissions	2	2	3	3	36
Use of heavy machinery & vehicles on site for drilling	Dust Fallout	2	1	3	4	24
Use of heavy machinery & vehicles on site for drilling	Increase in ambient noise levels	2	1	3	4	24
Use of heavy machinery & vehicles on site for drilling	Visual intrusion	1	1	2	4	8
Use of heavy machinery & vehicles on site for drilling	Disturbance of fauna species in the vicinity	2	2	3	4	48
Use of heavy machinery & vehicles on site for drilling	Release of methane gas from exploration boreholes	2	2	2	4	32
Use of heavy machinery & vehicles on site for drilling	Cross-contamination of aquifers due to borehole construction	3	3	4	2	72

ACTIVITIES	POTENTIAL IMPACT	Extent of impact	Duration of impact	Intensity of impact	Probability of occurrence of impact	SIGNIFICANCE if not mitigated
Use of heavy machinery & vehicles on site for drilling	Proliferation of invasive plant species	1	3	3	4	36
Closure						
Concurrent rehabilitation	Reducing soil compaction of disturbed area and access roads to improve drainage and control erosion	1	4	1	4	POSITIVE
Concurrent rehabilitation	Use stockpiled topsoil to close sumps	1	5	3	4	POSITIVE
Close drill hole	Restoration of land use and land capability	1	3	2	3	POSITIVE

Table 11 : Impacts and mitigation measures.

Element	Aspects and Impacts	Mitigation	Impact (post-mitigation)			
			Extent	Duration	Probability	Level of Significance
Soils	There will be minor disturbance of the soil at the proposed drill sites.	Rehabilitate each site as soon as the drilling is completed.	Low	Short Term	Definite	Low
Vegetation	The potential impacts of the proposed prospecting on the vegetation would occur at proposed drilling sites and the access routes used to get to these sites.	Environmental awareness training. Drillers to comply with all EMPr procedures. Drilling sites to be located in disturbed areas wherever possible. The prospecting area including drill sites and access routes are to be rehabilitated to as near original condition as possible. No fires to be made in the prospecting area.	Low	Short Term	Definite	Low
Animal life	-Animal life will be affected in the immediate vicinity of the drilling rig. It is anticipated that the noise and general activity will keep the animal life away from the site while the prospecting is ongoing.	-Environmental awareness training for workers. If any animals are encountered, they must not be killed or injured, but should rather be removed or chased away from the site. -The area will be fenced off to prevent access to the site, reducing mortality.	Low	Short Term	Definite	Low

	-Wildlife-vehicle collisions and physical hazards on the Project site may cause injury / mortality to individual animals. -Stock and game theft. -Stock and game loss due to unmonitored gates.	- Enforce speed limits on Project roads to reduce the potential for collisions with wildlife. - Vehicles will yield right-of-way to wildlife. Signs warning drivers of the possibility of wildlife -No hunting by Project personnel will be permitted while working or residing onsite. -Adhere to open and close of gate procedures. --The drill team must be registered by the landowner and have access cards to the premises to ensure controlled access to the farm. -No unauthorised visitors/access will be allowed.				
Surface Water	Existing water courses within the area	No water from the wetlands and river will be utilized and also a buffer Map developed will be used to ensure no water is contaminated.	Low	Short term	Possible	Low
Ground water	No groundwater will be used or abstracted during the prospecting operations.	Capping and sealing of boreholes to minimise water contamination	Low	Short Term	Possible	Low

Air Quality	Dust generation will be Minimal as the other roads are paved and there is some gravelled.	Establish EMPr procedures to minimise the generation of dust if any. Ensure vehicles drive slowly.	Low	Short Term	Probable	Low
Terrestrial Biology	Direct vegetation (and wildlife habitat) loss, alteration, and fragmentation from the physical footprint of the Projects.	-Limit the area of Project footprint and limit disturbance from employees and prospecting activities and conduct concurrent rehabilitation with follow-up inspections to decide effectiveness of rehabilitation steps undertaken. -Avoid vegetation removal during sensitive wildlife breeding seasons such as the migratory bird nesting season. -Apply and enforce speed limits along all Project access roads and always give the right-of-way to wildlife.	Low	Short Term	Definite	Low
Terrestrial Biology	Introduction of invasive plant species can change vegetation ecosystem composition	-Limit / prevent the transfer of invasive plant species from equipment and imported soil used for rehabilitation. -Remove all alien vegetation from the site which has established on newly exposed soils;	Low	Short Term	Definite	Low

Terrestrial Biology	-Attractants (e.g., food waste) may increase carnivore-human encounters and result in the loss (destruction or relocation) of individual animals. -Attractants may also increase predator numbers and thereby increase predation risk on prey species.	Reduce the risk of mortality to wildlife: - Education and reinforcement of proper waste management practices will be provided to all Project personnel. -Prohibit littering and feeding of wildlife. -Project personnel will be required to handle food and food wastes in a responsible manner. - Dispose of waste in accordance with a Waste Management Plan which will limit the presence of food attractants.	Low	Short Term	Definite	Low
Noise	Noise will be created by the drilling rig and vehicles.	Ensure vehicles and equipment are maintained. Silencers should be fitted on all engines.	Low	Short Term	Definite	Low
Cultural Heritage	Important heritage resources on the site such as graves and heritage structure were identified will be avoided	If any heritage resources, including fossils, graves or human remains, are encountered these must be reported to the authorities.	Low	Short Term	Possible	Low
Visual	The prospecting activity will not change the visual character of the property.	Rehabilitate drill sites and access tracks.	Low	Short Term	Definite	Low

Socio-economic	The effect of this prospecting activity for employment and socio-economic regime would be positive, but very limited in extent and duration. If a significant resource is delineated this could have a significant positive socio-economic impact, however a mining right application would be subject to a separate EIA process.	Environmental awareness training will be provided to all workers. Maximise procurement of goods and services from local providers.	Low	Short Term	Definite	Low (positive)
Social community	The prospecting operations should not impact on the community due to the distance and low intensity of the prospecting operation.	Ensure compliance with the EMPr. Ensure workers do not trespass onto farmers' property. Maintain communications and keep a "Complaints Register" on site.	Low	Short Term	Possible	Low
Solid Waste	All solid waste will be transported to the nearest municipal registered waste disposal facility waste site. Any industrial (hazardous) waste will be transported to a.	Ensure compliance with the EMPr. Include in environmental awareness training. Workers will not stay overnight at the site as the site surrounds settlements.	Low	Short Term	Definite	Low to medium
Traffic and access	Prospecting activities will generate very limited additional traffic. Prospecting vehicles are to access the property via existing roads and tracks only.	Comply with traffic regulations. Keep to speed limits. Ensure compliance with the EMPr.	Low	Short Term	Definite	Low

Cumulative Impacts	There are no significant cumulative impacts associated with this prospecting programme.	No mitigation required for prospecting.	N/A	N/A	N/A	N/A

13.2 Impact Assessment Methodology

v) Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;

(Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process was determined in order to decide the extent to which the initial site layout needs revision).

The potential impacts listed were assessed and determined for all activities associated with the different phases of the project (construction, operation, and decommissioning). This section provides the detailed methodology used for the assessment of the significance of potential environmental impacts in the EIA. This methodology allows for the identified potential impacts to be analyzed in a systematic manner, with significance rating (from insignificant to very high) assigned to each potential impact. The significance of an impact is defined as a combination of the consequence of the impact occurring and the probability that the impact will occur. The criteria used to determine impact consequence include extent, intensity, and duration of the impact. To determine the significance of an activity each activity was rated. The following parameters were used:

13.2.1.1 Extent of impact (E)

1 = Site specific - Extending only as far as the activity, or limited to the site and its immediate surroundings

2 = Regional - Will have an impact on the region. A development can often have a regional impact on Biodiversity. Example: if a feeding site for birds or mammals is destroyed, the population might leave the area or go extinct if they don't find other suitable areas.

3 = National - Will have an impact on a national scale - particularly if an ecosystem or species of national significance is affected

4 = International - Will have an impact across international borders or will impact on an ecosystem or species of international significance

13.2.1.2 Duration of impact (D)

1 = Short term (0-5 years)

2 = Medium term (5-15 years)

3 = Long term (16-30 years) - Impact will cease after the operational or working life of the activity, either due to natural process or by human intervention

4 = Discontinuous or intermittent - Impact may only occur during specific climatic conditions or during a particular time of year

5 = Permanent - Impact will be where mitigation or moderation by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient or temporary

13.2.1.3 Intensity of impact (I)

1 = Low Impact - Affects the environment in such a way that natural, cultural and soil functions and processes are not affected

2 = Medium Impact - Affected environment is altered by natural, cultural and soil functions and processes continue although in a modified way

3 = High Impact - Natural, cultural or social functions or processes are altered to the extent that they will temporarily or permanently cease

13.2.1.4 Probability of impact occurring (P)

1 = Improbable – Low likelihood

2 = Probable – Distinct possibility

3 = Highly probable – Most likely

4 = Definite - Impact will occur regardless of any prevention measures

13.2.1.5 Criteria of assigning significance to potential impacts

Significance is determined by means of the following calculation:

Extent of Impact **X** Duration of Impact **X** Intensity of Impact **X** Probability of Occurrence of Impact **= SIGNIFICANCE**

Significance determination criteria

Extent of Impact **Duration of Impact**

Site Specific	1	Short term	1
Regional	2	Medium term	2
National	3	Discontinuous	3
International	4	Long term	4
		Permanent	5

Intensity of Impact **Probability of Occurrence of Impact**

Low	1	Improbably (low likelihood)	1
Medium	2	Probable (Distinct possibility)	2
High	3	Highly probable (Most likely)	3
		Definite	4

SIGNIFICANCE

High	**73 - 240**
Medium	**36 - 72**
Low	**1- 35**

Table 12: Definitions of impact significance

Insignificant	The potential impact is negligible, and no mitigation measures or environmental management is required.
Very low and low	No specific mitigation measures required beyond normal environmental good practices.
Medium	Specific mitigation measures must be devised to reduce the impact significance to an acceptable level. If mitigation is not possible, compensation measures must be considered.
Very high	Specific mitigation measures must be identified and implemented to reduce the impact significance to an acceptable level. If such mitigation is not possible, very high significance negative impacts must be considered in the project's authorization process.

The impact significance will be rated in the prescribed way, with and without the effective implementation of the recommended mitigation measures. Different types of impacts were considered in the impact ratings (as seen in table 16 below).

Table 13: Types of Impact

Direct	Impacts that result from the direct interaction between a project activity and the receiving environment (e.g. dust generation which affects air quality).
Indirect	Impacts that result from other (non-project) activities but which are facilitated as a result of the project or impacts that occur as a result of subsequent interaction of direct project impacts within the environment (e.g. reduced water supply that affects crop production

	and subsequently impacts on subsistence-based livelihoods).
Cumulative	Impacts that act together with current/future potential impacts of other activities or proposed activities in the area/region that affect the same resources and/or receptors (e.g. combined effects of waste water discharges from more than one project into the same water resource, which may be acceptable individually, but cumulatively result in water quality reduction).

There is no statutory definition of significance and its determination is therefore partially subjective. Criteria for assessing impact significance arise from compliance status with relevant local legislation, policies and plans; relevant or industry policies; environmental standards or guidelines and internationally accepted best practice.

The consequence of the change to the biophysical or socio-economic environment (e.g. loss of habitats, decrease in water quality) was expressed, wherever practicable, in quantitative terms. For socio-economic impacts, the consequence must be viewed from the perspective of those affected, by considering the likely perceived importance of the impact and the ability of people to manage and adapt to the change.

The nature of the impact receptor (physical, biological, or human). Where the receptor is physical (e.g. a water resource) its quality, sensitivity to change and importance must be considered. Where the receptor is biological, its importance (e.g. its local, regional, national or international importance) and sensitivity to the impact must be considered. For a human receptor, the sensitivity of the household, community or wider society must be considered along with their ability to adapt to and manage impact effects.

The probability that the identified impact will occur is estimated based on experience and/or evidence that such an outcome has previously occurred.

The impact significance rating reflects the need for mitigation. While low significance impacts may not require specific mitigation measures, high significance negative impacts demand that adequate measures be put in place, to reduce the residual significance (impact significance rating, after mitigation), as described in Table 9 above.

vi) The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected.

(Provide a discussion in terms of advantages and disadvantages of the initial site layout compared to alternative layout options to accommodate concerns raised by affected parties)

13.2.1.6 Positive Impact associated with the proposed project that may be caused by the proposed development will be recognized using input from the following:

- Views of I&APs;
- Existing information;
- Specialist investigations;
- Site visit with the project team; and
- Legislation.

13.2.1.7 Negative Impacts associated with the proposed prospecting:

- Destruction of cultural heritage sites and artefacts
- Loss of soil resources
- Contamination and compaction of soils
- Erosion
- Change of current land use
- Removal / damage of natural vegetation
- Damage to sensitive biodiversity areas
- Disturbance of, riparian habitats & non-perennial river
- Contamination of surface water
- Impact on current land use
- Contamination of soils
- Loss of Natural habitant
- Air Quality Impact (Dust)
- Litter
- Disturbance of important bird species and fauna in the vicinity

13.3 Mitigation Measures

vii) The possible mitigation measures that could be applied and the level of risk.

(With regard to the issues and concerns raised by affected parties provide a list of the issues raised and an assessment/ discussion of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered).

Mitigation measures were identified for all possible impacts even though the destruction of heritage resources is considered a high impact, therefore heritage sites will not be drilled if they are found on site. The applicant shall ensure that this Environmental Management Plan is provided to the Project Manager and any other person or organisation who may work on the site. Bazil Technologies (Pty) Ltd development shall ensure that any person or organisation that works on the site complies with the requirements of this Environmental Management Programme report.

Table 14: Impact and Mitigation measures

ACTIVITIES	POTENTIAL IMPACT	MITIGATION MEASURES
Vegetation clearance for establishment of drill sites	Removal of / damage to natural vegetation	1) Boreholes and access tracks will be located in areas that will result in minimal ground disturbance. 2) Permission will be obtained from landowners before trees are felled. 3) Where an access road is needed, the relevant occupant and owner will be consulted prior to the development of that access to ensure that consensus is reached on the matter and the access will be rehabilitated at the end of the drilling programme. 4) Vegetation clearance will be limited to 0.06 ha per drill hole 5] Existing access roads would be used to prevent natural vegetation disturbances.
Vegetation clearance for establishment of drill sites	Disturbance of riparian habitats or riverbanks	1) During the planning phase for each borehole, wetlands, rivers and/or streams will be identified. The prospecting programme will be designed to avoid leaving a buffer zone of 500m from rivers & streams. 2) Rivers & Streams will not be crossed, accessed, drained, dredged or filled during prospecting. 3) Areas of ecological significance will be

ACTIVITIES	POTENTIAL IMPACT	MITIGATION MEASURES
		avoided and if disturbance is required, it will be undertaken in accordance with legislation.
Vegetation clearance for establishment of drill sites	The stripping of soil, incorrect stockpiling, erosion and storm water run-off can lead to the loss of topsoil	1) Topsoil will be stripped to a depth of 250 mm from all disturbed areas and stored outside the 1:50 year flood levels of rivers and streams, within the firebreak area. 2) Topsoil will be adequately protected from being blown away or being eroded. 3) Boreholes and access tracks will be located in areas that will result in minimal ground disturbance.
Vegetation clearance for establishment of drill sites	Changes to the shape or form of the land	1) During the planning phase for each borehole, specific controls will be identified and implemented, based on site conditions.
Vegetation clearance for establishment of drill sites	Impact on current land use	1) Land disturbed will be rehabilitated to a stable and permanent form suitable for subsequent land use. 2) Exact location of drill holes and new access routes will be determined through communication with landowner
Vegetation clearance, Site establishment, Drilling activities & movement of people and equipment on site	Destruction of cultural heritage sites and artefacts	1) Requirements of SAHRA will be adhered to 2) Potential heritage sites will be identified during the planning phase to ensure that such areas are avoided. Each prospecting site will be visited prior to any work starting to identify possible heritage sites. 3) Prospecting activities will be kept away from excluded and exempted areas. 4) Where boreholes are sited in proximity to heritage sites and depending on the proximity to the drilling site, appropriate measures such as flagging, pegging or

ACTIVITIES	POTENTIAL IMPACT	MITIGATION MEASURES
		installation of temporary fencing will be undertaken to ensure that the site is not impacted on during prospecting.
Vegetation clearance for establishment of drill sites	Dust pollution	1) Dust will be effectively controlled in all areas cleared from vegetation through water spraying.
Vegetation clearance for establishment of drill sites	Storm water run-off from cleared areas could lead to siltation of surface water	1) Controls will be aimed at minimizing erosion and sediment washing from drill pads, access roads and other disturbed areas. 2) Sediment and erosion controls will be designed to prevent runoff from the prospecting site into rivers & streams. 3) Sediment and erosion controls may include cut-off trenches and drains, culverts for tracks, silt fences, rock armouring or mulching.
Workers & material on site	Contamination of soils through spills from sanitation facilities & litter	1) A chemical toilet will be used on site during prospecting and will be used in such a way as to prevent water pollution. The use of a chemical toilet will be undertaken in consultation with the landowner 2) The portable Chemical toilet will be situated out of the 1: 100-year Floodline of any water courses to avoid water pollution. 3) Full or leaking toilets must be reported to the Supervisor for corrective action or replacement. 4) Prospecting areas will be maintained in a clean and tidy condition at all times. 5) All waste will be collected, separated and stored in properly constructed

ACTIVITIES	POTENTIAL IMPACT	MITIGATION MEASURES
		containers with lids and removed to an approved landfill or another site according to local municipal requirements. 6) Full waste bins must be reported to the Supervisor for collection and disposal at an approved landfill.
Workers & material on site	Fire	1) Vegetation around each exploration site within a 5m radius will be kept short to create a fire management zone. 2) Collection of firewood will not be allowed. 3) Open fires will be prohibited to people involved in prospecting. 4) No burning cigarettes or matches may be thrown down within the prospecting area. A bucket with sand will be provided for the disposal of cigarettes and matches. 5) No smoking will be allowed near gas, paints or fuel storage areas. 6) Suitable welding blankets are to be used when welding or operating grinders and this equipment is to be serviced regularly. 7) Rubbish or vegetation may under no circumstances be burnt. All waste will be removed off site and disposed of at an approved landfill.
Workers & material on site	Collection of firewood, damage to property	1) Collection of firewood will not be allowed. 2) Only one drill site at any given time. All employees present at the one drill site with appropriate supervision 3) Complaints and outcomes of subsequent investigations will be recorded

ACTIVITIES	POTENTIAL IMPACT	MITIGATION MEASURES
		in a Complaints Register in the format of a spreadsheet. 4) If damage to private property occurs as a result of prospecting activities, such damage will be repaired, or owners will be compensated as appropriate.
Workers & material on site	Contribution to the economy through employment	1) Due to the nature of prospecting, employment opportunities will be minimal. The prospecting crew is small (10 people) with specialised skills. Were possible, local people will however be employed during the project. 2) Local people and businesses with appropriate skills will be identified and included in the project tender process. The applicant is committed to employ local people and businesses during the project, where possible.
Workers & material on site	Spread of HIV/Aids to farm workers and local community	1) Due to the nature of prospecting, employment opportunities will be minimal. The prospecting crew is small (10 people) with specialised skills. Were possible, local people will however be employed during the project. 2) No employees will be permitted to stay on site. 3) Aids awareness talks
Use of heavy machinery & vehicles on site for drilling	Resource consumption (diesel - non-renewable resource)	1) Vehicles and equipment to be serviced regularly and maintained in good working condition
Use of heavy machinery &	Contamination of soils through hydrocarbon	1) All chemicals, fuels and oils to be stored on site will be appropriately bunded. 2) Precautions will be taken to prevent

ACTIVITIES	POTENTIAL IMPACT	MITIGATION MEASURES
vehicles on site for drilling	leaks and spills from machinery & equipment	spills and soil contamination. 3) Material Safety Data Sheets for the item(s) spilled will be consulted for information concerning clean-up requirements to ensure correct clean-up procedure. 4) Any contaminated soil will be collected into non-permeable bags and disposed of to an approved landfill site.
Use of heavy machinery & vehicles on site for drilling	Use of groundwater for drilling activities	1) Existing water supply locations will be identified for use and agreements will be reached with landowners regarding on-site water use. The drilling rig will require approximately 2,000l/day where possible. However, Air flush method will be proposed instead of using water. Where a suitable water supply is not available, water will be sourced from a commercial supplier and delivered to site by water tanker. 2) If required, a water use license will be applied for to DWS for the abstraction of surface- and/or groundwater during prospecting. 3) Adequate provision will be made for storing drinking water on site in the form of 2500 litre plastic water tanks.
Use of heavy machinery & vehicles on site for drilling	Contamination of surface water through hydrocarbon leaks and spills from machinery & equipment	1) The drilling fluid that will be used during prospecting must be biodegradable and not pose a water pollution threat. 2) Drilling sumps and containment measures will be designed to contain all drilling fluid. 3) Material Safety Data Sheets for the item(s) spilled will be consulted for

ACTIVITIES	POTENTIAL IMPACT	MITIGATION MEASURES
		information concerning clean-up requirements to ensure correct clean-up procedure. 4) Any contaminated soil will be collected into non-permeable bags and disposed of to an approved landfill site. 5) Drill sites to be located 500m from rivers & stream
Use of heavy machinery & vehicles on site for drilling	Contamination of groundwater through hydrocarbon leaks and spills from machinery & equipment	1) Machinery and equipment will only be maintained over a drip tray, a thin concrete slab or a PVC lining to prevent soil and water contamination. 2) No vehicle will be extensively repaired on site. 3) Material Safety Data Sheets for the item(s) spilled will be consulted for information concerning clean-up requirements to ensure correct clean-up procedure. 4) Any contaminated soil will be collected into non-permeable bags and disposed of to an approved landfill site by the Municipality.
Use of heavy machinery & vehicles on site for drilling	Compaction of soils through movement of heavy vehicles and machinery on site	1) Stay on predefined areas and routes. 2) Scarify access roads and stockpile areas to a depth of 500 mm and restore topsoil cover. 3) Re-seed or plant vegetation indigenous to the area.
Use of heavy machinery & vehicles on site for drilling	Damage to vegetation	1) Vehicles will only stay on dedicated roads (turning circles). 2) No movement of heavy machinery outside dedicated routes. 3) All routes and turning circles will be

ACTIVITIES	POTENTIAL IMPACT	MITIGATION MEASURES
		scarified and re-seeded with seeds from vegetation indigenous to the area.
Use of heavy machinery & vehicles on site for drilling	Release of gaseous emissions	1) Vehicles and equipment will be maintained in a good working order.
Use of heavy machinery & vehicles on site for drilling	Dust Fallout	1) Speed limits on gravel roads will be 40km/hr to minimise dust and noise generation. 2) Dust will be effectively controlled in all disturbed areas through water spraying.
Use of heavy machinery & vehicles on site for drilling	Increase in ambient noise levels	1) Speed limits on gravel roads will be 40km/hr to minimise dust and noise generation. 2) Prospecting activities will be restricted today light hours.
Use of heavy machinery & vehicles on site for drilling	Visual intrusion	1) Only one site to be drilled at any one time 2) Concurrent rehabilitation
Use of heavy machinery & vehicles on site for drilling	Disturbance of fauna species in the vicinity	1) Prospecting activities will be kept away from excluded and exempted areas. 2) A field survey will be undertaken before drilling commences at each drilling site to confirm that no threatened species, ecologically sensitive areas or conservation areas are present in sections to be cleared. 4) One site to be drilled at a time. 5) Concurrent rehabilitation.
Use of heavy machinery & vehicles on site for drilling	Release of methane gas from exploration boreholes	1) Exploration boreholes are to be capped when no drilling work is being undertaken. 2) Exploration boreholes which will not be used during production to be sealed with

ACTIVITIES	POTENTIAL IMPACT	MITIGATION MEASURES
		cement once exploration work has been completed.
Use of heavy machinery & vehicles on site for drilling	Cross-contamination of aquifers due to borehole construction	1) For the purpose of future monitoring programmes, impact assessments and concurrent rehabilitation, the depth of water strikes will be recorded during exploration drilling. 2) The static groundwater level will be monitored in prospecting boreholes that intersected water after completion and before concurrent rehabilitation for future monitoring, impact assessment and concurrent rehabilitation purposes. 3) Any completed hole that is not required for groundwater monitoring, will be sealed to prevent groundwater contamination.
Use of heavy machinery & vehicles on site for drilling	Proliferation of invasive plant species	1) Machinery will be cleared of dust/mud and seed prior to relocation to the next site to prevent the spread of alien invasive species.
Closure		
Concurrent rehabilitation	Reducing soil compaction of disturbed area and access roads to improve drainage and control erosion	1) Remaining refuse, chemicals, fuels and waste materials will be removed from the site following the completion of the prospecting programme. Such waste will be disposed of to an approved landfill. 2) Erosion and sediment controls as well as the disturbed area will be rehabilitated 3) An inspection on whether there is evidence of weeds or pest invasion as a result of prospecting activities will be undertaken and appropriate remediation actions will be implemented as required.

ACTIVITIES	POTENTIAL IMPACT	MITIGATION MEASURES
Concurrent rehabilitation	Use stockpiled topsoil to close sumps	1) Scarify access roads and stockpile storage areas to a depth of 500 mm. 2) Restore topsoil cover. 3) Re-seed or plant vegetation indigenous to the area.
Close drill hole	Restoration of land use and land capability	1) Exploration boreholes are to be capped when no drilling work is being undertaken. 2) Exploration boreholes which will not be used during production to be sealed with cement once exploration work has been completed.

viii) Motivation where no alternative sites were considered.

The location of the property is in an area where the geological formation that is known to host the desired mineralisation. Since exploration is temporary in nature no permanent structures will be constructed, Negotiations and agreements will be made with the farm owners to use any existing infrastructure like access roads.

ix) Statement motivating the alternative development location within the overall site.

(Provide a statement motivating the final site layout that is proposed)

This is an application for prospecting without bulk sampling where a total of 15 holes will be drilled at locations determined by the geology of the site. Drill holes will be located at least 500m from any watercourse and 500 m away from formal or informal dwelling or building structure. Since exploration is temporary in nature no permanent structures will be constructed, Negotiations and agreements will be made with the farm owner to use any existing infrastructure like access roads

x) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity.

(Including (i) a description of all environmental issues and risks that are identified during the environmental impact assessment process and (ii) an assessment of the significance of each

issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.)

In order to identify the potential impacts associated with the proposed prospecting activities the following steps were undertaken:

• Landowner and stakeholder consultation Environmental assessment conducted for proposed projects

• A detailed desktop investigation was undertaken to determine the environmental setting in which the project is located. Based on the desktop investigations various resources were used to determine the significance and sensitivity of the various environmental considerations. The desktop investigation involved the use of:

-South African National Biodiversity Institute (SANBI) Biodiversity

-Geographic Database LUDS system

-Geographic Information System base maps

• Site visits conducted. The site visit was used to ground truth the desktop information.

• The rating of the identified impacts was undertaken in a quantitative manner as provided in this document. The ratings are undertaken in a manner to calculate the significance of each of the impacts. The EAP also assesses the outcomes of the calculation to determine whether the outcome reflects the perceived and actual views.

• The identification of management measures is done based on the significance of the impacts and measures that have considered appropriate and successful, specifically as Best Practical and Economical Options.

Please refer to Tables 18.

a) Assessment of each identified potentially significant impact and risk

(This section of the report must consider all the known typical impacts of each of the activities (including those that could or should have been identified by knowledgeable persons) and not only those that were raised by registered interested and affected parties).

Table 15: Significant and Impact risk

Name of activity	Potential impact	Aspects affected	Phase	Significance					Mitigation type	Significance
E.g. for prospecting: Drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route, etc. E.g. for mining: Excavations, blasting, stockpiles, discard dumps/dams, loading, hauling, transport, water supply dams, boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.	Including the potential impacts for cumulative impacts. E.g. dust, noise, drainage surface disturbance, fly rock, surface and groundwater contamination, air pollution, etc.		In which impact is anticipated, e.g. construction, commissioning, operational, decommissioning, closure and post-closure.	If not mitigated					Modify, remedy, control or stop through, e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. E.g. Modify through alternative method. Control through noise control. Control through management and monitoring through rehabilitation	If mitigated
Site establishment activities Vegetation clearance Topsoil stripping and stockpiling	Cultural and Heritage (-ve)	Destruction/loss of cultural and heritage resources: No cultural/heritag	Construction/ set-up	1	1	1		3 (VL)	If concentrations of archaeological heritage material and human remains are uncovered during construction, work must	Negligible

Name of activity	Potential impact	Aspects affected	Phase	Significance					Mitigation type	Significance
Drill pad compaction Erection of office, toilets, fuel storage (if not by road tanker), water tanker, core storage Vehicle movements Waste management		e artefacts have been identified on site							cease immediately. Finds must be reported to a heritage specialist so that systematic and professional investigation/excavation can be undertaken.	
	Noise (-ve)	Noise generation	Construction/ set-up	1	3	1		5 (L)	Construction/set-up, operational and decommissioning activities will be limited to daylight hours, Mondays-Saturdays, and no activities on Sundays and public holidays. Separation of at least 500m, (preferably 1 000m) to be maintained between drill sites and dwellings. Noise abatement equipment, like mufflers on diesel engines, will be kept in good condition.	3(VL)
	Visual (–ve)	Visual intrusion	Construction/ set-up	1	3	1		5 (L)	The drilling rig and other visually prominent items on site will be in consultation with the landowner. Use existing vegetation as far as possible to screen prospecting operations from view.	3(VL)

Name of activity	Potential impact	Aspects affected	Phase	Significance					Mitigation type	Significance
									If necessary, operations can be screened from view by erecting a shade cloth barrier.	
	Traffic (-ve)	Increase in traffic volumes near the drilling site	Construction/ set up	1	2	1		4 (VL)	Traffic signs to be put around the site to notify motorists of the activities. Drilling vehicles will adhere to local speed limits as far as possible when driving in around site.	3(VL)
	Dust fall (-ve)	Dust fall and nuisance from activities	Construction/ set-up	2	3	1		6 (M)	Wet suppression should be applied to ensure that no visible dust is raised by the prospecting operations. Separation of at least 500m (preferably 1 000m) to be maintained between drill sites and dwellings. Low vehicle speeds will be enforced on unpaved surfaces.	3(VL)
	Soil and Vegetation (-ve)	The potential impact of the proposed prospecting on the vegetation would occur at proposed	Construction/ set up	1	3	2		6 (M)	Soil disturbance and clearance of vegetation at drill pads will kept to the absolute minimum. No clear scraping (dozing) will be carried out unless necessary to establish a level drill pad. Rather that surface vegetation is	5 (L)

Name of activity	Potential impact	Aspects affected	Phase	Significance					Mitigation type	Significance
		drilling sites and the access routes used to get to these sites.							cleared to make way for the drilling rig leaving the roots intact so that vegetation can coppice and regrow. Disturbed areas will be re-vegetated with indigenous species as soon as possible.	
	Animal life (-ve)	Animal life will be affected in the immediate vicinity of the drilling rig. It is anticipated that the noise and general activity will keep animals away from the site during prospecting.	Construction/ set up	1	3	2		6 (M)	Environmental awareness training sessions must be part of the workers' induction and site workshops. If any animals are encountered, they must not be killed or injured but removed/chased away from the site	5 (L)
	Social (-ve)	Friction between residents/landowners and construction personnel	Construction/ set-up	1	2	2		5 (L)	All operations will be carried out under the guidance of a strong, experienced manager with public consultation and conflict resolution skills. All prospecting personnel will be made aware of local conditions and sensitivities in the prospecting area and the	4 (VL)

Name of activity	Potential impact	Aspects affected	Phase	Significance					Mitigation type	Significance
									fact that some residents may not welcome the prospecting activities. There will be a strict requirement to always treat residents with respect and courtesy.	
	Job creation (+ve)	Employment will be created for the clearing of the land and establishing the drilling site.	Construction/ set-up	2	1	1		4 (VL)	No mitigation measures required.	4 (VL)
Exploration drilling Drilling Drill maintenance and refuelling Core sample collection and storage Vehicle movements Waste generation and management	Noise (-ve)	Noise generation	Operations	1	2	1		4 (VL)	Construction/set-up, operational and decommissioning activities will be limited to daylight hours, Mondays-Saturdays, and no activities on Sundays and public holidays. Separation of at least 500m (preferably 1 000m) to be kept between drill sites and dwellings. Noise abatement equipment, like mufflers on diesel engines, will be maintained in good condition. If intrusive noise levels are	3(VL)

Name of activity	Potential impact	Aspects affected	Phase	Significance					Mitigation type	Significance
									experienced by any person at any point, the source of the noise will be moved if practical, or placed in an acoustic enclosure, or an acoustic barrier will be erected between the source and the recipient.	
	Visual (-ve)	Visual intrusion	Operations	1	2	1	Definite	4 (VL)	The drilling rig and other visually prominent items on the site will be placed in consultation with the landowner. Use existing vegetation where possible to screen prospecting operations from view. If necessary, operations can be screened from view by erecting a shade cloth barrier.	3(VL)

Name of activity	Potential impact	Aspects affected	Phase	Significance					Mitigation type	Significance
Drilling	Dust fall (-ve)	Dust fall and nuisance from activities	Operations	1	2	1	Definite	4 (VL)	Wet suppression will be applied to ensure that no visible dust is raised by any of the prospecting operations. Separation of at least 500m (preferably 1 000m) to be kept between drill sites and dwellings. Low vehicle speeds will be enforced on unpaved surfaces.	3(VL)
Clearing of Vegetation	Soil and Vegetation (-ve)	Soil and vegetation disturbance from drill pad preparation	Operations	1	2	2	Definite	5 (L)	The soil disturbance and clearance of vegetation at drill pad areas will be limited to the minimum required. No clear scraping (dozing) to be carried out unless necessary to establish a level drill pad. Surface vegetation should rather be cleared to make way for the drilling rig leaving the roots intact so that vegetation can regrow. Disturbed areas will be re-vegetated with indigenous species as soon as possible.	3(VL)

Name of activity	Potential impact	Aspects affected	Phase	Significance					Mitigation type	Significance
Drilling	Animal life (-ve)	Animal life will be affected in the immediate vicinity of the drilling rig. It is anticipated that the noise and general activity will keep the animal life away from the site during prospecting.	Operations	1	2	2	Definite	5 (L)	Measures implemented during site establishment should apply in this phase too.	4(VL)
Sampling	Social (-ve)	Friction between residents/landowners and construction personnel	Operations	1	2	2	Definite	5 (L)	All operations will be carried out under the guidance of a strong, experienced manager with public consultation and conflict resolution skills. All prospecting personnel will be made aware of the local conditions and sensitivities in the prospecting area and the fact that some residents may not welcome the prospecting activities. There will always be a strict requirement to treat residents with respect and courtesy.	5 (L)

Name of activity	Potential impact	Aspects affected	Phase	Significance					Mitigation type	Significance
Employment Opportunity	Job creation (+ve)	Employment will be created for the clearing of the land and establishing the drilling site.	Operations	2	2	1	Definite	5 (L)	No mitigation measures required.	5 (L)

13.4 Specialist Studies

ix) Summary of specialist reports.

(This summary must be completed if any specialist reports informed the impact assessment and final site layout process and must be in the following tabular form): -

Table 16: Summary of specialist reports.

LIST OF STUDIES UNDERTAKEN	**RECOMMENDATIONS OF SPECIALIST REPORTS**	**SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT** (Mark with an X where applicable)	**REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.**
Hydrogeological Study	The prospecting activity should take place during dry seasons where the water percentages in the surrounding streams and wetlands are very low. all the Wetlands and non-perennial rivers will be buffered as no go area preferably a 500m buffer will apply. Drilling activity will not be conducted near these water resources. All the Wetlands will be buffered as no go area preferably a 500m buffer will apply.	X	Surface water and buffer zones

Soil Study	No washing of any mechanical equipment's or vehicles should be allowed near the water resources The core logs of boreholes with coal should be cleared from the ground immediately after logging by the geologists to prevent washing and leaching to the water resources during rainfall.	x	
Hydrological Study	It can be concluded that the prospecting of Coal will cause minimal impact on the water resources. Drilling activity should not be conducted near these water resources No washing of any mechanical equipment's or vehicles will be allowed near the water resources.	x	
Ecological Study	All the sensitive areas must be protected for the services they render to the environment. Proper rehabilitation and after-care of the excavated area must take place to prevent colonization by invader species. It is recommended that the management measures stipulated in this report 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.	x	

	Excavated areas must be rehabilitated to avoid or limit erosion. Drilled boreholes must be capped to avoid injuries to animals.		

13.5 Environmental Impact Statement

x) Summary of the key findings of the environmental impact assessment.

The proposed prospecting project falls within the Gert Sibande Region with topography of the project area is situated in a gentle topographical range from 1660 - 1760 mamsl. The area is characterized by gentle slopes. Vegetation units are present in the proposed project area are Moist Sandy Highveld Grassland falls within the Grassland Biome of South Africa (Mucina & Rutherford, 2006). Most of the plant species are non-grassy herbs (forbs) of which the growth is stimulated by fire. Trees are scarce within this biome as the dry winters, high summer rainfall and veld fires create unfavorable conditions for the growth of indigenous tree species.

proposed prospecting site covered by a Critical Biodiversity Area (CBA), ESA, heavily modified, moderately modified and Other Natural Area. Environmental sensitivity of the area is classified as the Critical Biodiversity Area 1 (CBA1), Critical Biodiversity Area 2 (CBA2), Ecological support area: local corridor, FEPA Sub catchments, and Protected Areas Expansion Strategy

The area comprises of very high intensity of agricultural activities such as farming and cultivation. Cattle farming, crop cultivation and livestock grazing is again a large cultural practice within the area. There is a settlement nearby the proposed project area. The area is capable for grazing is also capable of being used to grow crops (Arable).

The proposed prospecting area comprises of wetlands and moist sandy highveld grassland (as seen in figure below) which play an important role as microhabitat for avifauna species that may use the surrounding grassland for foraging and roosting.

The possible environmental impacts associated with the proposed prospecting are considered insignificant. A diamond core drill rig will be used for drilling. The drill team will require temporarily infrastructures. There are impacts associated with the heritage resources and river located onsite. During the pegging phase for each borehole buffer zone should be avoided to prevent negative impacts on heritage sites, rivers and/or streams that were identified. The prospecting programme was designed to avoid the impact of the river/heritage site and CBA,ESA, and Other Natural 500m buffer zone buffer zone.

The Monitoring of the required mitigation measures is to take place on site daily by the site Geologist with an assistance of an appointed Environmental Control Officer (ECO). Annual monitoring audits are to take place by an appointed independent environmental assessment practitioner to compile the required annual environmental compliance report required by the DMRE.

xi) Final Site Map

Provide a map at an appropriate scale which superimposes the proposed overall activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers.

Please refer to Appendix A.

xii) Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;

Positive Impact associated with the proposed Prospecting:

- Employment contributing to the economy (about 10 people per drill site)
- Positive contribution to the South African Gross Domestic Product
- Concurrent rehabilitation during prospecting

Negative Impacts associated with the proposed prospecting

- Destruction/loss of cultural and heritage resources during the construction/set-up phase.
- Noise generation from construction/set-up and operational activities of drilling.
- Visual intrusion caused by the drilling activities in the largely rural setting.
- Increased traffic near the drilling site during site establishment and prospecting.
- Dust fall and nuisance from drilling activities.
- Soil and vegetation disturbance from drill pad preparation during construction/set-up and operations, as contractors rehabilitate one site and move to the next.
- Animal life will be affected in the immediate vicinity of the drilling rig. It is expected that the noise and general activity will keep them away from the prospecting site.
- Disturbance of riparian habitats & non-perennial river
- Litter

Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr;

Based on the assessment and where applicable the recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorization.

The objectives of the impact management process are as follows:

Air Quality:

To ensure that the prospecting activities has a minimal adverse impact on air quality, dust limitation and suppression to be applied.

Groundwater:

To ensure that the prospecting activities have minimal adverse impact on the surrounding groundwater water quality and prevents pollution of existing groundwater resources. Detailed in Appendix L.

Surface Water

To ensure that the prospecting activities effectively utilize the consumption of freshwater, have minimal adverse impacts on the surrounding surface water quality and prevent pollution of surrounding surface water resources. A buffer of 500m to be observed from the water course.

Soils

To ensure that the prospecting activities have a positive impact on land and soils by mitigating potential erosion, preventing contamination and pollution.

Biodiversity

To ensure that the prospecting activities do not have an adverse impact on the current biodiversity.

Socio-Economic

To aid in the improvement of the current local economy and improve the social environment of communities affected by the prospecting activities.

Visual

To limit the visual impact of the prospecting activities. Only one drill rig to be used and concurrent rehabilitation to be implemented.

Noise

To control noise pollution stemming from the prospecting activities through the restriction of operational hours.

Heritage

To ensure that the prospecting activities avoid adverse impacts on the heritage resources of significance. Interaction with SAHRA and local residents to identify and confirm heritage sites. Marking and avoidance of sites if identified.

Waste

To ensure that the proposed prospecting operation adopts and implements waste management principles that are environmentally responsible. All Genera waste and Hazardous waste generated on site must be separated and disposed in such a manner as not to cause secondary pollution.

b) Aspects for inclusion as conditions of Authorisation.

Any aspects which must be made conditions of the Environmental Authorisation

- A field survey must be undertaken before drilling commences at each drilling site to confirm that no cultural heritage site is present in sections to be cleared.
- Prospecting should not occur within 500 m from any watercourse.
- Boreholes and access tracks will be located in areas that will result in minimal ground disturbance.
- Indigenous tree should be avoided during prospecting activities .
- Boreholes should be located nearby existing access road to avoid disturbance of natural vegetation
- Each target area to be pursued through invasive methods needs to be inspected for nests in trees and other birds. All trees accumulate nest of birds must be avoided
- During the pegging phase for each borehole, specific controls must be identified and implemented, based on site conditions.
- No employees will be permitted to stay on the site.
- Collection of firewood will not be allowed.
- Where an access road is needed, the relevant occupant and owner will be consulted prior to the development of that access to ensure that consensus is reached on the matter and the access will be rehabilitated at the end of the drilling programme.
- Concurrent rehabilitation of disturbed areas must be undertaken.

c) Description of any assumptions, uncertainties and gaps in knowledge.

(Which relate to the assessment and mitigation measures proposed)

The location of the final planned boreholes designed were identified through the approach of the prospecting work programme. This assessment is therefore based on a desktop approach at a broad scale and assuming that drilling could not occur

anywhere within the proposed prospecting license area as the area is highly sensitive on Critical Biodiversity. Once drill sites have been identified, then it is recommended that focus should be given to these sites in order to identify any cultural or heritage resources of significance, any ecologically significant areas that may occur as well as re-engaging landowners regarding the intention to access and conduct drilling activities on their property.

d) Reasoned opinion as to whether the proposed activity should or should not be authorised

a. Reasons why the activity should be authorized or not.

Prospecting is a short-term activity with minimal impact. According to the impact assessment undertaken for the proposed project, the key impacts of the project are on soils, endemic flora and fauna species and landowners/occupiers. The project will also have positive impacts due to the employment to be created although for a short term. The site has been identified as one the ecologically sensitive; Several CBAs, including rivers and wetlands, were observed on site. The identified CBAs have ecological function and high conservation importance. The proposed buffer zones in the wetland assessment report should be considered to conserve these CBAs.

The public has also been requested for their comments. All comments to be received during Public Participation Process will be included in this BAR and EMPr. These comments were be addressed as far as possible to the satisfaction of the interested and affected parties.

Prospecting activities may be undertaken provided all probable impacts will be effectively managed. The management of the impacts identified in the impact assessment for all phases of the proposed project will be undertaken through a range of programmes and plans contained in the EMPr. In consideration of the programmes and plans contained within the EMPr, layouts and method statements compiled for the project, which is assumed will be effectively implemented, there will be significant reduction in the significance of potential impacts. Based on the above, it is therefore the opinion of the EAP that the activity should be authorized.

b. Conditions that must be included in the authorisation

- No prospecting should occur within 500m from any watercourse.
- All sensitive area must be avoided.

- The positioning of boreholes and access tracks should be in areas that will result in minimal ground disturbance
- During the pegging phase for each borehole, specific controls must be identified and implemented, based on site conditions
- No employees will be permitted to stay on the site.
- Where new access road is needed to be created, the relevant occupant and owner will be consulted prior to the development of that access to ensure that consensus is reached on the matter and the access will be rehabilitated at the end of the drilling programme.

e) Period for which the Environmental Authorisation is required

The authorization is required for the duration of the prospecting right which is 5 years. plus, a potential to extend the right by an additional 3 years. Therefore, a total period of 8 years is required.

f) Undertaking

Confirm that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the Basic Assessment report and the Environmental Management Programme report.

An undertaking is provided at the end of this report.

13.6 Financial Provision

State the amount that is required to both manage and rehabilitate the environment in respect of rehabilitation.

A financial provision of approximately **R82 680** which includes rehabilitation activities, has been made by Bazil Technologies (Pty) Ltd (see in Table below). The applicant undertakes to provide financial provision through funding from the personal account.

i. Explain how the aforesaid amount was derived.

Confirm that this amount can be provided for from operating expenditure. Confirm that the amount, is anticipated to be an operating cost and is provided for as such in the Mining work programme, Financial and Technical Competence Report or PWP.

A financial provision of **R82 680** is proposed for the prospecting application. However an amount of approximately R 2 423 993.5 has been budgeted for the prospecting programme over 5 years as PWP, which includes rehabilitation activities.

The financial provision was calculated according to Financial Provision Regulations 6 of 2015, published under Government Notice R1147 in Government Gazette 39425 of November 2015 (the Financial Provisioning Regulations) for National Environmental Management Act 1998 (Act No. 107 of 1998) (NEMA) which prescribe the minimum content requirements. The amount was derived from the quantum calculations.

The drilling contractor will be responsible for rehabilitating the drill pad once the drilling activities have been completed at each exploration hole. This is typically a contractual arrangement between Bazil Technologies (Pty) Ltd, and the drilling contractor employed to implement drilling activities which include construction / set-up of drill pad, operational drilling activities and the rehabilitation of the drill site after drilling has ceased. The financial guarantee was calculated using the DMRE official financial quantum calculator below.

Table 17: Financial Quantum

CALCULATION OF THE QUANTUM

BAZIL TECHNOLOGIES

Applicant:
Evaluator: **Masindi Nefale**

Ref No.: **DMRE REF: MP 30/5/1/1/2/ (17127) PR**
Date: **Mar-22**

No.	Description	Unit	A Quantity	B Master Rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	0	19	1	1	0
2 (A)	Demolition of steel buildings and structures	m2	0	271	1	1	0
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	400	1	1	0
3	Rehabilitation of access roads	m2	11751	49	0,1	1	57579,9
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	471	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	257	1	1	0
5	Demolition of housing and/or administration facilities	m2	0	542	1	1	0
6	Opencast rehabilitation including final voids and ramps	ha	0	284292	1	1	0
7	Sealing of shafts adits and inclines	m3	0	146	1	1	0
8 (A)	Rehabilitation of overburden and spoils	ha	0	189528	1	1	0
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0	236054	1	1	0
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	685612	1	1	0
9	Rehabilitation of subsided areas	ha	0	158701	1	1	0
10	General surface rehabilitation	ha	0,9	150138	0,01	1	1351,242
11	River diversions	ha	0	150138	1	1	0
12	Fencing	m	0	171	1	1	0
13	Water management	ha	0	57087	1	1	0
14	2 to 3 years of maintenance and aftercare	ha	0	19980	1	1	0
15 (A)	Specialist study	Sum	0	0	1	1	0
15 (B)	Specialist study	Sum	0	0	1	1	0
					Sub Total 1		58931,142

1	Preliminary and General	7071,73704	weighting factor 2 1	7071,73704
2	Contingencies	5893,1142		5893,1142
			Subtotal 2	71895,99
			VAT (15%)	10784,40
			Grand Total	82680

SIGN
DATE

Masindi Nefale
Mar-22

ii. Confirm that this amount can be provided for from operating expenditure.

