

DRAFT BASIC ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR) FOR AN AMENDMENT (SECTION 102) OF THE EXISTING COAL PROSPECTING RIGHT (RENEWAL REF MP 30/5/1/1/2/17003 PR) ON ALL THE PORTIONS OF THE FARM GROOTRIETVALLEI 64 HT, WAKKERSTROOM MAGISTERIAL DISTRICT, MPUMALANGA PROVINCE.



APPLICANT:

MASHININI (PTY) LTD

Stand No. 117 Fredenheim Farm
Nelspruit
P.O BOX 15489
Nelspruit
Applicant: Gugu Mkhathswa
Cell: +27 76 2772 094
Email: gugu@mashinini.co.za

CONSULTANT:



Singo Consulting (Pty) Ltd

P/Bag X7297, Postnet Suite 87,
Witbank, 1035
Office 870
05 Balalaika St
Tasbet Part Ext 2
Witbank
EAP: Owen Netshavha
Cell: 0767756389
Email: owen@singoconsulting.co.za
admin@singoconsulting.co.za





mineral resources & energy

Department:
Mineral Resources and Energy
REPUBLIC OF SOUTH AFRICA

DRAFT 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).

NAME OF APPLICANT	MASHININI (PTY) LTD
TEL NO:	+27 76 277 2094
POSTAL ADDRESS:	STAND NO. 117 FREDENHEIM FARM
PHYSICAL ADDRESS:	STAND NO. 117 FREDENHEIM FARM
FILE REFERENCE NUMBER SAMRAD:	RENEWAL REF: MP 30/5/1/1/2/ 7003 PR

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Where site inspections, testing or fieldwork have taken place, the report is based on the information made available by the applicant 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.

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 Authorisation 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 authorisation 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 Authorisation 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—
 - (aa) can be reversed;
 - (bb) may cause irreplaceable loss of resources; and
 - (cc) can be managed, avoided or mitigated;
- e. (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

The Department of Environmental Affairs (DEA) has identified the need for the alignment of environmental authorisations and has promulgated a single environmental management system under NEMA whereby the DMR has become the competent authority for the authorisation of mining related projects under the NEMA Environmental Impact Assessment (EIA) Regulations. This will result in simultaneous decisions in terms of NEMA and other environmental management Acts.

Since the proposed prospecting project triggers activities listed in Listing Notice 1 of the NEMA, a Basic EIA authorisation process in terms of NEMA Government Notice Regulation (GNR) 982 (as amended by GNR325 of 7 April 2017) will be required.

Before an Gold, Cobalt, Chrome, Copper, Iron, mining process can be planned and built, a number of tests and surveys must be conducted to ensure that the project is economically viable, technically feasible, and

environmentally sound. Assessment of the geological information available has determined that the area in question may have good quality Gold, Cobalt, Chrome, Copper, Iron, reserves. To ascertain the above and determine the nature, location and extent of the reserves within the proposed prospecting area, it will be necessary that prospecting be undertaken. The prospecting will also determine if there are any features that may have an impact on the economic extraction of the Gold, Cobalt, Chrome, Copper, Iron.

The proposed prospecting project will consist of non-invasive and invasive (drilling sampling) activities. On surface, invasive methods include 10 diamond core drill boreholes. Non-invasive methods will include analytical desktop studies, geological mapping and decision-making on the viability of the project.

Most of the rehabilitation will be conducted while prospecting activities are undertaken. The final rehabilitation will be done once the prospecting activities have been completed at a site and before the drilling team leaves the site.

The stakeholder engagement process, as part of the Environmental Authorisation process, is conducted in terms of NEMA (as amended) which provides clear guidelines for stakeholder engagement during an EIA. One of the general objectives of integrated environmental management set out in Section 23(2) of NEMA is to ensure the “adequate and appropriate opportunity for public participation in decisions that may affect the environment”.

The stakeholder engagement process is primarily aimed at affording Stakeholders and Interested and Affected Parties (I&APs) the opportunity to gain an understanding of the project. In addition, the purpose of consultation with the landowner, affected parties and communities is to provide them with the necessary information about the proposed project so that they can make informed decisions as to whether and to which degree the project will affect them. In addition, the purpose of consultation with the Stakeholders and I&APs is to provide the competent authority with the necessary information for them to make informed decisions.

Before an EAP submits a final report, they must have given registered I&APs access to, and an opportunity to comment on the report prior to the submission of the final report to the competent authority for approval.

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List of abbreviations

BAR:	Basic Assessment Report
C Plan:	Conservation Plan
CBAs:	Critical Biodiversity Areas
CPR:	Competent Person's Report
CRR:	Comments and Responses Report
CV:	Curriculum Vitae
DEA:	Department of Environmental Affairs
DM:	District Municipality
DMR:	Department of Mineral Resources
DWS:	Department of Water and Sanitation
EA:	Environmental Authorisation
EAP:	Economic Active Population
EAP:	Environmental Assessment Practitioner
ECO:	Environmental Control Officer
EHS:	Environmental Health and Safety
EIA:	Environmental Impact Assessment
EMF:	Environmental Management Framework
EMPr:	Environmental Management Programme
ESA:	Ecological Support Area
GA:	Generally Authorised
GIS:	Geographic Information Systems
GNR:	Government Notice Regulation
GNR:	Government Notice Regulation
GSSA:	Geological Society of South Africa

I&APs:	Interested and Affected Parties
IDP:	Integrated Development Plans
LM:	Local Municipality
LUDS:	Land Use Development System
MPRDA:	Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002)
NEM:BA:	National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004)
NEM: WA:	National Environmental Management Waste Act (Act No. 59 of 2008)
NEMA:	National Environmental Management Act (Act No. 107 of 1998)
NFEPA:	National Freshwater Ecosystem Priority Areas
NGA:	National Groundwater Archive
NHRA:	National Heritage Resources Act, 1999 (Act 25 of 1999)
NWA:	National Water Act, 1998 (Act 36 of 1998)
PM:	Particulate Matter
RDP:	Reconstruction and Development Programme
SAHRA:	South African Heritage Resources Agency
SAHRIS:	South African Heritage Resources Information System
SANBI:	South African National Biodiversity Institute
SANS:	South African National Standards
SAPD:	South African Police Department
SCC:	Species of Conservation Concern
SDF:	Spatial Development Framework
SDF:	Spatial Development Framework
WMA:	Water Management Area
WUL:	Water Use Licence

3 Project background

Mashinini Trading (Pty) Ltd applied for a coal prospecting right section 16 of the MPRD (Act No. 28 of 2002) on the all the portions of the farm Grootrietvallei 64 HT, Wakkerstroom Magisterial District, Mpumalanga Province. The Competent Authority the Mpumalanga DMRE granted the Prospecting Right to Mashinini Trading (Pty) Ltd in terms of Section 17 of the MPRD (Act No. 28 of 2002). From the granting letter it was highlighted that the prospecting right shall commence on 14th October 2015 and, unless cancelled or suspended in terms of section 47 of the Act, will continue in force for a period of Three (3) years ending on 13th October 2018.

The period of prospecting expired before prospecting occurred, due to delayed execution of Prospecting Right, lack of access to the site, financial constraints. The lack of access to site was a major concern as it delayed the activities such as geological field mapping, exploration drilling of initial single prospect holes in proximity to the outcrop of the Vryheid formation (shallowest areas); and further delayed downhole geophysical survey. Mashinini Trading (Pty) Ltd appointed Singo Consulting (Pty) Ltd to renew the existing application, after the renewal of the application (Renewal Ref MP 30/5/1/1/2/17003 PR), the engagement with the landowner was done to request access to drill.

The exploration conducted on the aforesaid farm has proved that there are other minerals (Gold, Cobalt, Chrome, Copper, Iron, Manganese, Nickel, Silver, and Zinc) that were not granted on the prospecting right, Hence the appointed consultant should amend the existing prospecting right through **section 102**. The application has been renewed for 3 years and new boreholes (10) are proposed for detailed exploration of the new minerals (Gold, Cobalt, Chrome, Copper, Iron, Manganese, Nickel, Silver, and Zinc).

The process will involve conducting of Environmental Impact Assessment (EIA), Compile an Environmental Management Programme report (EMPr) and undertake Public Participation Process (PPP).The stakeholder engagement process, as part of the Environmental Authorisation process, is conducted in terms of NEMA (as amended) which provides clear guidelines for stakeholder engagement during an EIA. One of the general objectives of integrated environmental management set out in Section 23(2) of NEMA is to ensure the “adequate and appropriate opportunity for public participation in decisions that may affect the environment”.

The stakeholder engagement process is primarily aimed at affording Stakeholders and Interested and Affected Parties (I&APs) the opportunity to gain an understanding of the project. In addition, the purpose of consultation with the landowner, affected parties and communities is to provide them with the necessary information about the proposed project so that they can make informed decisions as to whether and to which degree the project will affect them. In addition, the purpose of consultation with the Stakeholders and I&APs is to provide the competent authority with the necessary information for them to make informed decisions.

Before an EAP submits a final report, they must have given registered I&APs access to, and an opportunity to comment on the report prior to the submission of the final report to the competent authority for approval. Currently we have community members interested in doing business with the applicant should this project gets to be approved, other authorities are interested in environmental management.

4 Purpose and context of this document

The project triggers activities listed in terms of Listing Notices 1 of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) (as amended) and will require an Environmental Authorisation (EA) from the Department of Mineral Resources (DMR), Mpumalanga Province.

This document serves as the draft Basic Assessment Report (Draft BAR) and includes the following objectives as a minimum:

- To comply with the requirements of NEMA and associated Regulations;
- Identify and assess the environmental (biophysical, socio-economic, and cultural) impacts of activities associated with decommissioning and closure of the cement-ash mixing plant. The cumulative impacts of the proposed development will also be identified and evaluated;
- Identify and evaluate potential management and mitigation measures that will reduce the possible negative impacts of the proposed development and enhance the positive impacts;
- Compile monitoring, management, mitigation and training needs in the EMP; and
- Provide the decision-making authorities with sufficient and accurate information in order to make a sound decision on the proposed development and set conditions that must be adhered to.

All activities that trigger activities listed in GNR 983 require that a Basic Assessment (BA) process be followed.

The BA process will entail:

- Compilation of an Initial Draft BAR and draft EMP for the public to comment on before the submission of the application to DMR.
- Submission of the EA Application to the DMR.
- Finalisation of the Draft BAR and EMP for the official public participation comment period of 30 days.
- Incorporation of stakeholder comments into the final BAR and EMP.
- Public Participation Process (PPP).

5 Contact Person and Correspondence Address

5.1 Details of EAP who prepared the report.

The EAP involved in the compilation of this BAR and her contact details are provided in Table 5-1 below:

Table 5-1: EAP Contact Detail

Details of the EAP who prepared the report:

Name of Practitioner	Mr Netshiavha Tshifhiwa
Designation	Junior Consultant
Tel No.	013 692 0041
Fax No.	086 514 4103
Email address	owen@singoconsulting.co.za

Details of the EAP who reviewed the report:

Name of Practitioner	Dr N.K Singo
Designation	Principal EAP
Tel No.	013 692 0041
Fax No.	086 514 4103
Email address	kenneth@singoconsulting.co.za

In terms of Regulation 13 of the NEMA 2014 EIA Regulations (Government Notice 326), an independent EAP must be appointed by the Applicant to manage the application. Singo Consulting (Pty) Ltd have been appointed by the Applicant as the EAP and are compliant with the definition of an EAP as defined in the 2014 EIA Regulations and the NEMA.

This includes, inter alia, the requirement that Singo Consulting (Pty) Ltd is:

- Objective and independent.
- Have expertise in conducting EIAs.
- Comply with the NEMA, the Regulations and all other applicable legislation.
- Take into account all relevant factors relating to the application.

Provide full disclosure to the Applicant and the relevant environmental authority

6 Project Location

6.1 Property Description

The description of the affected property is provided in Table 6-1 and map showing the affected property.

Farm Name:	All portions of the Farm Grootrietvallei 64 HT
Application area (Ha)	1 227.83 Hectares
Magisterial district:	Magisterial District of Wakkerstroom
Distance and direction from nearest town	Approximately 40.85 km West of Piet Retief
21-digit Surveyor General Code for each farm portion	TOHT00000000006400000 TOHT00000000006400003 TOHT00000000006400002 TOHT00000000006400001

No	Farm Name	Farm/ Erf No	Portion	Latitude	Longitude	Property Type
1	GROOTRIETVALEI	64	0	27°8'15.67S	30°22'36.33E	Farm
2	GROOTRIETVALEI	64	2	27°8'50.98S	30°23'36.78E	Farm Portion
3	GROOTRIETVALEI	64	1	27°8'19.05S	30°22'18.08E	Farm Portion
4	GROOTRIETVALEI	64	3	27°8'22.04S	30°23'23.35E	Farm Portion
5	GROOTRIETVALEI	64	0	27°7'40.68S	30°23'1.32E	Farm Portion
6	GROOTRIETVALEI	64	4	27°8'46.49S	30°23'42.21E	Farm Portion

The proposed prospecting right area is located approximately 24.1 km northwest of Kangra coal mine, 8.4 km southeast of Dirkiesdorp area, 50.4 km south-west of Wakkerstroom and it can be accessed through R543. In the Wakkerstroom area, the farm Grootrietvallei is underlain by rocks of the Vryheid Formation, with the mountain tops being capped by dolerite.

The Mpumalanga province occupies the eastern side of South Africa. It is surrounded by the Limpopo, Gauteng, Free State and KwaZulu-Natal provinces, as well as Swaziland on the east. The project is located in Piet Retief under Mkhondo Local Municipality within Gert Sibande District, see Figure below.



Figure 1: Gert Sibande District

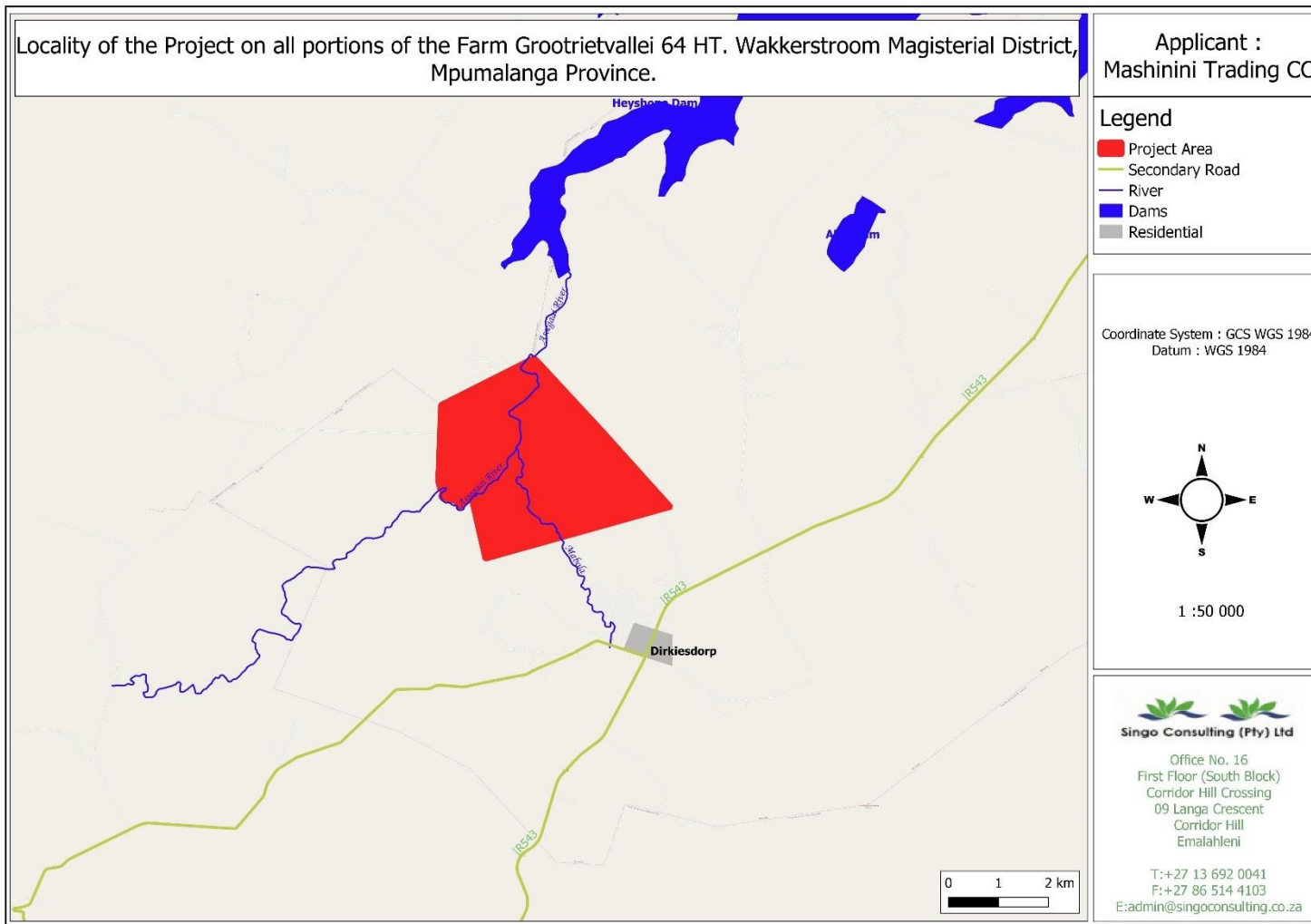


Figure 2: Locality Map

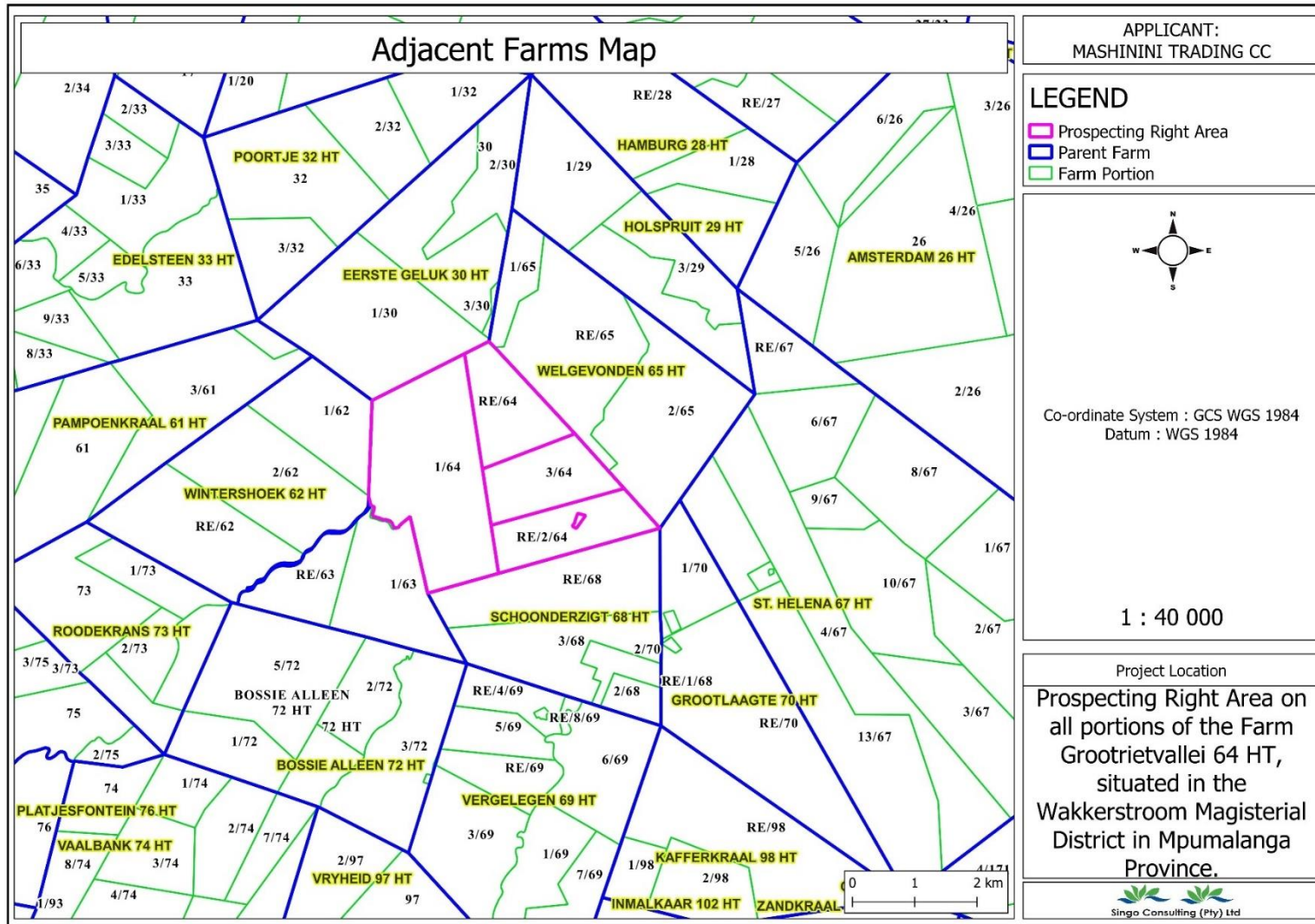


Figure 3: Adjacent farms

7 Description of the Scope of the Proposed Overall Activity

7.1 Overview

Prospecting will consist of non-invasive and invasive (drilling sampling) activities. The review of available information that exists over the area of interest will be undertaken by means of conducting a literature review from satellite images and other available information.

Prospecting will be conducted over a period of 3 years and will be categorized into phases, wherein phase 1 will be desktop study followed by RC and diamond drilling in phase 2. Phase 3 will be a completion studies and pre-feasibility. The machines and vehicles that will be used have been proven to be trusted to carry out the prospecting activities optimally. These machines and vehicles make use of hydrocarbon fuels such as diesel, petrol and oil.

7.2 Phase 1 (Literature Review)

Existing data on the area of study with relation to the topography, geology, mineralogy, geophysics, hydrology etc. will be to be analysed. This data will aid in determining the amount of potential that area carries in terms of mineralisation and the factors that affect it and its extraction thereof. The report that will be produced from this study will inform the next stage which is geological mapping.