The financial support provided by Bazil Technologies (Pty) Ltd submitted their financial support demonstrates the availability of funds to undertake prospecting of the desired mineral.

g) Specific Information required by the competent Authority

i) Compliance with the provisions of sections 24(4)(a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998). the EIA report must include the: -

ix) Impact on the socio-economic conditions of any directly affected person

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as an Appendix) .

There are no anticipated direct impacts on the socio-economic conditions of the landowners. Private owners of portions that are used for agricultural purposes will be compensated fairly for any loss due to the drilling programme. Drill holes will be immediately closed to avoid any contamination to the groundwater.

As the final positioning of the drill sites cannot be confirmed without completion of phase 1 of the prospecting programme, a recommendation has been made to ensure that the directly affected landowners are re-consulted a minimum of 1 month prior to implementing invasive activities (drilling). The purpose of the re-consultation is to ensure that socio-economic impacts on directly affected persons can be raised and where possible addressed.

x) Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act.

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act, attach the investigation report as **Appendix 2.19.2** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).

There is heritage sites or graves that was identified within the proposed prospecting area during site assessment. Study area is located on portions RE, RE/1, 3, RE/4, RE/5, RE/6, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, RE/20 & 21 of the farm Elandspoort 85 HS. However, any heritage resources of significance be exposed during the rather operational phase of the project, the South African Heritage Resources Authority (SAHRA) should be notified immediately, all development activities should be stopped, and an archaeologist accredited with the Association for Southern African Professional

Archaeologist (ASAPA) should be notified to determine appropriate mitigation measures for the discovered finds. This may include obtaining the necessary authorisation (permits) from SAHRA to conduct the required mitigation measures. Mitigation measures proposed in this report include that no drill site must be located within 100m of any heritage site. Furthermore, if graves and other heritage site maybe identified during prospecting activities within the area must be buffered as "no go" area by 100m zone.

xi) Other matters required in terms of sections 24(4)(a) and (b) of the Act.

(The EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation 22(2)(h), exist. The EAP must attach such motivation as Appendix 4).

The proposed prospecting activities (including the drilling) requested as part of this authorization is the only current viable way a mineral resource can be identified and used to generate a resource which is a minimum requirement to determine whether it is viable to invest in a future mine.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME

14 Environmental management programme.

a) Details of the EAP

(Confirm that the requirement for the provision of the details and expertise of the EAP are already included in PART A, section 1(a) herein as required).

Please refer to the Details of the EAP included in Part A, section 1(a)

b) Description of the Aspects of the Activity

(Confirm that the requirement to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, section (1)(h) herein as required).

The aspects of the activity are described in Part A Section 1(h).

c) Composite Map

(Provide a map (**Attached as an Appendix**) at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers).

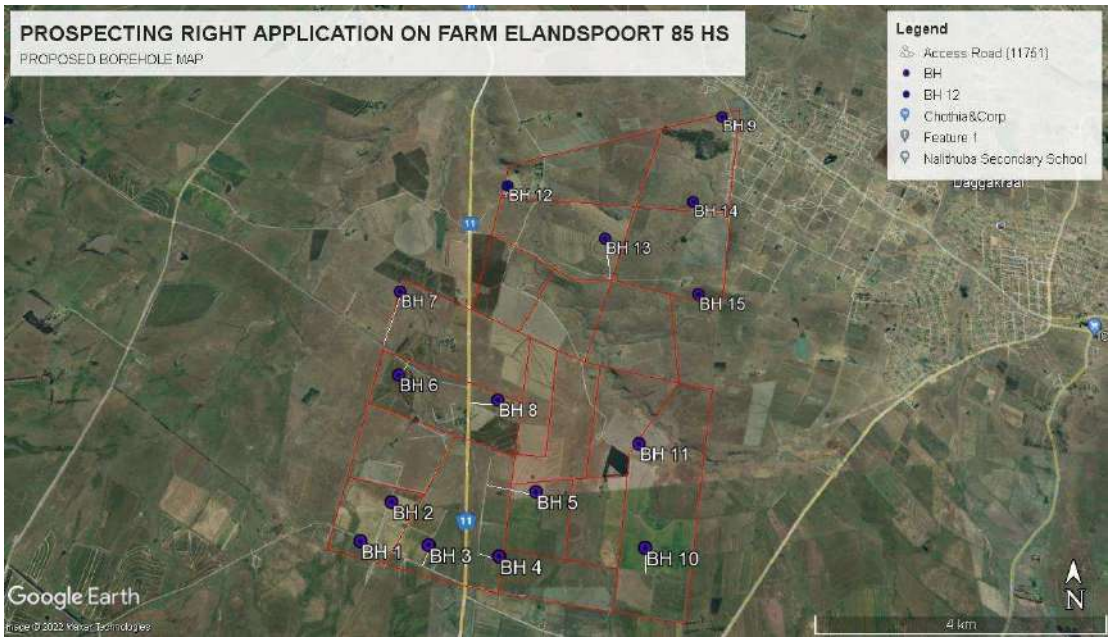


Figure 53: Proposed boreholes map for the proposed prosed prospecting project.

A general layout is enclosed though exploration is a temporal activity thus no permanent structures will be erected. Please refer to Appendix A.

d) Description of Impact management objectives including management statements.

i) Determination of closure objectives.

(Ensure that the closure objectives are informed by the type of environment described)

The overall goal for closure of the prospecting site is to re-instate the predetermined land-use of the landowners, neighbors and community, ensuring that the land is stable and safe in the long-term.

The closure objectives apply to the prospecting area in its final closed state and not whilst the site is in transformation towards this state. They nevertheless provide guidance during the operational phase. Closure objectives relate to the following:

Physical stability: To back-fill boreholes and pits on the prospecting site to ensure continuation of the land use after completion of prospecting activities.

Environmental quality: To ensure that local environmental quality is not adversely affected by possible physical effects and chemical contaminants arising from the prospecting site after completion of prospecting activities.

Health and safety: To limit the possible health and safety threats to humans and animals using the rehabilitated prospecting area after completion of prospecting activities.

Land capability/land-use: To ensure continuation or to the re-instate a suitable land capability over as large as possible area affected during prospecting.

Aesthetic quality: To leave behind a rehabilitated prospecting site that is neat and tidy, giving an acceptable overall aesthetic appearance.

Biodiversity: To encourage the re-establishment of indigenous and/ or appropriate vegetation on the rehabilitated prospecting site such that the biodiversity is largely re-instated over time, as well as protect the undisturbed areas to maintain/enhance the biodiversity of these areas. Prospecting area rehabilitated to limit impact on current land use

Environmental Legislation

To comply with all environmental legislation. Specific aspects to be adhered to from environmental legislation include National Environmental Management Act, Act 107 of 1998 (NEMA)

As the NEMA is the cornerstone of all environmental legislation, the management measures implemented by the Bazil Technologies will strive to adhere to the principles of NEMA:

• That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
• That pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, minimised and remedied;
• That the disturbance of landscapes and sites that constitute the nations cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;
• That waste is avoided, or where it cannot be altogether avoided, minimised and reused or recycled where possible and otherwise disposed of in a responsible manner;
• that the use and exploitation of non-renewable natural resources is responsible and equitable, and considers the consequences of the depletion of the resource;
• That a risk averse and cautious approach is applied, which considers the limits of current knowledge about the consequences of decisions and actions; and
• That negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, will be minimised and remedied.

Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.

ii) Volumes and rate of water use required for the operation.

Water in prospecting activities is required to; reduce the friction between the rock mass and the drill bit hence increasing cutting efficiency of the drill bit, water is also used to cool down the drill bit. Due to the advancement in technology, alternative cutting and cooling mechanisms have been developed whereby called air is utilised instead of water. In this project, drill bit which uses air will be used instead of those that use water. Therefore, water needs only relates to portable drinking water of personnel on site.

iii) Has a water use license has been applied for?

Section 21 of the National Water Act (Act 36 of 1998) list activities that triggers water use license, after careful assessment of the project area, activities to be undertaken were not found to trigger water use application. Instead, appropriate water management measures and buffers have been developed in this EMP for protection of water resources. Best Practice Guidelines will be utilised throughout the prospecting duration of the prospecting activities.

No Water use license is required for this prospecting application. Water will be sourced from commercial supplier and transported in via mobile tanker. Clean water for employees will be purchased from the shops.

iv) Impacts to be mitigated in their respective phases

Measures to rehabilitate the environment affected by the undertaking of any listed activities

Table 18: Impact mitigation and rehabilitation

Activities	**Phase**	**Size and scale of disturbance**	**Mitigation measures**	**Compliance with standards**	**Implementation period**
E.g. for prospecting: Drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route, etc. E.g. for mining: Excavations, blasting, stockpiles, discard dumps/dams, loading, hauling, transport, water supply dams, boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.	In which impact is anticipated, e.g. construction, commissioning, operational, decommissioning, closure and post-closure.	Volumes, tonnages and ha/m^2	Describe how each of the recommendations herein will remedy the cause of pollution or degradation and migration of pollutants.	A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities.	Describe the period when the measures in the environmental management program must be implemented. Measures must be implemented when required. Rehabilitation must take place at the earliest opportunity. With regard to rehabilitation, state whether it will take place upon cessation of the individual activity or cessation of mining, bulk sampling or alluvial diamond prospecting.
Site establishment activities Vegetation clearance Topsoil stripping and stockpiling Drill pad compaction Placement of temporary portable toilets and resting place	Construction/setup and operational phase	600m^2 diamond drill holes	Any buried artifacts that may be uncovered during site activities will require such activities to stop and a qualified archaeologist will be commissioned to assess their significance and determine appropriate	Heritage Act	Before and during drilling activities

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Implementation period
Vehicle movements			mitigation measures.		
Waste management	Construction/setup and operational phase	600m^2 diamond drill holes	Control noise generation by maintaining equipment. Limited to daylight hours on Mondays to Saturdays and no activities on Sundays and public holidays. Maintain a buffer of 100 m between drill sites and dwellings. The resting place shall be located outside of the 82dB Zone of the drill site.	SANS 10103 guideline	Before and during drilling activities
Exploration drilling: Drilling Drill maintenance and re-fueling Core sample collection and storage Vehicle movements Waste generation and management	Construction/setup and operational phase	600m^2 diamond drill holes	The drilling rig and other visually prominent items on the site will be located in consultation with the landowner; Make use of existing vegetation as far as possible to screen the prospecting operations from view; and If necessary, the	N/A	Before and during drilling activities

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Implementation period
			operations can be screened from view by erecting a shade cloth barrier		
	Construction/setup and operational phase	600m^2 diamond drill holes	Control dust emission by ensuring drill rig employs dust suppression system. Low vehicle speeds will be enforced on unpaved surfaces. Maintain a buffer of 100 m between drill sites and dwellings	GN R. 827 (NEMAQA)	Before and during drilling activities
	Construction/setup and operational phase	600m^2 diamond drill holes	The soil disturbance and clearance of vegetation at drill pad areas will be limited to the absolute minimum required and will not be dozed or scraped with vegetation roots left intact for later re growth; and Disturbed areas will be vegetated with locally indigenous species as soon as possible.	N/A	Before and during drilling activities

Activities	Phase	Size and scale of disturbance	Mitigation measures	Compliance with standards	Implementation period
	Construction/setup and operational phase	0.6 Ha per drill site	All operations will be carried out under the guidance of a strong, experienced manager with proven skills in public consultation and conflict resolution, including environmental coordinator where applicable; All prospecting personnel will be made aware of the local conditions and sensitivities in the prospecting area and the fact that some of the local residents may not welcome the prospecting activities in the area.	NEMA	Before and during drilling activities

h) Impact Management Outcomes

(A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph);

2.1 Impact Management Outcomes

A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph.

Table 19: Impact management

Activities	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
E.g. for prospecting: Drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route, etc. E.g. for mining: Excavations, blasting, stockpiles, discard dumps/dams, loading, hauling, transport, water supply dams, boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.	Including the potential impacts for cumulative impacts. E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.		In which impact is anticipated, e.g. construction, commissioning, operational, decommissioning, closure and post-closure.		
Site establishment activities (-ve) Vegetation clearance	Cultural and heritage	Destruction or loss of Cultural and Heritage Resources: No cultural/	Construction/ set-up	If concentrations of archaeological heritage material and human remains are uncovered during	Heritage Act

Activities	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
Topsoil stripping and stockpiling Drill pad compaction Erection of office, toilets, fuel storage (if not by road tanker), water tanker, core storage Vehicle movements Waste management		heritage artefacts have been identified on site.		construction, all work must cease immediately. The find must be reported to a heritage specialist so that systematic and professional investigation/ excavation can be undertaken.	
	Noise	Noise generation	Construction/ set-up	Construction/setup, operational and decommissioning activities will be limited to daylight hours on Mondays to Saturdays and no activities on Sundays and public holidays. Separation of distance of minimum 500m, but preferably 1 000m to be maintained between drill sites and dwellings. Noise abatement equipment, such as mufflers on diesel engines, will be maintained in good condition. If intrusive noise levels are experienced by any person at any point, the source of the noise will be moved if practical, or it will be placed in an acoustic enclosure, or an acoustic barrier will be erected	SANS 10103

Activities	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
				between the source and the recipient.	
	Visual	Visual intrusion	Construction/ set-up	The drilling rig and other visually prominent items on the site will be located in consultation with the landowner. Make use of existing vegetation as far as possible to screen the prospecting operations from view. If necessary, the operations can be screened from view by erecting a shade cloth barrier.	N/A
	Traffic	Increase in traffic volumes in drilling site vicinity	Construction/ set-up	Traffic signs to be put around the site to notify motorist of the activities. Construction vehicles to make trips on/off site only when necessary. Construction vehicles to adhere to local speed limits as far as possible when driving in around site.	National Traffic Act Regulations
	Dust fall	Dust fall and nuisance from activities	Construction/ set-up	Wet suppression should be applied to ensure that no visible dust is raised by any of the prospecting operations.	GN R. 827 (NEMAQA)

Activities	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
				Separation of distance of minimum 500m, but preferably 1 000m to be maintained between drill sites and dwelling. Low vehicle speeds will be enforced on unpaved surfaces.	
	Soil and vegetation	The potential impact of the proposed prospecting on the vegetation would occur at proposed drilling sites and the access routes used to get to these sites.	Construction/ set-up	The soil disturbance and clearance of vegetation at drill pad areas will be limited to the absolute minimum required; No clear scraping (dozing) be carried out unless necessary to establish a level drill pad. Rather that surface vegetation is cleared to make way for the drilling rig leaving the roots intact so that vegetation can coppice and regrow. Disturbed areas will be re-vegetated with locally indigenous species as soon as possible.	NEMBA
	Animal life	Animal life will be affected in the immediate vicinity of the drilling rig. It is anticipated	Construction/ set-up	Environmental awareness training sessions should be part of the workers' induction and site workshops.	NEMBA

Activities	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
		that the noise and general activity will keep the animal life away from the site while the prospecting is ongoing.		If any animals are met, they must not be killed or injured, but should rather be removed or chased away from the site.	
	Social	Friction between residents/landowners and construction personnel.	Construction/ set-up	All operations will be carried out under the guidance of a strong, experienced manager with proven skills in public consultation and conflict resolution. All prospecting personnel will be made aware of the local conditions and sensitivities in the prospecting area and the fact that some of the residents may not welcome the prospecting activities in the area. There will always be a strict requirement to treat residents with respect and courtesy .	NEMA
	Job creation	Employment will be created for the clearing of the land and establishing the drilling site.	Construction/ set-up	No mitigation measures required.	NEMA

Activities	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
Exploration drilling (ve) Drilling Drill maintenance and refuelling Core sample collection and storage Vehicle movements Waste generation and management	Noise	Noise generation	Operations	Activities will be limited to daylight hours on Mondays to Saturdays and no activities on Sundays and public holidays. Separation of distance of minimum 100m, but preferably 1 000m to be maintained between drill sites and dwellings; Noise abatement equipment, such as mufflers on diesel engines, will be maintained in good condition. If intrusive noise levels are experienced by any person at any point, the source of the noise will be moved if practical, or it will be placed in an acoustic enclosure, or an acoustic barrier will be erected between the source and the recipient.	Heritage Act
	Visual	Visual intrusion	Operations	The drilling rig and other visually prominent items on the site will be located in consultation with the landowner. Make use of existing vegetation as	SANS 10103

Activities	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
				far as possible to screen the prospecting operations from view. If necessary, the operations can be screened from view by erecting a shade cloth barrier.	
	Traffic	Increase in traffic volumes in the drilling site vicinity	Operations	Traffic signs to be put around the site to notify motorist of the activities. Construction vehicles to make trips on/off site only when necessary. Construction vehicles to adhere to local speed limits as far as possible when driving in around site.	N/A
	Dust fall	Dust fall and nuisance from activities	Operations	Wet suppression will be applied to ensure that no visible dust is raised by any of the prospecting operations. Separation of distance of minimum 500m, but preferably 1000m to be maintained between drill sites and dwellings. Low vehicle speeds will be enforced on unpaved surfaces.	National Traffic Act regulations
	Soil and	Soil and vegetation	Operations	The soil disturbance and clearance	GN R. 827

Activities	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
	vegetation	disturbance from drill pad preparation		of vegetation at drill pad areas will be limited to the absolute minimum required. No clear scraping (dozing) be carried out unless necessary to establish a level drill pad. Rather that surface vegetation be cleared to make way for the drilling rig leaving the roots intact so that vegetation can coppice and regrow. Disturbed areas will be re vegetated with locally indigenous species as soon as possible.	(NEMAQA)
	Animal life	Animal life will be affected in the immediate vicinity of the drilling rig. It is anticipated that the noise and general activity will keep the animal life away from the site while the prospecting is ongoing.	Operations	Measures implemented during site establishment should apply in this phase as well.	NEMBA
	Social	Friction between residents/landowners and construction personnel	Operations	All operations will be carried out under the guidance of a strong, experienced manager with	NEMBA

Activities	Potential impact	Aspects affected	Phase	Mitigation type	Standard to be achieved
				proven skills in public consultation and conflict resolution. All prospecting personnel will be made aware of the local conditions and sensitivities in the prospecting area and the fact that some of the residents may not welcome the prospecting activities in the area. There will always be a strict requirement to treat residents with respect and courtesy .	
	Job creation	Employment will be created for the clearing of the land and establishing the drilling site.	Operations	No mitigation measures required.	NEMA

The fauna at the site will not be impacted by the proposed processing activity, as they will be able to move away from or through the site unharmed. Workers must be educated and managed to ensure that no fauna at the site is harmed. Upon commencement of the proposed processing activities, the processing area will be fenced off to prevent livestock, from wandering into the work areas. Rehabilitate pits and drill holes sites immediately after sampling, concurrent rehabilitation, do not wait until the end to rehabilitate.

i) Impact Management Actions

(A description of impact management actions, identifying the way the impact management objectives and outcomes contemplated in paragraphs (c) and (d) will be achieved).

Table 20: Impact management actions

Activities	Potential impact	Mitigation type	Implementation period	Compliance with standards
Whether listed or not. E.g. excavations, blasting, stockpiles, discard dumps/dams, loading, hauling and transport, water supply dams/boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.	E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, ground water contamination, air pollution, etc.	Modify, remedy, control or stop through, e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity, etc. E.g., modify through alternative method, control through noise control, control through management and monitoring, and remedy through rehabilitation.	State when the environmental management programme measures must be implemented. Measures must be implemented when required. This must take place as soon as possible. Regarding rehabilitation, state upon cessation of the individual activity or mining, bulk sampling or alluvial diamond prospecting.	A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities.
Site establishment activities Vegetation clearance Topsoil stripping and stockpiling Drill pad compaction Erection of office, toilets, fuel storage (if not by	Cultural and heritage	Undertake heritage survey prior to site activities to identify cultural/heritage features and cordon these off with Chevron tape. Avoid cultural/heritage impacts by maintaining 100m buffer from any identified heritage feature. Any buried artifacts that may be uncovered during site activities will require such activities to stop and a qualified archaeologist will be commissioned to assess their significance	Before and after drilling activities.	Heritage Act

Activities	Potential impact	Mitigation type	Implementation period	Compliance with standards
road tanker), water tanker, core storage Vehicle movements Waste management		and determine appropriate mitigation measures.		
Exploration drilling Drilling Drill maintenance and refueling Core sample collection and storage Vehicle movements Waste generation and management	Noise	Control noise generation by maintaining equipment and limiting operation hours to daylight hours from Mondays to Saturdays (no activities on Sundays and public holidays). Maintain a buffer of 500m-1 000m between drill sites and dwellings. If intrusive noise levels are experienced by any person at any point, the source will be moved if practical, or placed in an acoustic enclosure, or an acoustic barrier will be erected between the source and the recipient.	Before and after drilling activities.	SANS 10103
	Visual	The drilling rig and other visually prominent items on site will be placed in consultation with the landowner. Existing vegetation will be used as far as possible to screen the prospecting operations from view. Operations can be hidden from view by erecting a shade cloth barrier.	Before and after drilling activities.	N/A
	Dust fall	Control dust emission by ensuring drill rig employs dust suppression system. Low vehicle speeds will be enforced on unpaved surfaces.	Before and after drilling activities.	GN R. 827 (NEMAQA)
	Soil and vegetation	Soil disturbance and vegetation clearance at drill pads will be kept to the minimum required and not be dozed/scraped; vegetation roots will be left	Before and during drilling activities; disturbed areas to re-vegetated as soon as	N/A

Activities	Potential impact	Mitigation type	Implementation period	Compliance with standards
		intact for regrowth. Disturbed areas will be re-vegetated with indigenous species as soon as possible.	possible.	
	Social	Operations will be carried out under the guidance of an experienced manager with public consultation and conflict resolution skills. All prospecting personnel will be made aware of conditions and sensitivities in the prospecting area and of the fact that some residents may not welcome the prospecting activities. Residents will always be treated with respect and courtesy .	Before and after drilling activities.	NEMA

i) Financial Provision

1. Determination of the amount of Financial Provision.

a. Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation.

The following closure objectives will be applicable for concurrent rehabilitation:

- Land disturbed will be rehabilitated to a stable and permanent form suitable for subsequent land use e.g., crop farming and animal grazing.
- The final land use will be like surrounding land-use i.e., crop farming & cattle grazing.
- There will be no adverse environmental effect outside the small, disturbed areas (0.06ha) per borehole and the affected area will be shaped to ensure effective drainage.

The closure objectives are to minimize disturbance wherever possible so that normal land use can continue after closure. Monitoring and maintenance of rehabilitated areas forming part of site closure to ensure the long-term effectiveness and sustainability of measures implemented. Rehabilitation of areas that will be disturbed because of prospecting activities to a land capability that will support and sustain a predetermined post-closure land use. The closure objectives include:

- Eliminating any safety risk associated with drill holes and sumps though adequate drill hole capping and backfilling
- Remove and/or rehabilitate all pollution and pollution sources, such as waste materials and spills
- Establishing the rehabilitated area, which is not subject to soil erosion and may result in the loss of soil, degradation of the environment and pollution of surface water resources
- Restore disturbed area and re-vegetate these areas with grass species naturally occurring in the area to restore the ecological function of such areas as far as is practicable

b. Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties.

The environmental objectives in relation to closure were consulted with affected parties. It was explained that should the prospecting yield negative results, then the end use for area will revert to its pre-prospecting land use. The end-use of the area

will therefore not be changed by the prospecting operations. Minimise the area to be disturbed and to ensure that the areas disturbed during the prospecting activities are rehabilitated and stable, as per the commitments made in the EMPr. Sustain the pre-prospecting land use and return the site to its near natural state as far as possible.

c. Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure.

The activities involved are for prospecting and will involve no permanent removal of soil and rock. Should the prospecting yield negative results, then the end use for area will revert to its pre-prospecting land use. The end-use of the area will therefore not be changed by the prospecting operations. However, should the prospecting operation yield positive results, then the farm could be subject to bulk sampling, mining rights or permit application and another more comprehensive Public Participation, Scoping, EIA and EMPr process. If a mining right is granted, then the area will be rehabilitated according to the requirements of the approved Environmental Management Programme that would apply throughout the life of the mine.

Rehabilitation of the prospecting site

To the effect on plants, seeds should be collected from plants reserved prior to disruption. If seeds are harvested from nearby seedbanks, the availability of seeds as a food source for several animals and birds may be indirectly affected. To facilitate establishment, replanting should only take place in springs or early summers (September to November), once the first rains have fallen.

The areas shall be cleared of any polluted soil upon the completion of the prospecting project. The surface shall then be ripped or ploughed to a depth of at least 300 mm and the surface of the surface previously stored adjacent to the site shall be distributed uniformly over the entire area to its original depth. If required, the area is then fertilized (based on a soil analysis). A plant seed mix adapted to represent the local indigenous flora is to be planted at the site. The surface shall be scarified or torn where the site has been rendered devoid of vegetation/grass or where soils have been compacted due to traffic. Before and during the prospecting activity and after recovery and closure, photographs of the camp, office locations and various borehole locations shall be taken at selected fixed points and kept on record for the knowledge of the Regional Manager.

Destruction/removal of infrastructure

On completion of operations, all structures on the prospecting terrain shall be dealt with in accordance with section 44 of the Mineral and Petroleum Resources Development Act,2002 (Act No. 28 of 2002). Infrastructure that will be demolished should be assessed for its suitability to be re-used or recycled. these proposed prospecting activities will not involve permanent infrastructure. After drilling has been completed in one area, the drilling team will ensure the site is Reverted to its original state by implementing the measures listed in Table 24 below.

Table 21: Rehabilitation measures

Aspect/Impact	Rehabilitation Measure	Monitoring Frequency and Responsibility
Removal of construction structures	• Clear and completely remove from site all construction plant equipment, storage containers, signage, temporary fencing, • temporary services, fixtures and any other temporary works; and Ensure that all access roads utilised during construction (which are not earmarked for closure and rehabilitation) are returned (as far as possible) to their state prior to construction.	Once-off, Bazil Technologies
Vegetation clearing/Replanting	• Remove any emerging alien and invasive vegetation to prevent further • establishment; • All planting work is to be undertaken by suitably qualified personnel making use of • the appropriate equipment; Transplant during the winter (between April and September); and Plant indigenous plants to minimise the spread of alien and invasive vegetation.	When revegetation is done and in blooming season,

Topsoil replacement	• Replace and redistribute stockpiled topsoil together with herbaceous vegetation, overlying grass and other fine organic matter in all disturbed areas of the • prospecting site, including temporary access routes and roads. Replace topsoil to the original depth (i.e. as much as was • removed prior to construction). Prohibiting the use of topsoil suspected to be contaminated with the seed of alien vegetation. Alternatively, the soil is to be sprayed with specified herbicides. Backfill planting holes with excavated material / approved topsoil, thoroughly mixed with weed free manure or compost (per volume about one quarter of the plant hole), one cup of 2:3:2 fertiliser and an approved ant and termite poison. Avoid compaction of soil as the single problem limits the effective of rehabilitation	Once-off, Bazil Technologies

Alien Plant Management Plan

The Alien and Invasive Species Regulations of the National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA) regulates all invasive organisms in South Africa and categorizes invasive plant species into four different categories: Category 1a & 1b, Category 2 and Category 3. Land users must control these plants by means of the methods prescribed in the Act. 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 meters 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 within close proximity to a watercourse (source: Droogenfontein, Vegetation Assessment, 2013).

In terms of the National Environmental Management: Biodiversity Act, invasive species are either prohibited or require a permit to be reserved on site. It is recommended that these species are controlled using registered control methods. The compilation of an Alien Plant Management Plan is recommended to achieve control of alien plants as follows:

- Prevention, early detection and eradication of weed species is the most economical and effective means of invasive plant management.
- Minimize soil disruption during both prospecting activities and rehabilitation
- Ensure vehicles and equipment are clean of invasive plants and seed
- Limit the movement of weed-infested soil.

Final Land use after rehabilitation

After the prospecting operations, the use of Elandspoort land within the proposed prospecting project area will not change. However, the area will need to be monitored every second month for the first three (3) years after borehole drilling, especially on the drilled rehabilitated area, until the land brings to its original state.

d. Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.

The Company is required to make the prescribed financial provision for the rehabilitation or management of negative environmental impacts. If the Company fails to rehabilitate or manage any negative impact on the environment, the DMRE may, upon written notice to the Company, use all or part of the financial provision to rehabilitate or manage the negative environmental impact in question. The Company will specify that the drilling contractor is required to comply with all the environmental measures specified in the EMPr. This will include avoiding unnecessary disturbance of natural vegetation and the rehabilitation of each drill site, immediately after drilling has been completed. All tracks to the drill sites must be rehabilitated at the end of the prospecting programme. The financial provision provides for the final checking of all sites before site clearance.

The land use capability assessment should be done before commencement of prospecting activities thus assumes fundamental importance in determining the rehabilitation plan. Safety after the completion of the prospecting activities will be done by concurrent rehabilitation of drill holes. Overburden will be recorded, and the holes filled back simultaneously.

compaction is the greatest single factor limiting the effective of rehabilitation.

Due to the nature of the activities, the impacts will be extremely limited and of short duration. The management plan is provided in such a manner as to ensure concurrent rehabilitation. The areas for drilling purposes will be the main area experiencing impacts. In this event the activities will be temporary in nature, and a detailed management plan has been provided to address potential impacts associated with these activities

To minimise compaction of replacement of soil

- Move soil when is dry. Soils should only be handled during dry season.
- Use appropriate equipment. Equipment used to replace soil has a major effect on compaction. After soil replacement, initial smoothing of the rough soil. Minimise travelling over the re-created profile

The objective of rehabilitation is to establish natural vegetation (e.g to enhance biodiversity) and where soil have been stripped and replaced directly with the seed-containing horizon on top, there should be no requirement for seed-ed preparation or seeding.

e. Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline.

The quantum of the financial provision required is R82 680. The Company must annually update and review the quantum of the financial provision (as per Regulation 54 (2) of the MPRDA). The financial Quantum Calculation is found under Appendix I.

The financial provision was calculated according to Financial Provision Regulations 6 of 2015, published under Government Notice R1147 in Government Gazette 39425 of November 2015 (the Financial Provisioning Regulations) for National Environmental Management Act 1998 (Act No. 107 of 1998) (NEMA) which prescribe the minimum content requirements. The amount was derived from the quantum calculations.

Regulation 54 deals with the quantum of financial provision and stipulates that it must be updated and reviewed annually. It must include, amongst others, a detailed breakdown of the cost required for post-closure management of residual and latent environmental impacts.

f. Confirm that the financial provision will be provided as determined.

Bazil Technologies (Pty) Ltd herewith confirms both its capacity and willingness to make the financial provision required should the prospecting right be granted. The

amount is anticipated to be an operating cost and provided for in the Prospecting Work Programme (PWP).

Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including

g. Monitoring of Impact Management Actions

h. Monitoring and reporting frequency

i. Responsible persons

j. Time period for implementing impact management actions

k. Mechanism for monitoring compliance

Table 22: Mechanism for monitoring

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Drilling (Site Establishment)	The clearing of vegetation	Weekly monitoring	Appointed drilling contractor	Weekly, annually by independent environmental assessment practitioner to compile the required annual environmental compliance report required by the DMRE
Drilling	The storage of hydrocarbon-based materials on site	Weekly monitoring	Appointed Drilling Contractor	Weekly, annually by independent environmental assessment practitioner to compile the required annual environmental compliance report required by the DMRE
Drilling	On-site waste management	Weekly monitoring	Environmental Control Officer	Weekly, annually by independent environmental assessment practitioner to compile the required annual environmental compliance report required by the DMRE
Drilling	The creation of roads/tracks	Weekly monitoring	Appointed drilling contractor	Daily by hired contractor, annually by independent environmental assessment practitioner to compile the required annual environmental compliance report required by the DMRE

Drilling	The removal of soil	Weekly monitoring	Drilling Contractor	Weekly done by contractor, annually by independent environmental assessment practitioner to compile the required annual environmental compliance report required by the DMRE
Drilling	Driving activities	Weekly monitoring	Licensed Driver	Daily by qualified driver, independent environmental assessment practitioner to compile the required annual environmental compliance report required by the DMRE
Drilling	Groundwater: Monitor the water quality of the boreholes	Weekly monitoring	Hydrogeologists	Weekly by Hydrogeologist, annually by independent environmental assessment practitioner to compile the required annual environmental compliance report required by the DMRE

l. Indicate the frequency of the submission of the performance assessment/ environmental audit report.

Regular monitoring of all the environmental management procedures and mitigation measures shall be carried out by the Company in order to ensure that the provisions of this EMPr are adhered to. Formal monitoring and performance assessment of the EMPr will be undertaken annually. A framework for a monitoring and performance assessment report is included in Appendix. Site photographs taken before drilling commences after each frilling site has been rehabilitated must be included in the performance assessment reports. Environmental audit report will be submitted annually.

m. Environmental Awareness Plan

(1) Manner in which the applicant intends to inform his or her employees of an environmental risk which may result from their work.

All employees will be required to undergo site induction. Additionally, daily toolbox talks will be held each morning before the activities for the day are commenced.

The Site Induction training will focus on the following:

- Discussion of environmental impacts as indicated in the Impact Assessment Table
- Waste management –The removal of all waste from site to prevent litter
- Water usage – Conservation of water, correlation between water & erosion.
- Driving protocol – Pre-start vehicle checks prior to driving, adhering to speed limits on dirt roads.
- Famer's protocol
- Environmental mitigation – Example no collection of wood, no open fires, no snaring or poaching of animals, no unnecessary destruction of vulnerable natural vegetation, clean-up of hydrocarbon spills, etc.
- Emergency procedure – Type of emergencies, type of alarms, emergency equipment, location of assembly point and identification of emergency wardens.

During the daily toolbox talks, the following will be discussed:

- Any environmental or health and safety incidents that may have occurred the previous day.
- Status of housekeeping on site.
- Ad hoc refresher in terms of emergency procedures.

All employees must be provided with environmental awareness training to inform them of any environmental risks which may result from their work and the manner in which the risks must be dealt with in order to avoid pollution or the degradation of the environment. Employees should be provided with environmental awareness training before prospecting operations start. All new employees should be provided with environmental awareness training Induction courses will be provided to all employees by a reputable trainer.

(b) Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

Please refer to the following:

- Impact Table

Environmental training needs for each section should be identified and addressed to ensure environmental management is part of day-to-day operations. The environmental risk responsibilities guide the training requirements of everyone. The responsibility for each level of management according to the Integrated Risk Management and ISO14001 role descriptions are. Environmental training recommended for the different levels of management guide the training needs identification process. This is a minimum guideline, and any additional training can be added where section specific issues or high-risk items require training and awareness It is the responsibility of the line manager to ensure environmental training needs for individual staff members are identified, agreed to, facilitated and tracked.

n. Specific information required by the Competent Authority

(Among others, confirm that the financial provision will be reviewed annually).

- Prospecting Work Programme
- The Financial Provision reviewed on an annual basis indicating work that would have been completed and money used for rehabilitation as required by the law.
- Performance assessment
- External Audits

o. UNDERTAKING

The EAP herewith confirms

a) The correctness of the information provided in the reports

b) The inclusion of comments and inputs from stakeholders and I&APs;

c) The inclusion of inputs and recommendations from the specialist reports where relevant; and

d) That the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected. Parties are correctly reflected herein.

Signature of the environmental assessment practitioner:

Singo Consulting (Pty) Ltd

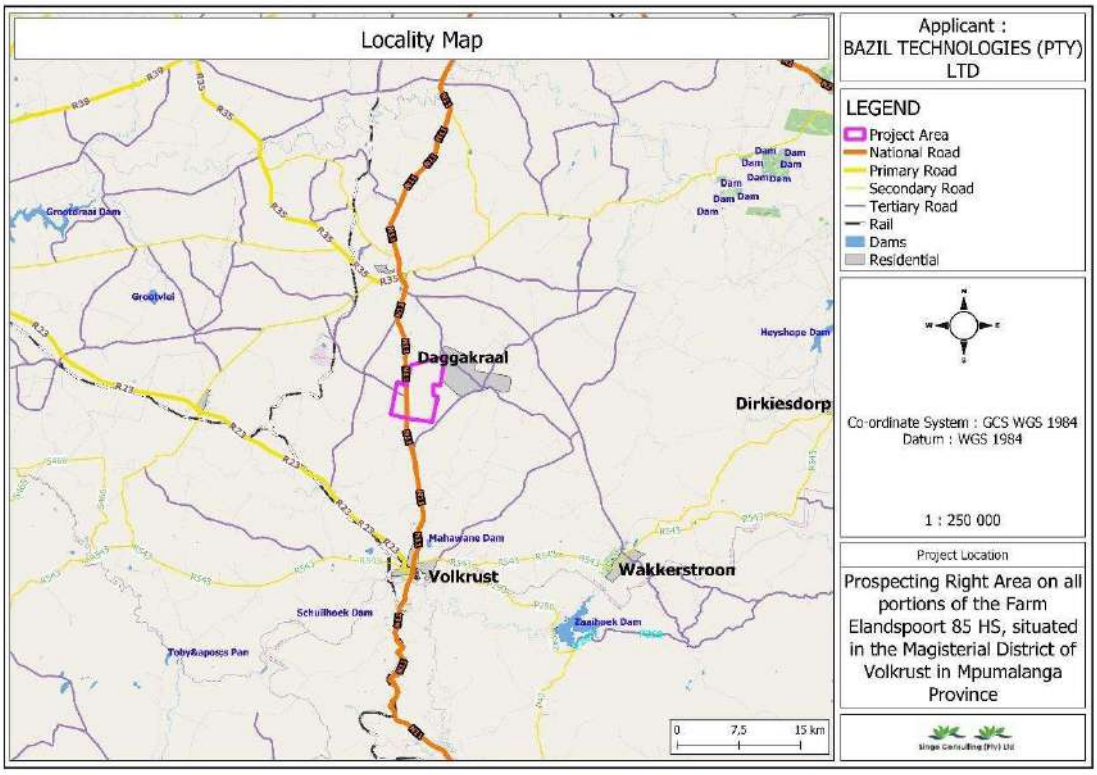
Name of company:

2022

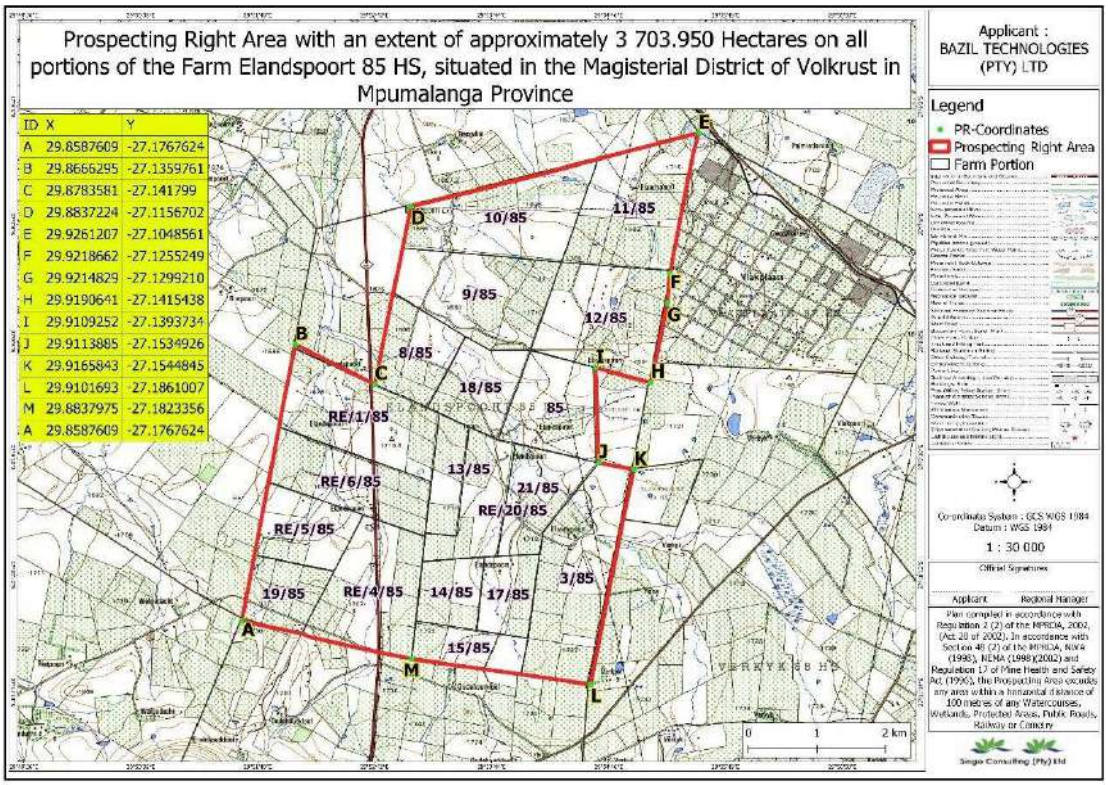
Date:

-END-

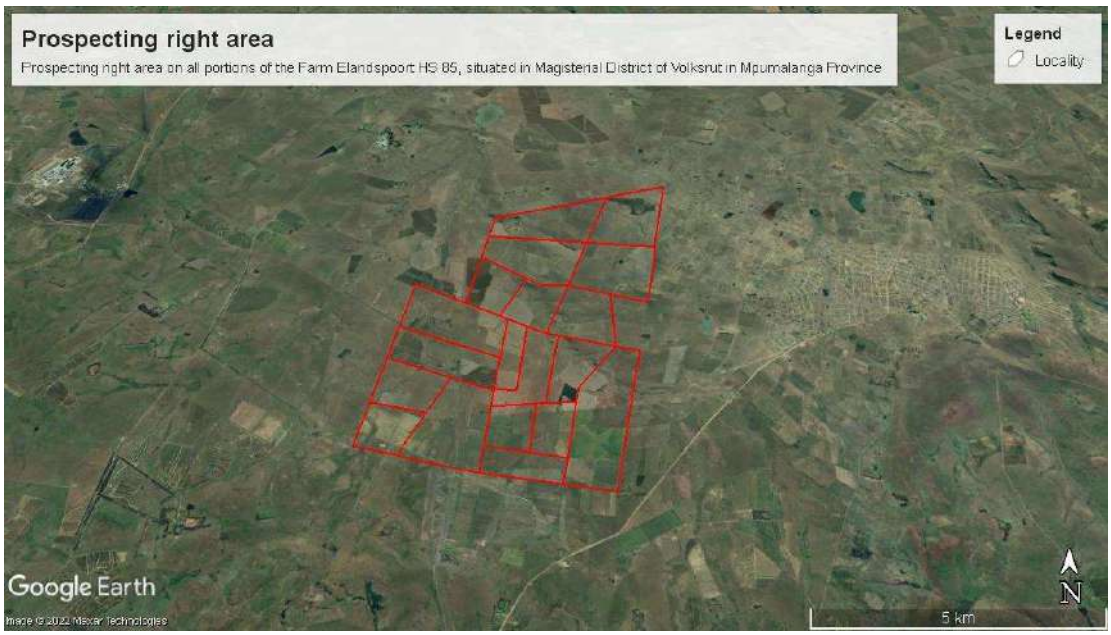
Appendix A: PROJECT MAPS



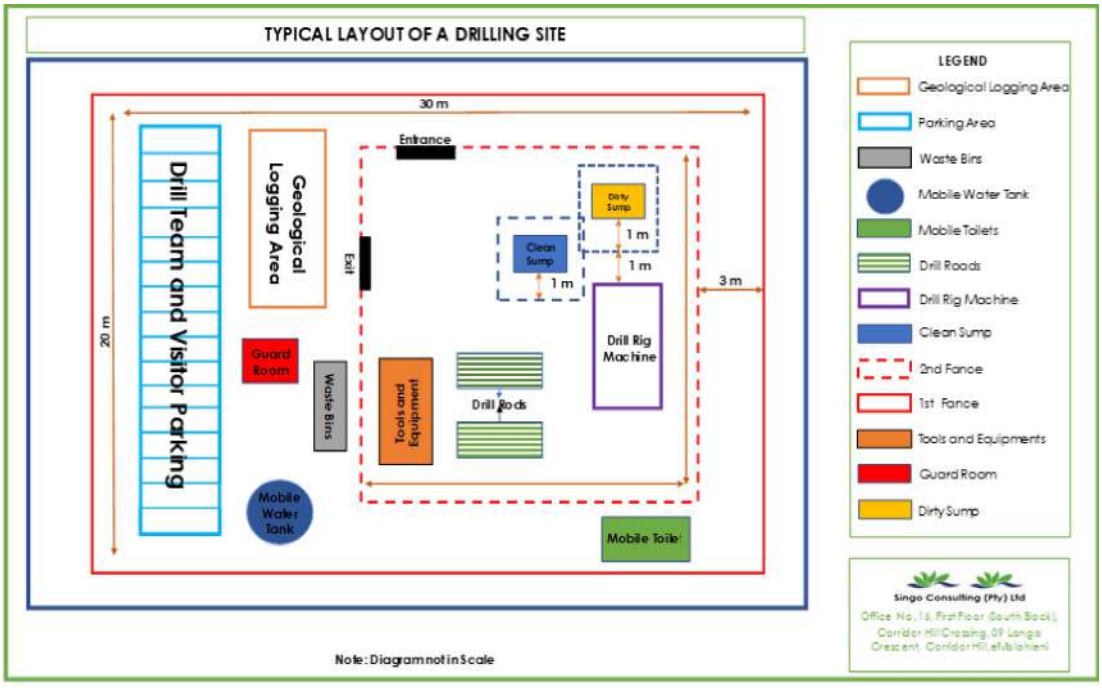
Locality Map of the project area



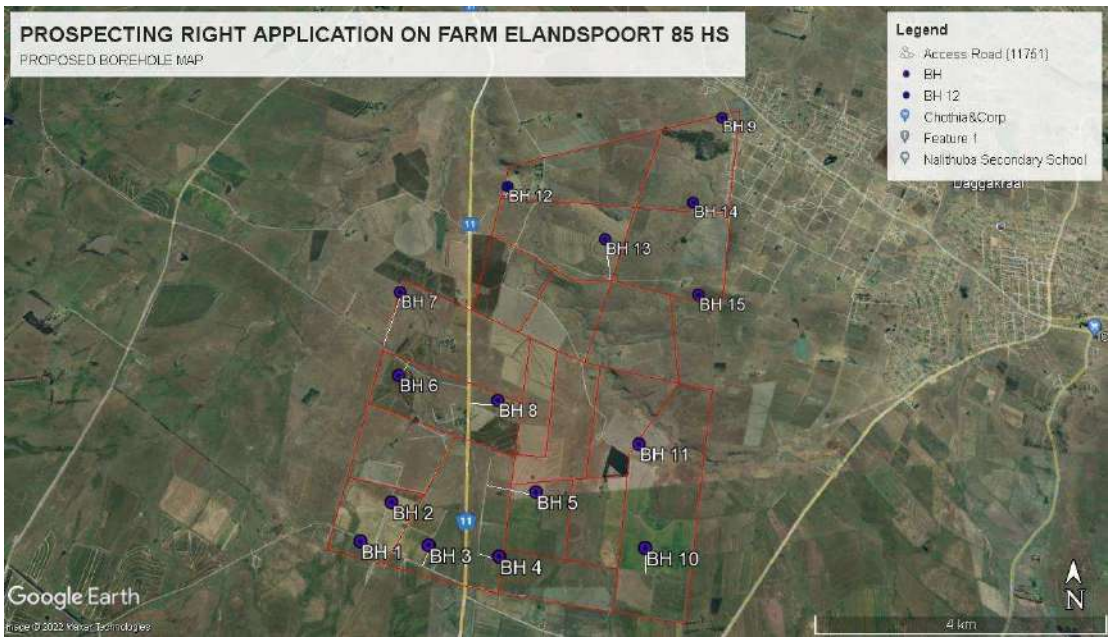
Regulation 2(2)Map for the proposed project area.