The non-invasive prospecting work will take approximately twelve (12) months and will compile the relevant data and observations from the recent and historical work done on site. The deliverables will be a detailed report and maps highlighting areas with the best potential to contain targeted minerals.

Once this information has been assessed in detail, it will be used to further develop and refine the ongoing prospecting activities. Aerial photographs and a high-resolution satellite image will be acquired for the prospecting right application so that a target identification process using both desktop study and geological mapping can be executed. Both desktop study and geological mapping interpretations will be used to focus future prospecting activities.

After the Desktop Study, a site geological mapping will be undertaken.

This is a process of physically locating the targeted ore body outcrop while obtaining detailed information about it. This information includes the strike and dip of the outcrop, the colour, the grain size and shape amongst others. The result of this stage will be a detailed geological map of the study area which will be correlated with the other maps obtained during the desktop study.

7.3 Phase 2 (Drilling)

This phase of drilling will consist of RC and diamond drilling (Figure 7-1) and will consist of drilling approximately 10 boreholes. The prospecting drilling campaign will be aimed at defining the extent of mineralisation and will demonstrate geological continuity of the mineralized zone across the entire area under investigation (application area). Numerous samples will be collected and tested in a registered laboratory.

RC drilling involves the process of crushing the rock material into fragments. Using air pressure, the rock fragments are lifted up the hole into the cyclone where they are collected into sample bags. A rifle splitter is used to homogenize the sample and to split it into two. The weights of the samples are recorded. Part of the one sample is washed and placed into a labelled chip tray after logging by the Field Geologist. This sample is stored for future reference. The remainder of the logged sample is labelled while still in the sample bag and taken to an accredited laboratory for analysis. Detailed geological, grade resource models and mineral resource estimates will be the result of this phase. Borehole collars will be covered by labelled slabs, and the position measured by GPS. Each drill borehole and sample site will be rehabilitated as prospecting proceeds.

7.4 Phase 3: Analytical Desktop Studies and Decision Making:

The project geologist monitors the programme, consolidates and processes the data and amends the programme depending on the results. This is a continuous process throughout the programme and continues even when no prospecting is done on the ground.

Each physical phase of prospecting is followed by desktop studies involving interpretation and modelling of all data gathered. These studies will determine the way the work programme is to proceed in terms of activity, quantity, resources, expenditure and duration.

A GIS based database will be constructed capturing all exploration data.

Table 1: Project Phases and Requirements

Phase	Activity (what are the activities that are planned to achieve optimal prospecting)	Skill(s) required (refers to the competent personnel that will be employed to achieve the required results)	Timeframe (in months) for the activity)	Outcome (What is the expected deliverable, e.g., Geological report, analytical results, feasibility study, etc.)	Timeframe for outcome (deadline for the expected outcome to be delivered)	What technical expert will sign off on the outcome? (e.g., geologist, mining engineer, surveyor, economist, etc.)
1	Non-Invasive	Contractors	1 month	Prospecting ready	Month 12	Mining Engineer
	Setup					
	Non-Invasive	Qualified geologist	5 months	Geological Report		Geologist
	Desktop Study including a Literature Survey of remotely sensed data and other available historic data					
Geological mapping	Qualified geologists	6 months	Detailed progress report and a geological map.	Geologist		
2	Invasive					
	Drilling (10 Boreholes)					

	Logging and sampling	Qualified geologists	6 months	Drill chips and core Geological log and assay results	Month 18	Senior geologists
3	Non-Invasive	Qualified geologists	6 months	Geological model and resource estimate	Month 24	Resource Geologist
	3D geological model and resource estimation					Principal Geologist
	Feasibility study			An appraisal of the feasibility of the project		

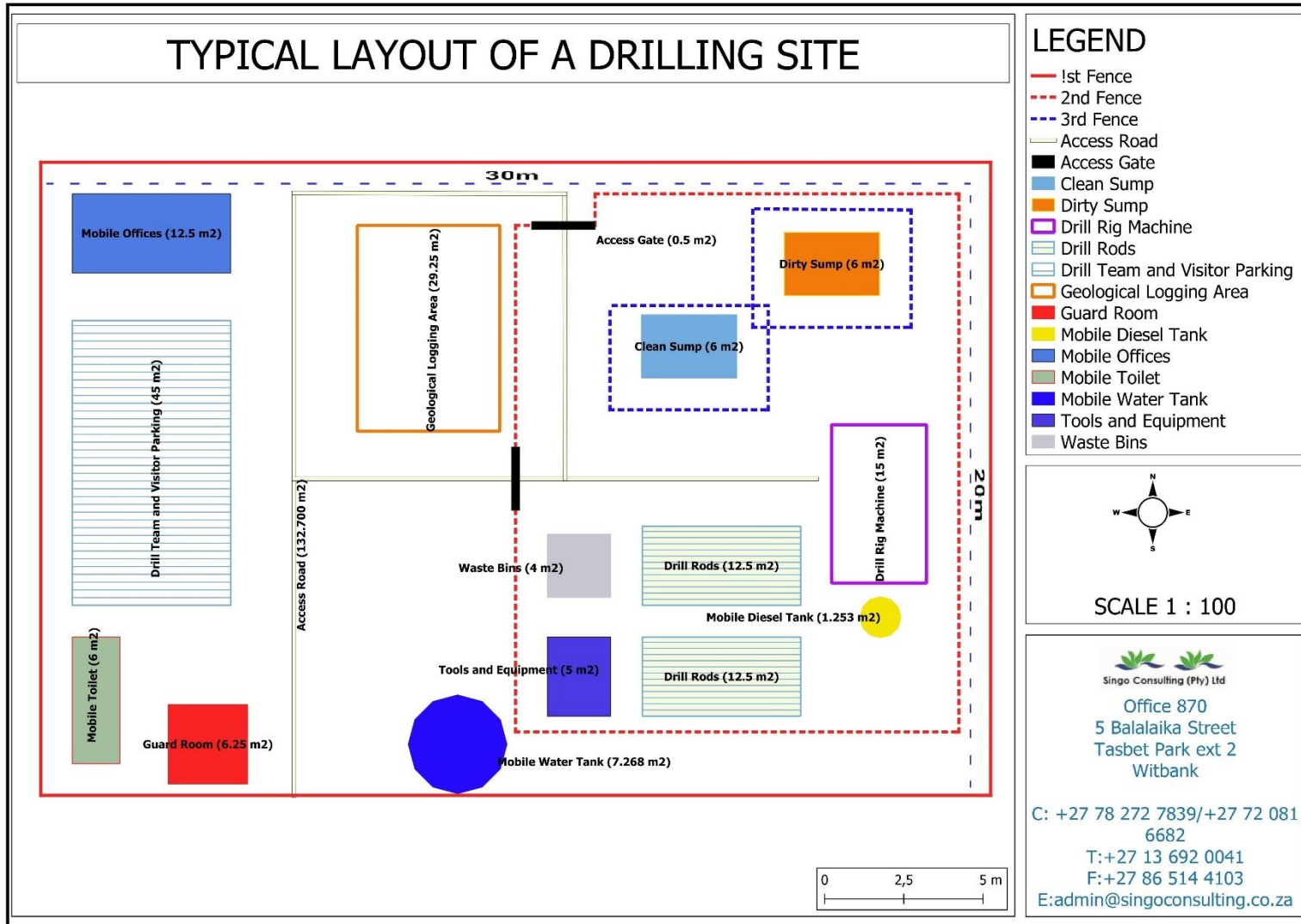


Figure 4: Drilling Layout Plan

8 Listed and specified activities

Section 16 of the MPRDA requires, upon request by the Minister that an Environmental Management Programme (EMPr) be submitted, and that the applicant must notify and consult with Interested and Affected Parties (I&APs). Section 24 of the NEMA requires that listed activities, which may potentially affect the environment negatively, must obtain an environmental authorisation from a relevant authority before the activities may commence.

Such activities are listed under the EIA Regulations (2014 which has been amended in 2017) and consist of:

- EIA Process (Government Notice Regulation (GNR 517).
- Listing Notice 1 GNR 517– Basic Assessment process,
- Listing Notice 2 GNR 517– Scoping and EIA process.
- Listing Notice 3 GNR 517– Activities in specific identified geographical areas only.

The purpose of these regulations is to avoid negative impacts on the environment, and where these cannot be avoided, ensure the mitigation and management of the impacts to acceptable levels, while optimising positive environmental impacts.

The proposed prospecting activity triggers activities listed in NEMA GNR 517: Listing Notice 1 as follows:

Activity 20: “Any activity including the operation of that activity which requires a prospecting right in terms of section 16 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity as contained in this Listing Notice or in Listing Notice 3 of 2014, required to exercise the prospecting right”.

Table below provides a summary of the identified NEMA listed activities that will be triggered by the prospecting project.

Table 2: Applicable Activities

Name of the activity (All activities including activities not listed)	Aerial extent of the activity in Ha or m ²	Listed activity mark with an x where applicable or affected	Applicable listing notice (GNR 517 or NOT LISTED)
Any activity including the operation of that activity which requires a prospecting right in terms of section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks, directly related to prospecting of a mineral resource, 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).	1 227.83 ha	X	GNR 517 Listing 1, Activity 20
10 Diamond core drillholes	Layout= 20m*30m= 600m ² Disturbance=600m ² *10=6000m ² =6000m ² /10000 =0.6Ha	X	GNR 517 Listing 1, Activity 20
Ablution facility	6m ²		
Fencing (No new fencing will be erected)	-		-
Access roads (Existing Roads will be used)			

Site Office (No site office to be established)			
--	--	--	--

9 Activities to be undertaken.

9.1.1 Prospecting

Please refer to Sections 7.1 to 7.3 for a detailed description of the prospecting activities to be undertaken.

9.1.2 Establishment of Temporary Access Roads

Existing roads will be used.

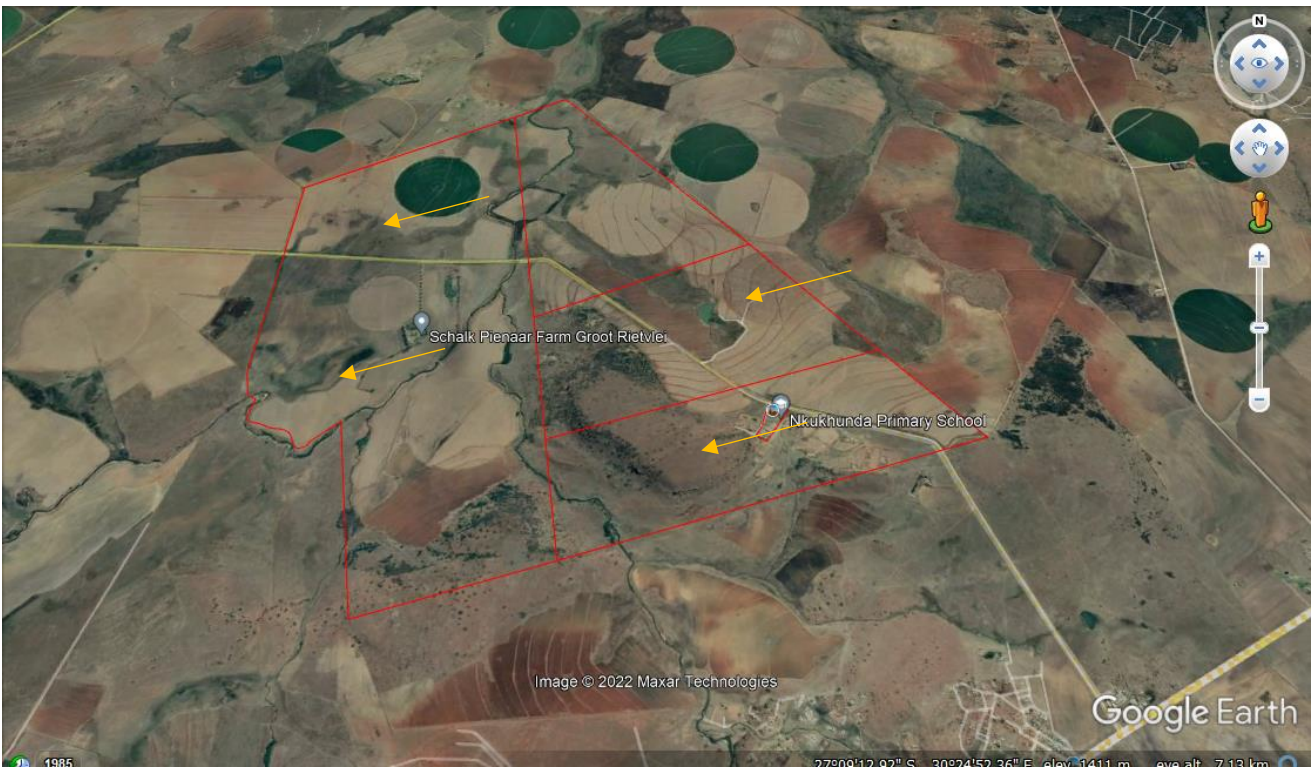


Figure 5: Satellite image showing existing roads

9.1.3 Power

Diesel powered vehicles and machinery will be used for the proposed project.

9.1.4 Water Supply

It is anticipated that water will be brought onto site and trucked to the identified drill sites. Water bowsers will be deployed to the sites as and when required.



Figure 6: Typical Example of water bowser

9.1.5 Ablution Facilities

Portable chemical toilets will be used for the management of sewage waste generated on site.



Figure 7: Typical Example of Ablution to be used

9.1.6 Temporary Site Office Area

A site office will not be necessary, equipment for logging such as chip and core, such as logging sheets, papers, pens and trays will be transported to and from site daily.

9.1.7 Blasting

The Prospecting Works Programme does not allow for bulk sampling therefore no blasting will take place.

9.1.8 Waste Management

Hazardous Waste

Hazardous waste to be generated includes mineral residue, hydrocarbon wastes (oil and liquid fuel wastes) and sewage waste. Hydrocarbon waste will be collected in drums for storage. The removal of the drums or any other appropriate receptacle will be undertaken by a registered waste disposal company, for disposal at a registered licensed waste disposal site. The drums will be placed on protected ground.

Mineral residue will include muds and drilling chips generated during the drilling of the exploration boreholes.

The mineral residue will be removed from the site and disposed of at a registered waste disposal site.

Oil waste and liquid fuel waste include used oils from mine machinery and vehicles and diesel/petrol waste.

General Waste

General waste to be generated from the proposed project area will include domestic waste which includes food containers, smoked cigarette. These will be collected daily to be disposed of at a registered domestic waste disposal site.

Storage of Dangerous Goods (Hydrocarbons)

No diesel fuel, oil and lubricants will be stored on site. These will be transported daily or when required.



Figure 8: Type of waste bins that will be used

9.1.9 Topsoil Stockpiling

Topsoil removed during the construction phase will be stockpiled for later use in the rehabilitation process.

9.1.10 Vegetation Clearance

Vegetation clearance will be necessary where prospecting and construction activities will be taking place. This will be done only in areas where it is required, unnecessary vegetation clearance will be discouraged.

9.1.11 Vehicle Parking

Staff vehicles and other vehicles working on the project will have a demarcated parking.

9.1.12 Geological Activity

After a successful drilling programme, the geologists and hydrologist appointed will undertake the core logging and sampling. This will be done to analysis the mineralogy on the sample so that a competent person report can be drafted with scientific facts.



Figure 9: Geological Core logging and sampling

10 Policy and legislative context

Table 8-1 provides a summary of the applicable legislation, policies and guidelines identified as relevant to the proposed project. In addition, a description of how the proposed activity complies with and responds to the legislation and policy context, is provided. This list is not exhaustive but rather represents an indication of the most applicable pieces of legislation relevant to the project.

Table 8-1: Applicable legislation, policies and guidelines

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WERE APPLIED	HOW DOES THIS DEVELOPMENT AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT

<p>Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA) (As amended)</p>	<p>Addition of Minerals in term of section 102 (Act 28 of 2002) (MPRDA) (As amended)</p>	<p>The application was submitted to the DMRE through online system SAMRAD.</p>
<p>National Heritage Resources Act, 1999 (Act 25 of 1999) (NHRA)</p>	<p>The project may trigger the requirements under Section 38 of the NHRA. However, the requirements for the permits have not yet been established.</p>	<p>The Environmental Management Programme (EMPr) will regulate the applicant to apply for tree removal permits from the South African Heritage Resources Agency (SAHRA) prior to removal or relocation of any heritage resources. The BAR and EMPr will also be submitted to the SAHRA through the South African Heritage Resources Information System (SAHRIS) to determine whether any permits will be required.</p>
<p>National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA)</p>	<p>This Basic Assessment Report (BAR) and Environmental Management Programme (EMP)</p>	<p>An application for an Environmental Authorisation was submitted to the DMR. The BAR and EMPr will be submitted to the DMR once finalised and have been subjected to a public participation process as required by Chapter 6 of the NEMA.</p>
<p>National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) (NEM:BA)</p>	<p>The possibility of the presence of protected flora</p>	<p>The EMPr will regulate the applicant to apply for tree removal permits prior to removal of any sensitive and/or protected species.</p>

National Water Act, 1998 (Act 36 of 1998) (NWA)	Drilling site establishment within 100 m of a watercourse or 500m of a wetland	<p>The South African National Biodiversity Institute (SANBI) National Wetlands database shows that there are no wetlands in the prospecting area. There are also watercourses and drainage lines that may be affected by the project. In terms of the NWA, any activities undertaken within 500 m of a wetland or within 100 m of a watercourse require a Section 21 (c) and (i) Water Use Licence (WUL). Should the impacts of the activities be of low significance, the activities may also be Generally Authorised (GA).</p> <p>Clarification is required from the DWS on whether a WUL or GA will be required.</p>
Municipal Integrated Development Plans (IDPs)	Land Claims	One of the key issues identified by the IDPs is to facilitate the land claims.
Spatial Development Framework (SDF)	Alternatives	There are no identified land claims in the proposed prospecting area.

11 Need and Desirability.

Mining in South Africa has 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 minerals prospected 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 area is situated within the geological formation which is known to host the minerals applied for. The proposed prospecting area falls within the Mkhondo Local Municipality which falls under the Gert Sibande District Municipality. According to the Statistics SA (2007), the mining sector provides over 20% of the gross domestic product (GDP) and approximately 6% employment in the province. According to the Gert Sibande District Municipality Integrated Development Plan (IDP) of 2013/14, sectoral contribution to the regional economy from mining was calculated at 28.8% in 2009. The need for the approval of this applied Prospecting Right is therefore crucial as it offers a chance that the applied minerals could be prospected in an economically, environmentally and socially viable manner, should the results yield sufficient resources to allow for mining, a new mine may be developed which would create more employment opportunities in the area.

12 Motivation

12.1 Preferred Site

The area of interest remains to be the preferred site as the previous exploration has proved that the area has a potential of other minerals (Gold, Cobalt, Chrome, Copper, Iron, Manganese, Nickel, Silver, and Zinc).

12.2 Technologies

Due to the nature of the proposed prospecting activities, future land use alternatives will not be compromised. Once the viable reserve has been confirmed, a comprehensive social and environmental impact assessment will be required (according to legislation).

In terms of the proposed technologies, these have been chosen based on long term proven success in prospecting. The prospecting activities proposed in the Prospecting Works Programme are dependent on the

preceding phase (desktop studies), therefore no alternatives have been indicated. The location of the intrusive drilling activities has been determined as provided in Figure 7-1. All infrastructure will be mobile.

12.3 Design/Layout

Since no complicated surface infrastructure that will be required for this project no design and layout alternatives for the proposed project were determined.

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

The invasive prospecting phase will be dependent of the results of the preceding phase. The location and extent of the drilling sites cannot be determined at this stage, therefore comprehensive mapping of the specific prospecting activity site could not be undertaken at this stage. For the purposes of this report, the overall prospecting site is presented in Figure 7-2 and location of the drilling boreholes presented in Figure 7-1.

The stakeholder consultation process has not been finalised at this stage, and therefore the comments raised by the I&APs have not been incorporated in this section. This will be updated as part of the final report.

13.1.1 The type of activity to be undertaken.

The application is for prospecting rights and no alternatives were considered. The activity will be conducted in phases. The physical phase of the Prospecting Works Programme will be dependent on the findings of Phase 1 of the process. Phase 1 will entail a desktop study and geological mapping. Phase 2 will consist of diamond core. The last phase will be a pre-feasibility study.

13.1.2 The design or layout of the activity

The location of the infrastructure will be determined based on the location of the prospecting activities, which will only be determined during Phase 1 of the Prospecting Works Programme, as well as the presence of sensitive environmental attributes such as wetlands, watercourses, protected flora and graves.

13.1.3 The technology to be used in the activity.

The proposed technologies have been chosen based on long term proven success in prospecting. This technology will be in the form of drilling machines and vehicles transporting staff and general equipment required in the drilling process.

13.1.4 The operational aspects of the activity

There is no plan to install permanent services in terms of water supply, electricity, access routes and or sewage facilities. The activities will commence with Phase 1, during which desktop studies will be conducted. After the desktop studies, geological mapping will be undertaken. This phase will also include planning for the drilling survey.

Phase 2 will entail the invasive prospecting drilling campaign where the extent of mineralisation will be defined, and the geological continuity of the mineralised zone will be determined. Numerous samples will be collected and tested in a registered laboratory.

Phase 3 of the process will entail desktop studies involving interpretation and modelling of all data gathered. These studies will determine the way the work programme is to proceed in terms of activity, quantity, resources, expenditure and duration.

13.1.5 The option of not implementing the activity.

The option of not implementing the activity will result in a loss of valuable information regarding the mineral status of the Gold, Cobalt, Chrome, Copper, Iron, present on the affected properties. In addition to this, should economical reserves be present, and the applicant does not have the opportunity to prospect, the opportunity to utilise the reserves will be lost.

13.2 Details of the Public Participation Process Followed

The Public Participation Process (PPP) was conducted in terms of Chapter 6 of the National Environmental Management Act, 1998 (Act 107 of 1998).

The stakeholder engagement process forms an important part of the impact assessment process. The stakeholder engagement process is primarily aimed at affording I&AP's the opportunity to gain an understanding of the proposed project. In addition, the purpose of consultation with the landowners, key stakeholders, and I&AP's is to provide them with the necessary information about the proposed project so that they can make informed decisions as to whether the project will affect them and provide the EIA team with local knowledge of the area and raise concerns relating to the biophysical, socio-economic and cultural impacts that may arise.