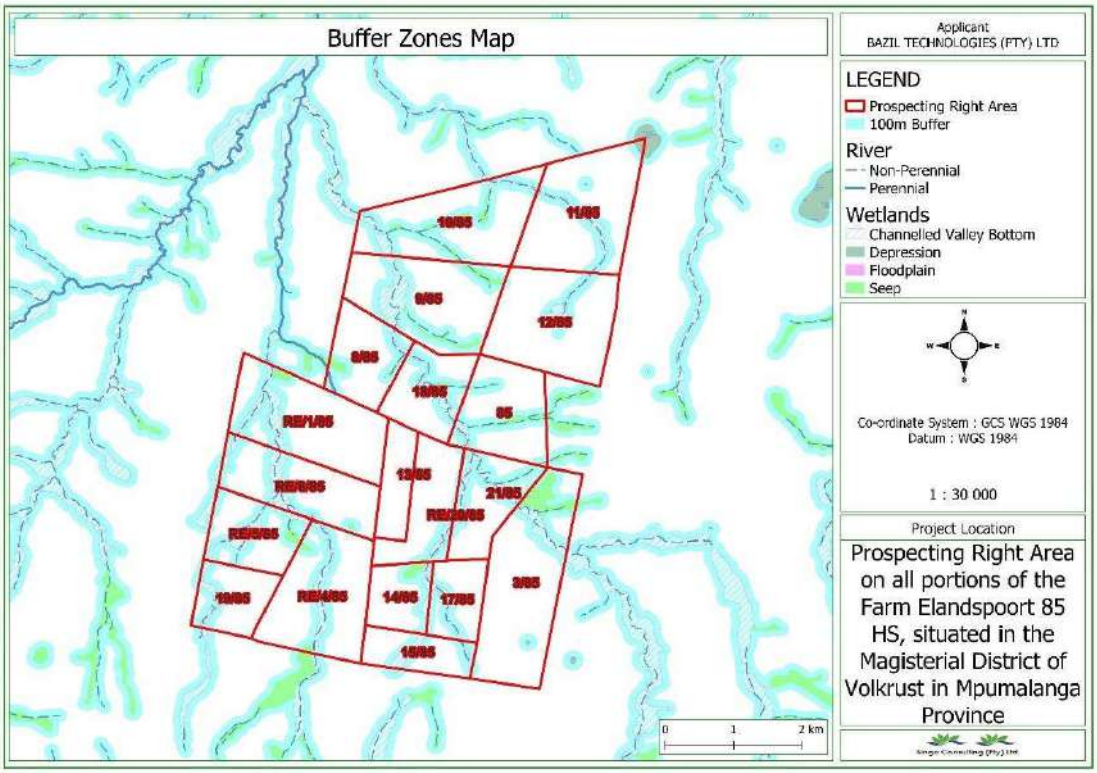
Google Earth View Map of the project area.



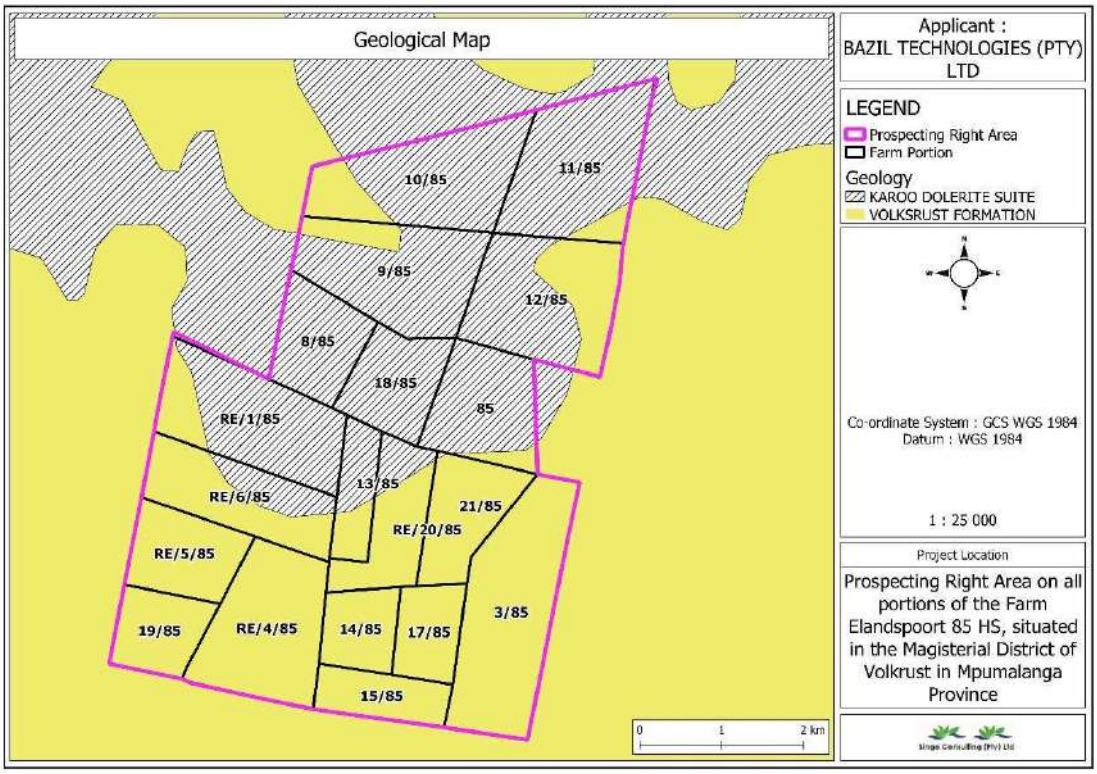
Infrastructure Map.



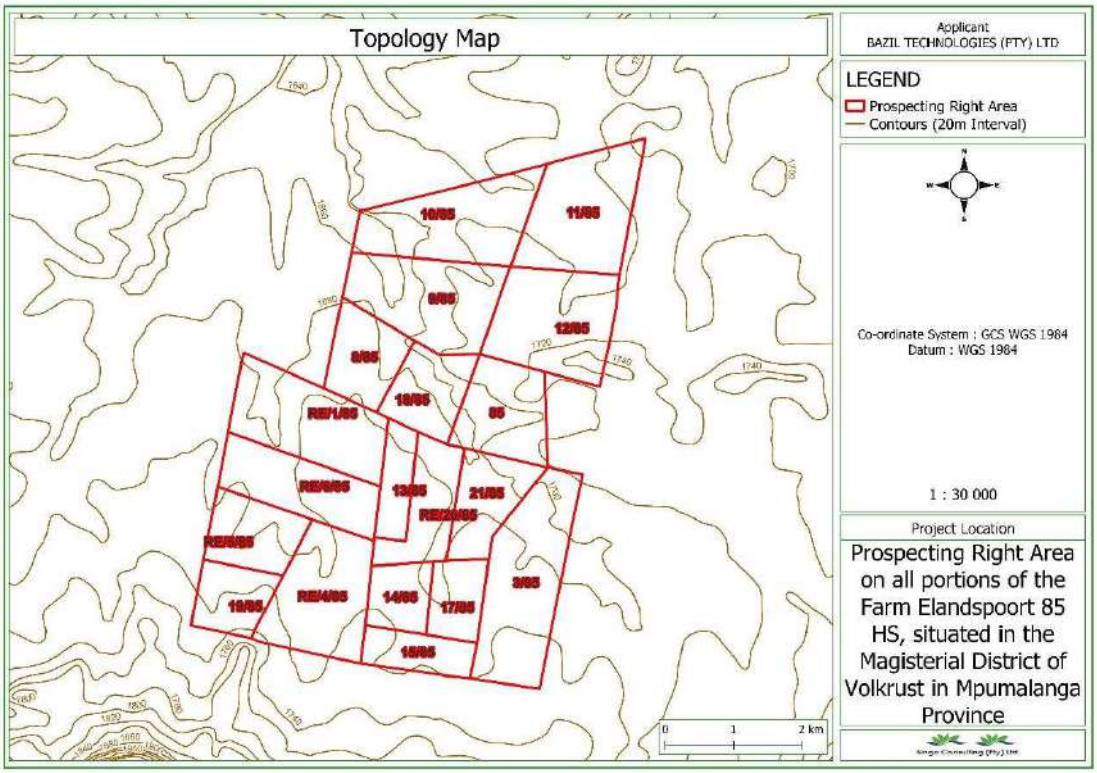
Proposed boreholes position Map of the project area



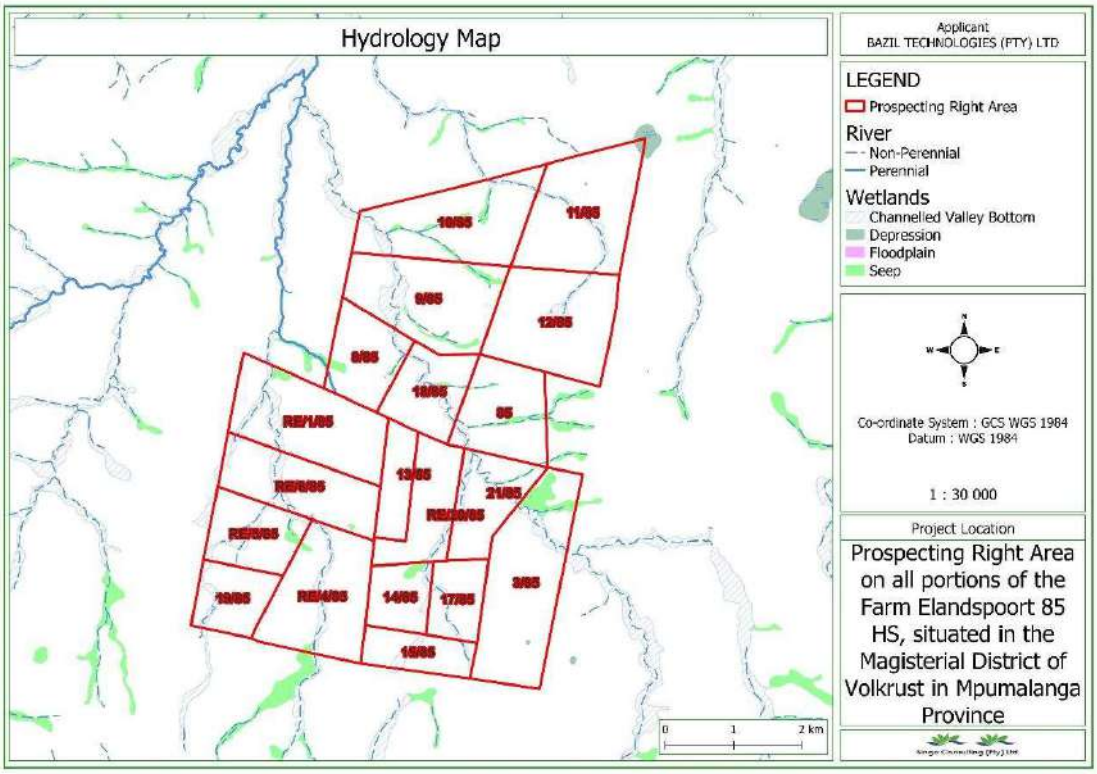
Buffer Map of the project area



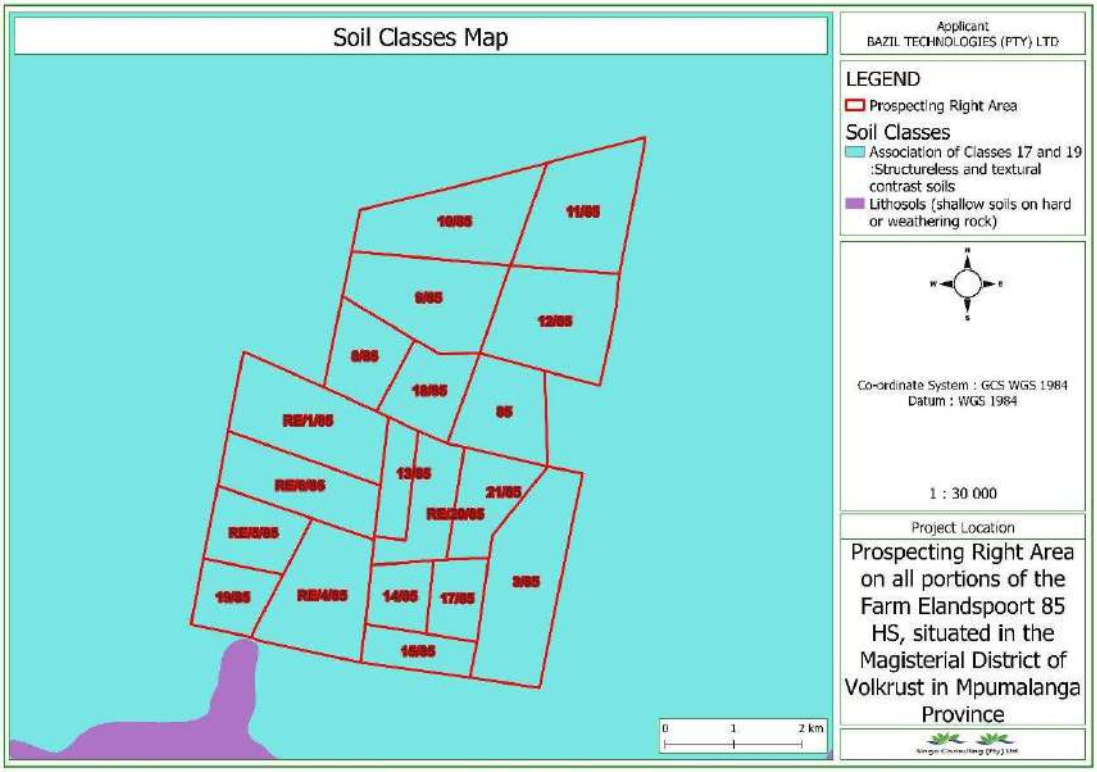
Geology Map of the project area



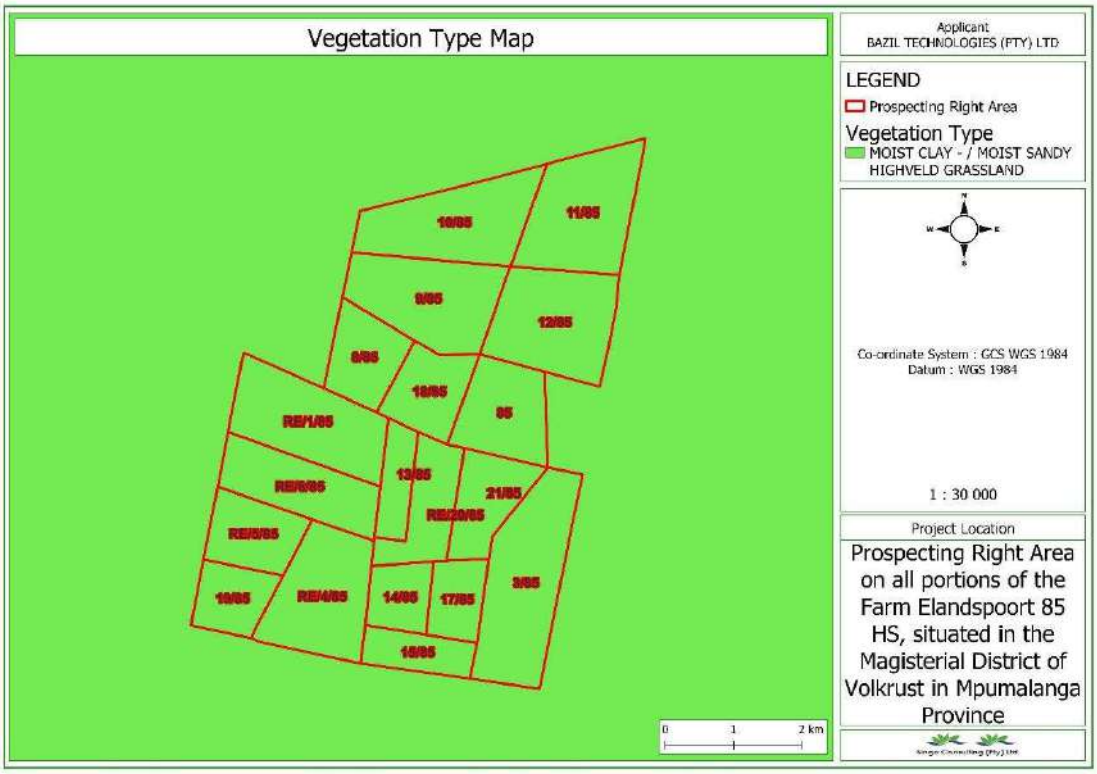
Topology Map of the project area



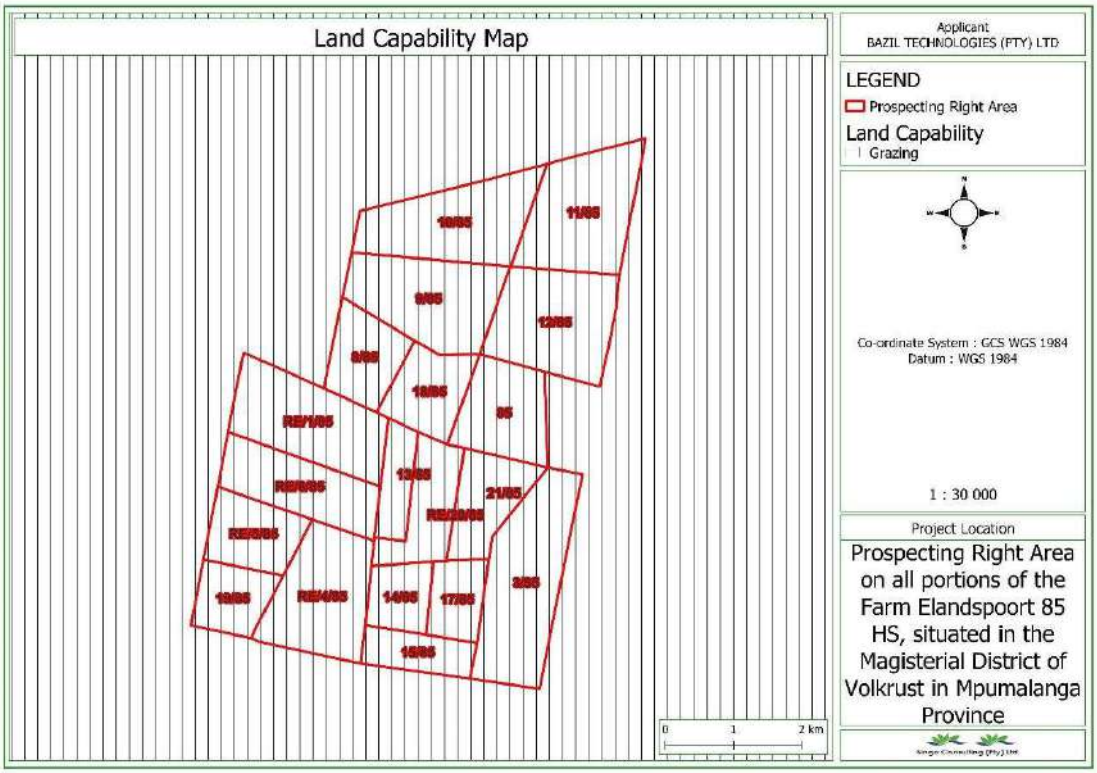
Hydrology Map of the project area.



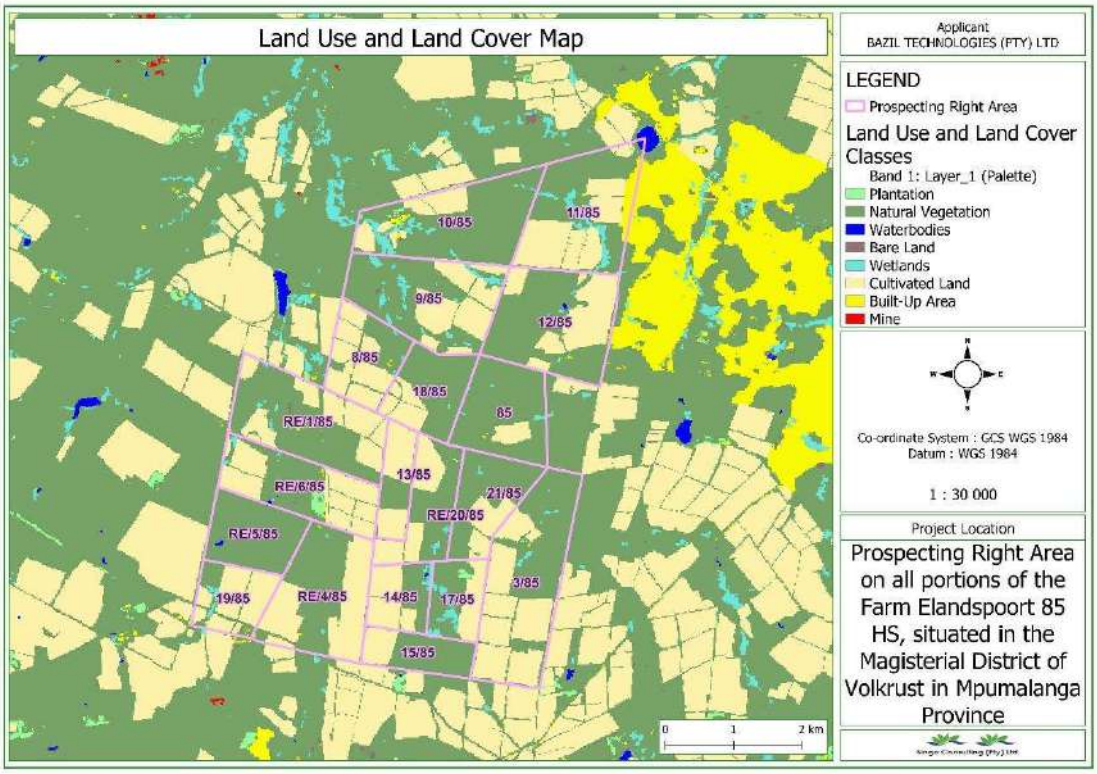
Soil Classes Map of the project area



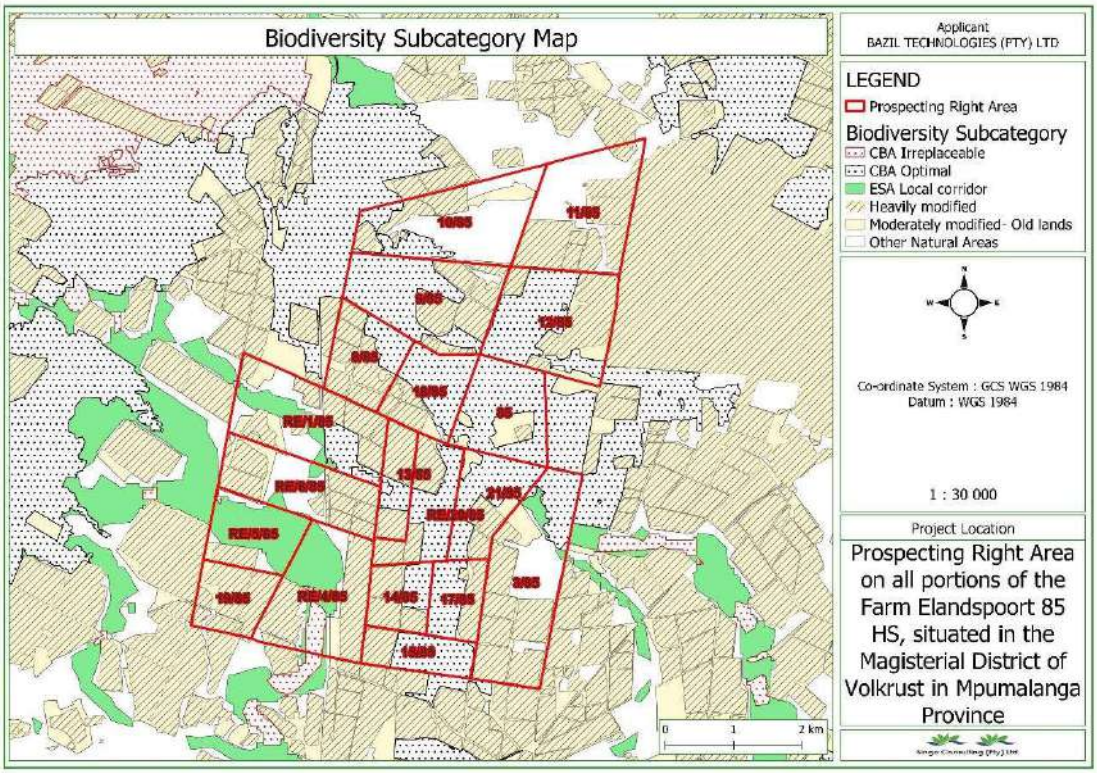
Vegetation Type Map of the project area



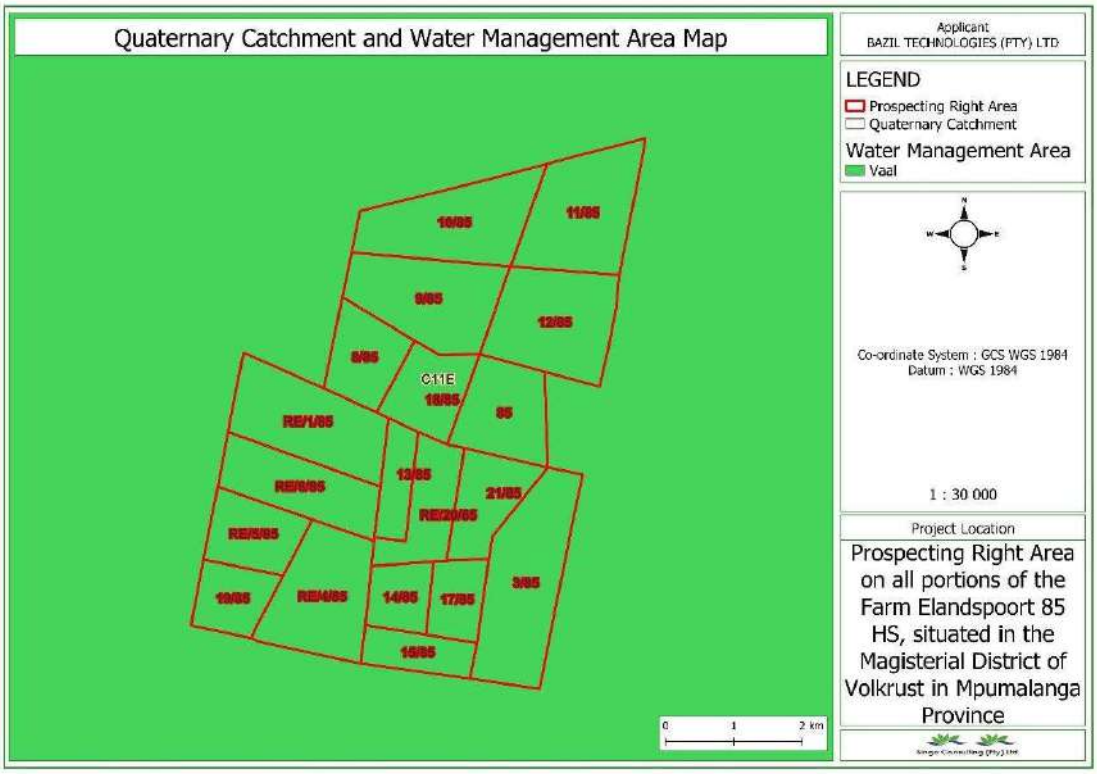
Land Capability Map of the project area



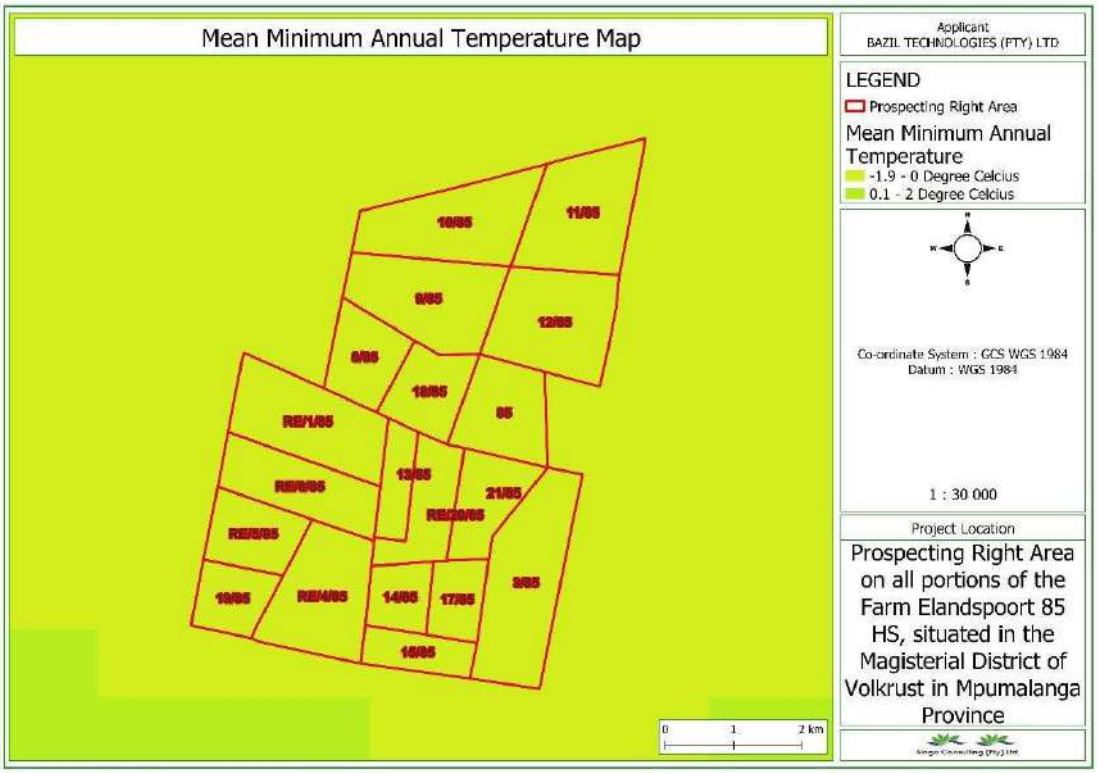
Land Use Map of the project area



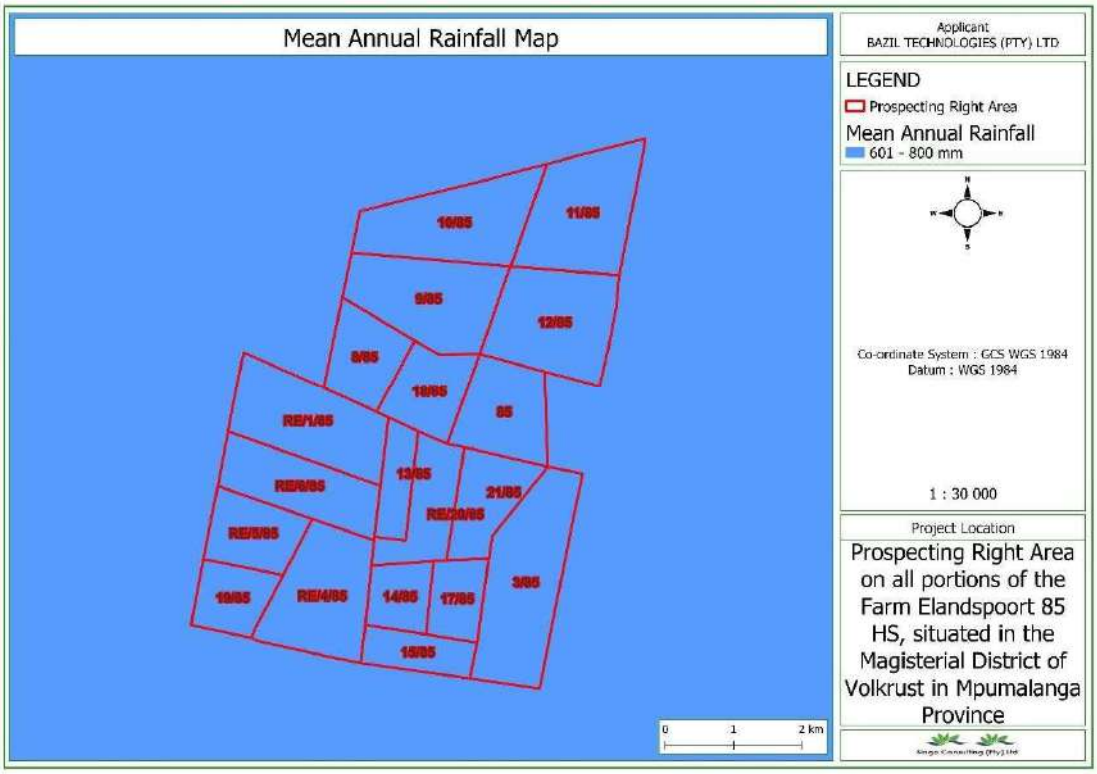
Biodiversity Map of the project area



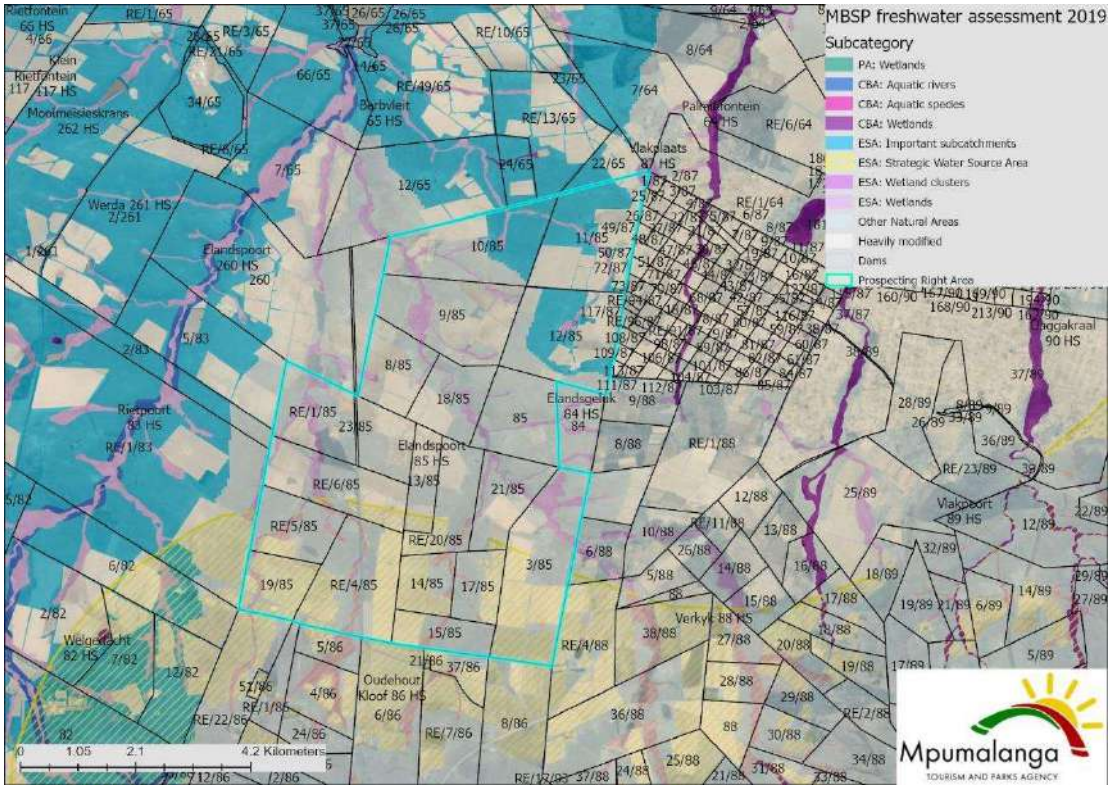
Quaternary Catchment and Water Management Area Map of the project area



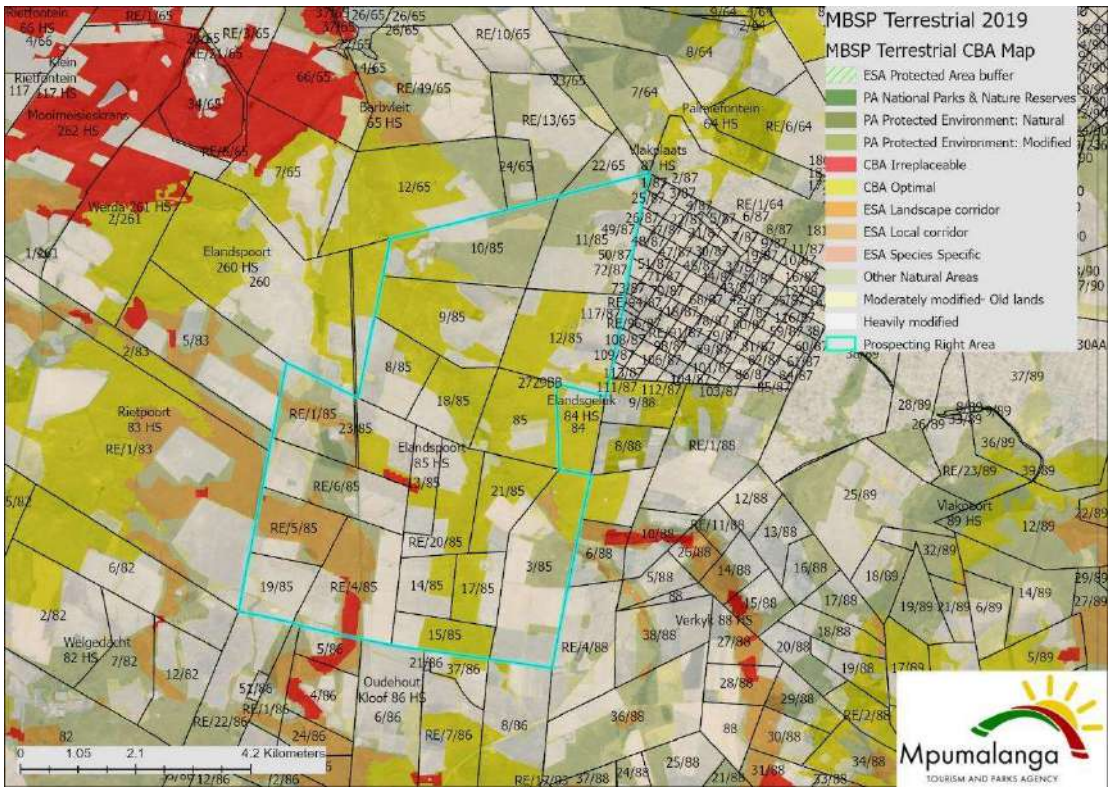
Mean Minimum Annual Temperature Map of the project area



Mean Annual Rainfall Map of the project area.



MBSP Freshwater Assessment 2019 Map of the project area (MTPA-2019).



MBSP Terrestrial 2019 Map of the project area (MTPA-2019).

mineral resources
& energy

Department:
Minerals Resources and Energy
REPUBLIC OF SOUTH AFRICA

Private Bag X7279, Witbank, 1035, Tel: 013 653 0500, Fax 013 690 3288
Saveways Centre, First Floor, Mandela Drive, Witbank, 1035, Mpumalanga Province
Directorate: Mineral Regulation: Mpumalanga Region
Subdirectorate: Mineral Laws **Enquiries**: Mugagadeli NL
Ref: MP 305/1/1/2/17127PR

EMAIL kenneth@singoconsulting.co.za

The Directors
Brazil Technologies (Pty) Ltd
Private Bag X7214
BENFLEUR
1035

Dear Sir/Madam

ACCEPTANCE OF AN APPLICATION FOR PROSPECTING RIGHT IN TERMS OF SECTION 16(4) OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (ACT 28 OF 2002) [HEREIN AFTER REFERRED TO AS THE ACT] AS AMENDED BY SECTION 12(d) OF THE MINERALS AND PETROLEUM RESOURCES DEVELOPMENT AMENDMENT ACT, 2008 (ACT 49 OF 2008) [HEREINAFTER REFERRED TO AS THE AMENDMENT ACT]

1. Please be informed that your application for prospecting of **Coal** on **the farm Elandspoort 85 HS**, situated in the Magisterial district of **Volksrust** is hereby accepted in terms of section 16(2) of the Act as amended by section 12(b) of the Amendment Act.

Acceptance Letter for the proposed project.

2. Please take notice that in terms of section 16(4) of the Act as amended by section 12(d)(a) and 12(d)(b) of the Amendment Act, you are required to:-

   2.1. to consult in the prescribed manner with the landowner, lawful occupier and any interested and affected party including the Land Restitution Commission and submit the result of such consultation on or before the 28 January 2022

3. You are in terms of section 17(1) of the Act as amended by section 13(c) of the Amendment Act required to give effect to the objects referred to in section 2(d) of the Act **to ensure that you are BBBEE compliant**. Therefore please submit on or before 11 January 2022 to this office for the attention of the writer here on any documentation proving such including but not limited to:-

   3.1. Certified copies of share certificates and share holders register
   3.2. Certified copies of Shareholders agreements
   3.3. Certified copies articles and memorandum of association of the company
   3.4. Trust deed documents and letters of authority for any trust holding shares
   3.5. Details relating to funding (all relevant agreements)
   3.6. Any other information that may be necessary to explain and serve as evidence that the applicant meets the appropriate HDSA ownership and/or compliance requirements of the aforesaid Act and Mining Charter; **thereby including women and communities in your structure.**

4. Please submit **within 14 days** from date of this letter for the attention of ***Mr Siyabonga Panduva 3 copies of a complete prospecting work programme prepared in terms of regulation 7 of the Mineral and***

Continued of Acceptance Letter for the proposed project.

Petroleum Resources Development Act, 2002 (Act no 28 of 2002): Mineral and Petroleum Development Regulation.

5. Please take note that failure to adhere to the timeframe stipulated above and to submit any documentation required in terms of this notice will result into non-compliance with the provision of the Act and the Amendment Act and will result in your application being processed refusal.

Yours faithfully

REGIONAL MANAGER
MPUMALANGA REGION
DATE: 21/12/2021

Continued of Acceptance Letter for the proposed project.

Appendix C: NEWSPAPER ADVERT, PROOF OF PUBLISHED NEWSPAPER & DRAFT BAR AND EMP SUBMISSION.

NOTICE OF PUBLIC PARTICIPATION FOR PROSPECTING RIGHT AND ENVIRONMENTAL AUTHORIZATION APPLICATION

Application for Prospecting Right: **Bazil Technologies (Pty) Ltd** has received an acceptance letter, with **DMRE Ref: MP 30/5/1/1/2/ 17127 PR** for the purpose of prospecting for **Coal**, on portions **RE, RE/1, 3, RE/4, RE/5, RE/6, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, RE/20 & 21** of the **farm Elandspoort 85 HS**, Situated in Pixley Ka Seme Local Municipality under Gert Sibande District Municipality, Mpumalanga Province. Prospecting (searching of commodity) procedure takes a period of 5 years. Coal is prospected in a relatively simple sequence of activities which includes site preparation, drilling, and rehabilitation of the drilled holes.

Notice is hereby given in terms of the Mineral and Petroleum Resources Development Act (MPRDA) (Act 28 of 2002) and EIA Regulations 2014, published under Government Notice No. 982 in Gazette No. 3822 of 8 December 2014, amended on 7 April 2017, that **Bazil Technologies (Pty) Ltd** has applied for a Prospecting Right for the above-mentioned mineral.

INVITATION TO COMMENT

Registration as Interested & Affected Party: As part of the EIA process, more especially the Public Participation Process (PPP) for this proposed prospecting project, Interested and Affected Parties (I&APs) are invited to register and kindly submit any comments or concerns to reach **Ms Masindi Nefale**. The public is also invited to review and comment on the draft Basic Assessment Report (BAR) and Environmental Management Programme report (EMPr). The draft BAR & EMPr will be available for review for 30 days' calendar period from **Monday the 28th of February 2022 to Wednesday the 30th of March 2022 (excluding public holiday)**. The Draft BAR & EMPr will be available at the **Daggakraal Public Library** & **Amersfoort Public Library**, and a soft copy upon request from Singo Consulting (Pty) Ltd using the detailed EAP's contact's below, via emails; Dropbox link; Google drive; WeTransfer, etc.

ENVIRONMENTAL ASSESSMENT PRACTITIONER & APPLICANT's DETAILS:

Singo Consulting (Pty) Ltd

Office No.: 870, 5 Balalaika Street
Tasbet Park Ext 2
eMalahleni (Witbank)
1040

Contact person: Ms Masindi Nefale

Tel No.: +27 13 692 0041
Fax No.: +27 86 514 4103
Cell No.: +27 76 324 5499
Email: masindi@singoconsulting.co.za

BAZIL TECHNOLOGIES
Building Africa For Difference

10 Harmonie St, Klarinet, eMalahleni, 1029

Contact person: Miss Noxolo Manyoba

Cell No: +27 72 258 1674
Tel No.: +27 13 110 1174
Fax No: +27 86 725 2785
Email: info@baziltechnologies.co.za
Website: www.baziltechnologies.co.za

Newspaper Advert

NOTICE OF PUBLIC PARTICIPATION FOR PROSPECTING RIGHT AND ENVIRONMENTAL AUTHORIZATION APPLICATION

Application for Prospecting Right: **Bazil Technologies (Pty) Ltd** has received an acceptance letter, with **DMRE Ref: MP 30/5/1/1/2/ 17127 PR** for the purpose of prospecting for **Coal**, on portions **RE, RE/1, 3, RE/4, RE/5, RE/6, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, RE/20 & 21** of the **farm Elandspoort 85 HS**, Situated in Pixley Ka Seme Local Municipality under Gert Sibande District Municipality, Mpumalanga Province. Prospecting (searching of commodity) procedure takes a period of 3 years. Coal is prospected in a relatively simple sequence of activities which includes site preparation, drilling, and rehabilitation of the drilled holes.

Notice is hereby given in terms of the Mineral and Petroleum Resources Development Act (MPRDA) (Act 28 of 2002) and EIA Regulations 2014, published under Government Notice No. 982 in Gazette No. 3822 of 8 December 2014, amended on 7 April 2017, that **Bazil Technologies (Pty) Ltd** has applied for a Prospecting Right for the above-mentioned mineral.