The stakeholder engagement process is conducted in terms of NEMA, which provides clear guidelines for stakeholder engagement during an EIA. Chapter 1 of the NEMA outlines the principles of environmental management, several pertaining to public consultation.

The figure below provides a summary of the stakeholder engagement process followed for the proposed project.

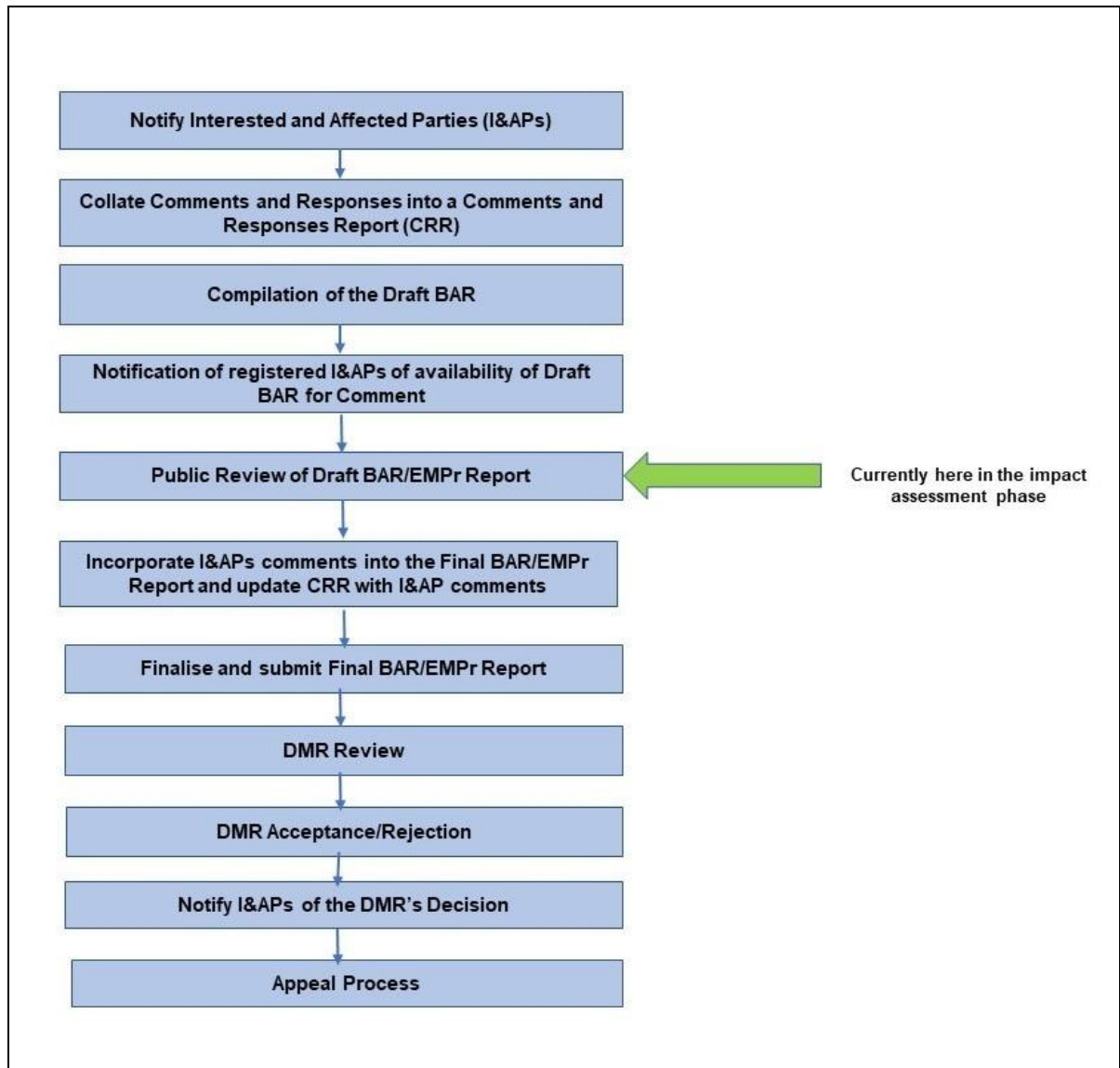


Figure 10: Summary of the Stakeholder Engagement Process followed

All the above guidelines have been incorporated into this stakeholder engagement process. This application will be submitted to the DMRE for authorisation as the competent authority. Stakeholder Identification Interested and Affected Parties

Using the information from the surveyor general's office and stakeholder's data (from those that responded to the project announcement that was conducted through placement of newspaper advertisements), on-site notices and notification letters sent to the adjacent and affected landowners, and I&APs register was developed.

The I&APs register will be maintained for the duration of the study where the details of stakeholders are captured and automatically updated upon communication to the EAP. The identification, registration, and comments from I&APs will be an on-going activity.

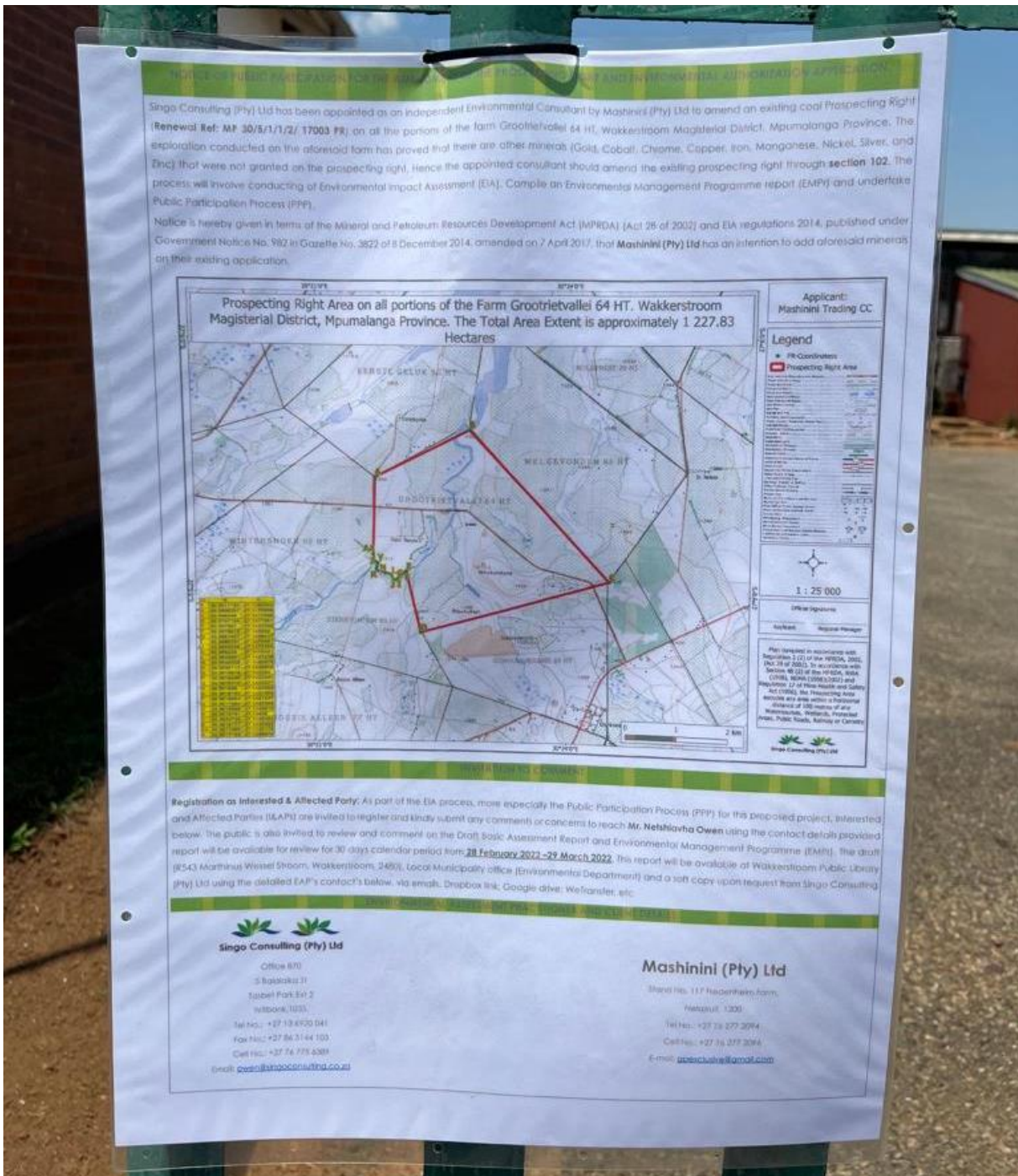


Photo 1; Site notice placed in Local Library



14 Mineral and Land Tenure

In common law systems, land tenure is the legal regime in which land is owned by an individual, who is said to "hold" the land. It determines who can use land, for how long and under what conditions. Tenure may be based both on official laws and policies, and on informal customs. In other words, land tenure system implies a system according to which land is held by an individual or the actual tiller of the land. It determines the owners' rights and responsibilities in connection with their holding. Consultation plays a pivotal role for Miners to get access to the land, Singo Consulting offers such service. From the consultation done by Singo Consulting in 2021, the landowners of affected portion were consulted. B Z Zelpy the Landowner of the farm Grootrietvallei 64 HT was consulted including adjacent landowners.

Farm List

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Date Requested 2021/06/07 11:35
Deeds Office MPUMALANGA
Registration Division HT
Farm Name -
Farm Number 64
Remaining Extent NOT SELECTED

PORTION LIST				
Portion	Owner	Title Deed	Registration Date	
0	B Z ZELPY 1007 PTY LTD	T11890/2012	2012/10/30	
1	B Z ZELPY 1007 PTY LTD	T11890/2012	2012/10/30	
2	B Z ZELPY 1007 PTY LTD	T11890/2012	2012/10/30	
3	B Z ZELPY 1007 PTY LTD	T11890/2012	2012/10/30	

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Figure 11: Title deed of the landowner

15 Summary of Issues Raised by I&APs

Table 11-3 provides a summary of the comments received to date following the newspaper adverts, site notices, written notification of the project and the Draft BAR review 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	Issues 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.
Municipal councillor	X			
Municipality				
No comments received to date.				
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWS)				
TO BE COMPLETED AFTER THE DRAFT BAR COMMENT PERIOD				
Communities				
Dept. Land Affairs				
No comments received to date.				
Traditional Leaders				
No comments received to date.				
Dept. Environmental Affairs				
No comments received to date.				
Other Competent Authorities affected				
No comments received to date.				
OTHER AFFECTED PARTIES				

16 Environmental Attributes Associated with the Alternatives

16.1 Baseline Environment (Topography, Climate, Geology & Water Resources)

16.1.1 Topography

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. The proposed prospecting area is characterized by a concave to steep slope topography. This can be observed on the topology map below. 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. Maximum elevation: 2,171 m, Average elevation: 1,833 m, Minimum elevation: 1,738 m

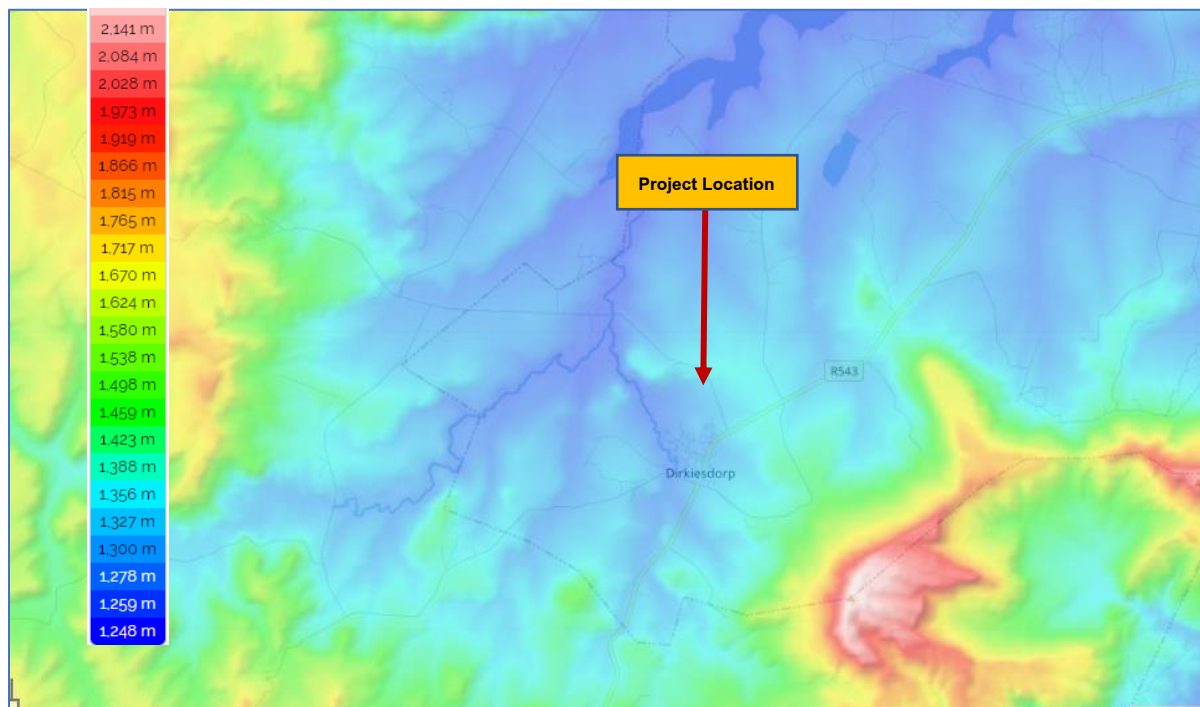


Figure 12: General Elevation around the project area

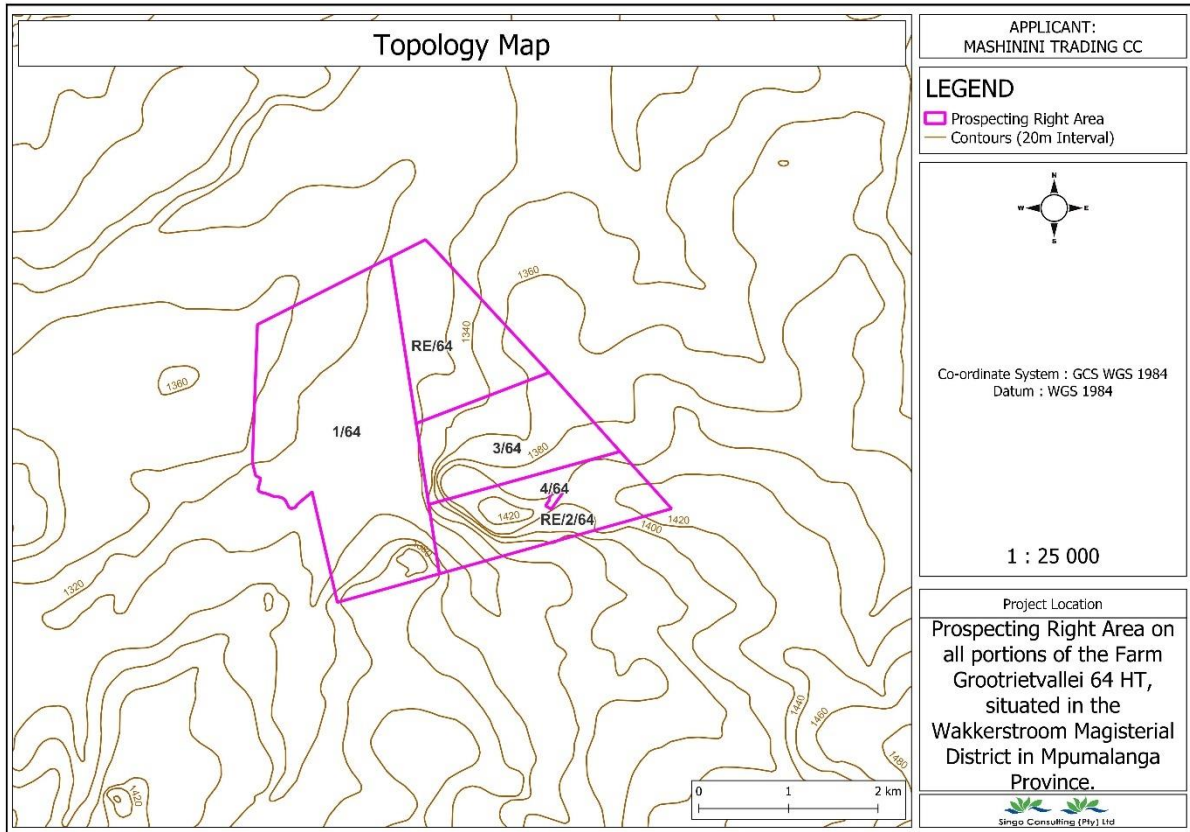


Figure 13: The topographical map of the project area

16.1.2 Climate

In Wakkerstroom, the climate is warm and temperate, and its summer has a good deal rainfall compared to the winter. The climate in Wakkerstroom is classified as Cwb by the KöppenGeiger system. In Wakkerstroom, the average annual temperature is 13.8°C. shows the mean annual rainfall of the project area which is between 601 – 800 mm. The driest month is June with 10 mm of precipitation. With an average of 126 mm, December is the month with the most precipitation for the whole year. January is the warmest month with an average of 17.4 °C. July has the lowest average temperature of the year of 8.1 °C. The precipitation varies between the driest month and the wettest month. During the year, the average temperatures vary by 9.3 °C.

The month with the highest relative humidity is January (76.08 %). The month with the lowest relative humidity is August (44.27 %). The month with the highest number of rainy days is December (19.77 days). The month with the lowest number of rainy days is June (1.87 days). Wakkerstroom are in the southern hemisphere. Summer starts here at the end of January and ends in December. There are the months of summer: December, January, February, March. In Wakkerstroom, the month with the most daily hours of sunshine is August with an average of 8.67 hours of sunshine. In total there are 268.86 hours of sunshine throughout August. The month with the fewest daily hours of sunshine in Wakkerstroom is January with an average of 7.81 hours of

sunshine a day. In total there are 242.19 hours of sunshine in January. Around 2876.63 hours of sunshine are counted in Wakkerstroom throughout the year. On average there are 94.53 hours of sunshine per month.

These are important natural water resources that should not be disturbed by anthropogenic activities. For this project where prospecting right poses a risk on them, will 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. A 100m buffer will apply around the water bodies present within the prospecting right area due to high density of water hence these streams contribute to the percentage of freshwater in South Africa.

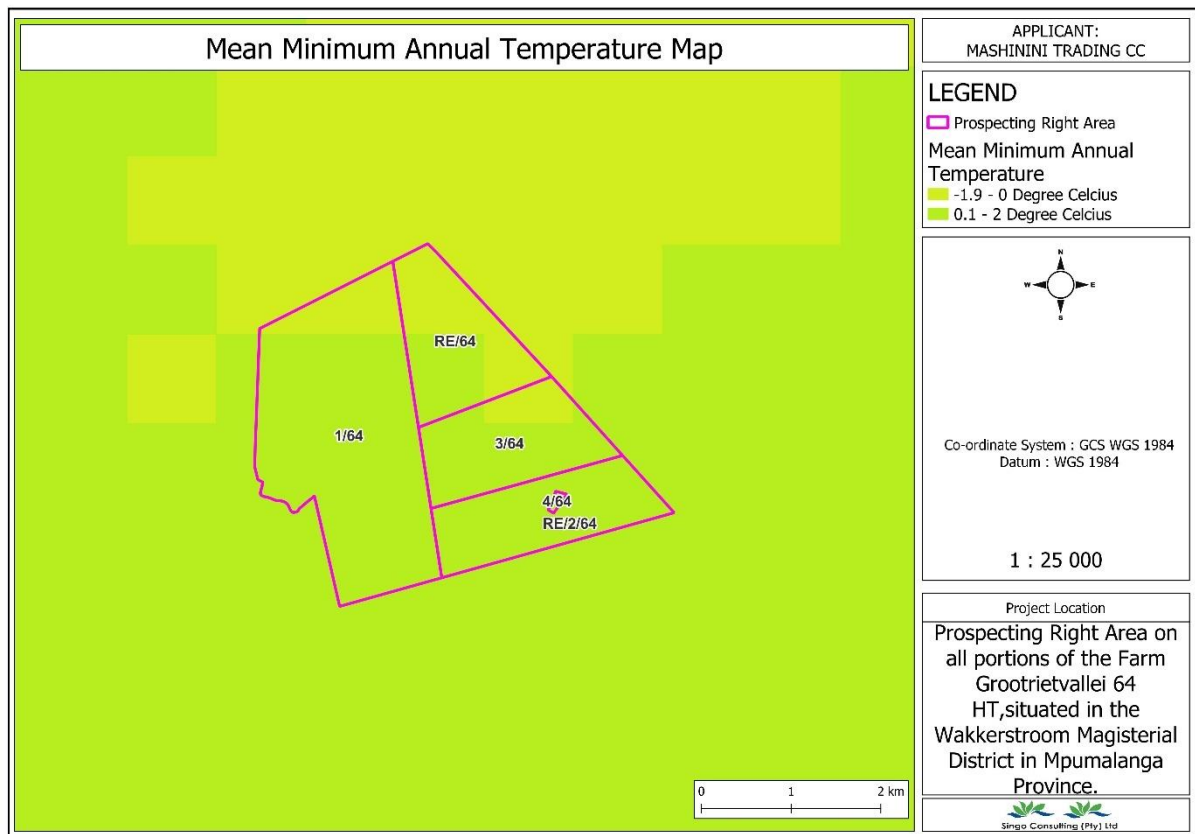


Figure 14: Mean annual temperature in the project area

16.1.3 Geology

The sedimentary part of the Karoo Supergroup 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 to the Karoo Supergroup fills 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.

The Karoo aged depositional environments broadly range from glacial (Dwyka Group), to shallow marine and coastal plain (Ecca Group), to nonmarine fluvial and aeolian (Beaufort and Stormberg groups). Whilst this paper focusses on the Ecca and Beaufort groups and Molteno Formation sedimentary successions, a review of the variable basement lithologies and Dwyka Group is also pertinent.