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ENVIRONMENTAL ASSESSMENT PRACTITIONER & APPLICANT's DETAILS:

Singo Consulting (Pty) Ltd
Office No.: 870, 3 Baralaka Street
Tasbet Park Ext 2
eMalahleni (Witbank)
1040

Contact person: Ms Masindi Nefale

Tel No.: +27 13 692 0041
Fax No.: +27 86 514 4103
Cell No.: +27 74 324 5499
Email: masindi@singoconsulting.co.za

BAZIL TECHNOLOGIES
10 Harmonie St, Klarinet, eMalahleni, 1029

Contact person: Miss Nokolo Manyoba

Cell No: +27 72 258 1674
Tel No.: +27 13 110 1174
Fax No: +27 86 725 2785
Email: info@bazltechnologies.co.za
Website: www.bazltechnologies.co.za

Shack Fire in Georgia Gardens

Monday, 10 January 2022, Miss Thembi Dlamini and two of her sons aged 4 and 14 were asleep in their shack which she had been renting in Georgia Gardens. The family was awakened by flames as her home was on fire. She scrambled to get herself and her children to safety. Unfortunately, Ms Dlamini was unable to save any of their possessions as the shack burned to the ground. All their property including important documents like her ID book, the children's birth certificates and school report were lost in the fire. The cause of the fire is a mystery as there was no electricity connection in the shack and the candle had already been blown out prior to the family going to bed. The family humbly requests the community for any form of assistance, especially in regards to her elder son as he was due to start school in grade 8 at Qhubulwazi Combined School. Volksrust Online Radio will assist with school shoes.

~Contact: 0739650006~

Residents complain about water

Certain surrounding areas in the Pixley ka Isaka Seme District are currently experiencing water problems. Those areas include Amersfoort, Daggakraal and Perdekop. The water is clearly dirty with a brown discoloring and may most likely contain impurities that may be harmful if ingested. Residents have complained to the local municipality as they say they are not expected to use this water for daily chores yet alone as drinking water. Looking forward to positive feedback and response from the local Municipality on the matter.

VACANCY

Miltec Products
Assistant Store Manager
Wakkerstroom Branch

The duties and responsibilities are as follows:

- Supporting the Store Manager in daily store operations.
- Supervising employees.
- Performing tasks that support running the store efficiently.
- Communicating with and helping customers.
- Ordering of stock and stock control.

Submit CV at Volksrust Build It or at Miltec Depot, 18 Vrede Street, Volksrust. Fax to 017 735 1490 or E-mail miltec@lantic.net.

social development
Department:
Social Development
PROVINCE OF KWAZULU-NATAL

The Social Worker Miss N.N Mzimela can be contacted on 017 735 3822/3/4

Manana Sifiso	26/01/2005	Phumzile Manana (Deceased)	Identity and whereabouts unknown	Inkwelo Farm, Charlestown
Hlatshwayo Bonginkosi	17/11/2006	Vilakazi Thembi (whereabouts unknown)	Hlatshwayo Tapelo (Deceased)	Small Kloof Farm, Volksrust
Hlatshwayo Siphokazi Lizzy	12/04/2010	Vilakazi Thembi (whereabouts unknown)	Hlatshwayo Tapelo (Deceased)	Small Kloof Farm, Volksrust
Hlatshwayo Nosipho Selinah	12/04/2010	Vilakazi Thembi (whereabouts unknown)	Hlatshwayo Tapelo (Deceased)	Small Kloof Farm, Volksrust

Build It Braai Stand Winner!!

Proof of Published Newspaper

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: All portions of the Farm Elandspoort 85 HS

Project title: All portions of the Farm Elandspoort 85 HS

Date screening report generated: 22/09/2021 10:01:22

Applicant: Bazil Technologies (Pty) Ltd

Compiler: Singo Consulting (Pty) Ltd

Compiler signature: 

.....

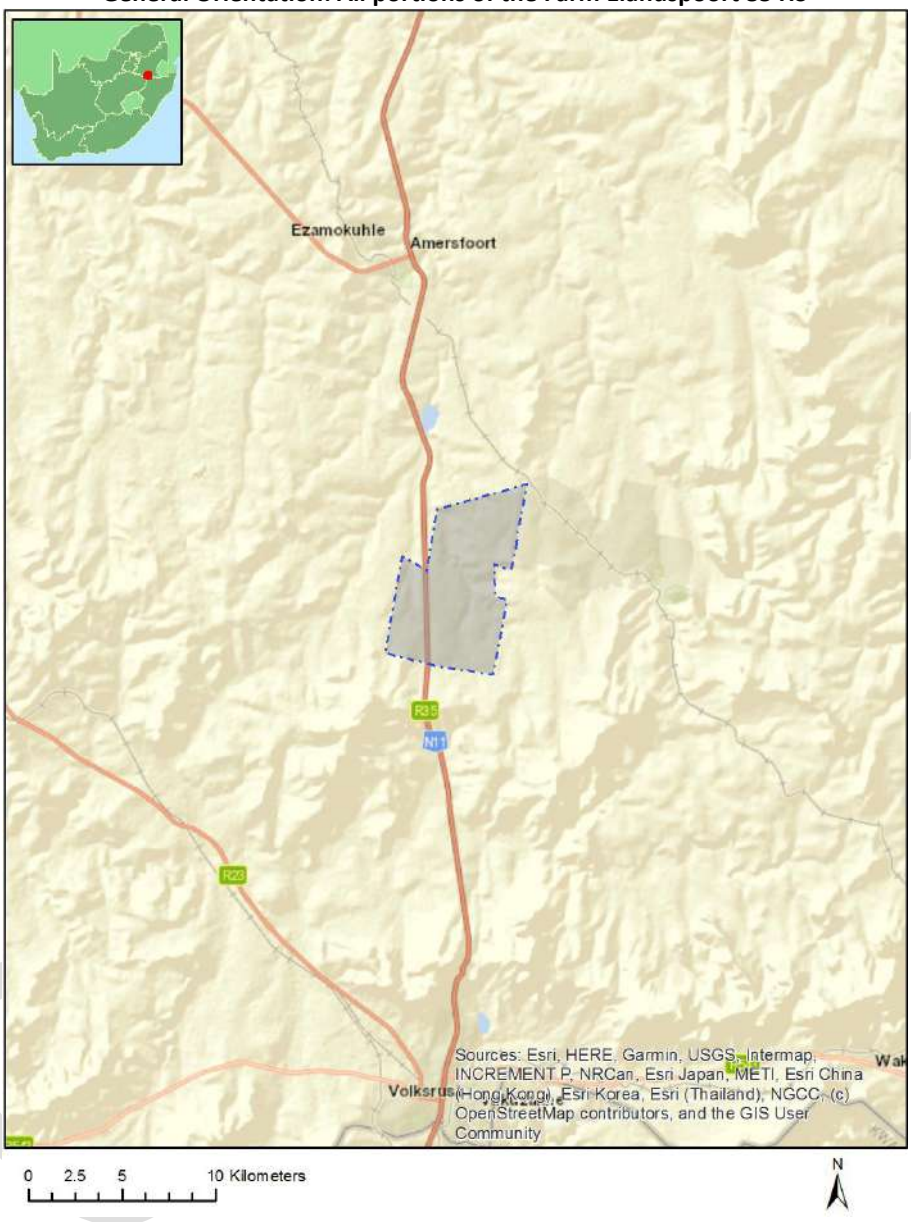
Application Category: Mining|Prospecting rights

Table of Contents

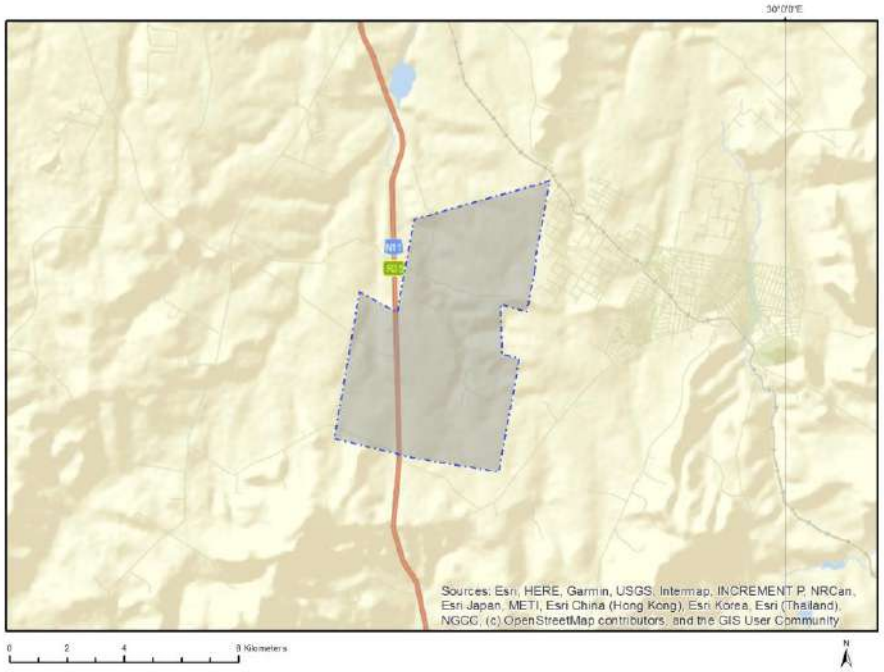
Proposed Project Location

Orientation map 1: General location

General Orientation: All portions of the Farm Elandspoort 85 HS



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	ELANDSGELUK	84	0	27°8'48.17S	29°54'52.18E	Farm
2	VERKYK	88	0	27°11'8.36S	29°56'16.62E	Farm
3	RIETPOORT	83	0	27°8'9.45S	29°49'15.36E	Farm
4	BERBVLEIT	65	0	27°5'11.33S	29°52'33.6E	Farm
5	ELANDSPOORT	85	0	27°8'48.9S	29°53'31.68E	Farm
6	OUDEHOUT KLOOF	86	0	27°12'38.62S	29°52'34.61E	Farm
7	VLAKPLAATS	87	0	27°7'32.73S	29°56'14.08E	Farm
8	ELANDSPOORT	85	10	27°7'2.33S	29°53'51.44E	Farm Portion
9	OUDEHOUT KLOOF	86	22	27°11'21.78S	29°51'29.64E	Farm Portion
10	ELANDSGELUK	84	0	27°8'48.17S	29°54'52.18E	Farm Portion
11	ELANDSPOORT	85	20	27°9'33.43S	29°53'36.84E	Farm Portion
12	BERBVLEIT	65	12	27°6'28.55S	29°53'15.96E	Farm Portion
13	BERBVLEIT	65	24	27°6'16.96S	29°54'15.91E	Farm Portion
14	RIETPOORT	83	1	27°8'40.55S	29°49'51.76E	Farm Portion
15	OUDEHOUT KLOOF	86	37	27°11'12.84S	29°53'43.62E	Farm Portion
16	VLAKPLAATS	87	108	27°7'55.98S	29°55'22.61E	Farm Portion
17	ELANDSPOORT	85	6	27°9'22.45S	29°52'29.18E	Farm Portion
18	ELANDSPOORT	85	12	27°7'55.39S	29°54'44.72E	Farm Portion
19	ELANDSPOORT	85	19	27°10'21.85S	29°51'53.69E	Farm Portion
20	BERBVLEIT	65	22	27°6'13.34S	29°55'9.45E	Farm Portion
21	VLAKPLAATS	87	109	27°8'4.65S	29°55'18.98E	Farm Portion
22	VERKYK	88	9	27°8'33.16S	29°55'29.98E	Farm Portion
23	VERKYK	88	4	27°10'57.67S	29°54'56.12E	Farm Portion
24	BERBVLEIT	65	13	27°5'51.29S	29°54'32.62E	Farm Portion

25	ELANDSPOORT	85	9	27°7'42.81S	29°53'37.55E	Farm Portion
26	ELANDSPOORT	85	13	27°9'20.43S	29°53'20.68E	Farm Portion
27	ELANDSPOORT	85	21	27°9'30.25S	29°54'8.65E	Farm Portion
28	ELANDSPOORT	85	17	27°10'22.41S	29°53'52.88E	Farm Portion
29	OUDEHOUT KLOOF	86	1	27°11'21.98S	29°51'54.18E	Farm Portion
30	OUDEHOUT KLOOF	86	8	27°12'2.1S	29°54'12E	Farm Portion
31	VLAKPLAATS	87	114	27°8'13.45S	29°55'15.06E	Farm Portion
32	VERKYK	88	6	27°10'2.26S	29°55'4.52E	Farm Portion
33	ELANDSPOORT	85	15	27°10'50.64S	29°53'32.3E	Farm Portion
34	ELANDSPOORT	85	0	27°8'43.38S	29°54'17.84E	Farm Portion
35	ELANDSPOORT	85	3	27°10'13.48S	29°54'29.44E	Farm Portion
36	ELANDSPOORT	85	11	27°6'57.12S	29°54'59.67E	Farm Portion
37	ELANDSPOORT	85	8	27°8'13.82S	29°53'3.79E	Farm Portion
38	ELANDSPOORT	85	1	27°8'42.85S	29°52'21.11E	Farm Portion
39	VLAKPLAATS	87	95	27°7'44.13S	29°55'21.59E	Farm Portion
40	ELANDSPOORT	85	14	27°10'21.17S	29°53'22.67E	Farm Portion
41	ELANDSPOORT	85	18	27°8'32.2S	29°53'38.14E	Farm Portion
42	ELANDSPOORT	85	4	27°10'20.62S	29°52'41.34E	Farm Portion
43	ELANDSPOORT	85	5	27°9'47.73S	29°52'4.66E	Farm Portion
44	ELANDSPOORT	85	23	27°8'51.96S	29°52'41.08E	Farm Portion

Development footprint[1] vertices:

Footprint	Latitude	Longitude
1	27°10'36.34S	29°51'31.54E
1	27°8'9.52S	29°51'59.87E
1	27°8'30.47S	29°52'42.08E
1	27°6'56.42S	29°53'1.4E
1	27°6'17.48S	29°55'34.03E
1	27°7'31.89S	29°55'18.72E
1	27°7'47.72S	29°55'17.34E
1	27°8'29.56S	29°55'8.63E
1	27°8'21.75S	29°54'39.33E
1	27°9'12.57S	29°54'41E
1	27°9'16.14S	29°54'59.7E
1	27°11'9.96S	29°54'36.61E
1	27°10'56.41S	29°53'1.67E
1	27°10'36.34S	29°51'31.54E

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

No	EIA Reference No	Classification	Status of application	Distance from proposed area (km)
1	14//12/16/3/3/2/752	Solar PV	Approved	9.8
2	14/12/16/3/3/2/752	Solar PV	Approved	9

[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:
Mining|Prospecting rights.

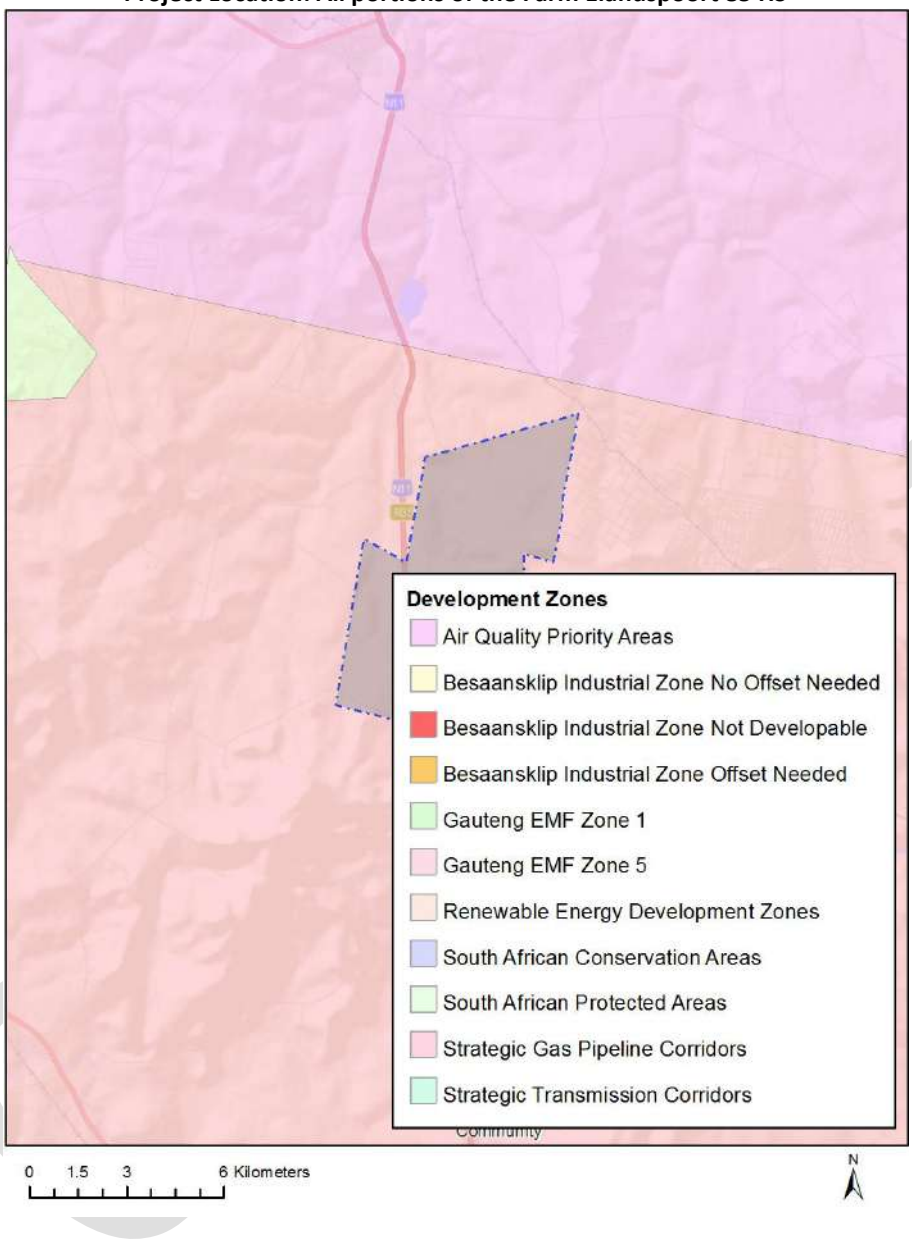
Relevant development incentives, restrictions, exclusions or prohibitions

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

Incentive, restriction or prohibition	Implication
Air Quality-Highveld Priority Area	https://screening.environment.gov.za/ScreeningDownloads/DevelopmentZones/HIGHVELD_PRIORITY_AREA_AQMP.pdf
Strategic Gas Pipeline Corridors -Phase 3: Richards Bay to Gauteng	https://screening.environment.gov.za/ScreeningDownloads/DevelopmentZones/Combined_GAS.pdf

Map indicating proposed development footprint within applicable development incentive, restriction, exclusion or prohibition zones

Project Location: All portions of the Farm Elandspoort 85 HS



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 environmental sensitivities of the proposed development footprint, 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.

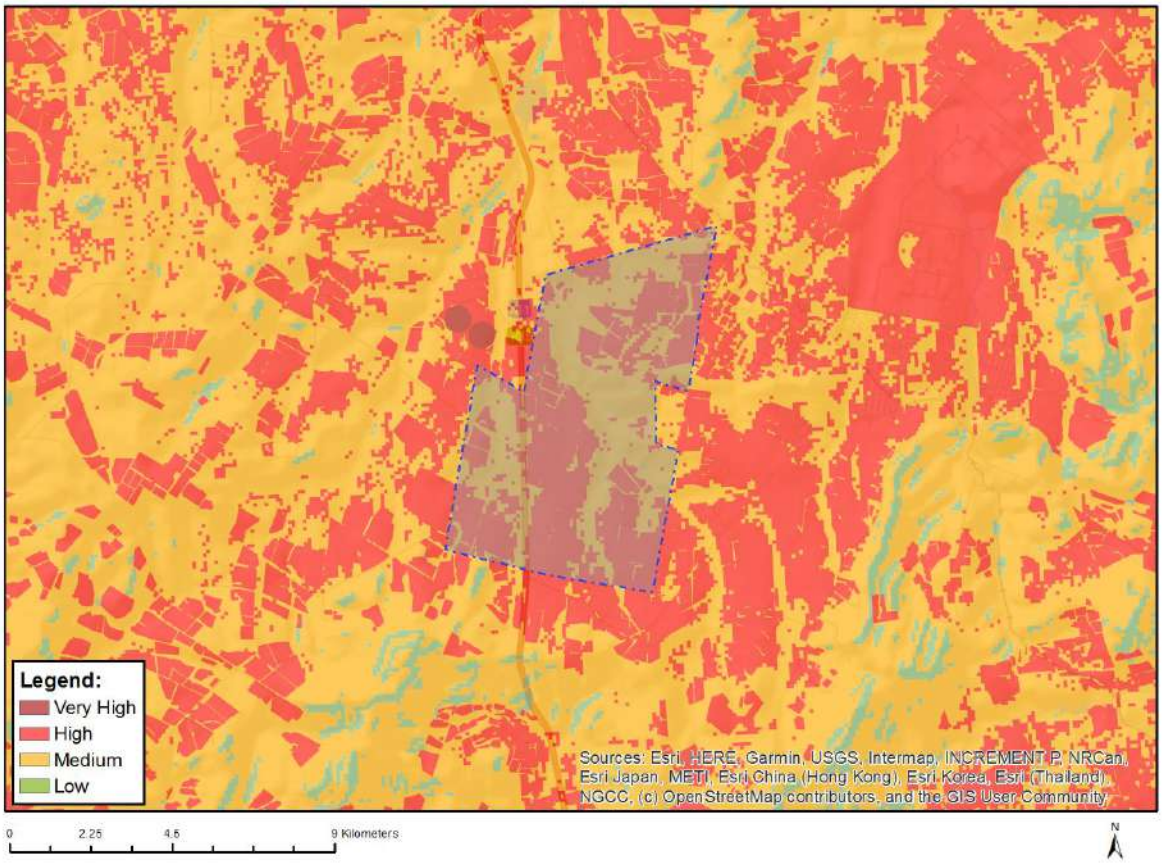
No	Specialist assessment	Assessment Protocol
1	Agricultural Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Agriculture_Assessment_Protocols.pdf
2	Archaeological and Cultural Heritage Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_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	Noise Impact Assess	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Noise_Impacts_Assessment_Protocol.pdf

	ment	
7	Radioactivity Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf
8	Plant Species Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Plant_Species_Assessment_Protocols.pdf
9	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



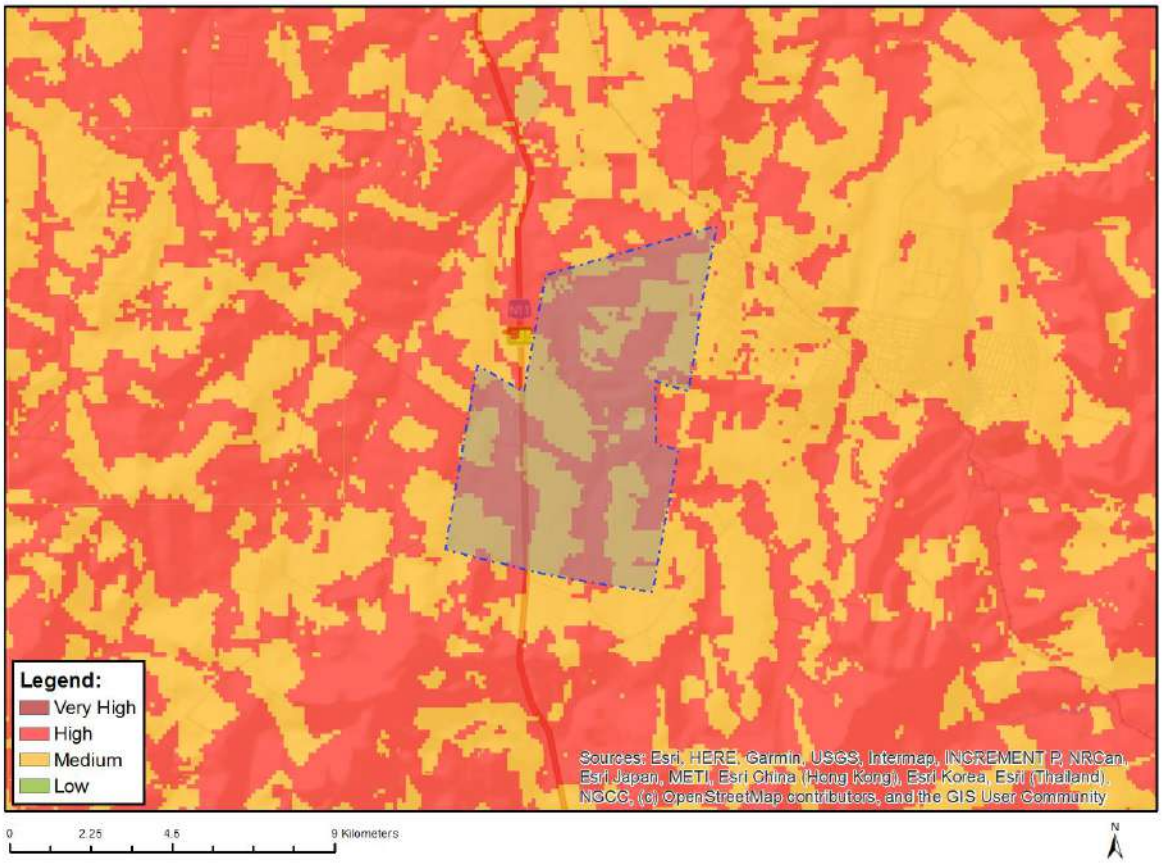
Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

Sensitivity	Feature(s)
High	Land capability;09. Moderate-High/10. Moderate-High
High	Annual Crop Cultivation / Planted Pastures Rotation;Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate
High	Annual Crop Cultivation / Planted Pastures Rotation;Land capability;09. Moderate-High/10. Moderate-High
High	Old Fields;Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate
High	Old Fields;Land capability;09. Moderate-High/10. Moderate-High
High	Annual Crop Cultivation / Planted Pastures Rotation;Land capability;01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05. Low
High	Small Holdings;Land capability;09. Moderate-High/10. Moderate-High

High	Small Holdings;Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate
Low	Land capability;01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05. Low
Medium	Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate

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.

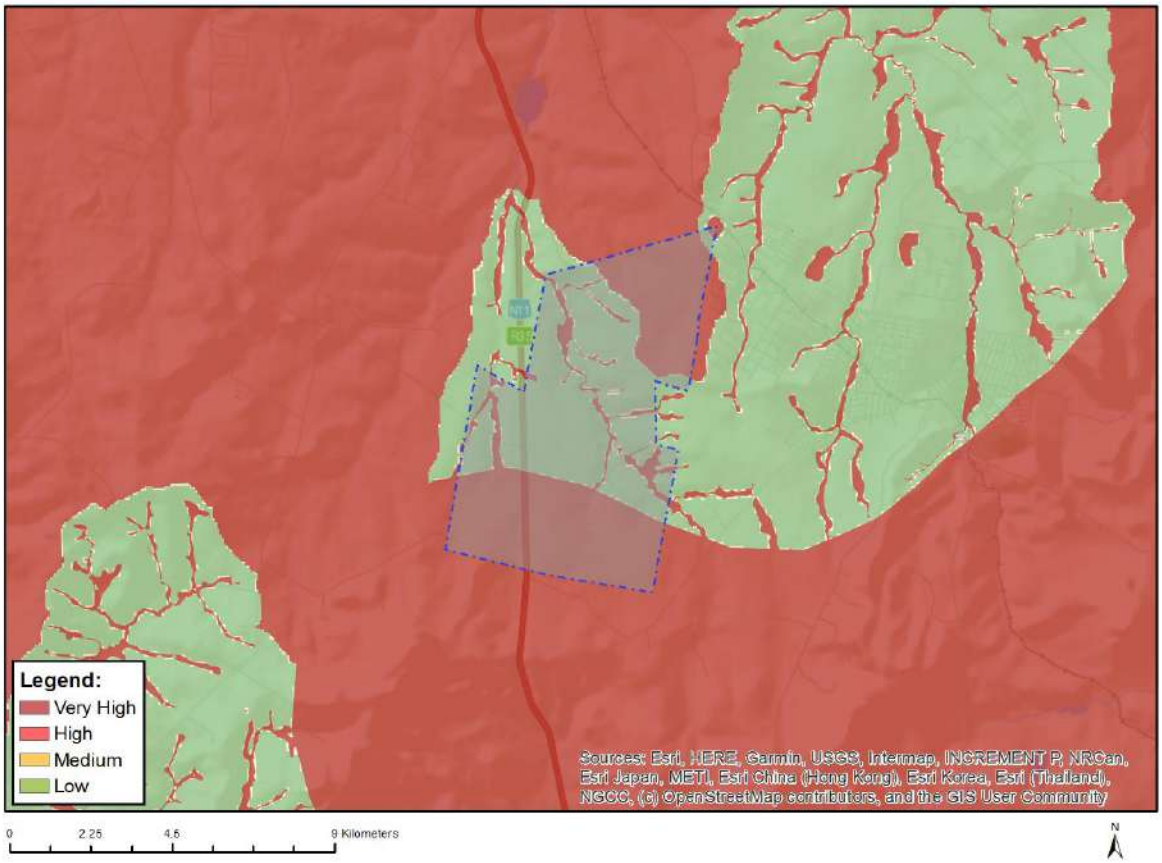
Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

Sensitivity	Feature(s)
High	Aves-Spizocorys fringillaris
High	Aves-Geronticus calvus
High	Aves-Sagittarius serpentarius
Medium	Reptilia-Smaug giganteus
Medium	Aves-Tyto capensis
Medium	Aves-Circus ranivorus
Medium	Aves-Spizocorys fringillaris
Medium	Sensitive species 2
Medium	Aves-Sagittarius serpentarius

Medium	Aves-Neotis denhami
Medium	Mammalia-Chrysospalax villosus
Medium	Mammalia-Crocidura maquassiensis
Medium	Mammalia-Hydrictis maculicollis
Medium	Mammalia-Ourebia ourebi ourebi

MAP OF RELATIVE AQUATIC BIODIVERSITY THEME SENSITIVITY

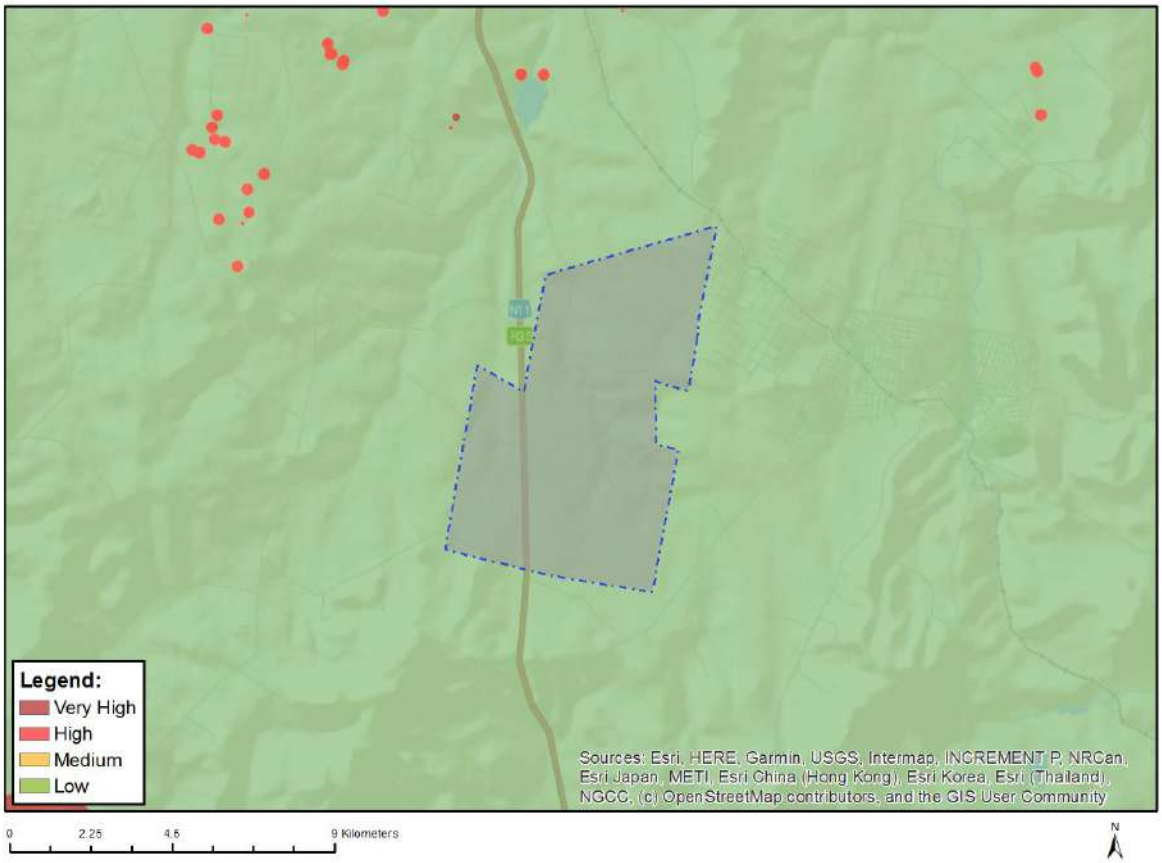


Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity
Very High	Strategic water source area
Very High	Wetlands and Estuaries
Very High	Freshwater ecosystem priority area quinary catchments

MAP OF RELATIVE ARCHAEOLOGICAL AND CULTURAL HERITAGE THEME SENSITIVITY

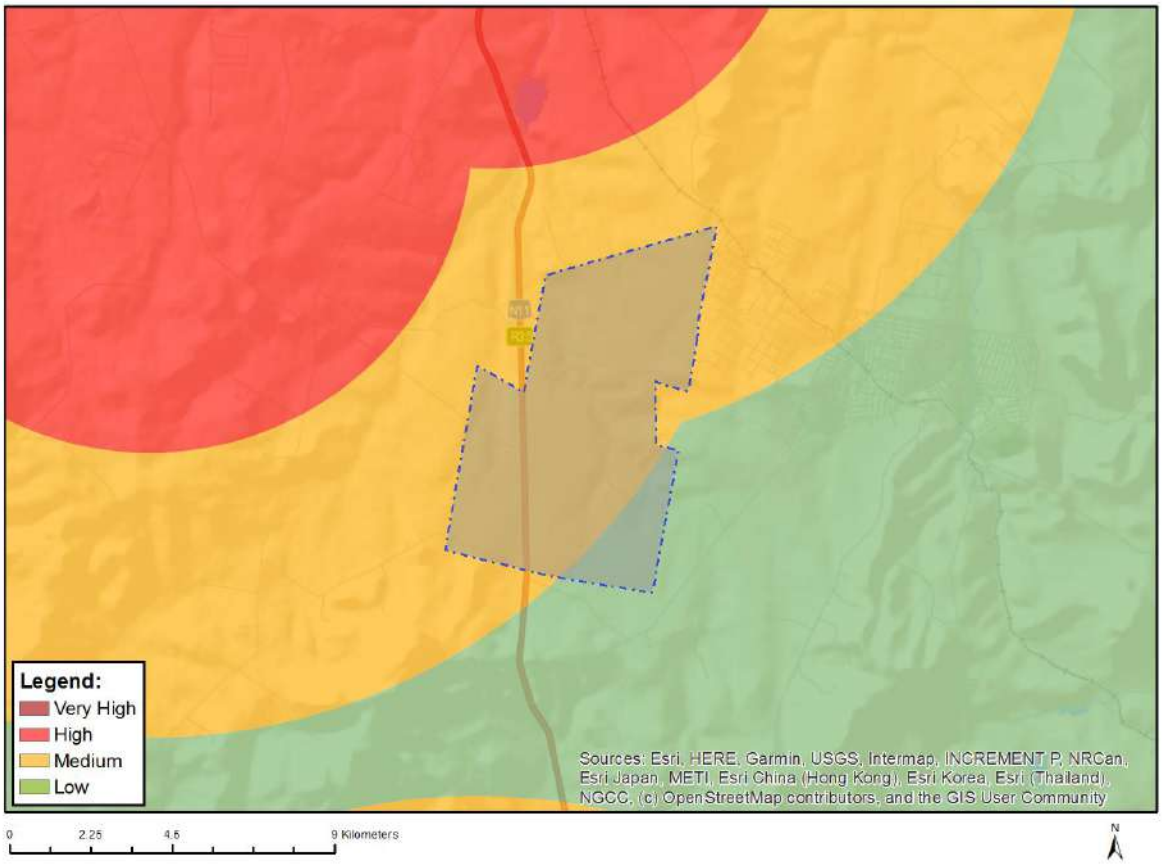


Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity

MAP OF RELATIVE CIVIL AVIATION THEME SENSITIVITY

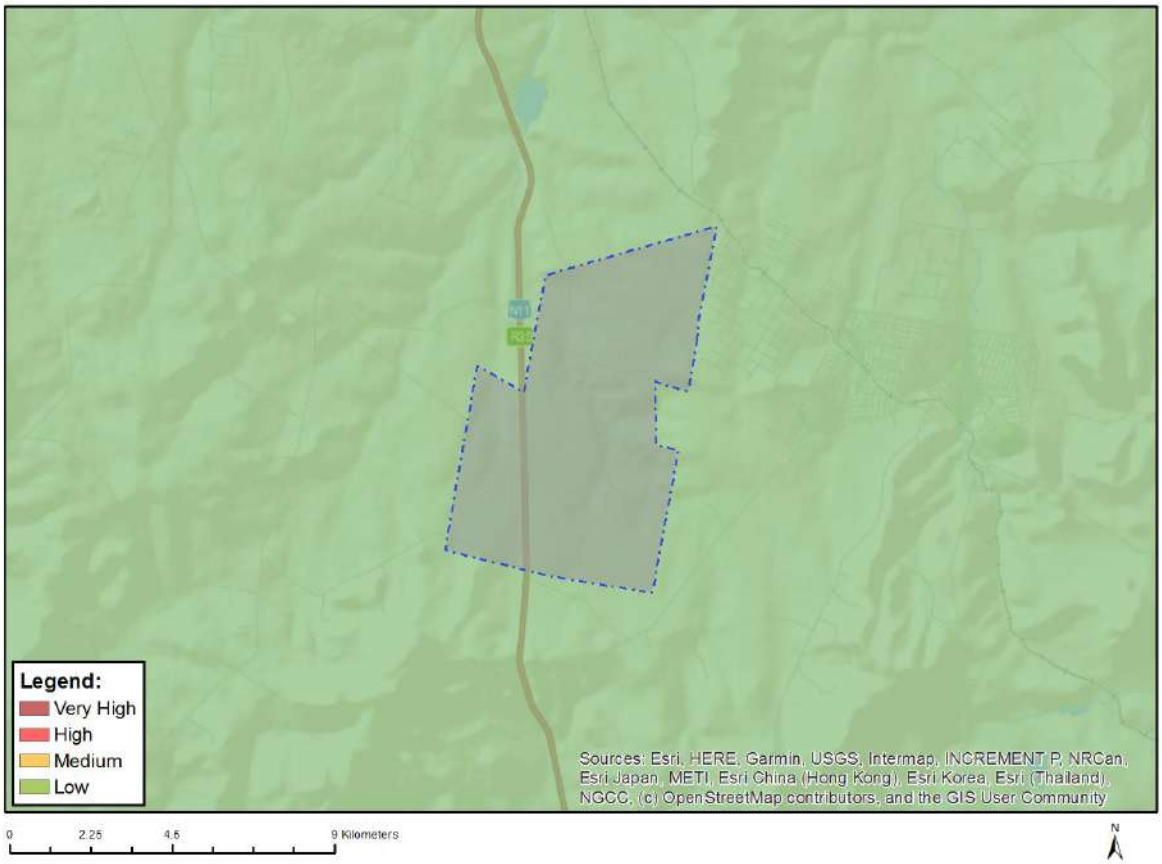


Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity
Medium	Between 8 and 15 km of other civil aviation aerodrome

MAP OF RELATIVE DEFENCE THEME SENSITIVITY

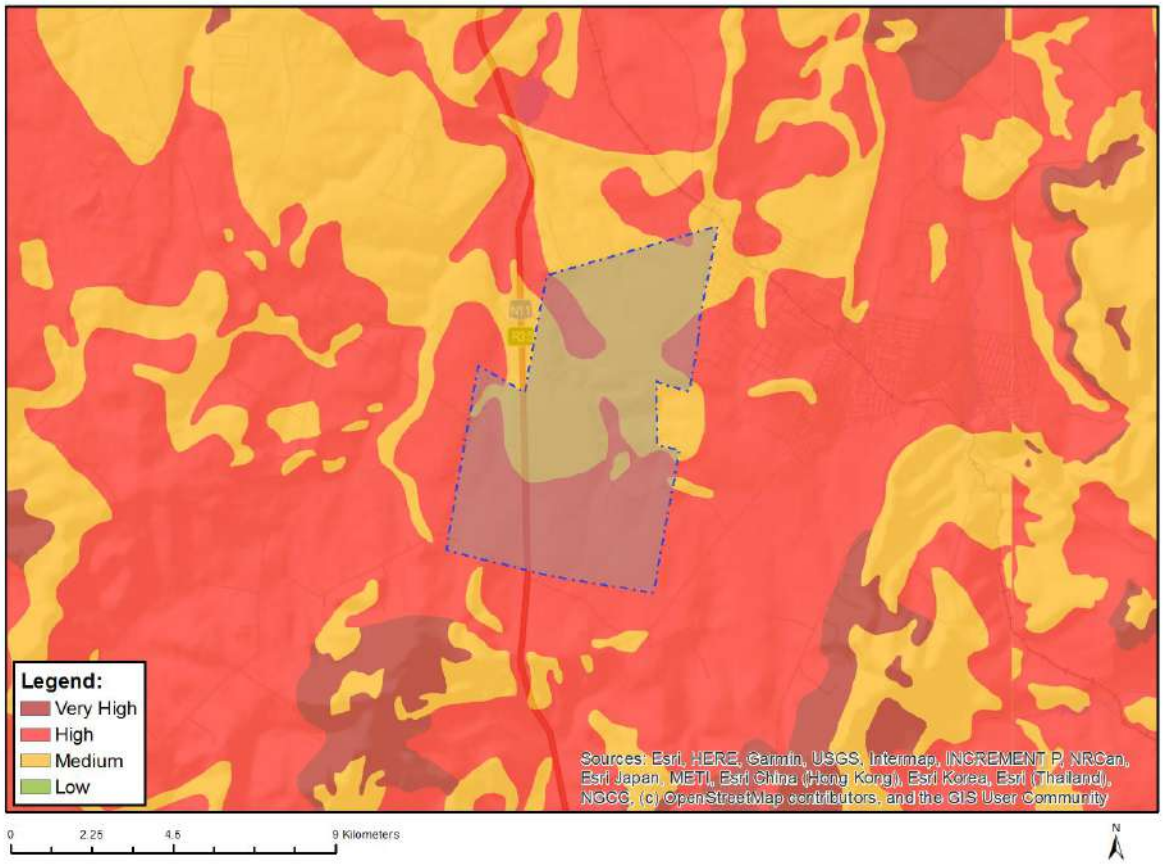


Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity

MAP OF RELATIVE PALEONTOLOGY THEME SENSITIVITY

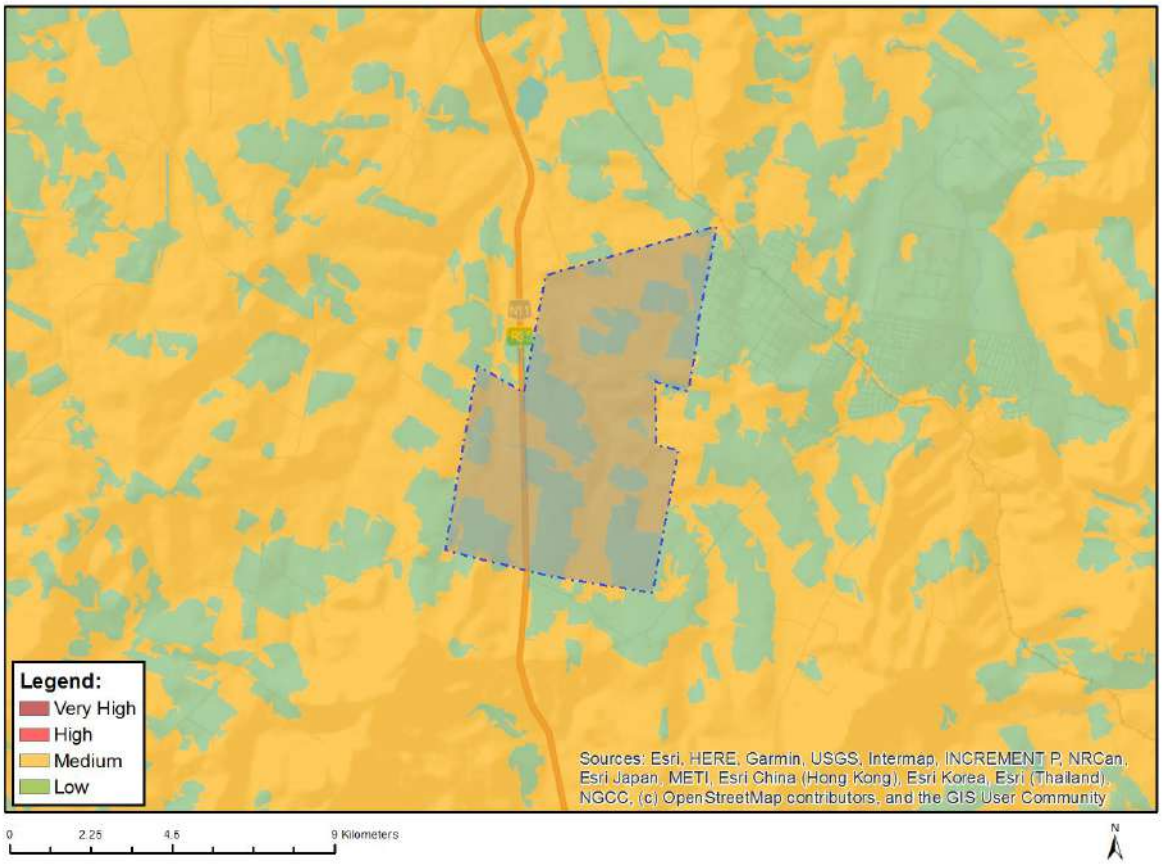


Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

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

MAP OF RELATIVE PLANT SPECIES THEME SENSITIVITY



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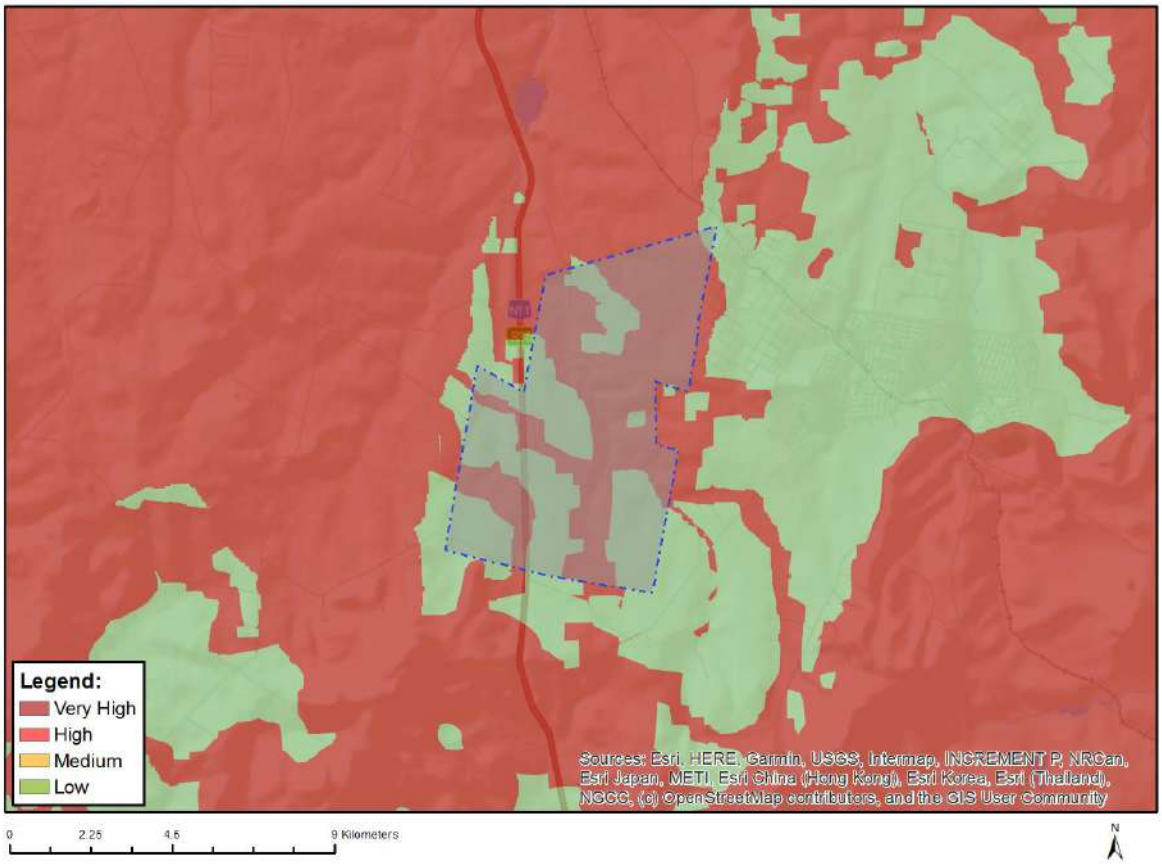
Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity
Medium	Sensitive species 1252
Medium	Sensitive species 314
Medium	Aspidoglossum xanthosphaerum
Medium	Sensitive species 998
Medium	Sensitive species 321
Medium	Sensitive species 851
Medium	Zaluzianskya distans

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
Very High	Critical biodiveristy area 1
Very High	Critical biodiveristy area 2
Very High	Ecological support area: local corridor
Very High	FEPA Subcatchments
Very High	Protected Areas Expansion Strategy

PROSPECTING RIGHT BASIC ECOLOGICAL STUDY

Basic ecological assessment for the proposed prospecting right application on all portions of the Farm Elandspoort 85 HS within the Magisterial District of Volksrust, Mpumalanga Province, South Africa

PREPARED BY

Singo Consulting (Pty) Ltd

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PREPARED FOR

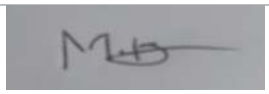
BAZIL TECHNOLOGIES
Building Africa For Difference

2022

DMRE REF: MP 30/5/1/1/2/17127 PR

Project details

Report type	Basic Ecological Assessment Report for prospecting right
Project title	Basic ecological assessment for the proposed prospecting right application on all portions of the Farm Elandspoort 85 HS within the Magisterial District of Volksrust, Mpumalanga Province, South Africa
Client	Bazil Technologies (Pty) Ltd
Site location	Elandspoort 85 HS within the Magisterial District of Volksrust, Mpumalanga Province, South Africa
Version	1
Date	7 February 2022

		Electronic signatures
Compiled by	Khodani Mathako (Environmental Assessment Practitioner) Singo Consulting (Pty) Ltd	
Reviewed by	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)	

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Project credentials

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Abbreviations

CARA	Conservation of Agricultural Resources
CBA	Critical Biodiversity Area
CR	Critically Endangered
DEA	Department of Environmental Affairs
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EN	Endangered
ESA	Ecological support area
NEMA	National Environmental Management Act, 107 of 1998
NEMBA	National Environmental Management Biodiversity Act, 10 of 2004
SANBI	South African National Biodiversity Institute
SFSD	Strategic Framework for Sustainable Development
VU	Vulnerable

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1 INTRODUCTION

Bazil Technologies (Pty) Ltd (Bazil Technologies) intends to prospect on all portions of the Farm Elandspoort 85 HS under the Magisterial District of Volksrust, Mpumalanga. Singo Consulting (Pty) Ltd (Singo Consulting) has been appointed as an independent Environmental Assessment Practitioner (EAP) to undertake an environmental impact assessment (EIA) for the proposed project in terms of EIA Regulations of the National Environmental Management Act, 1998 (Act No.107 of 1998) as amended, 7 April 2017 (NEMA).