Ecca group

The proposed 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 glaciolacustrine 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).

Vryheid formation

The majority of the economically extracted coal in South Africa occurs in rocks of the Vryheid Formation, which ranges in thickness in the MKB from less than 70.0 m to over 500.0 m. The Vryheid formation is dominated by mudrock, rhythmite, siltstone and fine- to coarse-grained sandstone (pebbly in places). The Formation contains up to five (mineable) coal seams. The different lithofacies are mainly arranged in upward-coarsening deltaic

cycles (up to 80m thick in the southeast). Fining-upward fluvial cycles, of which up to six are present in the east, are typically sheet-like in geometry, although some form valley-fill deposits. They comprise coarse-grained to pebbly, immature sandstones - with an abrupt upward transition into fine-grained sediments and coal seams. The facies types comprising the clastic sedimentary lithologies of the Vryheid Formation are predominantly conglomeratic granule stone, and coarse- to very coarse-grained arkosic sandstone, with lesser amounts of carbonaceous siltstone, bioturbated siltstone, minor carbonate-siderite beds, and coal.

16.2 Local Geology

In the Wakkerstroom area, the farm Grootrietvalei is underlain by rocks of the Vryheid Formation, with the mountain tops being capped by dolerite. The Vryheid Formation is potentially coal bearing. The project area falls within the southern part of the Ermelo Coalfield in which anthracite has been mined in the Piet Retief, Ermelo and Wakkerstroom areas, but essentially the Coalfield generates bituminous coal. It hosts up to eight coal seams within the middle Ecca Group sediments of the Karoo Supergroup, but not all are present in the various sectors.

The Utrecht Coalfield covers an area of 500,000 ha within the magisterial districts of Utrecht and Paulpietersburg (Spurr et al., 1986) in KwaZulu Natal Province and the south-eastern part of Mpumalanga province as seen in Figure 4. The coalfield extends from the town of Paulpietersburg in the north-east, in a south-westerly direction through the Elandsberg and Schurweberg mountain ranges. The western limit is defined by a barren, dolerite intruded area, which separates the Utrecht Coalfield from the northern portion of the Klip River Coalfield.

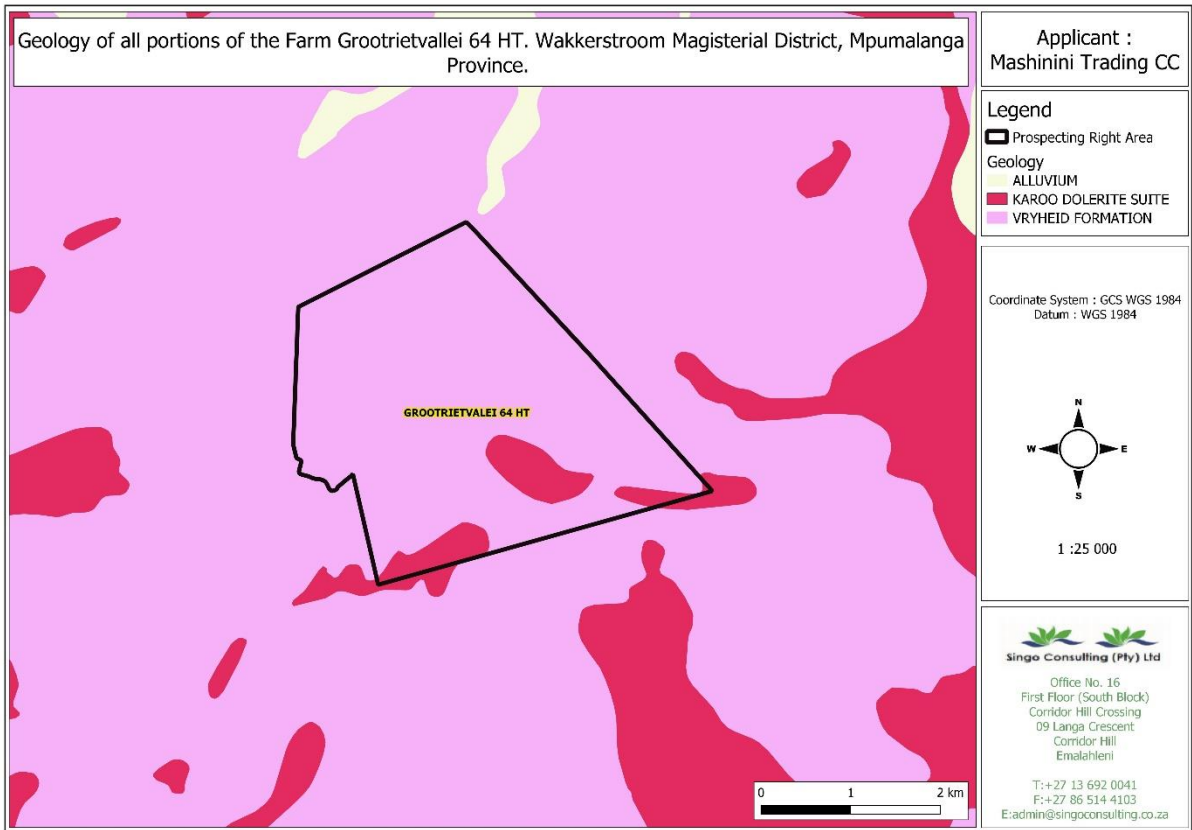
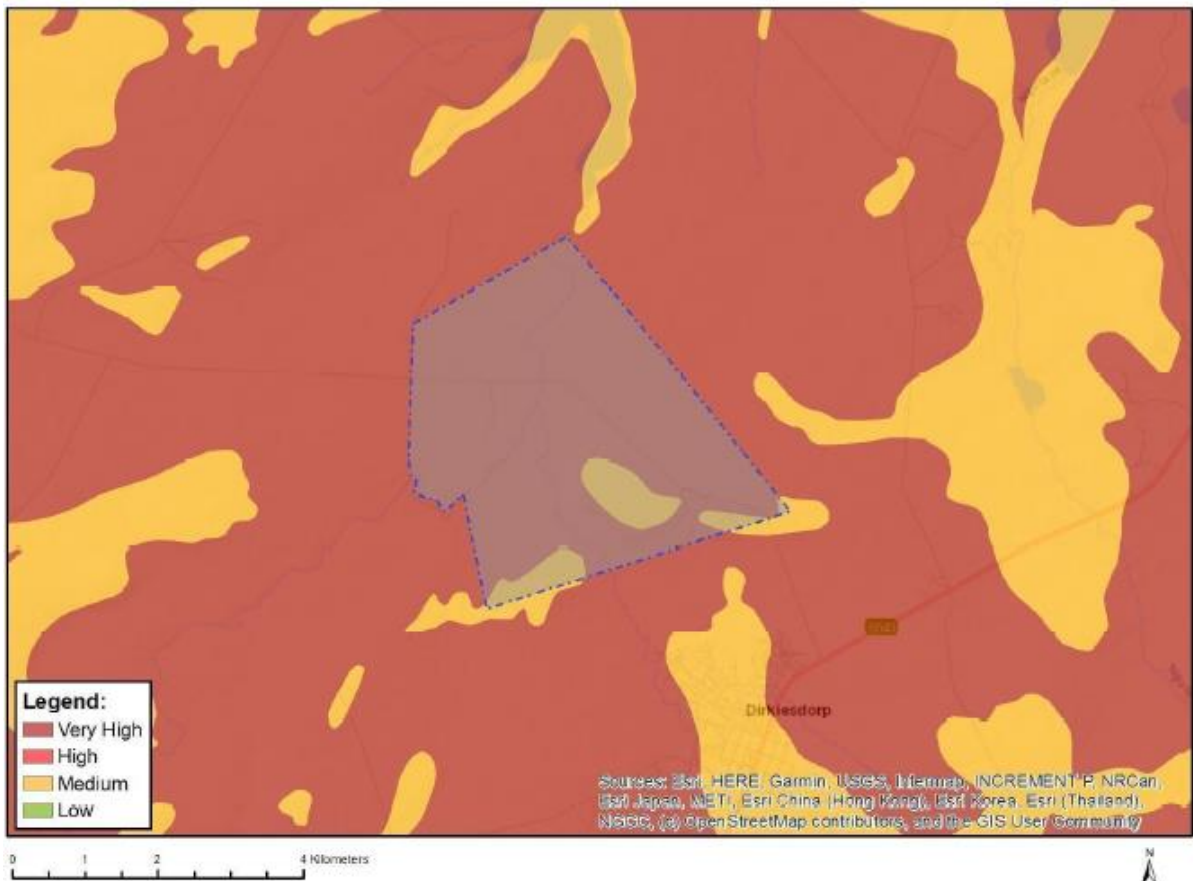


Figure 15: Geology of the project area

A large proportion of the coal is devolatilised. The devolatilization is caused mainly by dolerite sills either cutting through the coal seams or being near the coal seams. To a lesser extent, the devolatilisation is caused by dolerite dyke intrusions. Five major dolerite intrusions are recognised within the Utrecht Coalfield (Spurr et al., 1986) and dolerite intrusions significantly affect the rank and quality of the coals in the coalfield. They are also the main cause of any structural discontinuities and faults, with throws of up to 150 m documented where dolerite sills (particularly the Zinguin Sill) intrude through the coal zone (Spurr et al., 1986). Sills that occur below the coal zone have a greater metamorphic effect on the coals than sills that occur above the coal zone. Of the dolerites of the Utrecht Coalfield the Zuinguin Sill appears to have had the lowest temperature of intrusion, as, even with its great thickness, it can approach within 50- 60 m of a seam and have relatively little effect on the coal (Spurr et al., 1986).



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

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

Figure 16: Map of Relative Palaeontology Theme Sensitivity

16.3 Exploration Programme Conducted.

Drilling programme commenced on the 27th of July 2021 and finished on the 15th of August 2021. The proposed boreholes are in a cultivated farmland whereby the core was washed, neat and correct with depth markers. The main aim was to encounter coal seams however, the report analysis from SGS coal wasn't found however, gold, cobalt, chrome, copper, iron, manganese, nickel, silver, and zinc were found in the project area as seen on figure above. Iron (Fe) was found to be dominant (5,64%) compared to other minerals. Gold within the borehole areas was found to be 0.12 mg/kg which means that there can be more of gold in the prospecting area.

Table 3: Core recovery results

Borehole No.	Log date	Coordinates		Drilled Depth (m)	Core Recovery
		X	y		
BH01	12/08/2021	30.3698450	27.1400373	60.00	15.2%
BH02	12/08/2021	30.37485 E	27.15045 S	78.81	12.6% Loss
BH03	12/08/2021	30.37488 E	27.150485	77.81	22.1% Loss
BH04	12/08/2021	30.3646752	27.1276837	77.81	22.1% Loss
BH05	12/08/2021	30.3846651	27.1236930	70.00	20.0% Loss



Photo 3: Previous Exploration programme (Singo Consulting (Pty) Ltd, 2021)

16.3.1 Water Resources

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:

- Seep wetland

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 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.

These are important natural water resources that should not be disturbed by anthropogenic activities. For this project where prospecting right poses a risk on them, will 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. A 100m buffer will apply around the water bodies present within the prospecting right area due to high density of water hence these streams contribute to the percentage of freshwater in South Africa.

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.

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.