The EIA process requires that a specific ecology study be conducted. Singo Consulting has been appointed to conduct the EIA for the proposed project. This assessment identifies the negative environmental impact that the proposed project might have on the fauna, flora, and the sensitive faunal habitat found on site, and recommends mitigation measures.

1.1 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 prospecting right at Elandspoort.

The terms of reference for this investigation are limited to an ecological assessment that aims to:

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

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1.2 Project location

The proposed prospecting right area is located on all portions of the Farm Elandspoort 85 HS in the Magisterial District of Volksrust in Mpumalanga (see Figure 1 and Figure 2). The site covers an extent of 3703.950 ha and is situated approximately 23.1 km south of Volksrust, about 46.1 km south-west of Wakkerstroom and approximately 17.3 km north-east of Eskom UCG mine Daggakraal. The area can be accessed via N11 national road.

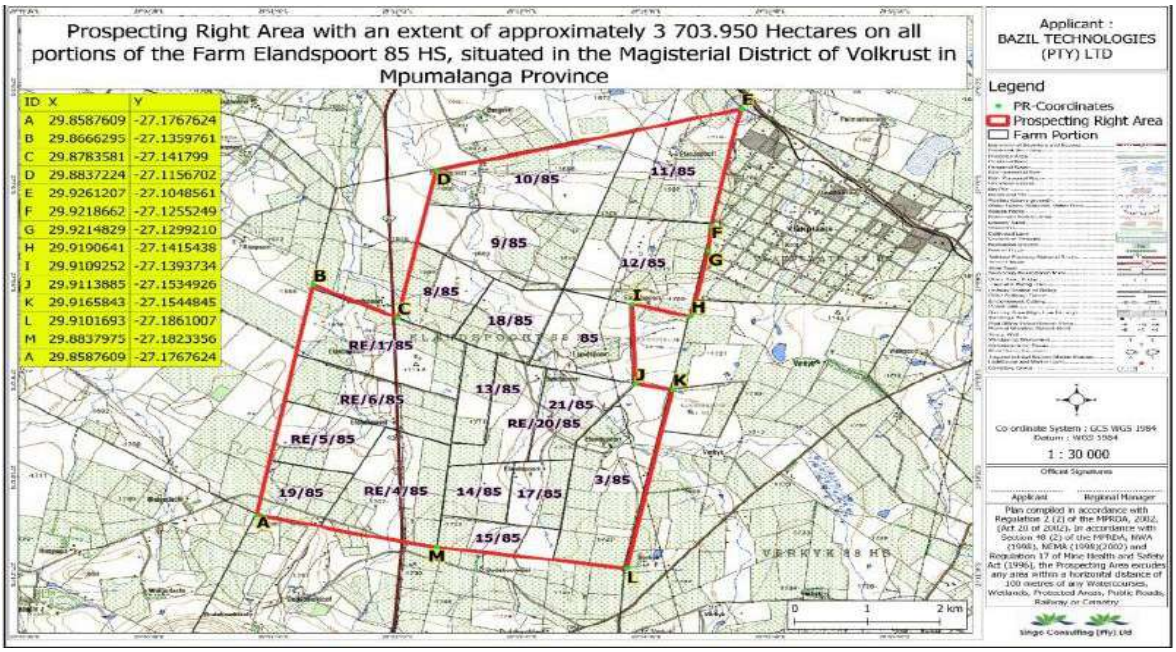

Figure 1: Locality of the proposed project.

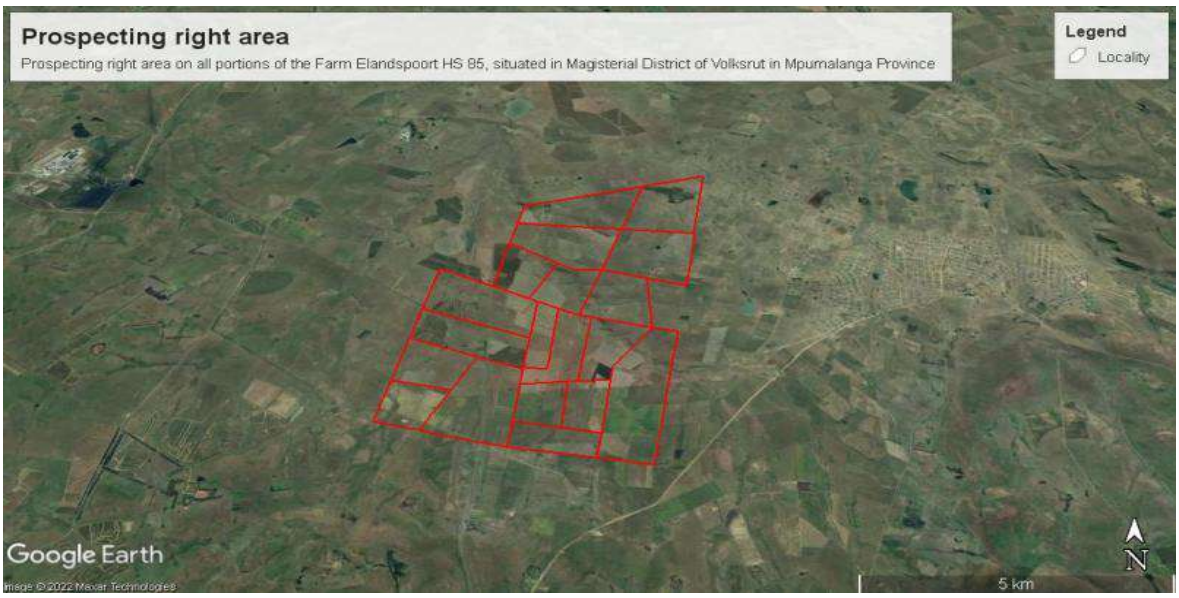

Figure 2: Google Earth map of the proposed site.

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2 GENERAL DESCRIPTION OF THE RECEIVING ENVIRONMENT

2.1 Climatic conditions

The regional climate of the proposed project area falls in the Highveld climatic zone, which is sub-humid, with a summer rainfall and cold winters. The mean minimum annual temperature ranges from -1.9˚C to 0˚C (see Figure 3). The area receives mean annual precipitation of about 601-800 mm and a mean annual evaporation of 1,975 mm.

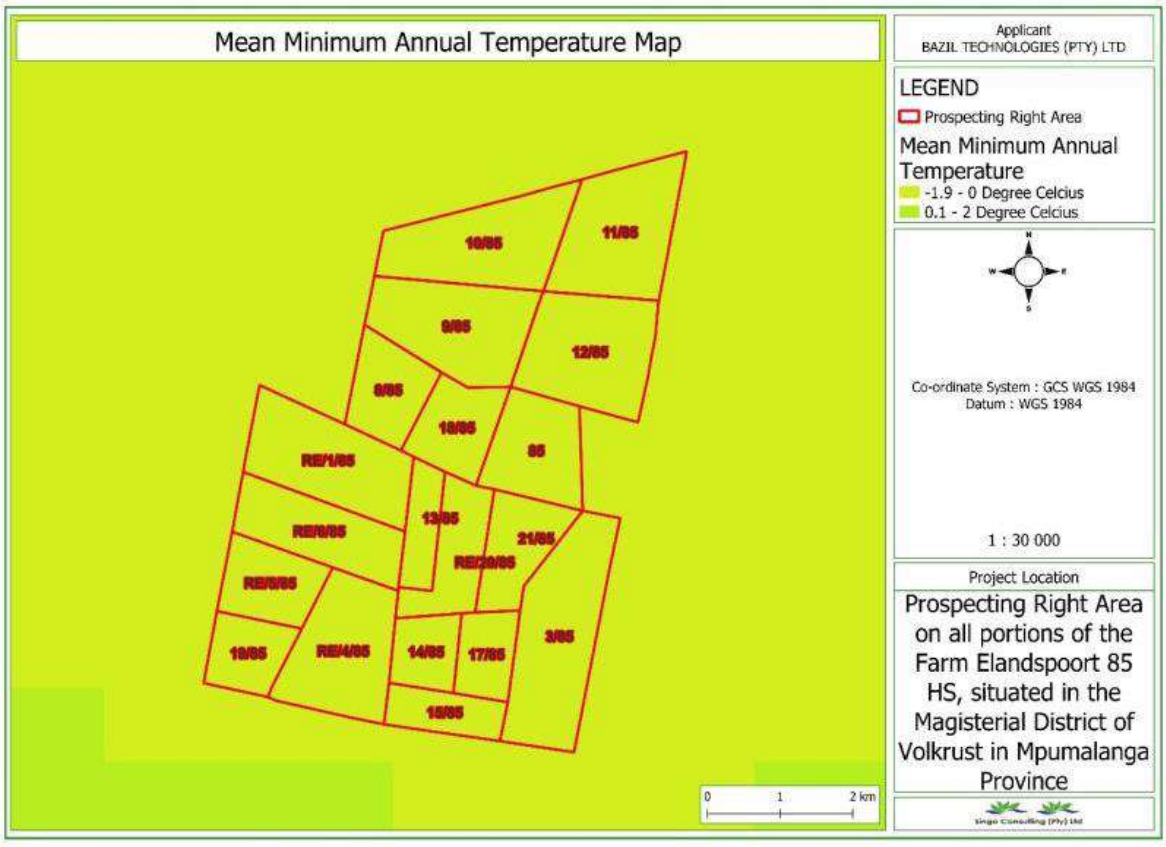

Figure 3: Mean annual temperature of the area.

2.2 Land use and land cover

The proposed project site is dominated by agricultural land use. This area is mostly used for cattle farming, crop cultivation and livestock grazing. The most dominant vegetation types of the area are Moist Clay/Moist Sandy Highveld Grassland. The area is covered with Amersfoot Clay Grassland (Gm 13) and it was previously classified as (VT 54) Themeda Veld to Highveld Sourveld Transition 43%, (VT 57) North-East Sandy Highveld (29%) (Acocks,

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1988), (LR 41) Wet Cold Highveld Grassland (30%) and (LR 38) Moist Sandy Highveld Grassland (29%) (Low & Rebelo, 1996).

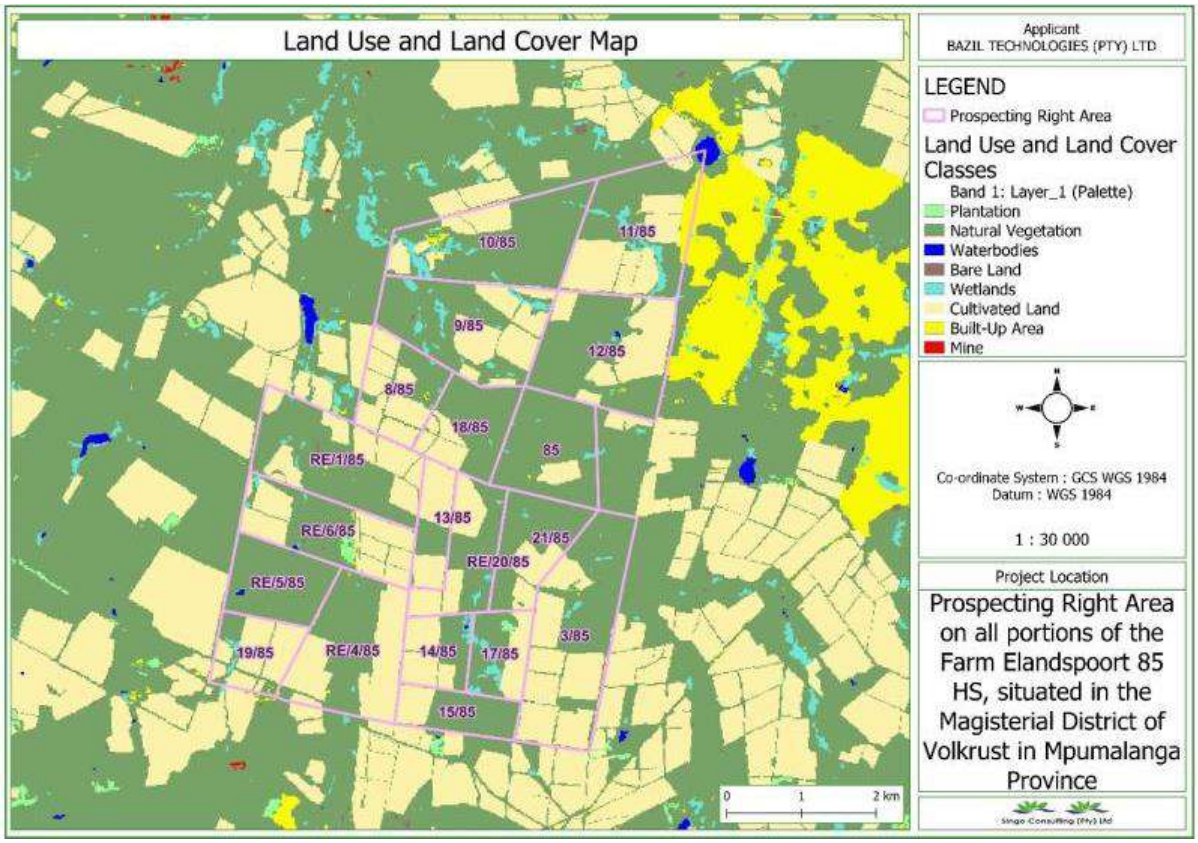

Figure 4: Land use and land cover.

2.3 Overview of the vegetation type and conservation status

The proposed prospecting areas are dominated by Moist Sandy Highveld Grassland (see Figure 5). The Moist Sandy Highveld Grassland is found in the sandy plains west of the Belfast Carolina-Ermelo area, and north of Volksrust (Mpumalanga), at an altitude of 1,600 to 1,800 m. The grassland is dominated by *Eragrostis plana*, *E. curvula*, *Heteropogon contortus*, *Trachypogon spicatus* and *Themeda triandra*. *Dicotyledonous forbs* are not abundant, but many species occur in the area (Van Rooyen & Bredenkamp, 1998). The distribution of this vegetation is controlled by rainfall on the cold, frosty, eastern Mpumalanga highveld together with sandy soils. It is generally very suitable for crop production while areas of natural vegetation are heavily grazed by sheep and cattle. The conservation status is considered very poor, being restricted to patchy remnants, which are often heavily grazed. Large parts are ploughed and subsequently transformed. The Nooitgedacht Dam

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Nature Reserve is the only official conservation area, but the Ermelo Game Park represents a good example of this vegetation (Van Rooyen & Bredenkamp, 1998).

The proposed site falls in the Grassland biome and the Mesic Highveld Grassland bioregion. The vegetation classifications describe the vegetation of the area as belonging to the Rand and Eastern Highveld Grassland vegetation types. The area has a woody species component, however, most wood species in the area (including *Pinus sp,Eucalyptus camaldulensis* and *Acacia mearnsii*) are exotic. Some of the areas in the proposed site are home to terrestrial grasslands, which have not been cultivated due to very stony soil. *Hyparrhenia dissoluta*, *Eragrostis rotifer*, *E. gummiflua*, *E. curvula*, *Pogonarthria squarrosa*, *Aristida congesta* and *Stoebe vulgaris* are common in sandy, disturbed veld (Mucina and Rutherford, 2006).

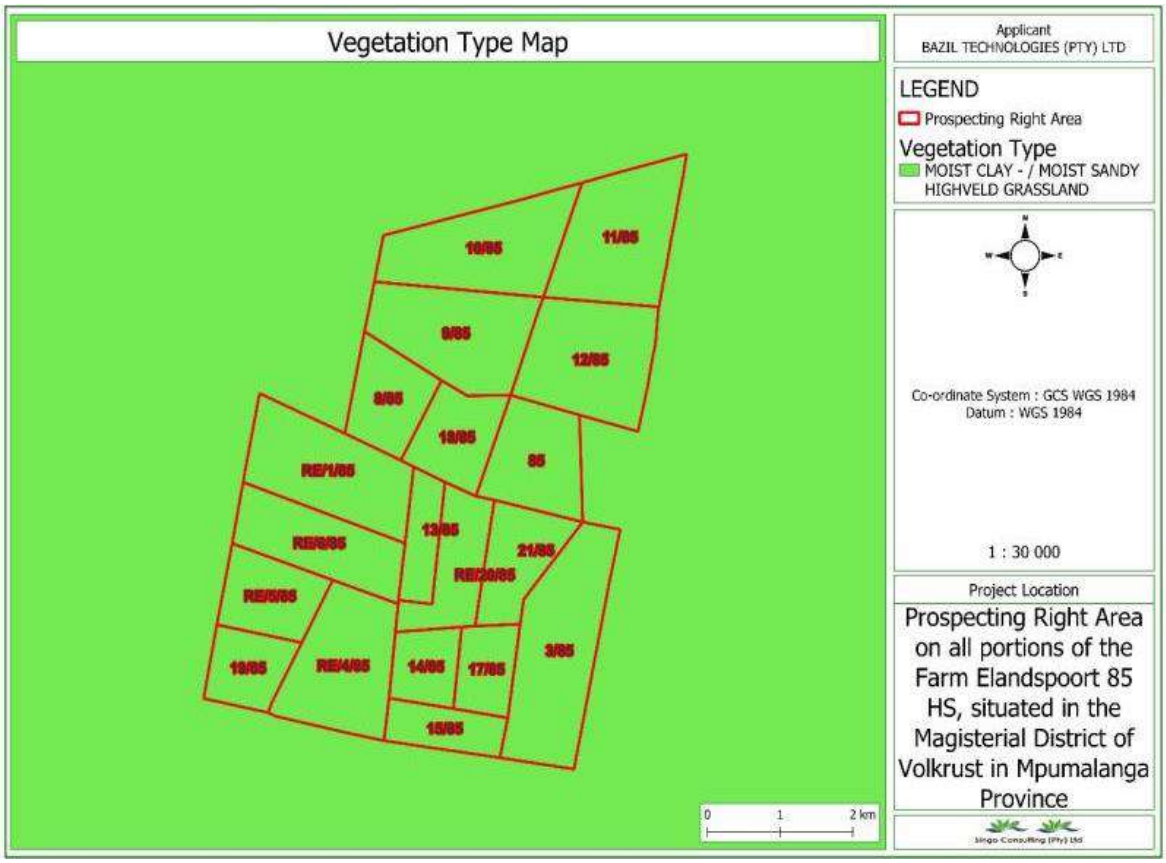

Figure 5: Vegetation type of the proposed area.

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2.4 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 categorising these ecosystems is to prioritise 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).

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3 LIMITATIONS

1. It was difficult to gain access to other areas of the proposed site as other landowners are against the proposed project, and nobody was allowed to conduct site assessments on those portions. This makes it difficult to identify species available on site.
2. 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.

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4 LEGISLATIVE REQUIREMENTS

This section summarises 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	
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 (SFSD)	The development of a broad framework for sustainable development was initiated to provide an overarching and guiding National Sustainable Development Strategy. The draft 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.

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Legislation/policy	
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 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: CR, EN, 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 (CARA)	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

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Legislation/policy	
	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 seeks to provide for the sustainable use 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
Mpumalanga Nature Conservation Act (10 of 1998)	To consolidate and amend the laws relating to nature conservation in the province and to provide for matters connected therewith.

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5 METHODOLOGY AND SITE ASSESSMENT

The information provided in this terrestrial biodiversity 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 ecology 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.

5.1 Desktop study

A desktop survey was conducted using maps and reviewing other reports and photography to assemble background information on the different features of and vegetation present in the proposed project area. The sites were assessed between 1 February 2022 and 4 February 2022 to record the features present.

5.2 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 & 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.

5.3 Fauna survey

Most mammals and reptiles are very secretive, nocturnal, hibernate (reptiles), migrate (birds) or prefer specific habitats, so sampling and identification was proved difficult.

5.4 Mammals

Mammals are nocturnal, secretive, or seasonal. Their specific habitats, walking trails, faeces, spoor, fur, bones, and carcasses were assessed to document mammal species associated with the proposed site. The site assessment was conducted using direct and

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indirect methods, including mammal sightings, and identification of burrows and holes, which were verified using the available literature (Skinner and Chimimba, 2005).

5.5 Ecological and faunal sensitivity analysis

Following the site visit, an ecological sensitivity analysis of the site was conducted based on the Mpumalanga Biodiversity Sector Plan (MBSP) which shows 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:

Low	Units with 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 in these areas with little ecological impact.
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.
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 proceed with caution as it may not be possible to mitigate all impacts appropriately.
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.

5.6 Methodology adapted in assessing impacts

Impacts significance will be assessed using the following descriptors:

Table 2: Impact assessment table.

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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 that 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.

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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 in spite of 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 ecological impact significance is 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 of each impact is rated as High (SP≥60), Medium (SP = 31-60) and Low (SP<30) (see Table 3).

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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/no mitigation and will have a limited influence on the decision
Medium	31-60	Where the impact can influence the environment and should be mitigated and could influence the decision unless it is mitigated.
High	61-100	Where the impact will influence 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.

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6 ASSESSMENT RESULTS

6.1 Vegetation and cultivation

The desktop study found that some areas of the proposed site are used for cultivation. During ground truthing, it was confirmed that the proposed area is used for maize and soya bean cultivation (see Figure 6 and Figure 7). Due to the complete transformation of currently cultivated field, the areas have negligible or low ecological function. During ground truthing, no red data or protected species were recorded in the cultivated areas and the probability of such species occurring in the cultivated area is considered low. The Species Status Report from the Mpumalanga Tourism and Parks Agency confirms that there are no plant species of concern on site (see Appendix 1).

Figure 6: Soya beans cultivated on site.

Figure 7: Maize cultivated on site.

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The other area of the proposed site is dominated by Moist Sandy Highveld Grassland. The vegetation comprises short, closed grassland, largely dominated by a *Sporobolus indicus (L)R.Br* often severely grazed by livestock to form a short lawn. The following floral species were recorded scattered in the grassland during ground truthing on the proposed site: *Parthenium hysterophorus L* (Santa Maria), *Hyparrhenia hirta (L) Stapf* (South African bluestem), *Cynodon dactylon (L) pers* (Bermuda Grass), *Olea europaea L.* (Olive), *Populus nigra L.* (Lombardy poplar), *Verbena rigida Spreng.* (Slender vervain), *Artemisia herba-alba Asso* (White wormwood), *Rumex crispus L* (Curly Dock), *Sporobolus indicus (L)R.Br* (Giant Parramata grass), *Stoebe vulgaris* (Slangbos), *Eragrostis plana*, *Eragrostis curvula* (Weeping lovegrass), *Heteropogon contortus* (Poaceae), *Trachypogon spicatus* (Grey-beard grass), *Themeda triandra*, (Red Grass) *Hypochaeris radicata*, *Cirsium ferox (L.) DC (Platte thistle)*, and *Ledebouria ovatifolia* (Flat-leaved African hyacinth).

Figure 8 depicts *Sporobolus indicus (L)R.Br* observed on site during site assessment. No red data or protected species were recorded in the grassland area during the site assessment. The Species Status Report from the Mpumalanga Tourism and Parks Agency confirmed that there are no plant species of concern on site (see Appendix 1). Table 4 depicts plant species recorded scattered in the grassland. In the grassland areas a termitarium was observed (see Figure 9). This shows that the area is still in relatively good condition and is likely to support a diversity of insect species, which include termites. The termitarium should not be disturbed during prospecting activities.

Figure 8: Sporobolus Indicus observed on site.

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Table 4: Plant species recorded scattered in the grassland on site.

Scientific names	Common names
Parthenium hysterophorus L	Santa Maria
Hyparrhenia hirta (L) Stapf	South African bluestem
Cynodon dactylon (L) pers	Bermuda Grass
Olea europaea L.	Olive
Populus nigra L.	Lombardy poplar
Verbena rigida Spreng.	Slender vervain
Artemisia herba-alba Asso	White wormwood
Rumex crispus L	Curly Dock
Sporobolus indicus (L)R.Br	Giant Parramata grass
Cirsium ferox (L.) DC	Platte thistle
Stoebe vulgaris	Slangbos
Eragrostis curvula	Weeping lovegrass
Themeda triandra	Red Grass
Heteropogon contortus	Poaceae
Trachypogon spicatus	Grey-beard grass
Ledebouria ovatifolia	Flat-leaved African hyacinth

Figure 9: Termitarium observed onsite.

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6.2 Alien invasive plants

Declared weeds and invaders tend 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). During ground truthing, several intruder or exotic species were identified on site.

Table 5 lists the intruder or exotic plant species identified on the proposed site. Most of the species identified were on the moist sandy grassland area. Figure 10 depicts one of the invaders or intruders that occur on the proposed site, namely *Salix Babylonica* (Weeping Willow). *Salix Babylonica* (Weeping Willow) was also observed invading wetland areas on a proposed site. The intruders/invaders need to be eradicated on site to improve ecological function of rivers and wetlands as they consume a lot of water.

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

Scientific name	Common name	Endemism
Bidens Pilosa	Blackjack	Invasive
Rumex crispus L	Curly Dock	Invasive
Agave	Agave	Alien invasive
Salix Babylonica	Weeping Willow	Invasive
Populus Nigra L	Lombardy poplar	Invasive
Verbena rigida Spreng	Slender vervain	Invasive
Erigeron sumatrensis Retz	Tall fleabane	Weed

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Figure 10: *Salix Babylonica* observed on site.

6.3 Mammals

During the desktop study, no red data mammal species were found on the proposed site. During site assessment wild animals and domestic animals were observed on site. Domestic animals like cattle, donkeys and horses were observed grazing on site (see Figure 11 and Figure 12). In some areas of the proposed site, farmers harvest fodder for live-stock feeding (see Figure 13). A fox was also observed on site, which indicates that the area is in relatively good condition, and likely to support a diversity of mammal species. The Species Status Report from the Mpumalanga Tourism and Parks Agency confirms that there are no red/protected mammal species on site (see Appendix 1).

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Figure 11: Cattle grazing on site.

Figure 12: Donkeys grazing on site.

Figure 13: Fodder harvested for livestock feeding.

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6.4 Birds

Birds are considered good ecological indicators, since their presence or absence indicate whether the ecosystem is functioning properly or not. Bird communities and ecological condition are linked to land cover, as the types of bird species in the area change when land cover changes. The Species Status Report from the Mpumalanga Tourism and Parks Agency indicate that no red data bird species are present on the proposed site. Only *Eupodotis caerulescens* (Blue Korhaan), a bird species of least concern, was identified (see Appendix 1). During ground truthing, Owl and Corvidae Crows were observed on site, but no red data species were identified. This is due to habitat destruction by cultivation activities on site. Figure 14 depicts Corvidae Crows observed on site and specialised bird habitats/nests are depicted in Figure 15.

Habitat-specific species are sensitive to environmental change, with habitat destruction being the leading cause of species decline worldwide. The identified nest indicates that the area has an ecological functioning and conservation importance of high as it provides birds with roosting sites. Disturbance should not be allowed during prospecting, as it will prevent the area from supporting bird species present in the area. It is widely accepted that vegetation structure, rather than the actual plant species, influences bird species distribution and abundance (Harrison et al., 1997).

Figure 14: Corvidae Crows observed on site.

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Figure 15: Specialised bird habitat.

6.5 Ecological and faunal sensitivity analysis

The wetlands and rivers present on the proposed site were identified during the desktop study. During ground truthing, these wetlands and rivers were observed (see Figure 16). According to the MBSP, most of the proposed site is in sensitive areas (see Figure 17). The area is disturbed due to cultivation and livestock grazing. The wetland and rivers on site are sensitive areas (of high importance) where the ecological impacts would be most significant. All the proposed buffer-zones (as per the wetland assessment report) should be considered to conserve the rivers and wetlands, as they provide water to wild animals, domestic animals, and birds on site.

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Figure 16: A river and wetland observed on site.

Vegetation associated with watercourses were identified during the site assessment along the wetland and river on site. Some of the plant species recorded in this area include *Persicaria maculosa Gray* (Red shank, *Typha angustifolia* (Narrow-leaf cattail) and *Typha latifolia L* (Copper's reed). All the vegetation associated with watercourses in the project area falls in CBAs according to the MBSP (see Figure 17). The suitability of this community for Red Data/protected species is considered low and no red data or protected species was recorded on this area during ground truthing. During prospecting process care should be taken into consideration to avoid unnecessary disturbance of these CBAs.

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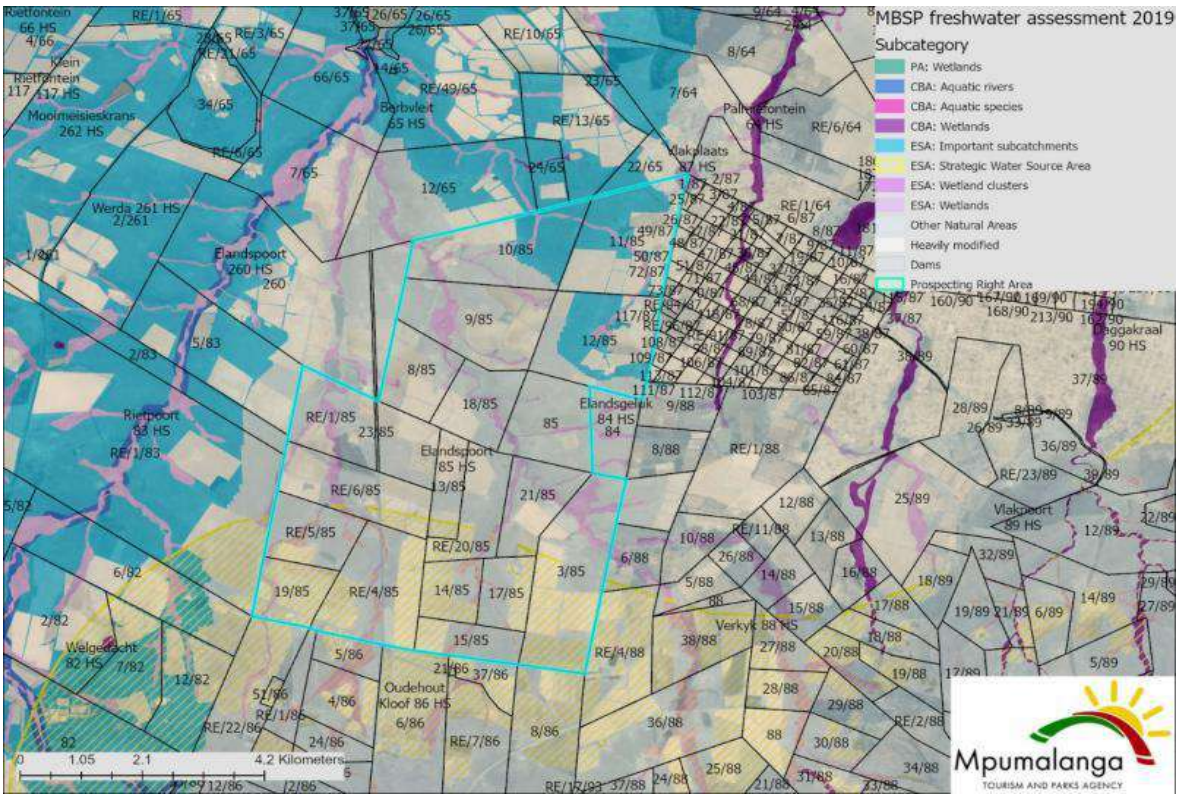

Figure 17: Sensitivity map of the proposed site.

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7 IMPACT ASSESSMENT

7.1 Introduction

The regulations in terms of Chapter 5 of the NEMA requires a description of the potential impacts the proposed development will have on the environment. The following tables present details of the potential impacts of the proposed project activities, as well as the proposed mitigation measures.

7.2 Vegetation species

Table 6: Loss of vegetation and natural habitat due to prospecting.

Impact phase	Prospecting excavation/trenching/drilling phase				
Possible impact	Loss of vegetation and natural habitat				
Type of impact	Direct and indirect impact				
Rating criteria	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**
Calculation	2	4	6	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 • There should be environmental awareness and training before prospecting commences. • No natural and indigenous vegetation areas edge may be cleared/impacted during prospecting. • Areas affected by the proposed prospecting should be minimal and buffer zones that will not be affected must be established. • Use available farm roads to avoid unnecessary disturbance of natural and indigenous vegetation. • An ecologist must supervise the rescue operation to ensure its success. • Disturbed areas must be rehabilitated with indigenous plants as soon as prospecting concludes.					

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7.3 Alien invasive species

Table 7: Introduction of alien invasive species during rehabilitation.

Impact phase	Rehabilitation phase after prospecting 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 • Buffer zones must be established, and strict measures must be implemented to prevent prospecting in these zones. No vegetation clearing should be allowed in these 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. • Only topsoil and excavated materials removed from the prospected site may be used to backfill and rehabilitate impacted areas.					

7.4 Birds

Table 8: Impacts of prospecting on birds and its associated roosting site.

Impact phase	Prospecting excavation/trenching/drilling 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	3	5	8	4	High (61-90)

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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

- Vegetation clearing should be minimized to avoid unnecessary disturbance of bird roosting sites.
- Ensure that there is no disturbance to bird species, nests, breeding sites. Create artificial sites for birds or demarcate the area during prospecting.
- Demarcation should not be removed upon completion of prospecting, as the area will serve as roosting sites for birds.
- Demarcation method to be approved by an Environmental Control Officer (ECO).
- Prohibit activities like trapping, hunting, and killing of birds on site during prospecting.
- Ensure that the *Eupodotis caerulescens* (Blue Korhaan), if identified on site should be protected.
- ECO to conduct regular site inspections and remove any snares or traps erected onsite.
- Employees and contractors should be made aware of the presence of birds and rules regarding suitable induction and on-site signage.
- A conservation-orientated plan should be developed personally for contractors so that there can be a penalty clause for non-compliance.

7.5 Mammals

Table 9: Loss of mammals due to prospecting.

Impact phase	Prospecting excavation/trenching/drilling 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

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Impact mitigation measures
• Pre-prospecting walk to be carried out on site to ensure the absence of mammal habitats. • Hunting weapons are prohibited on site. • Dogs are prohibited on the worksite as they are threats to wild animals. • A low-speed limit should be enforced on site 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 prospecting. • 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 on site. • 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.

7.6 Sensitive areas

Table 10: Impacts of the prospecting on sensitive areas.

Impact phase	Prospecting excavation/trenching/drilling 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	3	5	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					

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- No disturbance in drainage lines, rivers, and wetlands, including prospecting across wetlands and rivers, fill dumping, road construction, and all forms of temporary disturbance.
- Prospecting to be approved by water use license (WUL) and carefully monitored to avoid unnecessary impacts on wetlands/riparian areas (particularly in-stream habitat).
- Storm water and erosion control measures to be implemented and monitored as per EMP to prevent siltation or erosion of sensitive environment identified on site.
- No prospecting 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.

7.7 Potential erosion

Table 11: Potential erosion of the site and its surroundings during prospecting.

Impact phase	Prospecting excavation/trenching/drilling phase				
Possible impact	Potential erosion of the prospecting 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 prospecting. • Restore existing agricultural land contours immediately after prospecting. • Conduct prospecting only on the proposed area. • Implement erosion and storm water runoff management measures according to EMP requirements to prevent erosion on the prospected areas and surroundings.					

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• Backfill excavated trenches immediately with onsite excavated material after collection of samples and capping of drilled boreholes. • Monitor the prospected areas for signs of erosion and implement erosion rectification and prevention measures if required.

7.8 Waste generation

Table 12: Waste generation due to prospecting activities.

Impact phase	Prospecting excavation/trenching/drilling 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 • Proper ablution and storage facilities must be provided on site. • Implement proper Standard Operating Procedures to regulate refuelling and other pollution. • Implement rehabilitation strategy as part of EMP, like a clean-up plan/strategy if spills occur and proper facilities (ablution) to ensure no sewage spills into drainage lines and streams.					

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8 CONCLUSION AND RECOMMENDATIONS

This study aims to provide sufficient transparent and technically robust information on the impacts of prospecting activities to enable informed decision-making by the authorities. The proposed prospecting area has been disturbed before by maize and soya bean cultivation, and livestock grazing. The proposed development will not have a significant impact, because no vegetation or natural habitat will be cleared. No species of concern were observed on site. According to the Species Status Report from the Mpumalanga Tourism and Parks Agency, there are no plant species of concern on site either (see Appendix 1).

Several CBAs, including rivers and wetlands, were observed on site. The identified CBAs have ecological function and high conservation importance. The proposed buffer zones in the wetland assessment report should be considered to conserve these CBAs. Since rivers and wetlands provide water to animals and birds on site, the applicant should not disturb these areas. If drilling must occur in the regulated area, a permit application needs to be lodged with the DWS prior to any disturbance of these areas.

Specialised bird habitats/nests were observed on the proposed site. The area has a high ecological functioning and conservation importance as it provides birds with roosting sites. According to the Species Status Report from the Mpumalanga Tourism and Parks Agency, *Eupodotis caerulescens* (Blue Korhaan) bird species of least concern are present on the proposed site, but was not observed during site assessment (see Appendix 1) The applicant must ensure that bird species are protected if identified by creating artificial sites for birds and not disturbing roosting sites. A fox was observed on site during ground truthing, which indicates that the area is in relatively good condition, and likely to support a diversity of mammal species.

All the sensitive areas must be protected for the services they render to the environment. Proper rehabilitation and after-care of the excavated area must take place to prevent colonisation by invader species. All mitigation measures proposed in this report must be implemented during all phases of the proposed project. It is recommended that the management measures stipulated in this report 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.

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Other specific conclusions and recommendations include:

- All licenses must be obtained prior to prospecting activities.
- All ablution facilities must be placed far away from the streams.
- Avoid highly sensitive areas when placing structures in the prospecting area.
- Implement an alien and invasive management plan, and an emergency preparedness plan for spillages.
- Excavated areas must be rehabilitated to avoid or limit erosion.
- Drilled boreholes must be capped to avoid injuries to animals.

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 prospecting area.

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Appendix 1: Species status report.

Species Status Report Friday, February 04, 2022

Resolution <=100: Map Grid=2729BB: Databse=All

2729BB

Common Name	Scientific Name	Conservation RSA	MTPA	Endemic
Birds				
AMERSFOORT TOWN AND TOWNLANDS 57 HS				
Southern Bald Ibis	Geronticus calvus	VU	VU	RSA
BERGVLIET 65 HS				
Blue Crane	Anthropoides paradiseus	NT	VU	
Blue Korhaan	Eupodotis caerulescens	LC	NT	RSA
Secretarybird	Sagittarius serpentarius	VU	VU	
Southern Bald Ibis	Geronticus calvus	VU	VU	RSA
ELANDSFONTEIN 92 HS				
Rudd's Lark	Heteromirafra ruddi	EN	EN	RSA
ELANDSPOORT 85 HS				
Blue Korhaan	Eupodotis caerulescens	LC	NT	RSA
ENON 61 HS				
Blue Crane	Anthropoides paradiseus	NT	VU	
Blue Korhaan	Eupodotis caerulescens	LC	NT	RSA
Grey Crowned Crane	Balearica regulorum	EN	EN	
LANGBERG 85 HT				
Blue Korhaan	Eupodotis caerulescens	LC	NT	RSA
OUDEHOUT KLOOF 86 HS				
Blue Korhaan	Eupodotis caerulescens	LC	NT	RSA
OUHOUTKRAAL 62 HS				
Blue Korhaan	Eupodotis caerulescens	LC	NT	RSA
PALMIETFONTEIN 64 HS				
Blue Crane	Anthropoides paradiseus	NT	VU	
Grey Crowned Crane	Balearica regulorum	EN	EN	
PALMIETSPRUIT 68 HS				
Denhams Bustard	Neotis denhami	VU	VU	
RIETPOORT 83 HS				
Secretarybird	Sagittarius serpentarius	VU	VU	
ROODEKOPJES 67 HS				
Blue Korhaan	Eupodotis caerulescens	LC	NT	RSA

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Rudd's Lark	Heteromirafra ruddi	EN	EN	RSA
Rudd's Lark	Heteromirafra ruddi	EN	EN	RSA
SCHULPSPRUIT 60 HS				
Southern Bald Ibis	Geronticus calvus	VU	VU	RSA
SCHURVEPOORT 63 HS				

Blue Korhaan	Eupodotis caerulescens	LC	NT	RSA
STERKFONTEIN 93 HS				
Southern Bald Ibis	Geronticus calvus	VU	VU	RSA
VERKYK 88 HS				
Blue Korhaan	Eupodotis caerulescens	LC	NT	RSA
Grey Crowned Crane	Balearica regulorum	EN	EN	
VLAKPOORT 89 HS				
Blue Korhaan	Eupodotis caerulescens	LC	NT	RSA
WITKOPPIES 81 HS				
Bothas Lark	Spizocorys fringillaris	EN	EN	RSA
Bothas Lark	Spizocorys fringillaris	EN	EN	RSA
Fish				
SCHULPSPRUIT 60 HS				
BANO V RSA	Enteromius anoplus - Upper Vaal form		EN/CR	EN
Reptiles				
Homoroselaps dorsalis	Homoroselaps dorsalis	NT	NT	RSA
Smaug giganteus	Smaug giganteus	VU	VU	RSA
BERGVLIET 65 HS				
Smaug giganteus	Smaug giganteus	VU	VU	RSA
Smaug giganteus	Smaug giganteus	VU	VU	RSA
ELANDSPOORT 85 HS				
Smaug giganteus	Smaug giganteus	VU	VU	RSA
OUDEHOUT KLOOF 86 HS				
Smaug giganteus	Smaug giganteus	VU	VU	RSA
Smaug giganteus	Smaug giganteus	VU	VU	RSA
PALMIETFONTEIN 64 HS				
Smaug giganteus	Smaug giganteus	VU	VU	RSA
PALMIETSPRUIT 68 HS				
Smaug giganteus	Smaug giganteus	VU	VU	RSA
RIETFONTEIN 66 HS				
Smaug giganteus	Smaug giganteus	VU	VU	RSA

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RIETPOORT 83 HS				
Homoroselaps lacteus	Homoroselaps lacteus	LC	NT	RSA
Smaug giganteus	Smaug giganteus	VU	VU	RSA
ROODEKOPJES 67 HS				
Smaug giganteus	Smaug giganteus	VU	VU	RSA
Smaug giganteus	Smaug giganteus	VU	VU	RSA
TWEEFONTEIN 97 HS				
Smaug giganteus	Smaug giganteus	VU	VU	RSA
VERKYK 88 HS				
Smaug giganteus	Smaug giganteus	VU	VU	RSA
WELGEDACHT 82 HS				
Smaug giganteus	Smaug giganteus	VU	VU	RSA
WITKOPPIES 81 HS				

Smaug giganteus	Smaug giganteus	VU	VU	RSA
Large Mammals				
KOPPIES KRAAL 56 HS				
Ourebia ourebi ourebi	Oribi	EN	EN	
ROODEKOPJES 67 HS				
Aonyx capensis	Cape clawless otter	NT	NT	
Leptailurus serval	Serval	NT	NT	
Orycteropus afer	Aardvark	LC	LC	
Proteles cristatus	Aardwolf	LC	LC	
Plants				
Boophone disticha	Boophone disticha	LC	LC	NOT
Hypoxis hemerocallidea	Hypoxis hemerocallidea	LC	LC	NOT
AMERSFOORT TOWN AND TOWNLANDS				
Crinum bulbispermum	Crinum bulbispermum	Declining	Declining	FSA
Gladiolus robertsoniae	Gladiolus robertsoniae	NT	NT	SA
BERGVLIET 65 HS				
Eucomis autumnalis	Eucomis autumnalis	Declining	Declining	FSA
ENON 61 HS				
Boophone disticha	Boophone disticha	LC	LC	NOT
Eucomis autumnalis	Eucomis autumnalis	Declining	Declining	FSA
OUDEHOUT KLOOF 86 HS				
Nerine platypetala	Nerine platypetala	VU	VU	SA

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BASIC PROSPECTING RIGHT HYDROGEOLOGICAL STUDY

BASIC HYDROGEOLOGICAL STUDY FOR A PROSPECTING RIGHT AND ENVIRONMENTAL AUTHORIZATION APPLICATION FOR COAL BY BAZIL TECHNOLOGIES (PTY) LTD ON PORTION RE, RE/1, 3, RE/4, RE/5, RE/6, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, RE/20 AND 21 OF THE FARM ELANDSPOORT 85 HS, SITUATED WITHIN THE PIXELY KA SEME LOCAL MUNICIPALITY IN THE GERT SIBANDE DISTRICT MUNICIPALITY, MPUMALANGA PROVINCE, SOUTH AFRICA.

PREPARED FOR

BAZIL TECHNOLOGIES
Building Africa For Difference

PREPARED BY

Singo Consulting (Pty) Ltd

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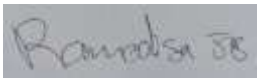
DMRE REF: MP 30/5/1/1/2/ 17127 PR)

2022

Project Information

Report Type	Basic Prospecting Right Hydrogeological Report
Project Title:	Basic Hydrogeological Report for Prospecting Right Application that has been lodged for Coal located on portions RE, RE/1, 3, RE/4, RE/5, RE/6, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, RE/20 and 21 of the Farm Elandspoort 85 PR, situated in the Gert Sibande District Municipality, Mpumalanga Province, South Africa.
Client	Bazil Technologies (Pty) Ltd
Version	1
Date	08 February 2022

Electronic signatures

Compiled By	Bogosi Ramodisa (Hydrogeologist Intern) Singo Consulting (Pty) Ltd	
Reviewed By	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 South African Council for Natural Scientific Professions (SACNASP: Earth Science Reg. No: 400069/16),	

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Report Credentials

Disclaimer:	Copyright:
The results and conclusions of this report are limited to the Scope of Work agreed between Singo Consulting (Pty) Ltd and Bazil Technologies (Pty) Pty for whom this investigation has been conducted. All notions made and all knowledge contained within this report and its attachments hinge on the convenience to and dependability of relevant information, including maps, previous reports and word-of-mouth, from the Client and affected parties. All work conducted by Singo Consulting (Pty) Ltd is done in accordance with the Singo Consulting (Pty) Ltd Standard Operating Procedures.	

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OUTCOMES OF THE INVESTIGATION

- Drilling activity will not be conducted near water resources.
- And all the wetlands, perennial and non-perennial rivers will be buffered, and a 100m buffer will apply.
- Extreme caution will be taken during prospecting, washing of any mechanical equipment or vehicles will be allowed near the water resources.
- Water samples will be taken from selected the exploration boreholes by using approved sampling techniques and adhering to recognized sampling procedures. Samples should be analysed for both organic as well as inorganic pollutants, as mining activity often led to hydrocarbon spills in the form of diesel and oil.
- The core of exploration boreholes will be cleared from the ground immediately after logging by the geologists to prevent washing and leaching to the water resources during rainfall.
- After prospecting, rehabilitation of the disturbed area will take place.
- The numerical model will be recalibrated as soon as more hydrogeological data such as monitoring holes are made available. This would enhance model predictions and certainty.
- Absorbent Spill kits will be made available near the drill rigs during drilling activities.

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1 INTRODUCTION

1.1 Background information

Bazil Technologies (Pty) Ltd has appointed Singo Consulting (Pty) Ltd to conduct a basic hydrogeological research for the Prospecting Right Application for Coal Prospecting on the Farm Elandspoort 85 HS in Gert Sibande District Municipality, Mpumalanga Province.

This report is not intended to be a comprehensive description of the proposed project; rather, it is being prepared as a preliminary geohydrological research to assess the geohydrological impact of prospecting activity on the environment.

1.2 Project location

A locality map created by QGIS software illustrates detailed and comprehensive information regarding the surrounding settlements and infrastructure of the proposed project area. The proposed project area is on the farm Elandspoort 85 HS which is approximately 12 km south of Amersfoort and approximately 20 km north of Volksrust and west Daggakraal.

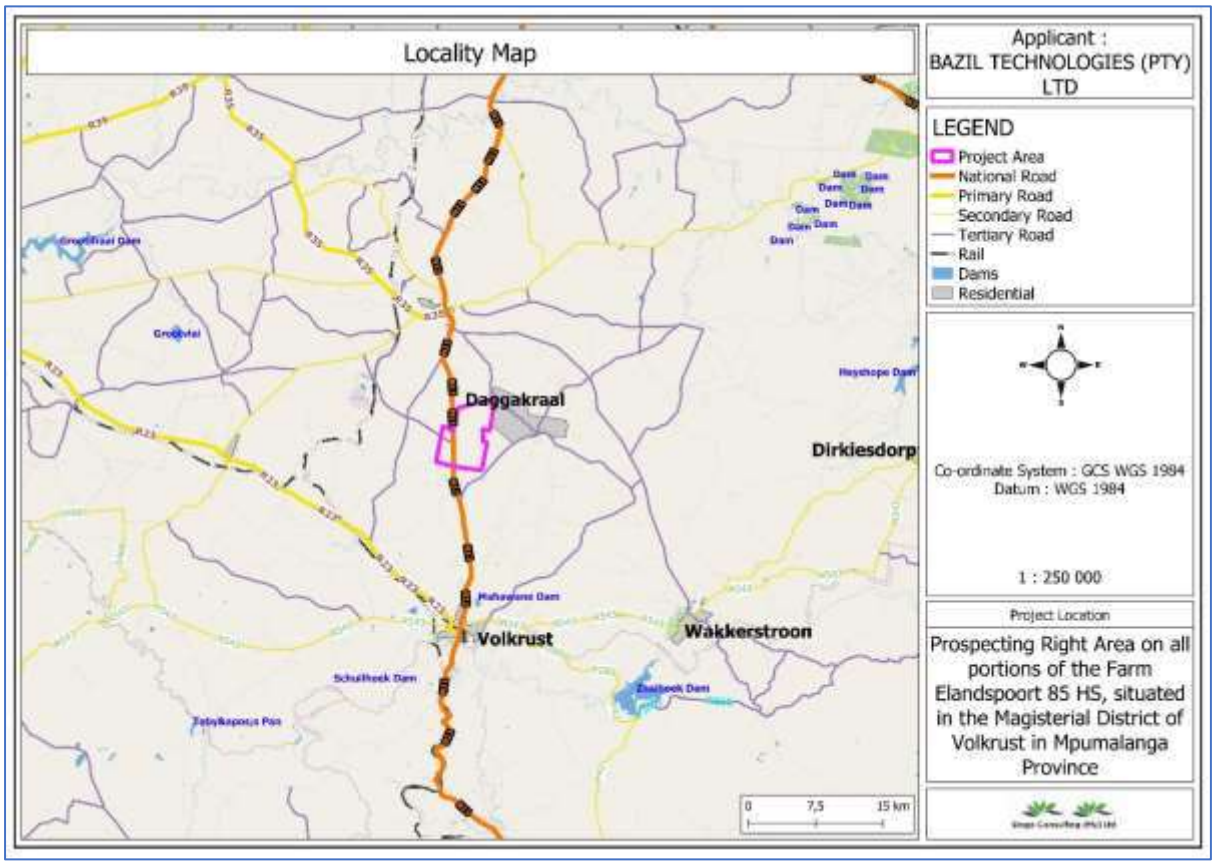

Figure 1: Locality map of the proposed project.

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2 GEOHYDROLOGICAL SETTING.

2.1 Topography and drainage

The study of the shape and properties of land surfaces is known as topography. The topography of a region can be a description of the surface shapes and features, or it can be a description of the surface shapes and features (especially their depiction in maps). Topography is a branch of geology and planetary science concerned with local detail in general, covering not only relief but also natural and man-made characteristics, as well as local history and culture.

As indicated in Figure 2, the proposed prospecting area is characterized by steep slopes and the project area have mountains or hills. On the topography map shown below, you can see this. The flow of water during rainy seasons flows from the area of high elevation to the area of low elevation as it is indicated by contour lines.

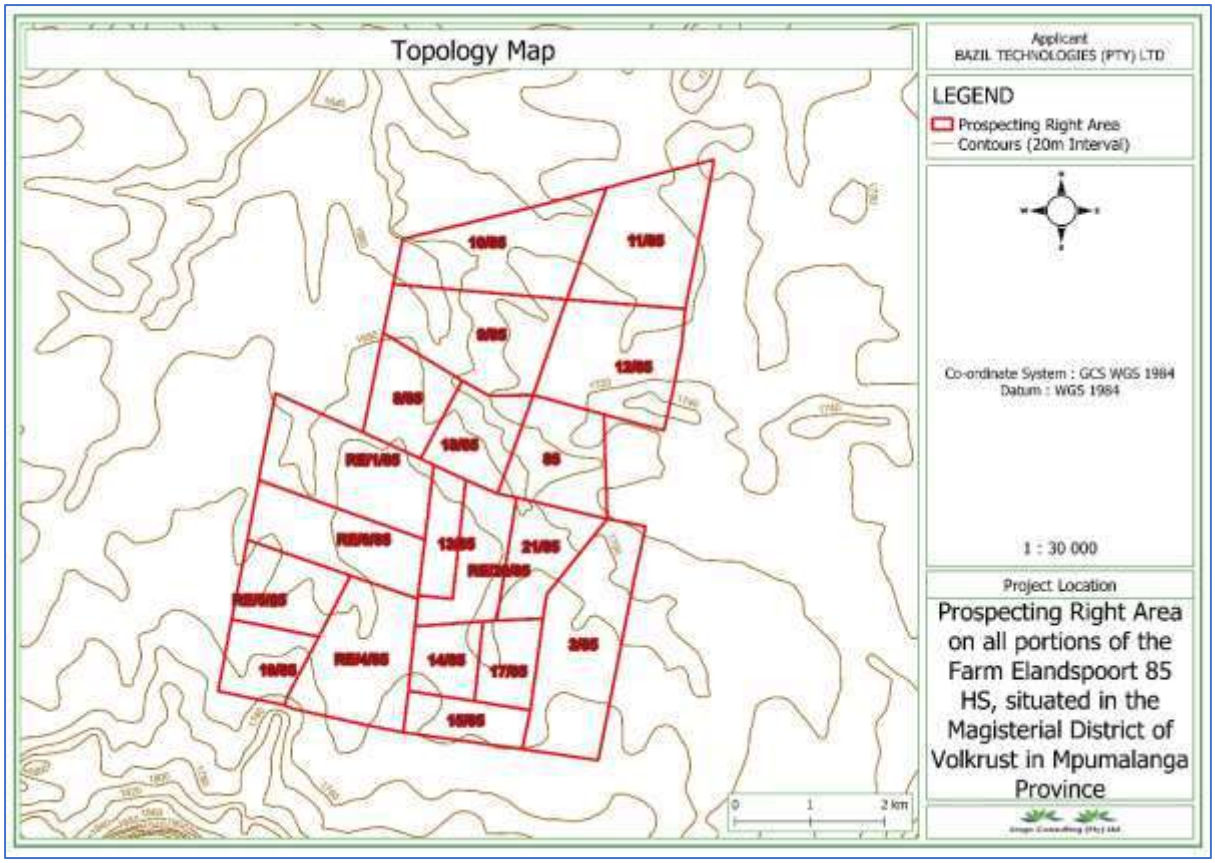

Figure 2: Topology within the project area.

The hydrology surrounding the proposed area is of vital importance. In this context hydrology is all the surface waters appearing within and nearby the proposed project area, where a

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potential to be impacted upon by the project exist. The hydrology map, illustrates that the following water bodies exists within and nearby the project area:

- Channelled valley-bottom wetland
- Perennial river
- Non-perennial river
- Depression
- Seep

These are valuable natural water resources that should not be harmed by human activity. There will be procedures and guidelines put in place for this project if prospecting right poses a risk to them in order to conserve the water resources in this area and achieve effective water conservation. During dry seasons, when water percentages in water bodies are unusually low, the prospecting right will be exercised. Drilling will not take place near these water resources; instead, exploratory geologists will be directed to drill and sample away from the site's rivers and wetlands. As shown in Figure 4, a 100m buffer will be applied around the water bodies present within the prospecting right area.

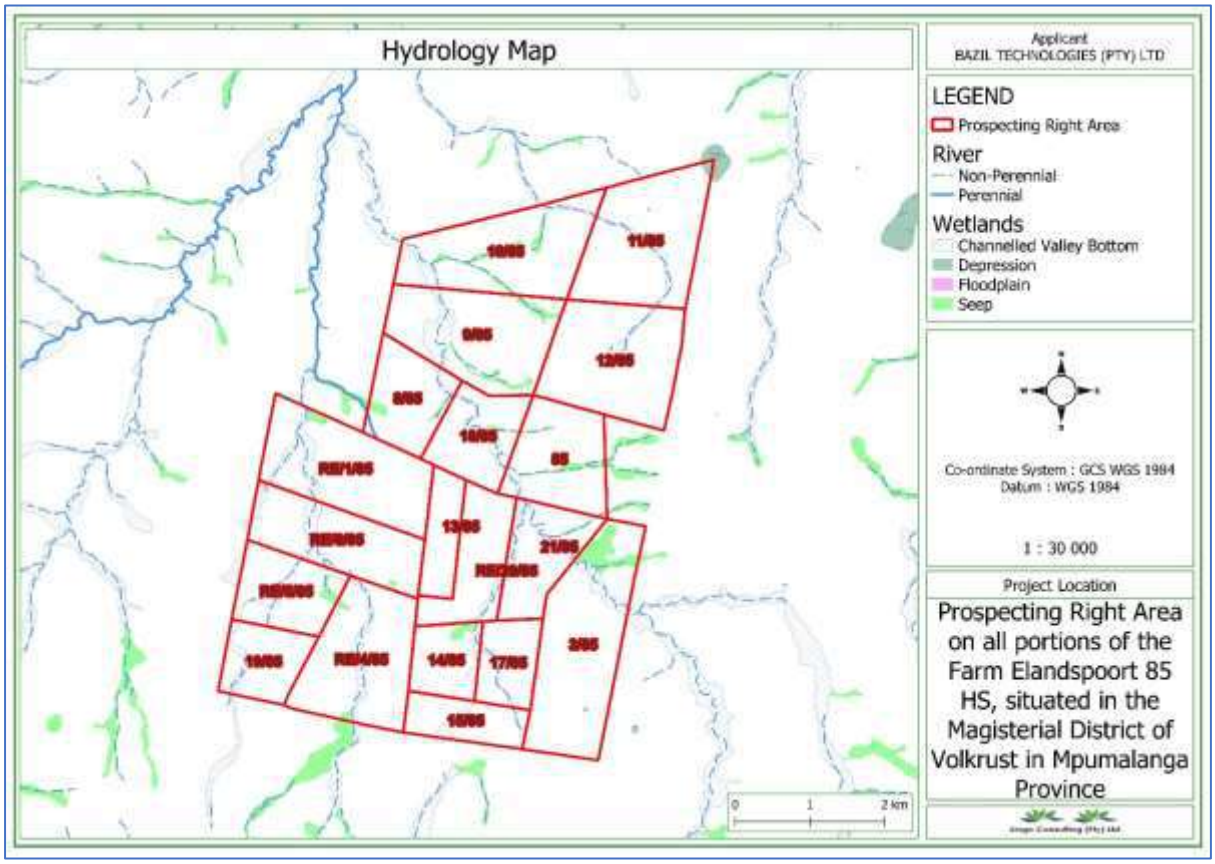

Figure 3: Hydrology of the prospecting right area.

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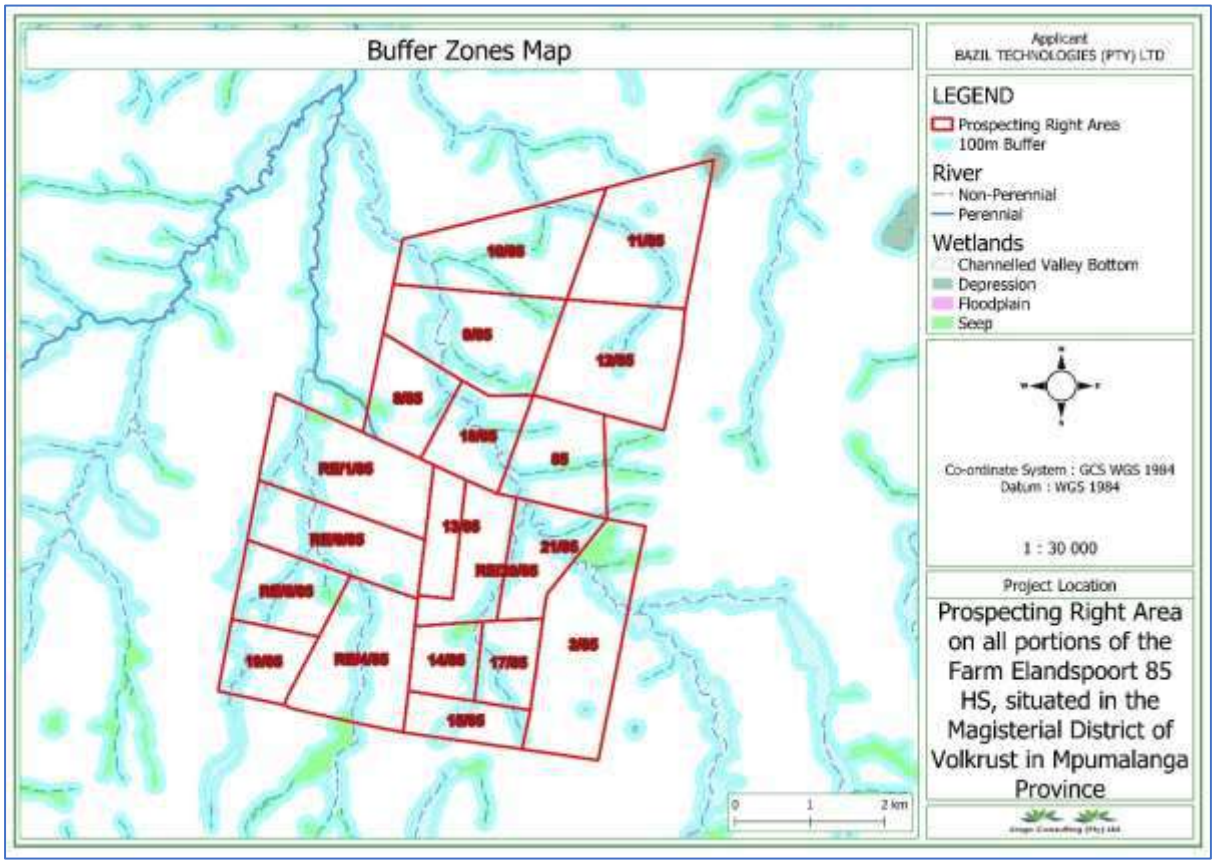

Figure 4: A buffer of the prospecting area.

2.2 Climate

The Köppen-Geiger climate classification of Gert Sibande District is Cwb. The average annual temperature of Gert Sibande District is 15.7 °C. According Figure *5*, the mean annual rainfall is between 601 – 800 mm. The driest month is July with precipitation of 6 mm. January is the month were most precipitation falls in with an average of 200 mm. December is the warmest month with an average of 20.5 °C. July has the lowest temperature of the year were by the average temperature is 9.5 °C. The precipitation of 149 mm varies between the driest and the wettest months. The average temperatures vary during the year by 9.7 °C.

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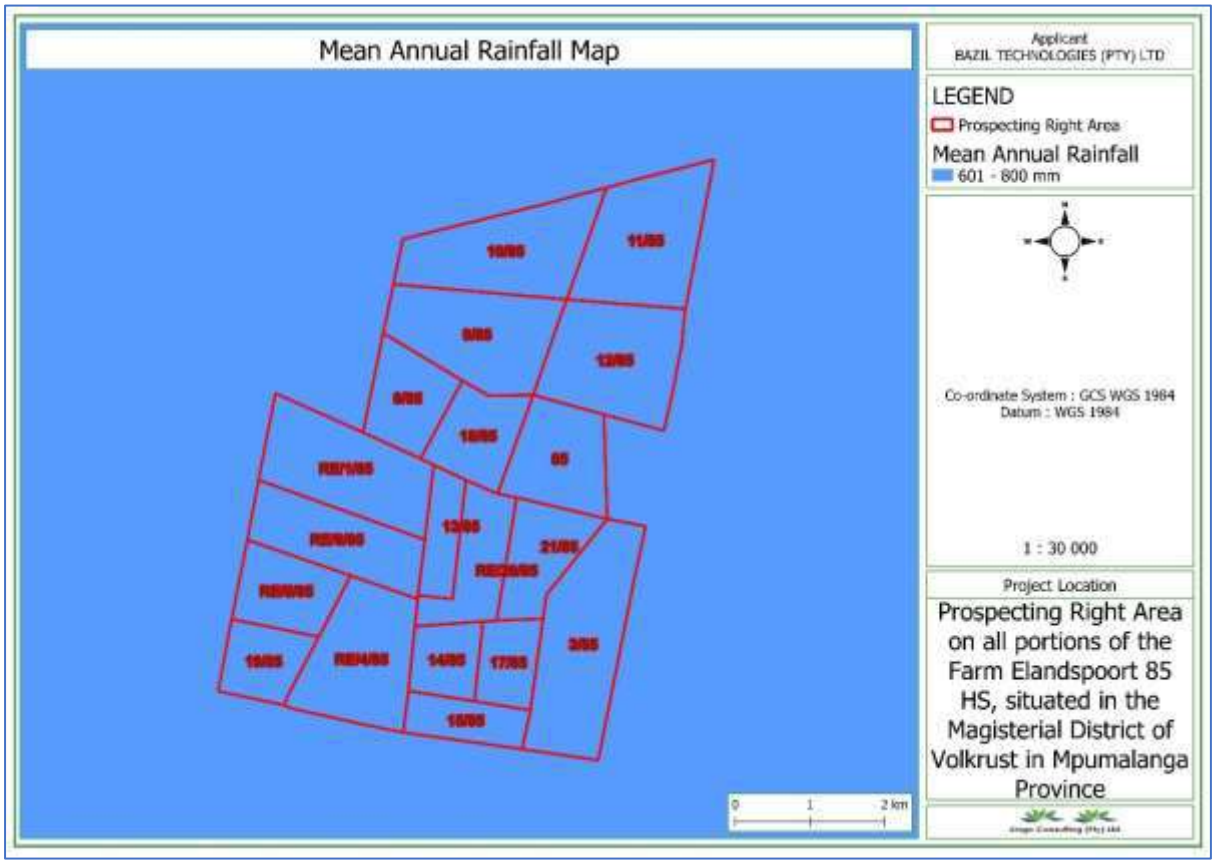

Figure 5: Annual rainfall map.

2.3 Catchment Description

The regional hydrological setting of the project site is indicated in Figure 6. The project area is in the Vaal Management Areas (WMA). The quaternary catchment of the project area is C11E. The WR2012 study, presents hydrological parameters for each quaternary catchment including area, mean annual precipitation (MAP) and mean annual runoff (MAR). Based on the WR2012 study, the project area falls within the quaternary catchment of C11E. The total catchment area of C11E is 1157 km^2 with MAP of 697 millimetre (mm).

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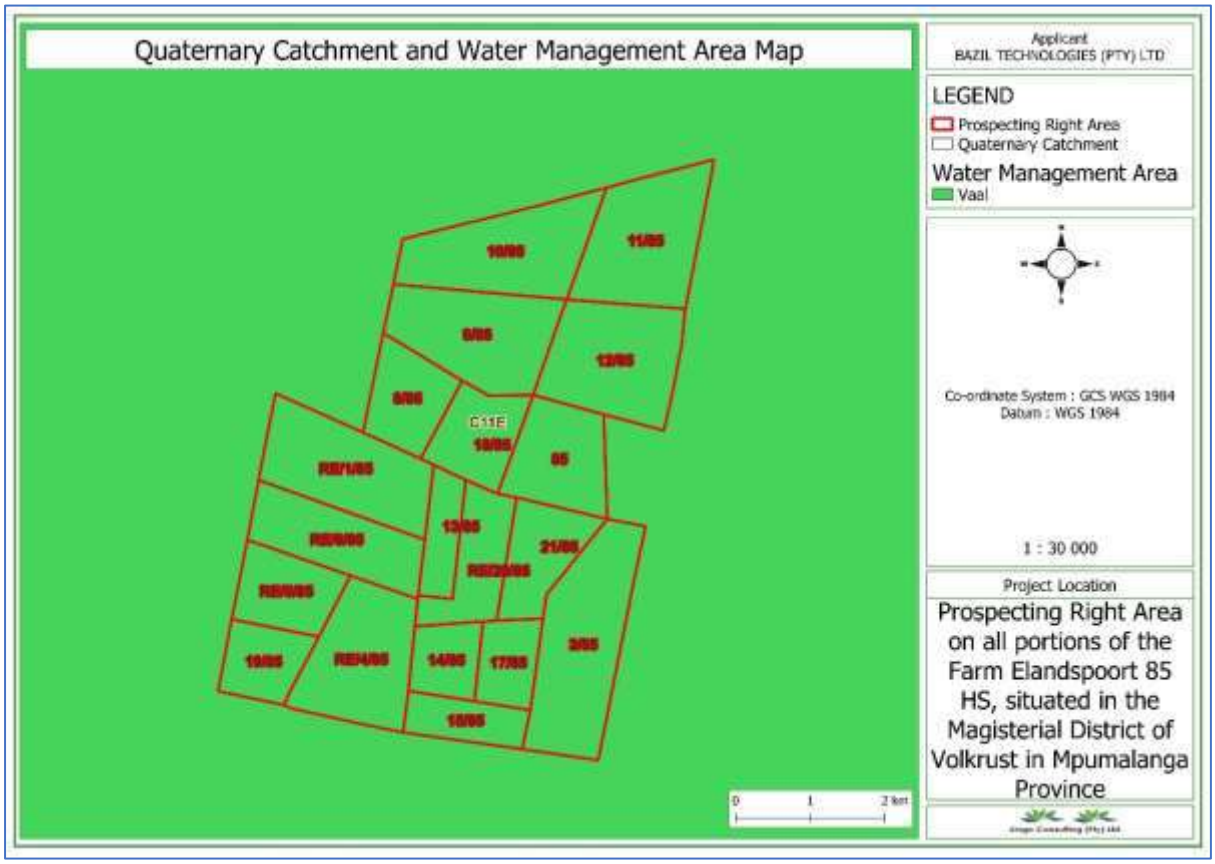

Figure 6: Quaternary catchment map of the project area.

3 SCOPE OF WORK

The following assignments were completed for this hydrogeological study:

1. 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.

2. Hydrogeological Modelling

- Numerical Groundwater Flow and Transport Model
  - Model inputs
  - Model Calibration
  - Scenario Modelling

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- Hydrogeological Impact Assessment
- Use the model to predict potential mining impacts on the shallow and deep groundwater flow systems, groundwater seepages and spring discharges.

3. Reporting

Creating a detailed geohydrological report that summarizes all of the findings and existing conditions in the project region. The techniques, findings, quantitative analysis (geochemical assessment and modelling outcomes), impact assessments, suggestions (suggested monitoring program and recommended mitigation strategies for expected impacts), and conclusions are all included in this groundwater specialist report. According to the Standard Guide for Documenting a Ground-Water Flow Model Application, the conceptual and numerical model creation, simplifying assumptions, and outcomes of predictive simulations are documented (ASTM, 2006).

4 METHODOLOGY

4.1 Desktop study

A literature study of all available relevant data was performed to provide additional data where required. Data sourced from the literature study was incorporated into the entire research report and referenced accordingly. Data was sourced from: science literature (journals, textbooks, reports, maps etc.), GIS data available to the author from Singo Consulting (Pty) Ltd, DWS, SAWS weather station records and available relevant scientific work performed on the study area. A detailed list of all the sources of the literature incorporated into the research report is provided in the reference list.

4.2 Hydrocensus

The major goal of the Hydrocensus is to collect all accessible groundwater data, such as counting the number of boreholes, recording their names, conditions, and coordinates, and measuring water levels. This aids in determining the study area's baseline groundwater use and users. To gather a representative population of boreholes in the area, a complete hydrocensus will be undertaken on and around the site within a 2km radius of the project area. All accessible information about boreholes and borehole owners will be collected and recorded during the Hydrocensus.

4.3 Drilling and sitting of boreholes.

At various places throughout the proposed project area, exploration boreholes will be bored one at a time. The drill hole depths will average 100 m and will be determined onsite as the

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drilling program progresses, based on the depths and dips measured in previous holes. A 100-meter buffer will be maintained between specified wetlands and waterways. From public roads, a 100-meter buffer shall be maintained.

Drilling will take place after the drill site has been gated off, cleared, and drilled. Drilling will be followed by immediate rehabilitation. After each hole is drilled, the site will be rehabilitated before the drilling crew moves on to the next planned hole. This process will continue until all of the holes have been drilled.

4.4 Groundwater modelling

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. The chosen software is MODFLOW.

4.5 Groundwater availability assessment

The fractured aquifer system (from 15 to 40 meters) under the weathered zone is well cemented and does not enable significant water flow. As a result, all groundwater movement occurs along secondary features in the rock, such as fractures, cracks, and joints. Sandstone and quartzite have the best development of these structures, which explains why the latter rock type has better water yielding qualities.

Except when worn, dolerite sills and dikes are largely impervious to water movement. The fractured aquifer always has higher salt loading than the upper worn aquifer in terms of water quality. A prolonged contact time between the water and the rock is responsible for the increased salt concentrations (IGS, 2008).

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5 BASELINE INFORMATION

5.1 Geology

5.1.1 Regional geology

The basal Stratigraphy of the Karoo Supergroup comprises the Dwyka Group which is a Late Carboniferous to Early Permian (~320Ma) sequence of glacial and periglacial sediments including diamictite, till moraine, conglomerate, sandstone, mudstone and varved shale. The Dwyka group is overlain by the Ecca Group which is an Early to Late Permian (~260 Ma) sequence composed of sandstone, siltstone, mudstone, and large deposits of coal seams deposited in a terrestrial basin on a gently subsiding shelf platform. In the surrounding Witbank Coalfield areas, the Ecca Group is overlain by the Beaufort Group, which is Early Triassic (~260 to 210 Ma), comprising multi-colored mudstone and sandstone with only minor coal accumulation, and was deposited in a fluvial environment.

The Molteno Formation rests unconformably on the Beaufort Group and comprises Late Triassic (~210 Ma) coarse, immature sandstone with minor argillaceous layers derived from braided streams. This in turn is overlain by the Elliot Formation consisting of red mudstone and sandstone and the Clarens Formation comprising Aeolian sandstone. At the top of the Karoo Supergroup stratigraphy is the Drakensburg Group, which comprises Early to Middle Jurassic (~180 Ma) flood basalts.

According to the 2628 East Rand 1:250 000 geology series map the site is situated on Permian (245 000 – 290 000 million years) sandstone, shale and coal beds of the Vryheid Formation of the Ecca Group, and Karoo Supergroup. Jurassic (145 000 – 208 000 million years) dolerite sills intruded into the older sediments through vertical feeder dykes. Quaternary surficial deposits of alluvium and ferricrete can be found throughout the surrounding area.

The Ecca Group, which is part of the Karoo Supergroup, comprises of sediments deposited in shallow marine and fluvial-deltaic environments with coal accumulated as peat in swamps and marshes associated with these environments. The sandstone and coal layers are normally reasonable aquifers, while the shale trends to act as aquitards. Several layered aquifers perched on the relative impermeable shale are common in such sequences. The Dwyka Formation comprises consolidated products of glaciations (with high amounts of clay) and is normally considered have impermeable qualities. The general horizontally disposed sediments of the Karoo Supergroup are typically undulating with a gentle regional dip to the south. The extent of the coal is largely controlled by the pre-Karoo topography.

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Abundant dolerite intrusions are present in the Ecca sediments. These intrusions comprise sills, which vary from being concordant to transgressive in structure, and feeder dykes. Although these structures serve as aquitards and tend to compartmentalize the groundwater regime, the contact zones with the pre-existing geological formations also serve as groundwater conduits. There are common occurrences of minor slips or faults, particularly in close proximity to the dolerite intrusions. Within the coalfield, these minor slips, displacing the coal seam by a matter of 1 to 2 meters, are likely to be common in places.

Beaufort Group sediments were deposited in an intracratonic basin receiving detritus from a source area located to the south and west (Ryan 1967, Martini 1974, Turner 1975). Sedimentation was initiated by source area uplift (especially in the south), possibly due to collision between two lithospheric plates reproducing a cordilleran type orogenic event as predicted by modern plate tectonic theory (Dewey and Bird 1970) . The sediments consist mainly of mudstones, siltstones and sandstones, and along the southern margin of the basin they have been caught up in the Cape Orogeny and extensively folded. Northwards the folding decreases in intensity and dies out completely on approaching the northern boundary of the study area where the sediments are flat-lying.

The Beaufort Group lies conformably on the Ecca Group, the contact between them records a gradual change from a deltaic depositional system to a fluvial depositional system in response to source area uplift and the northward progradation of Beaufort sediments, accompanied by a gradual shallowing and shrinkage of the Ecca Basin in the same general direction. Thus argillaceous sediments assigned to the Ecca Group in the northern part of the basin may be the time equivalent of the Beaufort Group in the south (Turner 1978) and the boundary on a basinwide scale must be diachronous.

The Ecca-Beaufort boundary is generally defined and mapped on the basis of the first occurrence of red and purple mudstones characteristic of the Beaufort Group. Unfortunately this definition cannot be applied in many areas because of the sporadic distribution of red and purple mudstones in the lower part of the Beaufort succession, as pointed out by Ryan (1967). A more reliable and accurate indication of the boundary is the presence of thick, laterally persistent sandstones of delta front origin that Johnson (1976) included in his Waterford Formation at the top of the Ecca Group. These sandstones can be distinguished from those in the Beaufort on the basis of their internal structure (presence of deformation structures and lack of cross-bedding), coarsening-upwards as opposed to fining-upwards grain-size trends, and the interbedded shales, which are generally darker, more carbonaceous and better laminated than the argillaceous rocks in the Beaufort Group.

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5.1.2 Local geology

Karoo Dolerite Suite

The Karoo Dolerite Suite Represents a network of dykes and sills which occur as feeders or tongues to the flood basalt province (Walker and Poldervaart, 1949) and are best developed in the main Karoo Basin. The rocks of the Karoo Supergroup were pervasively intruded by these dolerite sills and dykes, central ring complexes (Eales et al., 1984; Galerne et al., 2008) and saucer-shaped sheets (Duncan and Marsh, 2006), contemporaneous with and immediately followed the eruptions of the Drakensberg lavas, as determined by cross-cutting relations (Mountain, 1968; Walker and Poldervaart, 1949). Multiple dolerite intrusion events occurred in the Karoo, Both predating and postdating the flood basalts (Erlank, 1984; Mountain, 1968; Walker and Poldervaart, 1949), therefore making it nearly impossible to associate them with any single intrusive or tectonic event (Chevallier and Woodford, 1999; Duncan and Marsh, 2006; van Zijl, 2006a).

Sills and sheet intrusion in the Karoo range from a few meters to 200m thick (Duncan and Marsh, 2006; Walker and Poldervaart, 1949) and often cap hills with underlying sedimentary strata. Some sheet intrusion dip almost vertically and may be termed dykes. The true dykes however, are typically up to 10m wide and extend 5 – 30 km along the strike (Duncan and Marsh, 2006). Generally dykes are unrelated to sills (Eales et al., 1984) many dykes appear to have intruded after the sills and sheet intrusions , as revealed by cross-cutting relationships (Walker and Poldervaart, 1949) and resistivity studies (van Zijl, 2006b). Central ring complexes are often interpreted as sites of original volcanic activity (Eales et al., 1984).

The approximate trend of the dykes in the central and eastern Karoo is between north and northwest with subordinate trends at roughly right angles (Walker and Poldervaart, 1949). In the western Karoo, dykes and sills form complex, interconnected and anastamosed system along with discordant sheets and saucer-shaped intrusions (Chevalier and Woodford, 1999). In several areas in the Karoo Basin, the dykes are concentrated in swarms and some have been identified as feeder system to the overlying lavas (Eales et al., 1984) However, the majority of the dykes do not show strong preferred orientation (Duncan and Marsh, 2006).

Volksrust Formation

The Volksrust Formation is a predominantly argillaceous unit, which interfingers with the overlying Beaufort Group and underlying Vryheid Formation. Where the latter pinches out towards the southwest the Volksrust merges with the Tierberg Formation in the northern outcrop area or with the Pietermaritzburg Formation in the undifferentiated Ecca Group in the southeast. Drilling has shown that it reaches a thickness of 380m about 120km northeast

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of Bloemfontein, thinning to 250 m in the east (Taverner-Smith et al., 1988) and to 100 m towards the northern margin of the basin.

The Formation consists of grey to black, silty shale with thin, usually bioturbated, siltstone or sandstone lenses and beds, particularly towards its upper and lower boundaries. Thin phosphate and carbonate beds and concretions are relatively common. A shallow water shelf environment has been proposed (Smith et al., 1993), with the upward-coarsening transition into the Beaufort Group representing a prodelta and distal delta front environment (Cadle and Hobday, 1977; Visser and Loock, 1978).

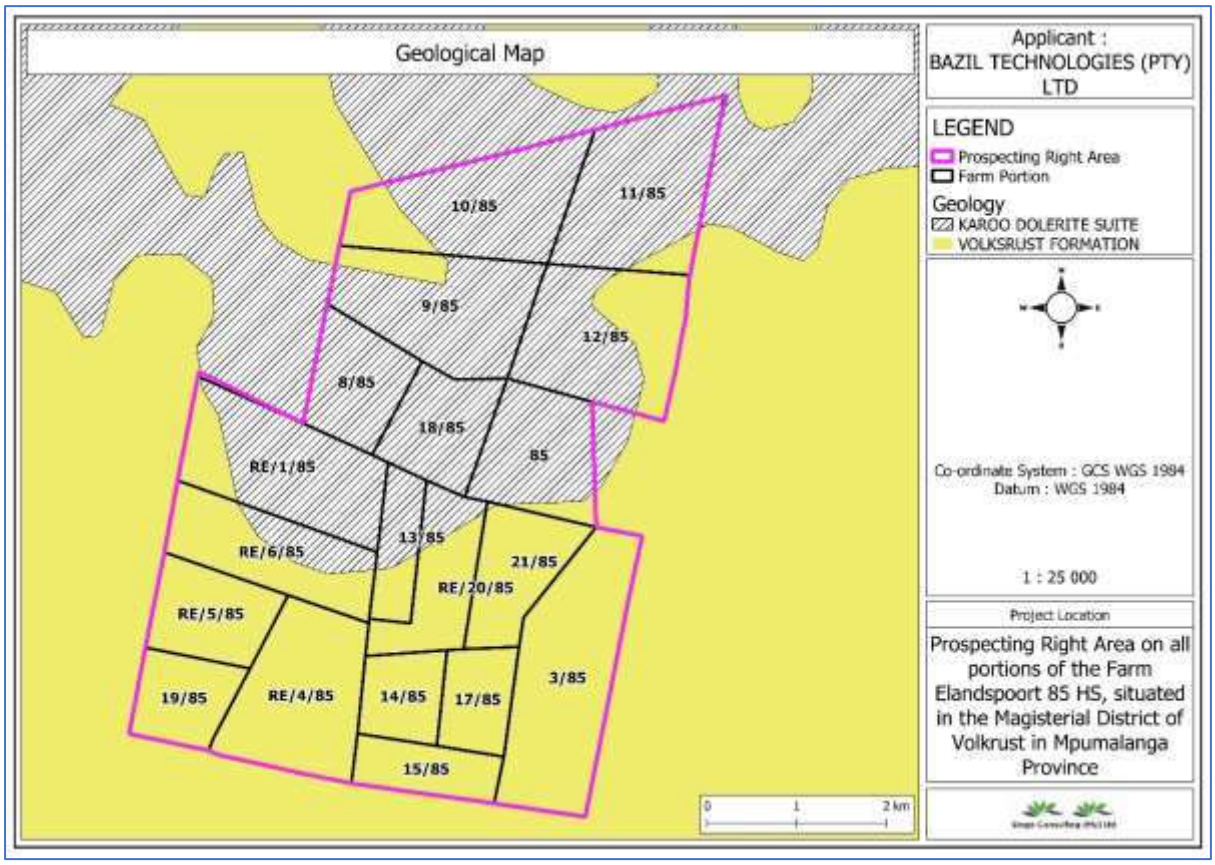

Figure 7: Geology of the prospecting right area.

5.3 Hydrogeology

Typically, five distinct aquifer types:

- Basement (fractured Achaean-Proterozoic igneous/ metamorphic)
- Hard rock (e.g., Table Mountain TMG, Waterberg and Natal Groups sandstone; fractured)
- Karst/ dolomite (dissolution)
- Karoo (fractured and influenced by dykes)

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- Porous (intergranular Quaternary alluvial, coastal, Aeolian and other surficial unconsolidated deposits)

The study area falls under **the Karoo (fractured and influenced by dykes)**. For effective borehole yields, the boreholes must target the fracture zones in this area.

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
- 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. Groundwater potential is generally low in these rocks, with 87% of borehole yields < 3 l/s.

The lithologies of siltstone, shale, sandstone, and coal seams make up the fractured Karoo aquifer. The pores of the geological units are generally strongly cemented, and fractured flow over secondary structures such as faults, bedding plane fractures, and so on is the primary flow mechanism. Due to the establishment of cooling joints, the intrusion of dolerite dykes and sills into the fractured aquifer has resulted in the formation of preferential flow routes along the contacts of these lithologies. The dykes may operate as permeable or semi-permeable barriers to prevent water from flowing across them.

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 characterized by high fluoride levels which limits exploitation of this aquifer in

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combination with the general low yields, deep (expensive) drilling and the low recharge (Grobbelaar et al, 2004). Mining of the coal seams has resulted in the introduction of an artificial aquifer system which generally dominates the groundwater flow on a local and regional scale. Below is a summary of the geohydrological system.

5.4 Potential contaminants

Because this activity will only take place for a brief period of time, the possible pollutants for coal prospecting are limited and can be easily handled. Hydrocarbon-related pollutants are most likely to be found in fuel and oil handling facilities. Spills and leaks of oils, grease, and other hydrocarbon products (such as petrol and diesel) handled in these areas may pollute the environment (e.g., from drill rigs).

During drilling activities, absorbent spill kits will be accessible near the drill rigs (see Figure 8). The oil absorbent chemicals will ensure that no oils infiltrate into the groundwater, causing contamination.

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Figure 8: Examples of Absorbent spill kit to be used.

6 AQUIFER CLASSIFICATION

Aquifer categorization in various parts of South Africa is depicted in the diagram below. The project region indicated by the red arrow is thought to be made up of minor aquifers, with surface water being the primary supply of water. When a region is described as having minor aquifer, it signifies that the aquifer is either moderately producing aquifer of acceptable quality or a high yielding aquifer of poor-quality water, as shown in Table *1*.

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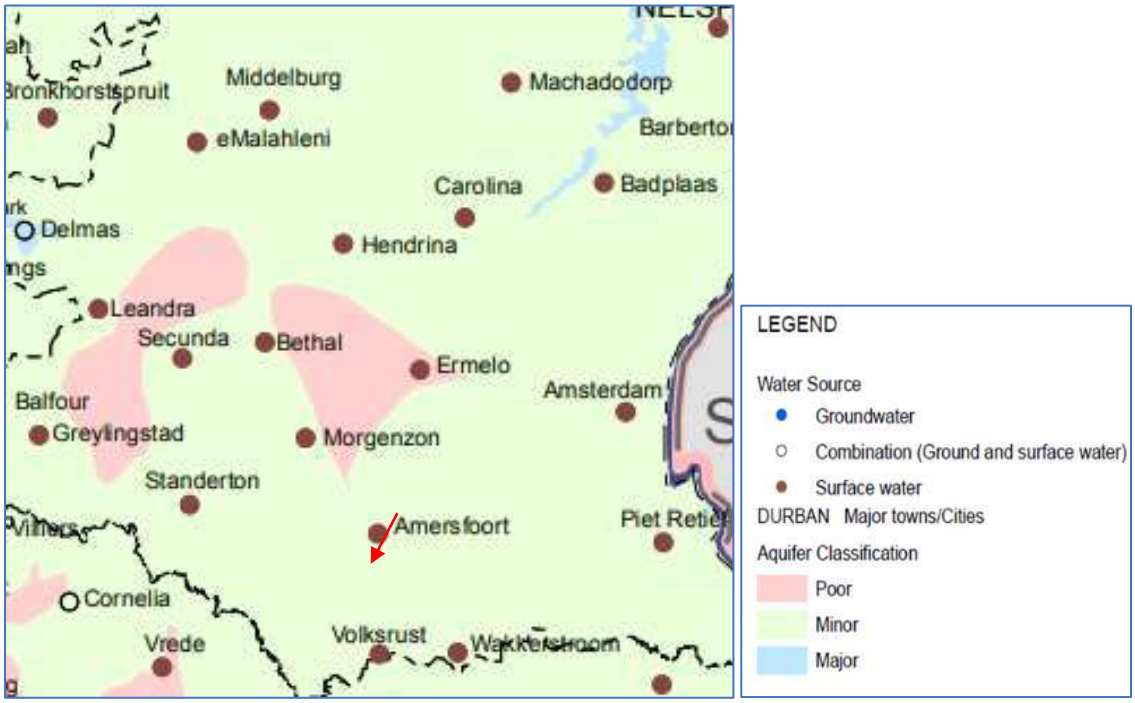

Figure 9: Aquifer classification of South Africa.

Table 1: 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 utilized 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 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.

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7.3 Groundwater elevation and gradient

- Constant head boundary conditions on west and east boundaries
- Single layer aquifer of 30 m thickness
- Hydraulic head of 10 m along western boundary and 30 m along the eastern boundary
- Uniform hydraulic conductivity of 0.001 m/d

7.4 Groundwater sources and sinks

Following the characterization of the aquifers, contaminant sources and groundwater receptors, the conceptual model was transformed into a numerical model 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.

- The **sources** represent any entity that contributes to the groundwater quantity and/or quality
- The **pathways** are the aquifers through which the groundwater and contaminants migrate 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.

Table 2: Possible source, pathways and receptors.

Potential Sources	Pathways	Receptors
Fuel & hydrocarbon spills Core-Drilling	Vadose zone Groundwater Sediment erosion	Aquatic life Terrestrial Wildlife Vegetation Humans

8 GEOHYDROLOGICAL IMPACTS

During the prospecting phase of Coal, the following impacts are envisioned:

- Clearing of vegetation leading to increased runoff and less infiltration.
- Diesel and oil spillages from the drill rig

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- Increase in volume of contaminated water that needs to be managed within the footprint.
- Erosion of stream banks as a result of crossings and diversions leading to siltation of the stream

During the prospecting period, the following management measures will apply:

- All spillages will need to be cleaned up as soon as practically possible.
- Providing spill absorbing material
- All equipment utilizing hydrocarbons will be stored on a hard-standing surface.
- Vehicles and machinery will be maintained in good order to minimize leakages.

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Table 3: Groundwater impact assessment.

Prospecting right impact assessment table						
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Department: Land and water division						
Risk Assessment						
Potential environmental impact	**Cause of the impact**	**Recommended measures/remarks for mitigation**	**Impact risk before mitigation**	**Impact risk after mitigation**	**Responsible person(s)**	**When mitigation should be implemented**
Fuel & hydrocarbon spills	Drill rig, trucks, and cars	Clean up immediately after accidental spills & Divert run-off from highways that may contain hydrocarbons. Providing spill absorbing material All equipment utilizing hydrocarbons will be stored on a hard-standing surface. Vehicles and machinery will need to be maintained in good order to minimize leakages.			The project management team	During the prospecting activities
Aquifer contamination	During drilling exploration boreholes	• Install casing and rehabilitate the exploration boreholes • Take water samples from the drilled boreholes			The project management team	After drilling
Clearing of vegetation leading to increased runoff	During pegging, and preparation of the drilling yard	• Rehabilitate the site by using a hoe to dug the compacted soil or a tractor.			The project management team	After pegging and drilling

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and less infiltration						
Surface water contamination	• Washing of working equipment machinery • Using water from the river to operate the drill rig	• Avoid drilling near surface water • Do not wash equipment and vehicles at or near water bodies • Conduct prospecting during dry seasons when the water percentages in wetlands and rivers are very low • All the wetlands and rivers will need to be buffered as no go area			The project management team	During prospecting period
Erosion of stream banks as a result of crossings and diversions leading to siltation of the streams	During prospecting activities like logging and sampling	Do desktop study and avoid working near the water bodies			Prospecting team	During the prospecting phase
Soil compaction	During constructing gravel roads to access the site	Rehabilitate these roads by digging with tractors and ploughing vegetation			The project management team	After the prospecting phase
Water and soil contamination	Core logging	The core logs of boreholes with mineral of interest should be cleared from the ground immediately after logging by the geologists to prevent washing and leaching to the water resources during rainfall			The project management team	After the prospecting phase
Impact Classification						
Low environmental Impact.		Medium environmental Impact		High	Very High environmental impact	

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		environmental impact	

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9 CONCLUSIONS AND RECOMMENDATIONS

It may be determined that the prospecting activity will have a low impact on water resources because mitigation measures will be strictly undertaken before the project begins. During dry seasons, when the water percentages in the neighboring streams are very low, the prospecting right activity will take place. Drilling will not take place within 100 meters of waterways, and exploratory geologists will be instructed to drill and sample more than 100 meters away from rivers and wetlands on the property. During drilling, the exploration boreholes will be cased, and the boreholes will be appropriately rehabilitated by cap sealing the borehole after drilling.

Due to the river and various wetlands inside and around the project area, extreme caution will be exercised when prospecting. There will be no washing of mechanical equipment or automobiles near water supplies. Rivers and wetlands will be designated as no-go zones with a 100-meter barrier. The project area is located within the Vaal Management Areas (WMA), and its quaternary catchment is C11E. The geologists will clear the core logs of boreholes with mineral of interest from the earth soon after logging to prevent washing and leaching into the water resources during rainfall. During drilling operations, absorbent spill kits will be placed around the drill rigs.

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PROSPECTING RIGHT HYDROLOGICAL STUDY

BASIC HYDROLOGICAL REPORT FOR PROSPECTING RIGHT APPLICATION FOR COAL ON PORTIONS RE, RE/1, 3, RE/4, RE/5, RE/6, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, RE/20 & 21 OF THE FARM ELANDSPOORT 85 HS, WHICH IS SITUATED WITHIN THE PIXLEY KA SEME LOCAL MUNICIPALITY UNDER GERT SIBANDE DISTRICT MUNICIPALITY, MPUMALANGA PROVINCE.

2021

PREPARED FOR

BAZIL TECHNOLOGIES

PREPARED BY

Singo Consulting (Pty) Ltd

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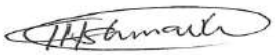
DMRE REF NO: MP 30/5/1/1/2/ 17127 PR

Project Information

Report Type	Basic Prospecting Right Hydrological Report
Project Title:	Basic hydrological report for Bazil Technologies (Pty) Ltd prospecting right application for Coal on portions RE, RE/1, 3, RE/4, RE/5, RE/6, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, RE/20 & 21 of the farm Elandspoort 85 HS, which is situated within the Pixley Ka Seme Local Municipality under Gert Sibande District Municipality, Mpumalanga Province.
Client	Bazil Technologies (Pty) Ltd
Site Location	Magisterial District of Belfast, Mpumalanga Province.
Version	1
Date	15 February 2022

Electronic signatures

Compiled By	Daniel Tshinavhe (Environmental Specialist) Singo Consulting (Pty) Ltd	
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Report Credentials

Disclaimer:

The results and conclusions of this report are limited to the Scope of Work agreed between Singo Consulting (Pty) Ltd and Bazil Technologies (Pty) Ltd for whom this investigation has been conducted. All notions made and all knowledge contained within this report and its attachments hinge on the convenience to and dependability of relevant information, including maps, previous reports and word-of-mouth, from the Client and affected parties. All work conducted by Singo Consulting (Pty) Ltd is done in accordance with the Singo Consulting (Pty) Ltd Standard Operating Procedures.

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1 Introduction

1.1 Background information

Singo Consulting (Pty) Ltd was appointed by Bazil Technologies (Pty) Ltd to conduct a hydrological study for the Prospecting Right Application which has been submitted for Coal on portions RE, RE/1, 3, RE/4, RE/5, RE/6, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, RE/20 & 21 of the farm Elandspoort 85 HS, which is situated within the Pixley Ka Seme Local Municipality under Gert Sibande District Municipality, Mpumalanga Province. This report is not planned to be an intensive description of the proposed project; however, it is conducted as a specialist surface water study providing the surface water information required for the environmental authorizations for the proposed prospecting project.

1.2 Objectives and Aims of the study

The overall objective of this desktop hydrological study entails to:

- Identify the potential for surface contamination within the study area and the nature of likely contaminants to be encountered where Coal prospecting will take place.
- Gathering all the relevant information and recommendations in a hydrological report, prepared in such a way that it can be included into the Environmental Management Program document.

1.3 Project location

A locality map created by QGIS software illustrates basic information regarding the surrounding settlements and infrastructure of the proposed project area. The proposed project area is situated on portions RE, RE/1, 3, RE/4, RE/5, RE/6, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, RE/20 & 21 of the farm Elandspoort 85 HS, which is situated within the Pixley Ka Seme Local Municipality under Gert Sibande District Municipality, Mpumalanga Province. The proposed project is situated approximately 12 km South of Amersfoort, approximately 20 km North of Volksrust and West of Daggakraal.

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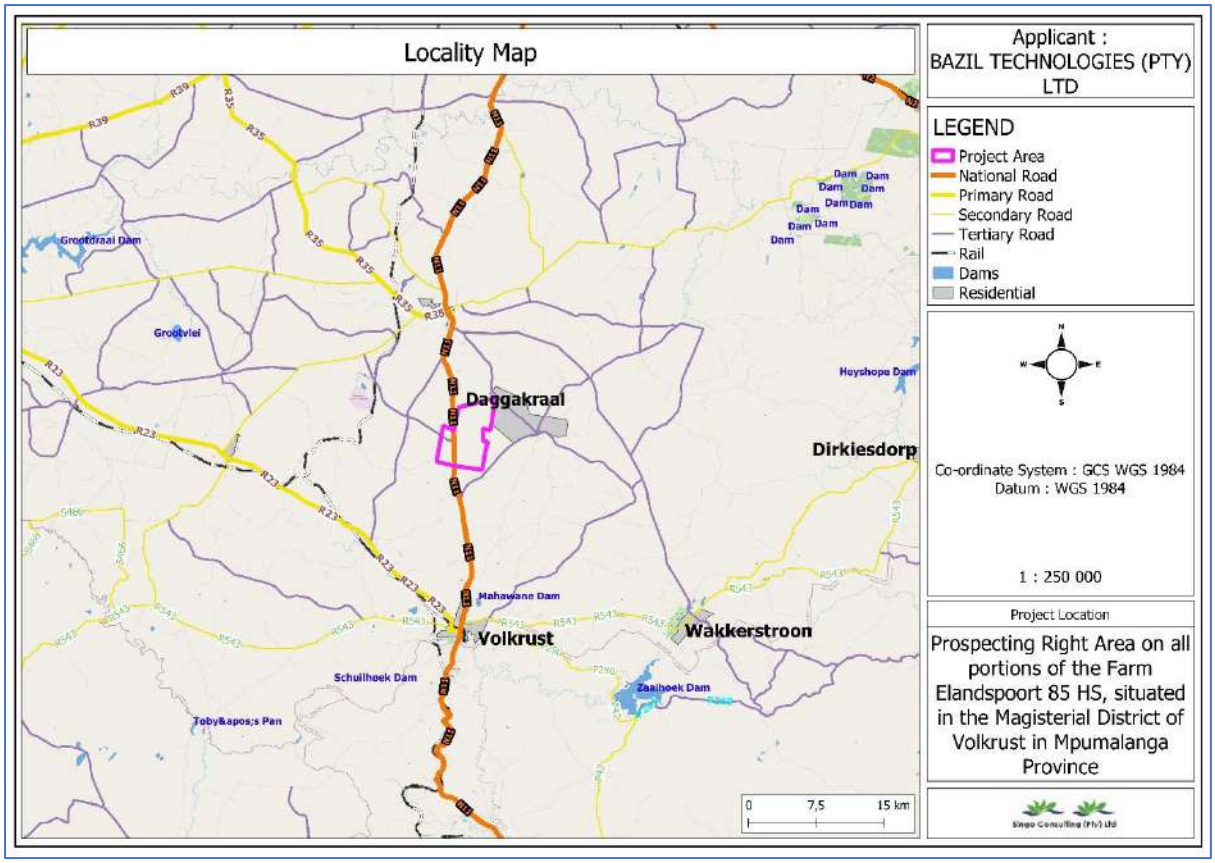

Figure 1: Locality Map of the proposed project

2. Scope of Work

- Baseline study
  - A desktop study was conducted to evaluate current and previous land uses to assess the implications for hydrology contaminations.
  - Sites visit to correlate the information that was collected during the desk study.
  - Maps from the hydrology study will be used to indicate the catchment areas and any strategic points.
  - The Mean Annual Runoff (MAR), peak flow rates and volumes will be estimated for these catchments using WR2012 data.
- Impacts assessment.
  - All surface water impacts will be described, and mitigation measures will then be proposed as normally required for the Environmental Impact Assessment/Environmental Management Plan (EIA/EMP) for prospecting activities.

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3 Methodology

3.1 Desktop Study

A desktop study was conducted to evaluate current and previous land uses to assess the implications for hydrology contaminations. The desktop study included:

- Assessment of historical aerial photography for the precinct and surrounding areas.
- A desk study to collect background information regarding climate, rainfall, geology, and hydrology structures within the proposed development area. This information will aid in conforming calculated decisions regarding the development of the proposed prospecting project with respect to possible associated impacts on the local surface water regime.
- Software employed in the study area was QGIS 2.14.9 for Geographic Information Systems (GIS) work.
- Review and summary of any previous reports or studies regarding environmental, geological or groundwater conditions, in or within the vicinity of the study area.

4 Overviews of Relevant Legislation and Standards

4.1 Legal Framework

DWA's vision for water quality management in South Africa is to:

- Ensure the continuous improvement of Water Quality Management
- Become a recognized world leader in Water Quality Management
- Be proactive, dynamic, efficient, and effective in its delivery of services to the public
- Provide the necessary policies and systems to ensure integrated sustainable management of water quality
- Promote cooperative governance across all spheres of management and
- Ensure a fully capacitated, loyal workforce to support its functions.

4.2 National Legislation

National legislation applicable to surface water management includes:

- Constitution of the Republic of South Africa, 1996 (No. 108 of 1996) – The Bill of Rights states that everyone has the right to an environment that is not harmful to their health or well-being.

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- National Water Act, 1998 (Act 36 of 1998) – Provides for the protection of the quality of water and water resources in South Africa and provides for the establishment of Water Management.

4.3 National Policy/Guidelines

National policy and guidelines applicable to surface water management includes:

- South African Water Quality Guidelines, First Edition, 1996 – These guidelines set out the minimum water quality requirements for a range of water quality parameters for each water user.
- Development of a Waste Discharge Charge System: Framework Document. Second Edition, 2000 – Provides a framework for the implementation of a system to charge for water use such as the discharge of waste that impacts on water resources.
- Best Practice Guidelines for the mining sector, DWAF 2006, 2008 dealing with aspects of DWA's water management hierarchy and deals with integrated mine water management, pollution prevention and minimisation of impacts, water reuse and reclamation and water treatment.
- Best Practice Guidelines for the mining sector, DWAF 2006, 2008 dealing with general water management strategies, techniques and tools which could be applied cross – sectorial and deals with storm water management, water and salt balances, water monitoring systems, impact prediction.
- Best Practice Guidelines for the mining sector, DWAF 2006-2008 dealing with specific mining activities and addresses the prevention and management of impacts from small scale mining, water management for Mine Residue Deposits, pollution control dams, water management for surface mines, and water management for underground mines.

5 Baseline Information

5.1 Topography and drainage

Topography is the study of the shape and features of land surfaces. The topography of an area could refer to the surface shapes and features themselves, or a description (especially their depiction in maps). Topography is a field of geoscience and planetary science and is concerned with local detail in general, including not only relief but also natural and artificial

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features, and even local history and culture. The proposed prospecting area is characterized by steep slope topography. This can be observed on the topology map attached (Figure 2). The flow of water during rainy seasons flows from the area of high elevation to the area of low elevation as it is indicated or displayed by contour lines.

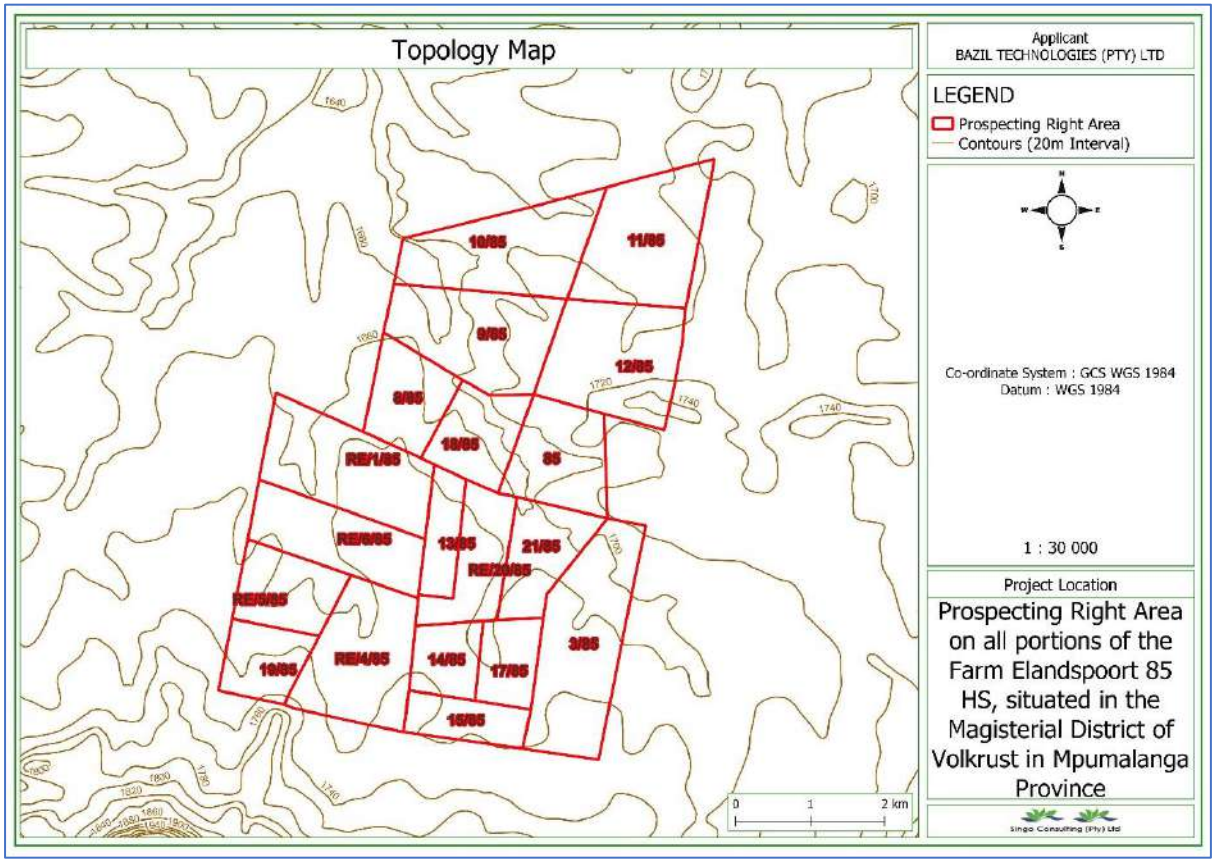

Figure 2: Topology within the project area

5.2 Hydrological description

5.2.1 Catchment

The prospecting area falls within the Vaal Water Management Area (WMA). The farm portions of the prospecting right fall within the main quaternary catchment C11E. The C11E catchment covers an extent of 1157 km^2, a mean annual evaporation (MAE) of 1400 mm, a mean annual precipitation (MAP) of 697 mm and a mean annual runoff (MAR) of 66.87 mcm. Figure below illustrates the Quaternary catchment and the Water Management Area (WMA).

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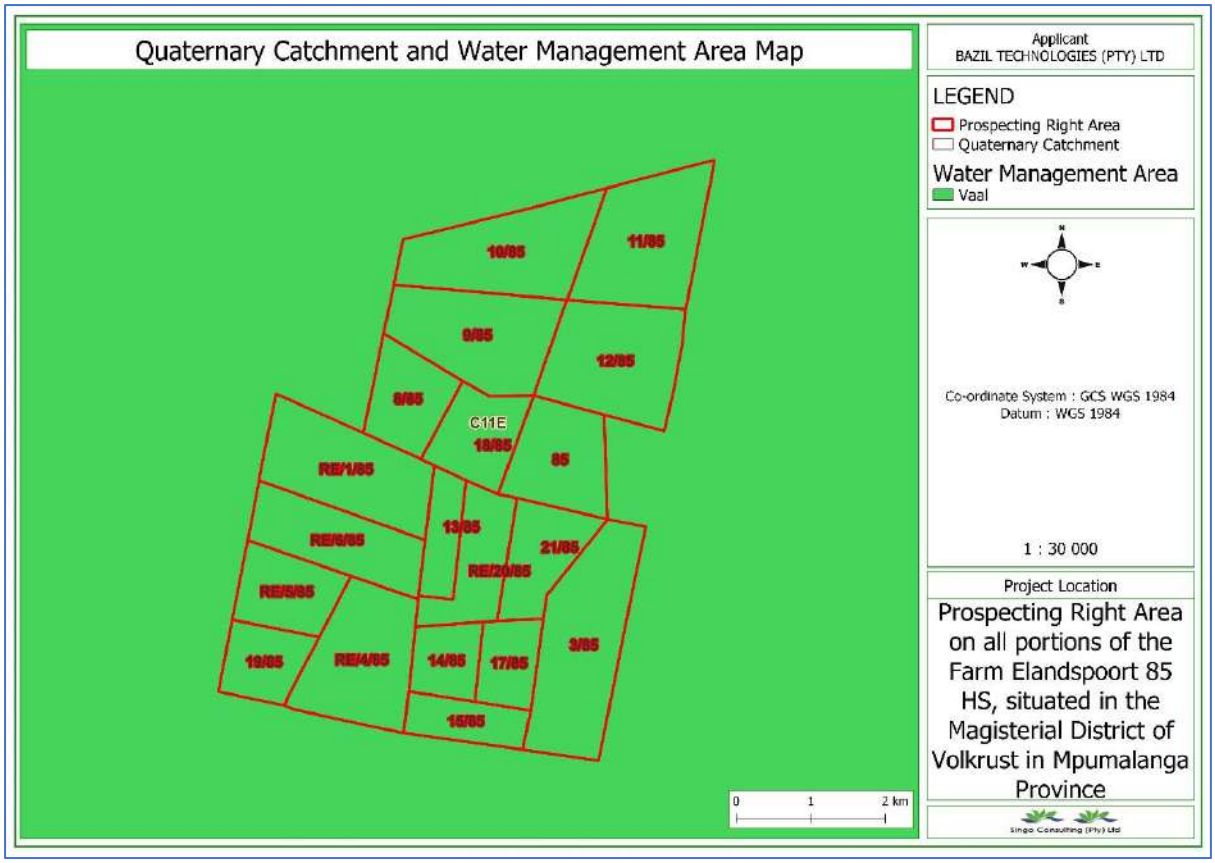

Figure 3: Quaternary Catchment and WMA

5.2.2 Hydrology

The hydrology surrounding the proposed area is very importance during prospecting. In this context hydrology is all the surface waters appearing within and nearby the proposed project area, where a potential to be impacted upon by the project exist. The hydrology map, illustrates that the following water bodies exists:

- Channelled valley-bottom wetland
- Depression wetland
- Seep wetland
- Perennial river
- Non-perennial river

For this project where prospecting right poses a risk on them, there should be measures and guidelines put in place that will protect the water resources in this area to ensure optimal conservation of water. The prospecting right activities should take place during dry seasons when the water percentages are extremely low. Extreme caution should be taken during

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prospecting, owing to the rivers and numerous wetlands existing nearby and within the project area. And all the wetlands, perennial and non-perennial rivers will be buffered as a no-go area and approximately a 100m buffer should apply.

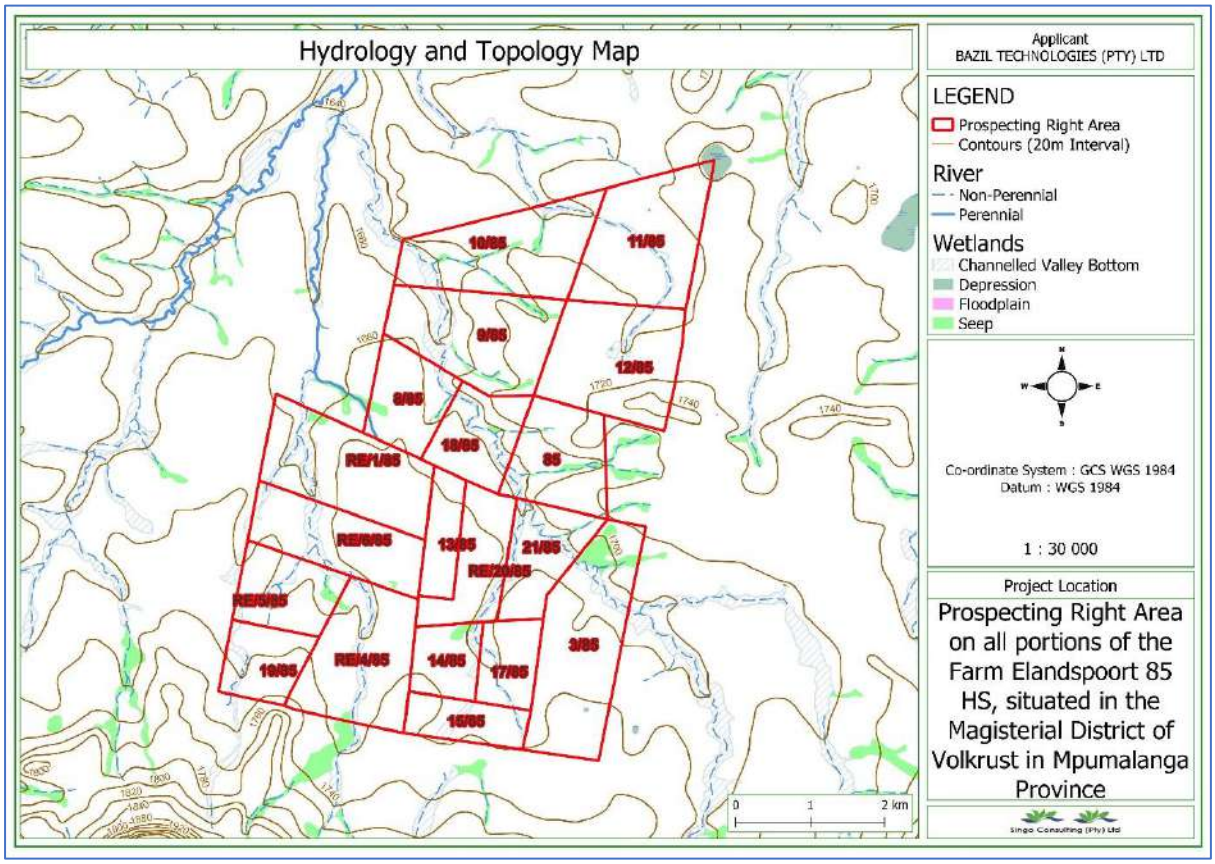

Figure 4: Hydrological and Topology within the proposed prospecting project

5.2.3 Buffer Zones

Buffer zones are strips of undeveloped, typically vegetated land (composed in many cases of riparian habitat or terrestrial plant communities) which separate development or adjacent land uses from aquatic ecosystems (rivers and wetlands). For the protection of the aquatic resource in the study area it is essential that buffer zones are adequately defined. In establishing buffer zones, it is essential to define the primary purpose for establishing buffers, which will guide the development of an appropriate approach. The primary purposes for this study are to:

- Reduce the impacts of adjacent land uses on water resource quality. At a broad level, this would be used to flag potential constraints to development to inform regional planning initiatives. The primary application is likely to inform site-specific planning of

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new developments / land use change. It may also be applied as "Best-practice" guidelines to inform land management (e.g. certification schemes).

- Sustaining or improving the ability of the water resources to provide goods and services to society. This recognizes the importance of aquatic resources, and that adequate protection of these resources is required to ensure that levels of benefits are not jeopardized for current or future generations.
- Providing protection of and providing habitat for aquatic and semi-aquatic species.

Buffer width is regularly cited as one of the most important attributes affecting the functioning of aquatic buffers, regardless of the site properties or intended protection characteristics of the buffer. To assess and apply the width of any buffer it is important to understand the role that buffer zones do play in protecting aquatic resources with associated biota and in mitigating impacts from anthropogenic activities.

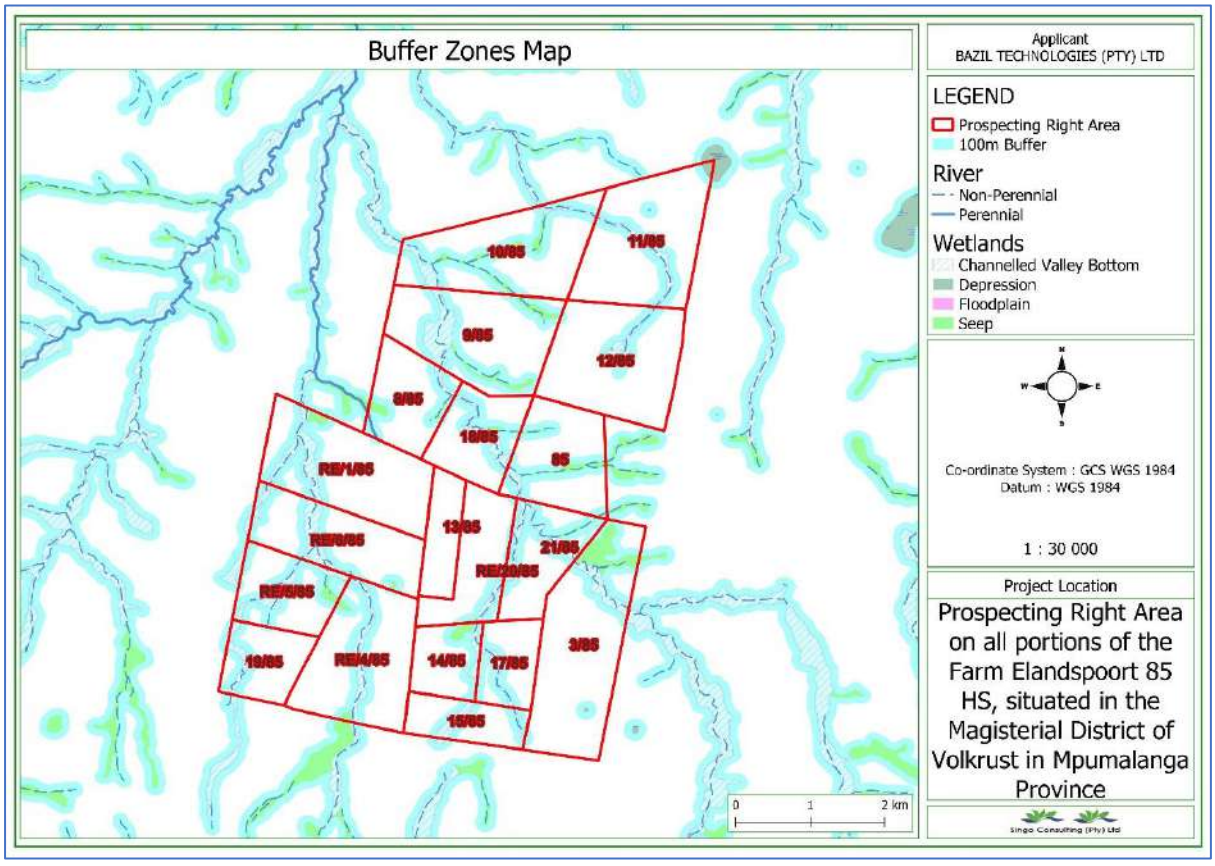

Figure 5: Hydrology with buffer

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5.3 Climate

The average annual temperature of Gert Sibande District is 15.7 °C. According Figure 7, the mean annual rainfall is between 601 – 800 mm. The driest month is July with precipitation of 6 mm. January is the month were most precipitation falls in with an average of 200 mm. December is the warmest month with an average of 20.5 °C. July has the lowest temperature of the year were by the average temperature is 9.5 °C. The precipitation of 149 mm varies between the driest and the wettest months. The average temperatures vary during the year by 9.7 °C.

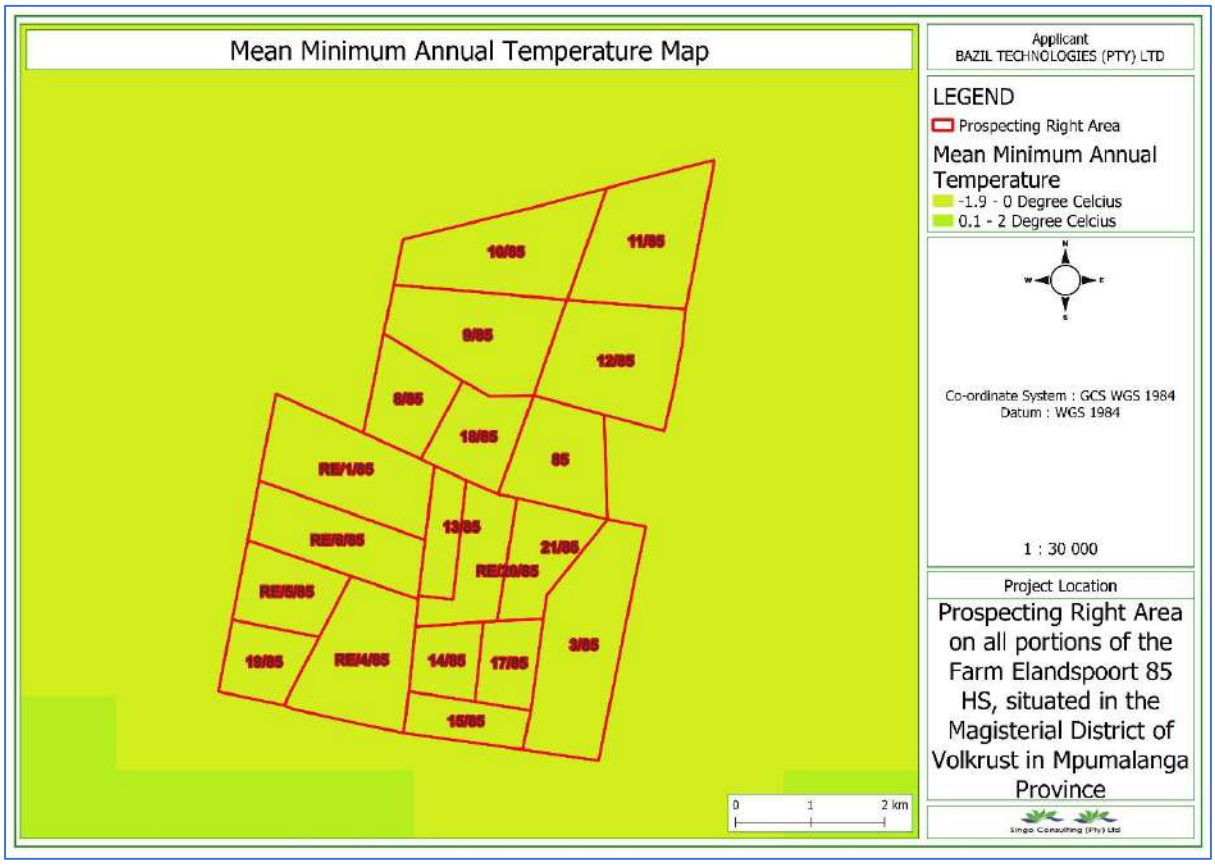

Figure 6: Mean annual temperature in the project area

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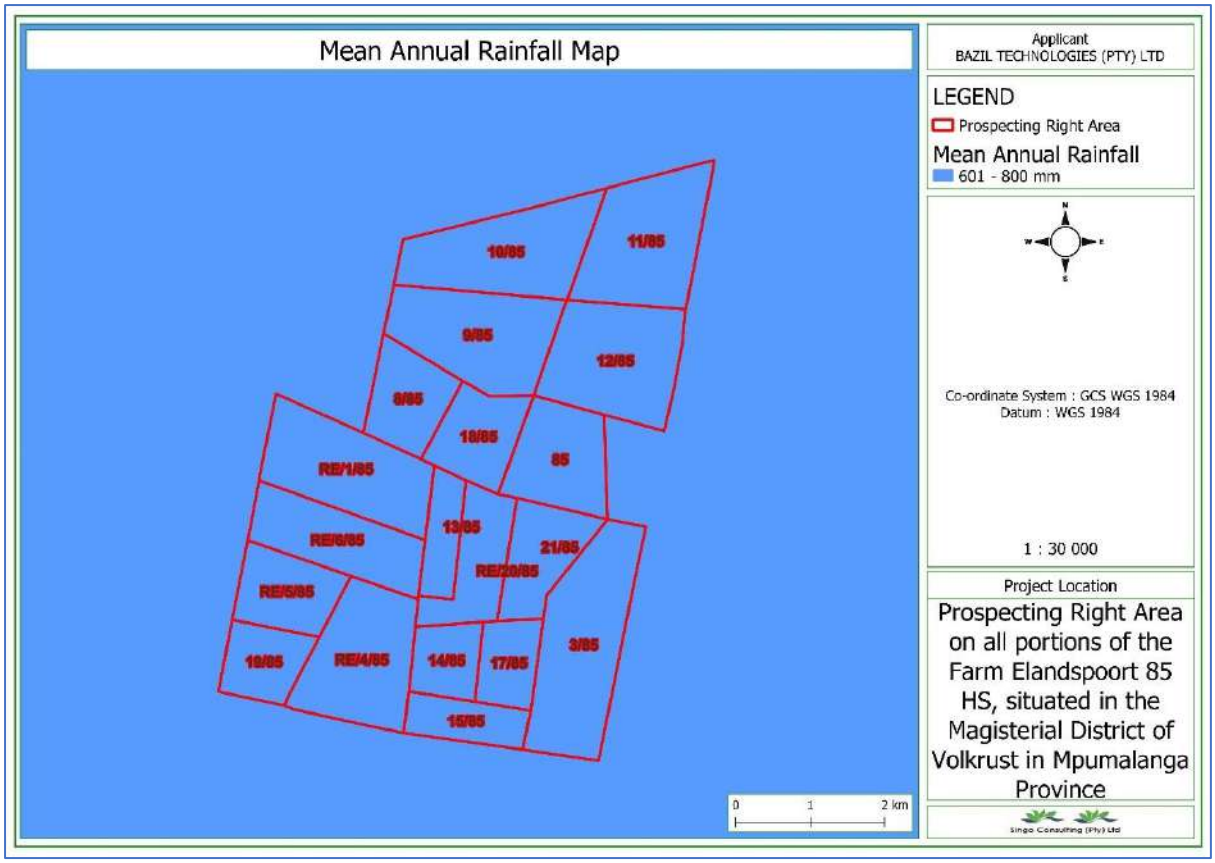

Figure 7: Mean annual rainfall within the project area.

5.4 Geology

5.4.1 Regional Geology

The coal deposits in South Africa are largely hosted by the Karoo Supergroup, which was deposited in the Gondwana basin that covered parts of Africa, Antarctica, South America, and Australia. The basal Stratigraphy of the Karoo Supergroup comprises the Dwyka Group which is a Late Carboniferous to Early Permian (~320Ma) sequence of glacial and periglacial sediments including diamictite, till moraine, conglomerate, sandstone, mudstone and varved shale.

The Dwyka group is overlain by the Ecca Group which is an Early to Late Permian (~260 Ma) sequence composed of sandstone, siltstone, mudstone, and large deposits of coal seams deposited in a terrestrial basin on a gently subsiding shelf platform. In the surrounding Witbank Coalfield areas, the Ecca Group is overlain by the Beaufort Group, which is Early Triassic (~260

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to 210 Ma), comprising multi-colored mudstone and sandstone with only minor coal accumulation, and was deposited in a fluvial environment.

The Molteno Formation rests unconformably on the Beaufort Group and comprises Late Triassic (~210 Ma) coarse, immature sandstone with minor argillaceous layers derived from braided streams. This in turn is overlain by the Elliot Formation consisting of red mudstone and sandstone and the Clarens Formation comprising Aeolian sandstone. At the top of the Karoo Supergroup stratigraphy is the Drakensburg Group, which comprises Early to Middle Jurassic (~180 Ma) flood basalts.

According to the 2628 East Rand 1:250 000 geology series map the site is situated on Permian (245 000 – 290 000 million years) sandstone, shale and coal beds of the Vryheid Formation of the Ecca Group, and Karoo Supergroup. Jurassic (145 000 – 208 000 million years) dolerite sills intruded into the older sediments through vertical feeder dykes. Quaternary surficial deposits of alluvium and ferricrete can be found throughout the surrounding area.

The Ecca Group, which is part of the Karoo Supergroup, comprises of sediments deposited in shallow marine and fluvial-deltaic environments with coal accumulated as peat in swamps and marshes associated with these environments. The sandstone and coal layers are normally reasonable aquifers, while the shale trends to act as aquitards. Several layered aquifers perched on the relative impermeable shale are common in such sequences. The Dwyka Formation comprises consolidated products of glaciations (with high amounts of clay) and is normally considered have impermeable qualities.

The general horizontally disposed sediments of the Karoo Supergroup are typically undulating with a gentle regional dip to the south. The extent of the coal is largely controlled by the pre-Karoo topography. Abundant dolerite intrusions are present in the Ecca sediments. These intrusions comprise sills, which vary from being concordant to transgressive in structure, and feeder dykes.

Although these structures serve as aquitards and tend to compartmentalize the groundwater regime, the contact zones with the pre-existing geological formations also serve as groundwater conduits. There are common occurrences of minor slips or faults, particularly in close proximity to the dolerite intrusions. Within the coalfield, these minor slips, displacing the coal seam by a matter of 1 to 2 meters, are likely to be common in places.

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5.4.2 Local Geology

Karoo Dolerite Suite

The Karoo Dolerite Suite Represents a network of dykes and sills which occur as feeders or tongues to the flood basalt province (Walker and Poldervaart, 1949) and are best developed in the main Karoo Basin. The rocks of the Karoo Supergroup were pervasively intruded by these dolerite sills and dykes, central ring complexes (Eales et al., 1984; Galerne et al., 2008) and saucer-shaped sheets (Duncan and Marsh, 2006), contemporaneous with and immediately followed the eruptions of the Drakensberg lavas, as determined by cross-cutting relations (Mountain, 1968; Walker and Poldervaart, 1949). Multiple dolerite intrusion events occurred in the Karoo, Both predating and postdating the flood basalts (Erlank, 1984; Mountain, 1968; Walker and Poldervaart, 1949), therefore making it nearly impossible to associate them with any single intrusive or tectonic event (Chevallier and Woodford, 1999; Duncan and Marsh, 2006; van Zijl, 2006a).

Sills and sheet intrusion in the Karoo range from a few meters to 200m thick (Duncan and Marsh, 2006; Walker and Poldervaart, 1949) and often cap hills with underlying sedimentary strata. Some sheet intrusion dip almost vertically and may be termed dykes. The true dykes however, are typically up to 10m wide and extend 5 – 30 km along the strike (Duncan and Marsh, 2006). Generally dykes are unrelated to sills (Eales et al., 1984) many dykes appear to have intruded after the sills and sheet intrusions , as revealed by cross-cutting relationships (Walker and Poldervaart, 1949) and resistivity studies (van Zijl, 2006b). Central ring complexes are often interpreted as sites of original volcanic activity (Eales et al., 1984).

The approximate trend of the dykes in the central and eastern Karoo is between north and northwest with subordinate trends at roughly right angles (Walker and Poldervaart, 1949). In the western Karoo, dykes and sills form complex, interconnected and anastamosed system along with discordant sheets and saucer-shaped intrusions (Chevalier and Woodford, 1999). In several areas in the Karoo Basin, the dykes are concentrated in swarms and some have been identified as feeder system to the overlying lavas (Eales et al., 1984) However, the majority of the dykes do not show strong preferred orientation (Duncan and Marsh, 2006).

Volksrust Formation

The Volksrust Formation is a predominantly argillaceous unit, which interfingers with the overlying Beaufort Group and underlying Vryheid Formation. Where the latter pinches out towards the southwest the Volksrust merges with the Tierberg Formation in the northern outcrop area or with the Pietermaritzburg Formation in the undifferentiated Ecca Group in the southeast. Drilling has shown that it reaches a thickness of 380m about 120km northeastof

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Bloemfontein, thinning to 250 m in the east (Taverner-Smith et al., 1988) and to 100 m towards the northern margin of the basin.

The Formation consists of grey to black, silty shale with thin, usually bioturbated, siltstone or sandstone lenses and beds, particularly towards its upper and lower boundaries. Thin phosphate and carbonate beds and concretions are relatively common. A shallow water shelf environment has been proposed (Smith et al., 1993), with the upward-coarsening transition into the Beaufort Group representing a prodelta and distal delta front environment (Cadle and Hobday, 1977; Visser and Loock, 1978).

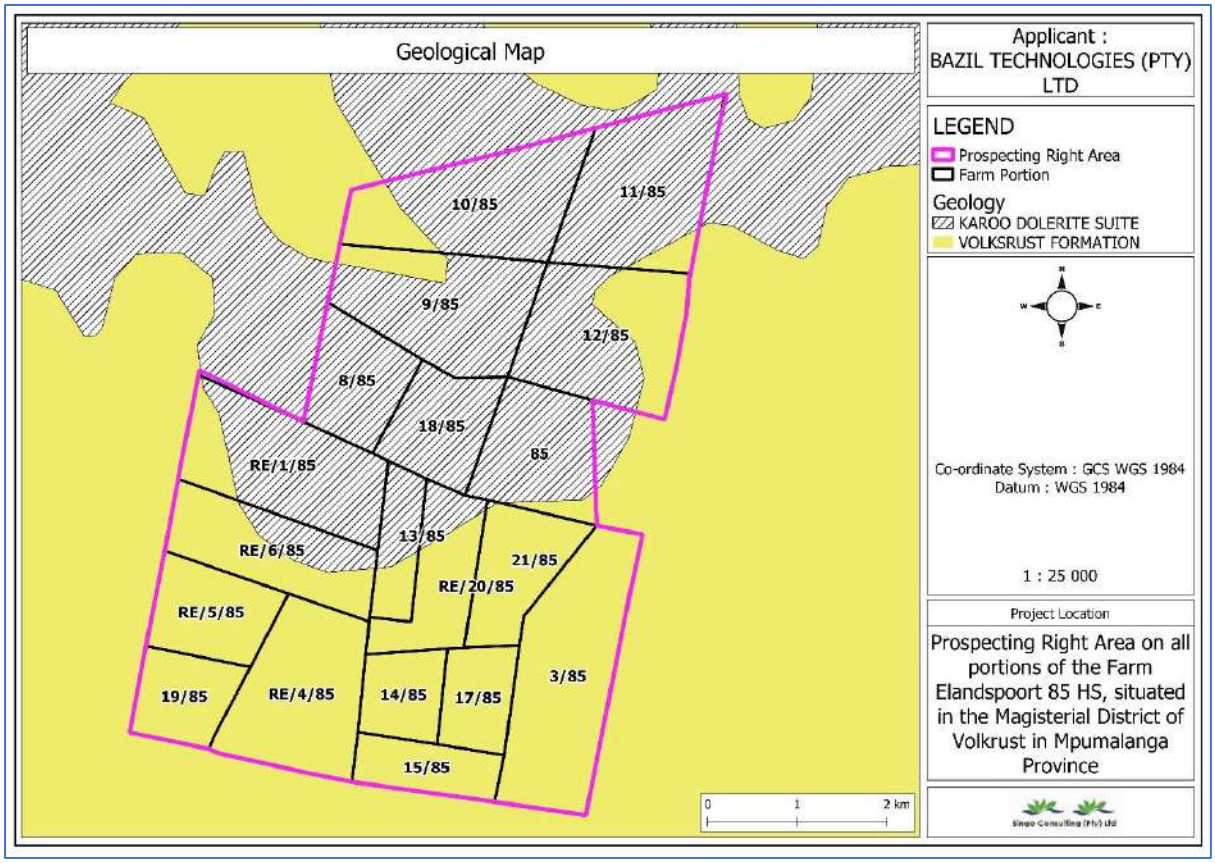

Figure 8: Geology of the prospecting right area

6 Surface Water Impact Assessment

This Environmental Management Programme (EMPr) addresses the management of potential environmental impacts related to the proposed project in respect of surface water and should be used for managing, mitigating, and monitoring of the environmental impacts.

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This exercise of risk identification and mitigation involves identification of streams found downstream of the proposed development, as well as a description of the identified risks the environment may incur during the various phases of the project.

Impact Assessment methodology Status of Impact The impacts are assessed as either having a:

- Negative effect (i.e., at a `cost' to the environment)
- Positive effect (i.e., a `benefit' to the environment)
- Neutral effect on the environment.

Extent of the Impact

- (1) Site (site only)
- (2) Local (site boundary and immediate surrounds)
- (3) Regional
- (4) National
- (5) International

Duration of the Impact

The length that the impact will last for is described as either:

- (1) Immediate (<1 year)
- (2) Short term (1-5 years)
- (3) Medium term (5-15 years)
- (4) Long term (ceases after the operational life span of the project),
- (5) Permanent

Magnitude of the Impact

The intensity or severity of the impacts is indicated as either:

- None
- Minor
- (4) Low
- (6) Moderate (environmental functions altered but continue)
- (8) High (environmental functions temporarily cease)
- (10) Very high / unsure (environmental functions permanently cease)

Probability of Occurrence

The likelihood of the impact actually taking place is indicated as either:

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- None (the impact will not occur)
- Improbable (probability very low due to design or experience)
- (4) Low probability (unlikely to occur)
- (6) Medium probability (distinct probability that the impact will occur)
- (8) High probability (most likely to occur)
- (10) Definite

Significance of the Impact

Based on the information contained in the points above, the potential impacts are assigned a significance rating (S). This rating is formulated by adding the sum of the numbers assigned to extent (E), duration (D) and magnitude (M) and multiplying this sum by the probability (P) of the impact.

S= (E+D+M) P

The significance ratings are given below:

- **(<30) Low** (i.e., where this impact would not have a direct influence on the decision to develop in the area),
- **(30-60) Medium** (i.e., where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- **(>60) High** (i.e., where the impact must have an influence on the decision process to develop in the area)

6.1 Impacts that might occur.

During the Coal prospecting period the following impacts are envisioned:

- Clearing of vegetation leading to increased runoff and less infiltration.
- Diesel and oil spillages from the drill rig
- Increase in volume of contaminated water that needs to be managed within the footprint
- Erosion of stream banks because of crossings and diversions leading to siltation of the streams

6.1.1 Siltation on surface water

Footprint clearance will expose bare soil that could result in sheet wash into nearby watercourses during a precipitation event. In addition, dust can further be transported into

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watercourses or be deposited on infrastructure near watercourses thereby exacerbating the impact of siltation during rainfall events.

Table 1: Siltation on surface water caused by site clearance.

Issue	**Corrective measures**	**Impact rating criteria**					**Significance**
		Nature	**Extent**	**Duration**	**Magnitude**	**Probability**	
Siltation of surface water resources	No	Negative	1	1	4	8	48
	Yes	Negative	1	1	2	5	20
Corrective Measures		➢ Stripping of vegetation for prospecting must occur in a phased manner and must be restricted to the prospecting footprint to reduce the risk of erosion during times of precipitation. ➢ The contractor shall be responsible for rehabilitating all eroded areas in such a way that the erosion potential is minimised after prospecting has been completed					

6.1.2 Surface water contamination

Truck oils and fuel could leak and spill to water resources. All oils and fuels must be stored in bunded areas, and any spillages must be managed immediately in accordance with the Emergency Response plan. The emergency response plan must be provided by contractors. This will reduce the risks from medium to low.

Table 2: Surface water contamination during prospecting phase

Issue	**Corrective measures**	**Impact rating criteria**					**Significance**
		Nature	**Extent**	**Duration**	**Magnitude**	**Probability**	
Surface water contamination	No	Negative	1	1	6	8	64

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(Truck oils and fuel could leak and spill)	Yes	Negative	1	1	3	5	25
Corrective Measures		➢ In case of emergencies or unforeseen events, the problem must be remediated immediately and any spillage into any watercourses be reported to the Department of Water Affairs. ➢ Remove all project-related material / support equipment immediately on completion of any of the prospecting phases					

7 Monitoring Plan

The objective of the surface water management and monitoring measures is to minimise the impact on surface water dependent systems to be retained from disturbance within and adjacent to controlled sites; to maintain hydrological regimes of surface water so that the environmental values are protected and, to check compliance with license requirements and for reporting purposes.

Water dependent systems are parts of the environment in which the composition of species and natural ecological processes are determined by the permanent or temporary presence of flowing or standing surface water or groundwater. The in-stream areas of rivers, riparian vegetation, springs, wetlands, floodplains, groundwater-dependent terrestrial vegetation are all examples of water dependent systems (Department of Water, January 2013). The objectives of these systems will be achieved if there is no impact on the in-stream and downstream fitness for use criteria.

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8 Conclusions and Recommendations

The farm portions of the prospecting right fall within the main quaternary catchment C11E under the Vaal Water Management Area (WMA).

The proposed prospecting area is characterized by a steep slope topography

The following recommendations has been made:

- It can be concluded that the prospecting of Coal will cause minimal impact on the water resources.
- Drilling activity should not be conducted near these water resources
- No washing of any mechanical equipment's or vehicles will be allowed near the water resources.
- All the wetlands and non-perennial streams will be buffered as "no go" area preferably a 100m buffer will apply.
- Absorbent Spill kits will be made available near the drill rigs during drilling activities
- To avoid soil erosion and siltation in the watercourse, vegetation will not be cleared

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PROSPECTING RIGHT BASIC SOIL STUDY

BASIC SOIL STUDY REPORT FOR ENVIRONMENTAL AUTHORIZATION, FOR A PROPOSED PROSPECTING RIGHT APPLICATION WITHIN PORTIONS RE, RE/1, 3, RE/4, RE/5, RE/6, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, RE/20 & 21 OF THE FARM ELANDSPOORT 85 HS, WHICH IS SITUATED WITHIN THE PIXLEY KA SEME LOCAL MUNICIPALITY UNDER GERT SIBANDE DISTRICT MUNICIPALITY, MPUMALANGA PROVINCE, SOUTH AFRICA.

PREPARED FOR

BAZIL TECHNOLOGIES

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DMRE REF: MP 30/5/1/1/2/ 17127 PR

2022

Project Information

Report Type	Basic Soil Study Report for Prospecting Right
Project Title:	Basic Soil study report for Environmental Authorization, for the proposed prospecting right application within portions RE, RE/1, 3, RE/4, RE/5, RE/6, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, RE/20 & 21 of the farm Elandspoort 85 HS, which is situated within the Pixley Ka Seme Local Municipality under Gert Sibande District Municipality, Mpumalanga Province, South Africa.
Client	Bazil Technologies (Pty) Ltd
Site Location	Pixley Ka Seme Local Municipality under Gert Sibande District Municipality, Mpumalanga Province, South Africa.
Version	1
Date	13 January 2022

Electronic signatures

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Reviewed by	Mutshidzi Munyai (Hydrogeologist) Singo Consulting (Pty) Ltd (Water Resources Science (Candidate Natural Scientist), Environment Science (Candidate Natural Scientist) (SACNASP Registration Number 122464)
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Report Credentials

Disclaimer:

The opinion expressed in this and associated reports are based on the information provided by Bazil Technologies (Pty) Ltd to Singo Consulting (Pty) Ltd ("Singo Consulting") and is specific to the scope of work agreed with Bazil Technologies (Pty) Ltd.

Singo Consulting acts as an advisor to the Bazil Technologies (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 Bazil Technologies (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.

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1 Introduction

1.1 Background Information

Singo Consulting (Pty) Ltd was appointed Bazil Technologies (Pty) Ltd to conduct a basic soil study for the Prospecting Right Application which has been submitted for the prospecting of Coal resource located on within portions RE, RE/1, 3, RE/4, RE/5, RE/6, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, RE/20 & 21 of the farm Elandspoort 85 HS, which is situated within the Pixley Ka Seme Local Municipality under Gert Sibande District Municipality, Mpumalanga Province, South Africa.

The main aim of conducting this study is to find information with regards to the soil potential, current land use as well as land capability.

This report is not planned to be an intensive description of the proposed project; however, it is conducted as a specialist basic soil study to evaluate the soil potential, current land use as well as land capability information required for the environmental authorizations for the proposed prospecting project.

1.2 Project location

A locality map created by QGIS software illustrates detailed and comprehensive information regarding the surrounding settlements and infrastructure. The proposed project area is Situated approximately 12 km South of Amersfoort, approximately 20 km North of Volksrust and approximately 4 km west of Daggakraal, under the Pixley Ka Seme Local Municipality under Gert Sibande District Municipality, Mpumalanga Province, as indicated in Figure 1.

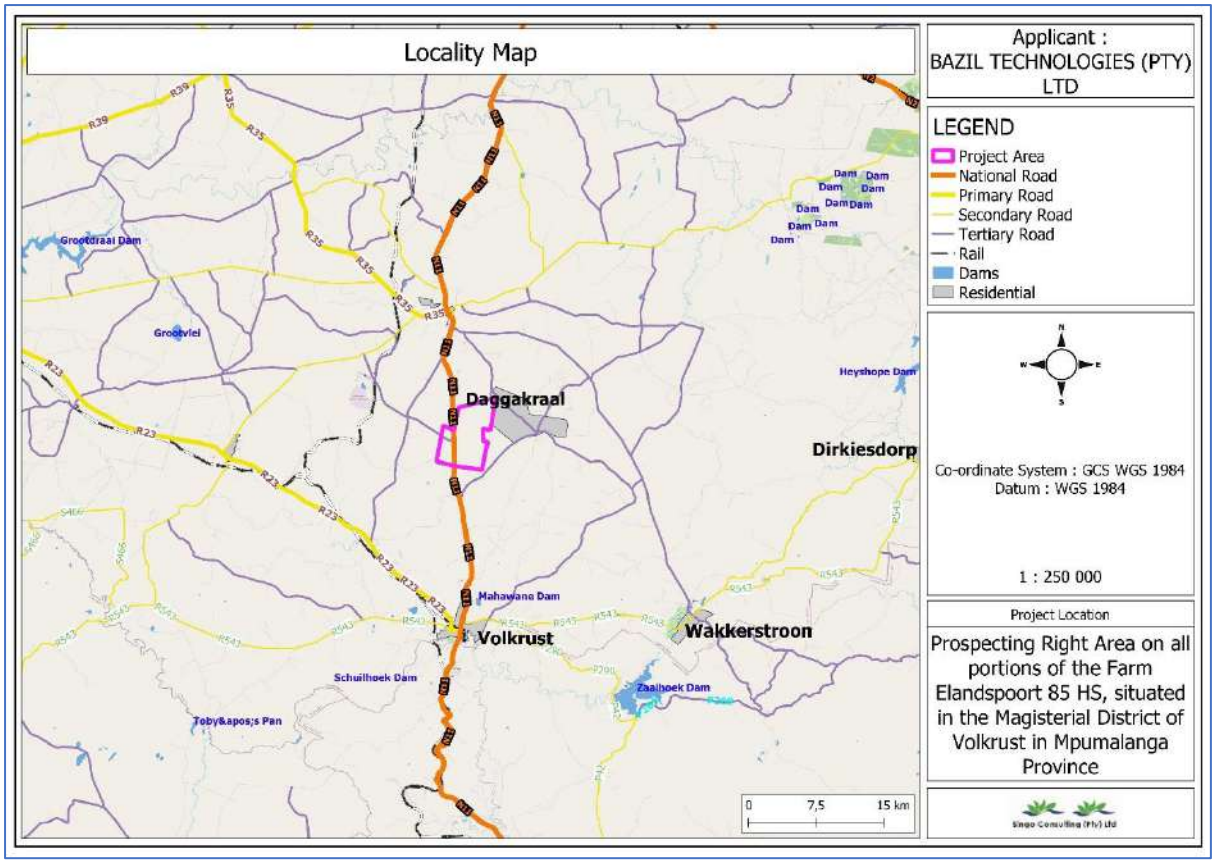

Figure 1: Locality of the proposed project

2 Scope of work

The scope of work included the following:

- Conduct a basic soil assessment of the proposed prospecting right project.
- Determine impacts of the proposed prospecting activities of Coal resource on soil and provide associated mitigation measures.
- Classify and map soil forms according to the South African Taxonomic Soil Classification System, 1991.
- Derive and map land capability based on soil properties.
- Map all current land uses.

3 Terms of Reference

The following tasks were undertaken in the compilation of the soil assessment, land use and land capability study:

3.1 Basic Soil Study

- A basic soil assessment of the proposed project development footprint areas associated within the proposed Coal resource prospecting site.
- The soil classification will be done according to the Taxonomic Soil Classification System for South Africa, 1991. The following attributes were included at each observation:
  - Soil form and family
  - Soil depth
  - Estimated soil texture
  - Soil structure
  - Underlying material
  - Current land use
  - Land capability

4 Soil survey Methodology

4.1 Soil survey procedures

The soil survey procedures allow soil surveyors to arrive at the project area, analyze and study soil properties such as colour, texture, structure amongst others and differentiate between horizons. Classification will also be enabled for soil surveyors to complete. Chemical tests can be carried out in the field (e.g., pH, test for carbonates and test for Mn oxides). Classification will be done at this stage providing information about the chemical, physical, and mineralogical characterization of the soil. Soil scientists that map the area, familiarize themselves with soils they expect to find and use characteristics to distinguish them from other soils in the area by doing a desktop study.

Delineating soil boundaries

To avoid digging random soil pits with an auger, a map of the area will be taken, and a grid will be made on the map to determine where samples will be taken from. An efficient soil mapper looks at changes in vegetation, topography, and soil colour.

A bare soil map can also be looked at to see where changes in colour occur indicating differences in soil. Once the project area is established, an auger will be used to dig holes in order to determine the soil profiles.

4.2 Soil Classification

The soil classification will be done according to the Taxonomic Soil Classification System for South Africa, 1991. The following attributes were included at each observation:

- Soil form and family
- Soil depth
- Estimated soil texture
- Soil structure
- Underlying material
- Current land use and Land capability

4.3 Soil sampling and analyses

boreholes cannot be drilled randomly, therefore a map of the area is used and a grid is created on the map to determine where the samples will be taken from. An efficient soil mapper looks at changes in vegetation, topography, and soil colour. A bare soil map can also be utilized to see where changes in colour occur indicating the differences in soil. Once sites are identified, soil samples will be collected with a soil auger.

4.4 Structure of the SA classification system

Procedure to follow when identifying a soil:

- Demarcate master horizons in profile.
- Identify diagnostic horizons/materials.
- Establish soil form.
- Identify family differentiae.
- Establish soil family.
- Determine textural class

4.5 Environmental Impact Assessment

The impact rating process is designed to provide a numerical rating of the various environmental impacts identified using the Input-Output model. It must be emphasized that the purpose of this process is not to provide an incontrovertible rating of the significance of various aspects, but rather to provide a structured, traceable, and defendable methodology of rating the relative significance of impacts in a specific context. This provides the project proponent a greater understanding of the impacts of this project and the issues which need to be addressed by mitigation and give the regulators information on which to base their decisions on.

The significance rating process follows the established impact/risk assessment formula:

Significance= Consequence x Probability

Where

Consequence = Severity + Spatial Scale + Duration

Probability = Likelihood of an impact occurring

The matrix calculates the rating out of 147, whereby Severity, Spatial Scale, Duration and Probability are each rated out of seven as indicated in Table 1. Weighting can be applied to the various parameters. Impacts are rated prior to mitigation and again after consideration of the mitigation measure proposed in the Environmental Management Plans (EMP). The significance of an impact is then determined and categorized into one of four categories, as indicated in Table 2, which supports Table 3. Environmental management actions will be assigned for all identified impacts. A neutral impact implies that it causes the area to return to a pre-project state. This is not regarded as positive, as there would have been no need for this activity if the operation were not carried out.

Table 1: Impact assessment parameter ratings

	Severity				
Rating	**Environmental**	**Social, cultural and heritage**	**Spatial scale**	**Duration**	**Probability**
7	Very significant impact on the environment. Irreparable damage to highly valued species, habitat or eco system. Persistent severe damage	Irreparable damage to highly valued items of great cultural significance or complete breakdown of social order.	International The effect will occur across international borders	Permanent: No Mitigation No mitigation measures of natural process will reduce the impact after implementation	Certain/Definite. The impact will occur regardless of the implementation of any preventative or corrective actions.
6	Significant impact on highly valued species, habitat or ecosystem	Irreparable damage to highly valued items of cultural significance or breakdown of social order.	National Will affect the entire country	Permanent: Mitigation measures of natural process will reduce the impact	Almost certain/Highly probable It is most likely that the impact will occur
5	Very serious, long term environmental impairment of ecosystem function that may take several years to rehabilitate	Very serious widespread social impacts. Irreparable damage to highly valued items.	Province/ Region Will affect the entire province or region	Project Life The impact will cease after the operational life span of the project	Likely The impact may occur

4	Serious medium term environmental effects. Environmental damage can be reversed in less than a year	On-going serious social issues. Significant damage to structures / items of cultural significance	Municipal Area Will affect the whole municipal area	Long term 6-15 years	Probable Has occurred here or elsewhere and could therefore occur
3	Moderate, short-term effects but not affecting ecosystem function. Rehabilitation requires intervention of external specialists and can be done in less than a month	On-going social issues. Damage to items of cultural significance. Local	Local Local extending only as far as the development site area	Medium term 1-5 years	Unlikely Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur
2	Minor effects on biological or physical environment. Environmental damage can be rehabilitated internally with/ without help of external consultants	Minor medium-term social impacts on local population. Mostly repairable. Cultural functions and processes not affected.	Limited Limited to the site and its immediate surroundings	Short term Less than 1 year	Rare/ improbable Conceivable, but only in extreme circumstances and/ or has not happened during lifetime of the project but has happened elsewhere. The possibility of the impact materializing is very low as a result of design, historic experience or implementation of adequate mitigation measures
1	Limited damage to minimal area of low significance, (e.g., ad hoc spills within	Low-level repairable damage to commonplace structures	Very limited Limited to specific isolated parts	Immediate Less than 1 month	Highly unlikely/None Expected never to happen

	plant area). Will have no impact on the environment.		of the site.		

According to the Impact assessment parameter ratings in Table 1, the rating of the proposed area is classified as 3, since there will be a moderate, short-term effects on the environment but not affecting the ecosystem function. Rehabilitation will require intervention of external specialists and can be done in less than a month. The spatial scale of the impact is the Local area, the impact can extend only as far as the development site area. The Likelihood of an impact to occur is unlikely but there is a possibility that the impact will occur once the project has started. The duration of the impact can last between 1- 5 years.

Table 2: Probability Consequence Matrix

Significance		Consequence (severity + scale + duration)								
		1	3	5	7	9	11	15	18	21
Probability / Likelihood	1	1	3	5	7	9	11	15	18	21
	2	2	6	10	14	18	22	30	36	42
	3	3	9	15	21	27	33	45	54	63
	4	4	12	20	28	36	44	60	72	84
	5	5	15	25	35	45	55	75	90	105
	6	6	18	30	42	54	66	90	108	126
	7	7	21	35	49	63	77	105	126	147

Table 3: Impact significance threshold limits

Significance		
Low	**0 – 35**	
Low-Medium	**36 – 76**	
Medium- High	**73 – 107**	
High	**108 - 147**	

5 Description of the Receiving Environment

The Proposed Prospecting Right area is located within Portion 02 of the portions RE, RE/1, 3, RE/4, RE/5, RE/6, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, RE/20 & 21 of the farm Elandspoort 85 HS, which is situated within the Pixley Ka Seme Local Municipality under Gert Sibande District Municipality, Mpumalanga Province, South Africa.

5.1 Climate

Mpumalanga has a warm and temperate climate. Mpumalanga is a city with a lot of rain. There is a lot of rain even in the driest month. Köppen and Geiger classify this location as Cfb. The Mean annual temperature and rainfall of the project area are shown in Figure 2 and Figure 3. Warm summers and cold winters are typical of the Northwest climate in the study area.

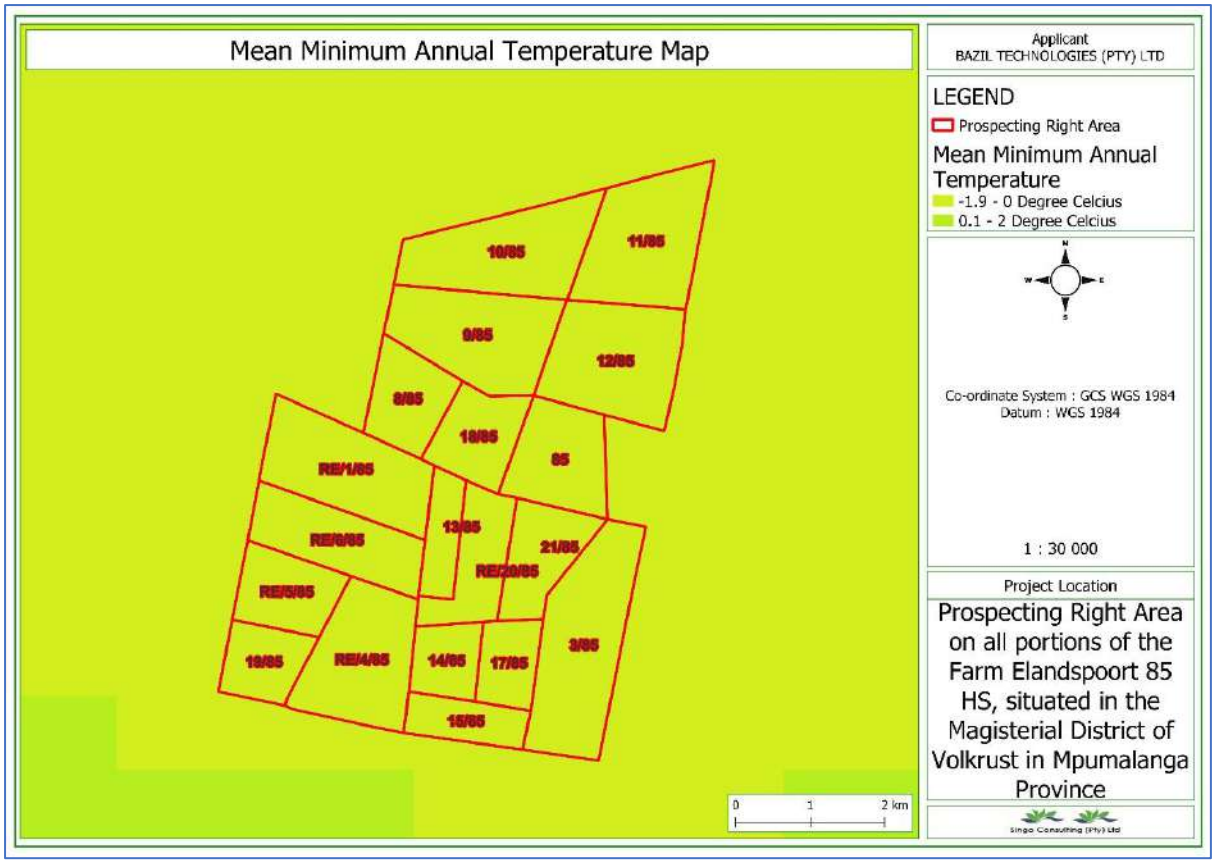

Figure 2: Mean annual temperature of the project area.

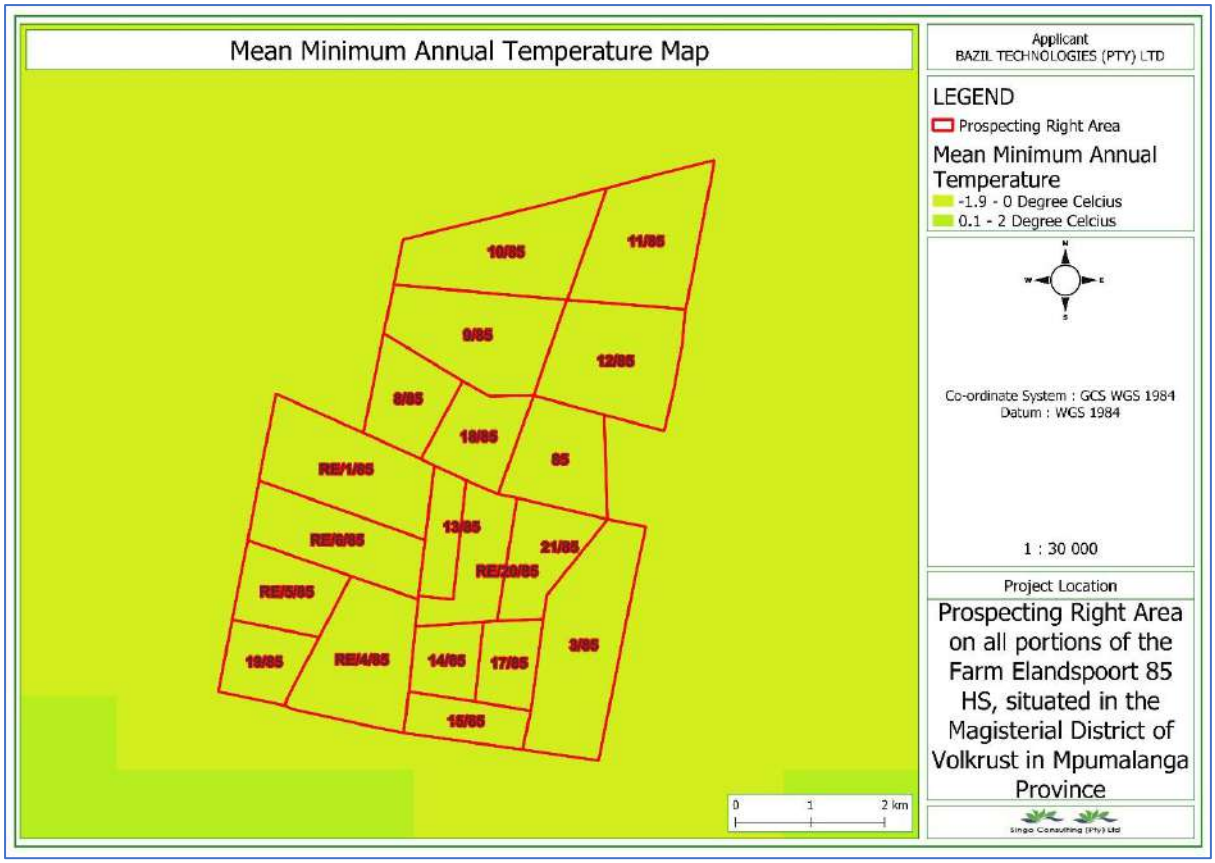

Figure 3: Mean annual rainfall of the project area.

5.2 Soil classes of the project area

The soil classes map in Figure *4* below, shows that the Prospecting Right area is largely covered with Association of Classes 17 and 19: Structureless and textural contrast soils.

5.2.2 Association of Classes 17 and 19 :Structureless and textural contrast soils.

The Association of Classes 17 and 19 :Structureless and textural contrast soils can be defined based on their soil depth, Soil Drainage, erodibility.

Soil depth

Depth of the soil profile is from the top to the parent material or bedrock. This type of soil can be classified as a restricted soil depth. A restricted soil depth is a nearly continuous layer that has one or more physical, chemical, or thermal properties.

Soil Drainage

Soil drainage is a natural process by which water moves across, though, and out of the soil because of the force of gravity. The soils in the proposed area have an excessive drainage due to the soils having very coarse texture. Their typical water table is less than 150.

Erodibility

Erodibility is the inherent yielding or non-resistance of soils and rocks to erosion. The freely drained structureless soils have high erodibility. A high erodibility implies that the same amount of work exerted by the erosion processes lead to a larger removal of material.

Natural Fertility

Soil fertility refers to the ability of soil to sustain agricultural plant growth, i.e., to provide plant habitat and result in sustained and consistent yields of high quality. The soil, as a nature of them, contains some nutrients which is known as 'inherent fertility'. Among the plant nutrients, nitrogen, phosphorus, and potassium is essential for the normal growth and yield of crop. The proposed area has a low natural fertility soil.

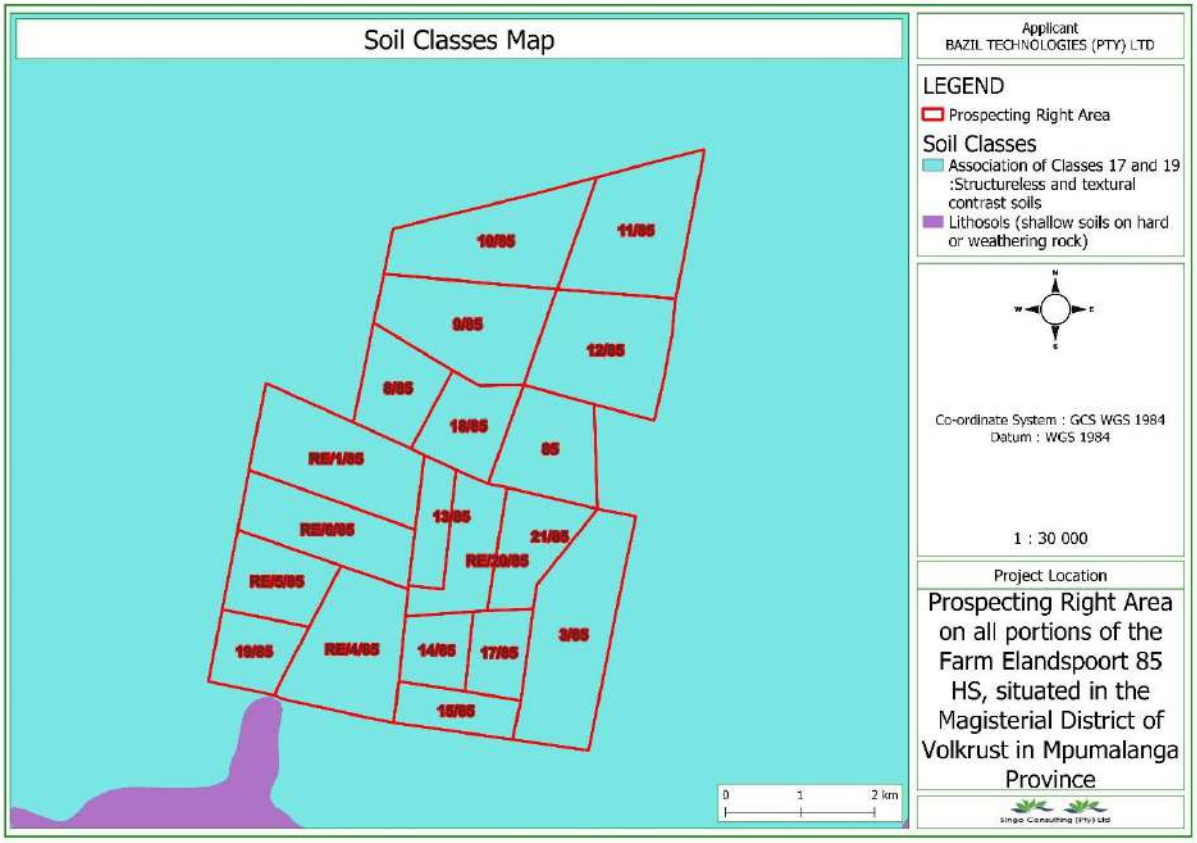

Figure 4: soil class map of the project area.

5.3 Land use

Figure *5* below is a map of the land uses found in the area. The prospecting right area is covered with plantations, natural vegetation, wetlands, cultivated land, uncategorized land, Waterbodies and Built- up land.

5.3.1 Cultivated Land

Cultivated land is the area of land that are ploughed and/or prepared for raising crops (excluding timber production). It includes areas currently under crop, or land being prepared.

5.3.2 Natural Vegetation

Natural vegetation refers to a plant community, which has grown naturally without human aid and has been left undisturbed by humans for a long time.

5.3.3 Built- up land

Is a human settlement with a high population density and infrastructure of built environment. Built up land can also be defined as land which is 'irreversibly urban in character', meaning that they are characteristic of a village, town, or city. They include areas of built-up land with a minimum of 20 hectares (200,000m2). Any areas with less than 200 metres between them are linked to become a single built-up area.

5.3.4 Waterbodies

A body of water or waterbody is any significant accumulation of water, generally on a planet's surface. The term most often refers to oceans, seas, and lakes, but it includes smaller pools of water such as ponds, wetlands, or more rarely, puddles.

5.3.5 Wetlands

A wetland is a distinct ecosystem that is flooded by water, either permanently or seasonally. Flooding results in oxygen-free (anoxic) processes prevailing, especially in the soils. The primary factor that distinguishes wetlands from terrestrial landforms or water bodies is the characteristic vegetation of aquatic plants, adapted to the unique anoxic hydric soils.

5.3.6 Plantations

A plantation is a large-scale estate, generally centered on a plantation house, meant for farming that specializes in cash crops. The crops that are grown include cotton, coffee, tea, cocoa, sugar cane, opium, sisal, oil seeds, oil palms, fruits, rubber trees and forest trees.

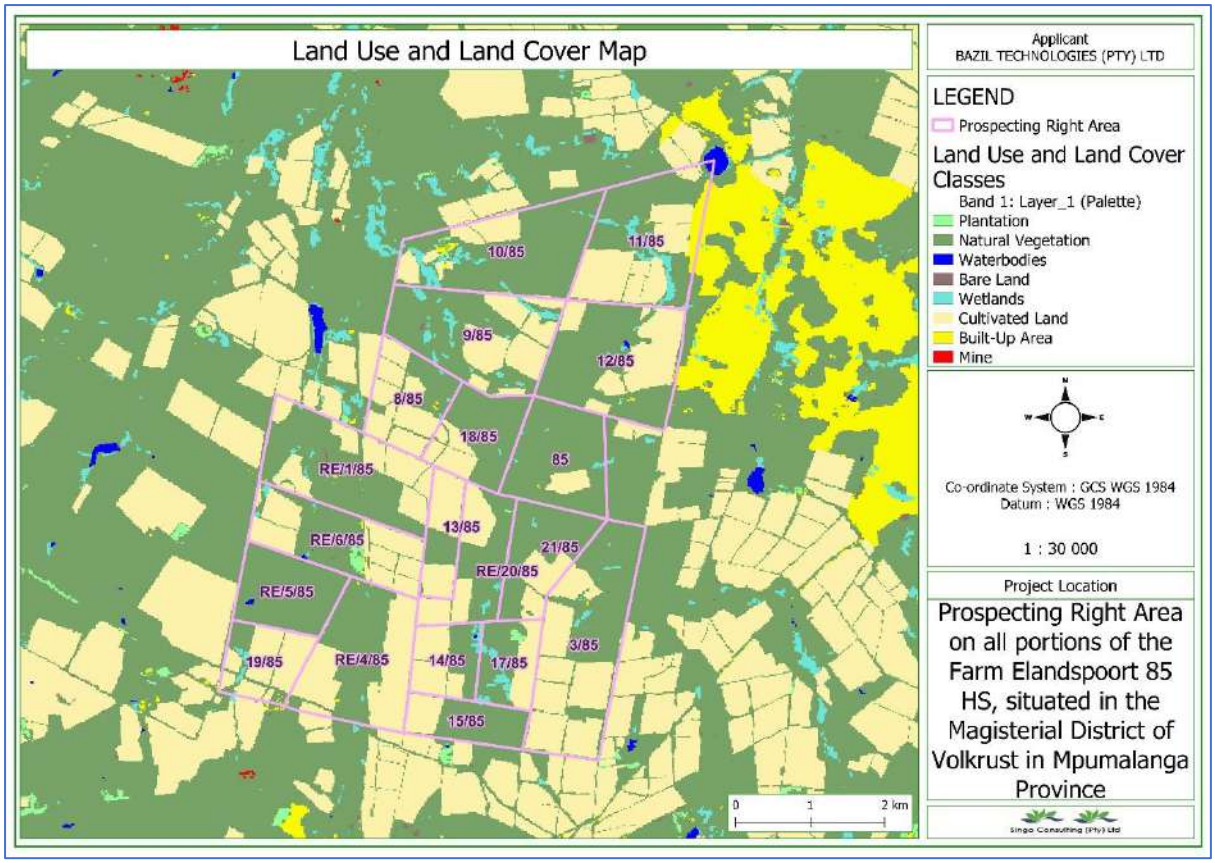

Figure 5: Land use and land cover map.

5.4 Land Capability

The Land capability classification is one of several interpretation groups that was made for agricultural purposes. As with all the interpretation groups, the land capability classification starts with one soil-mapping unit, which is the building block of the system.

The land capability is classified into grazing, arable and wilderness. In this classification the arable soils are grouped according to their potentialities and limitations for sustained production of the common cultivated crops that do not require specialized site conditioning or site treatment. Nonarable soils (soils unsuitable for long time sustained use for cultivated crops) are grouped according to their potentialities and limitations to produce permanent vegetation and according to their risks of soil damage if mismanaged. The land capability of the proposed area is classified as grazing land. Arable land is any land capable of being ploughed and used to grow crops. Figure 6 shows that the proposed area has grazing potential.

The capability grouping of soils is designed:

0. to help landowners and others use and interpret the soil maps,

1. to introduce users to the detail of the soil map itself, and
2. to make possible broad generalizations based on soil potentialities, limitations in use, and management problems.

The capability classification provides three major categories of soil groupings:

0. Capability unit,
1. capability subclass, and
2. capability class.

The first category, capability unit, is a grouping of soils that have about the same responses to systems of management of common cultivated crops and pasture plants. Soils in any one capability unit are adapted to the same kinds of common cultivated and pasture plants and require similar alternative systems of management for these crops. Long-time estimated yields of adapted crops for individual soils within the unit under comparable management do not vary more than about 25 percent.

The second category, the subclass, is a grouping of capability units having similar kinds of limitations and hazards. Four general kinds of limitations or hazards are recognized: (1) Erosion hazard, (2) wetness, (3) rooting zone limitations, and (4) climate.

The third and broadest category in the capability classification places all the soils in eight capability classes. The risks of soil damage or limitations in use become progressively greater from class I to class VIII. Soils in the first four classes under good management can produce adapted plants, such as forest trees or range plants, and the common cultivated field crops ^ and pasture plants. Soils in classes V, VI, and VII are suited to the use of adapted native plants. Some soils in classes V and VI are also capable of producing specialized crops, such as certain fruits and ornamentals, and even field and vegetable crops under highly intensive management involving elaborate practices for soil and water conservation. Soils in class VIII do not return on-site benefits for inputs of management for crops, grasses, or trees without major reclamation.

The grouping of soils into capability units, subclasses, and classes is done primarily based on their capability to produce common cultivated crops and pasture plants without deterioration over a long period of time. To express suitability of the soils for range and woodland use, the soil mapping units are grouped into range sites and woodland-suitability group.

Table 4: Relationship of soil-mapping unit to capability classification (Source: (KELLOGO, 1961))

Soil-mapping unit	**Capability unit**	**Capability subclass**	**Capability class**
A soil mapping unit is the part of the landscape' that has the same qualities and characteristics and whose limits are static by accurate definitions. Within the cartographic limitations and considering the purpose for which the map is made, the soil mapping unit is the unit at which the highest number of accurate statements and predictions can be done. The soil mapping units gives more information about the details of soils. The basis for all the interpretation is the basic mapping units. They provide the information required for the development of capability units, forest site groups, crop suitability	A group of one or more individual soil mapping units having similar potentials and continuing limitations or hazards is termed as capability unit. The soils in a capability unit are sufficiently uniform to (1) produce similar kinds of cultivated crops and pasture plants with similar management practices, (2) require similar conservation treatment and management under the same kind and condition of vegetative cover, (3) have comparable potential productivity. The capability unit condenses and simplifies soils information for planning individual tracts of land, field by field. Capability units with	are the groupings of capability units that have the same major conservation problem are called Subclasses. The problems include— 1. e >Erosion and runoff. 2. w >Excess water. 3. s >Root-zone limitations. 4. c >Climatic limitations. The information about the involved limitations and the kind of problems related to conservation are provided by capability Subclass. The information about the map user relating to the limitation degree and the kind of problems involved in broad program planning, conservation need	Capability classes are groups of capability subclasses or capability units that have the same relative degree of hazard or limitation. The limitation and risks of soil damage in use become more from class I to class VIII. The capability classes are useful as a means of introducing the map user to the more detailed information on the soil map. The classes show the location, amount, and general suitability of the soils for agricultural use. Only information concerning general agricultural limitations in soil use are obtained at the capability class level.

groups, range site groups, engineering groups, and other interpretation groups. The most specific management ways and estimated yields relates to the individual mapping unit.	the class and subclass furnish information about the degree of limitation, kind of conservation problems and the management practices needed.	studies, and similar purposes are provided by the class and sub class.	

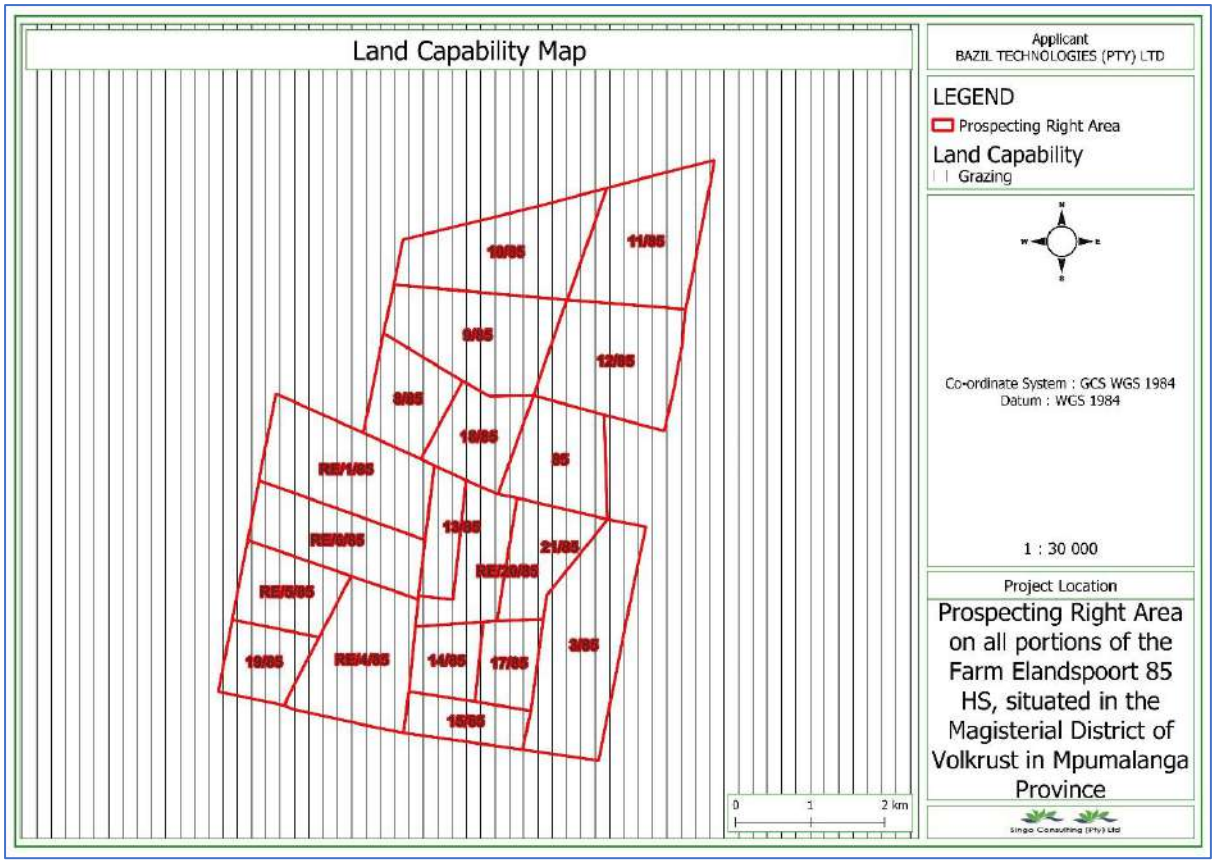

Figure 6: Land Capability map

6 Potential Environmental Impacts

During Coal resource prospecting phase, the work carried out will mainly be mapping, logging, sampling, and diamond core drilling to investigate the existence of the expected mineralization, the thickness of the orebodies and its distribution. Core logs will be taken off-site to be sampled and analysed. During these activities only 1.35 hectares space will be disturbed.

The topography and natural drainage lines may also be disturbed. The overall impact will be loss of topsoil as a result of erosion as well as potential contamination of the soil, fuel, and oils (hydrocarbons) as a result of the drill rigs that will be used during core drilling.

Prospecting activities will however not change or alter the land use from natural, cultivated. The pathways that will be developed during prospecting will be temporary and not paved, they should be rehabilitated and closed after prospecting. No toxic chemicals are anticipated to flow within the soils as the operation will not involve any mining activity or blasting.

7 Impact Assessment

The environmental impact assessment is designed to identify impacts related to prospecting activities and how to mitigate these impacts. It is anticipated that with the correct mitigation measures being put in place these impacts can be reduced. The rating of impacts is based on the type of activity that will be undertaken. Similar activities that will have the same impact to soil, land use and land capability have been grouped together and discussed for impacts, such as loss of topsoil as a resource.

When the impact rating is significantly different because of the activity, a separate rating has been given for those activities. The activities, such as chrome ore prospecting would potentially have a lower impact on soil, land capability and land use as these areas are less disturbed. For the purpose of this impact assessment activities that are located within relatively undisturbed areas have been rated together and all other activities falling within the prospecting area have been rated together with respect to the level of the impacts.

7.1 Prospecting Phase

Topsoil will not be removed as there will not be any mining related activities taking place. No foundation excavations will be needed for fuel storage depot as fuel will be transported to site daily during the drilling phase.

Table 5: Loss of topsoil as a resource, erosion, and compaction

Criteria	Details / Discussion
Description of impact	During diamond core drilling the land clearance and earthworks will have a minor impact. Even though soil will be cleared from most of the areas where infrastructure will be placed, areas that are not disturbed by the drilling will remain in their current land use. The boreholes footprint will be minimal. The pathways to be created to provide access of the drill rig can cause compaction of soil. During clearance of vegetation there is a greater risk, when compared to other areas, that topsoil would be exposed and there are potential risks for increased erosion in these areas

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	during rainfall events, resulting in a potential loss of soil as a resource. In addition, wind erosion would be greater as these areas are exposed as a result of the removal of vegetation.
Mitigation required	• Pathways are to be stripped when the soil is dry (as far as practical possible), as to reduce compaction; and • To be stripped according to the stripping guideline and management plan, and further recommendations contained within the rehabilitation plan. • Minimize the period of exposure of soil disturbances through a planning schedule

8 Soil Management Plan

8.1 Background

More important than chemical imbalances which can be easily restored at cost, is soil compaction and volumes of replacement during soil reclamation. Heavy drill rigs equipment to be used during prospecting may lead to areas of decreased soil and land capabilities. Such areas have limited land use options and specialized management needs. However, this impact will be minimal.

8.2 Physical mitigation

The soil to retain and supply nutrients must be assessed during prospecting operation and during borehole rehabilitation phase. Erosion and storm water runoff management measures as per EMP requirement to prevent or if prevention is impossible, limit any erosion from occurring on the drilling areas and surroundings and any storm water runoff from the activity's areas. Good quantity and quality topsoil are an essential ingredient in the process of soil reclamation.

Factors leading to decay in soil quality are:

- Contamination impacts on soil quality
- Erosion impacts on soil volume

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- Undifferentiating storage impacts on soil quality and
- Undifferentiating use impacts on soil volume.

Therefore, care must be taken during the prospecting process to prevent compaction and to replace soil volumes back to a representative pre-process plant soil and land capability while emulating the pre prospecting landscape.

8.3 Soil quality indicators

Deciding on and monitoring soil quality indicators during soil impacts and reclamation can significantly improve the chances of reclaiming soil to a sustainable resource. The following actions should form part of monitoring soil quality and rehabilitation sustainability:

- Visual soil assessment by a specialist
- Soil quality monitoring system
- Visual assessment should include specialist scoring of water ponding, plant vigour, yield, tilth, earthworms, runoff, ease of tillage, soil colour, soil aroma, soil structure and cloddiness.
- Soil quality monitoring should include bulk density, infiltration rate, water holding capacity, electrical conductivity, pH, soil nitrate and microbial activity.

To ensure sustainability from agricultural soil potential point of view, reclamation should be reclaimed back to cultivation land capacity.

Organic matter must be added back into the soil so that soil should be pre-mixed with organic material and placed back last to a depth of at least 300 mm. Continuous visual and soil quality monitoring as mentioned under the soil quality indicators above should ensure that the best possible soil reclamation procedure is followed.

Vehicle movements must be restricted to freshly dumped soil to prevent compaction as much as possible.

9 Conclusion and Recommendations

A soil, land use and land capability investigation were conducted for the proposed Coal resource prospecting project. The topographical, land use and soil type data available for the site were compiled using both desktop and field assessment data to determine the potential impacts of the prospecting activities.

The following conclusions are made in this study:

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- The proposed area is covered with Association of Classes 17 and 19: Structureless and textural contrast soils.
- It is anticipated that the Coal resource prospecting activities will not lead to severe loss of soils and degradation of agricultural potential.
- The exploration geologist will be advised to drill and sample more than 500m away from the waterbody on site.
- The prospecting boreholes must be cased after drilling and properly rehabilitated by cap sealing the borehole after drilling.
- The core of Coal resource on the drilled boreholes, should be cleared from the ground immediately after logging by a geologist, to prevent washing and leaching on the water resources during precipitation events.
- Absorbent Spill kits will be made available near the drill rigs during drilling activities.

10 References

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Appendices

Appendix A: Specialists qualifications

Available upon request

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