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.

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 watercourses or be deposited on infrastructure near watercourses thereby exacerbating the impact of siltation during rainfall events.

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 high to low.



Photo 4: Water sampling within the project area

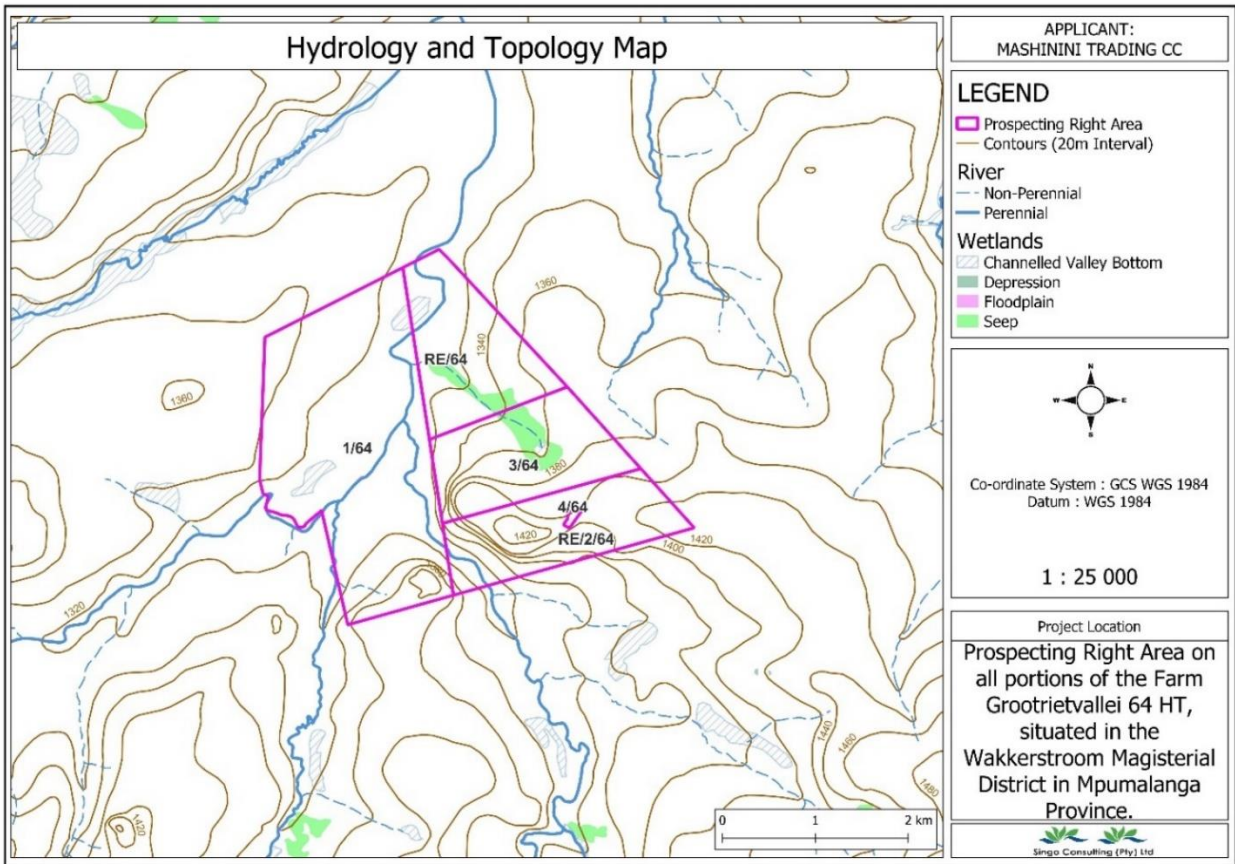
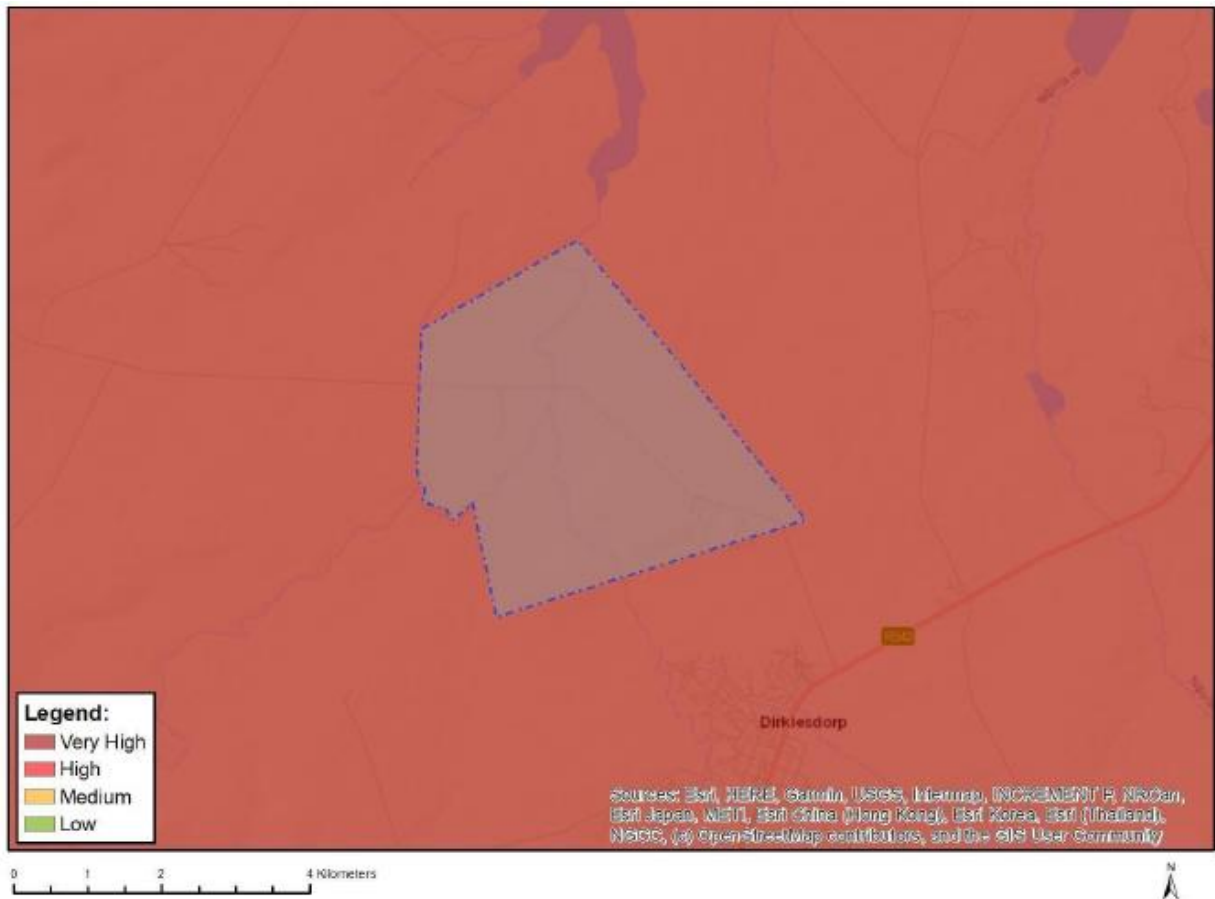


Figure 17: Hydrological and Topology within the proposed prospecting project



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity	Feature(s)
Very High	Aquatic CBAs
Very High	Wetlands and Estuaries
Very High	Freshwater ecosystem priority area quinary catchments

Figure 18: Map of Relative Terrestrial Biodiversity Theme Sensitivity

16.3.2 Vegetation Types

As according to the biodiversity map above (see Figure 23) the proposed project has the Critical Biodiversity Area Irreplaceable (CBA) Sensitivity, areas that are 80-100% irreplaceable for meeting biodiversity conservation targets, or critical linkages, or Critical Endangered Ecosystem should be maintain in a natural state with no loss of ecosystems, functionality or species, no flexibility in land-use options. Moderately modified – Old lands are areas which were modified within 80 years but now abandoned, including old mines and old cultivated lands which should stabilize and mange to restore ecological functionality, particularly soil carbon and water-related functionality and ESA Local Corridor are fine

scale connectivity pathways that contribute to resilience and connectivity between climate change focal changes. Should be maintained in a natural state with limited loss of ecosystems or functionality. *Dracosciadium italae*, *Aspidoglossum demissum*, *Gerbera aurantiaca* and *Indofera hybrid*.

Ocotea bullata, the species was heavily exploited in the past for timber industry and more recently for bark for the traditional trade. Despite its wide, disjunction, Distribution Subpopulation in at least 53 % of its range have been heavily exploited, rendering them extinct, near-extinct, rare, scarce or fragmented. We estimate a minimum of 50% population reduction in the last 240 years (generation length 80 years). The *Ocotea bullata* are endemic in Eastern Cape, Kwa Zulu Natal, Limpopo, Mpumalanga and Western Cape.

Dracosciadium italae with an Extent of Occurrence (EOO) of 2860km², less than 10 locations known. Much of its habitat has been transformed into forestry plantation. Threatened by ongoing habitat degradation through severe overgrazing, especially in Ngome area. It is muchly in Endemic in Kwa zulu Natal and Mpumalanga province.

Aspidoglossum demissum with a range restricted (EOO 28km²), localized habited specialist. Known from four locations and potentially threatened by severe overgrazing. *Aspidoglossum demissum* is endemic in Kwa zulu Natal and Mpumalanga Province. The species is known from 57 four, three adjacent in Wakkerstroom district and one near Volksrust. Grasslands on all four properties are used for grazing of livestock. Judging by the condition of the grasslands, grazing pressure is currently low (S.P. Bester pers. obs.), and grazing is not suspected to be a threat to this species at present. Should management practises change, and grazing pressure increase, the population could potentially be impacted.

Gerbera aurantiaca, is regarded as endangered A2ac. Mistbelt grassland endemic, the species habitat has been over 90% transformed for commercial forestry transformation and crop and culture cultivation for over the past 120 years. Recent loss of habitat in the KwaZulu-Natal Midlands to urban development. *Gerbera aurantiaca* is a long-lived clonal species whose generation time is suspected to exceed 100 years. Subpopulations are scattered and there isn't a linear relationship between Mistbelt grasslands and the presence of subpopulations, we therefore extrapolate a 50% loss of subpopulations from the 90% loss of habitat. Recent studies by I. Johnson and S. Johnson show that this species is a poor recruiter and has low seed viability as a result it is unlikely to be able to recover from the past loss of individuals.

Indigofera hybrid is Known from three locations. Some habitat has been transformed to forestry plantations and agriculture and further habitat loss remains a potential threat. Endemic in Mpumalanga province with a range from Ermelo to Wakkerstrom. Habitat of this species is very badly degraded (John Burrows).

Approximately 0,6 ha of vegetation will be cleared during prospecting, however, care will be taken to avoid relocation and/or disturbance of any protected species identified. The cleared area with vegetation will be rehabilitated per drill site. Though prospecting activities are of a low impact. Sensitivity of the farm has been noted and will be kept in close

supervision during the prospecting phases. Drilling will be concentrated on the highly modified areas of the farm. Rehabilitation will take place on each drill site as drilling activities commences, an ECO will be appointed to overlook the drilling activities.

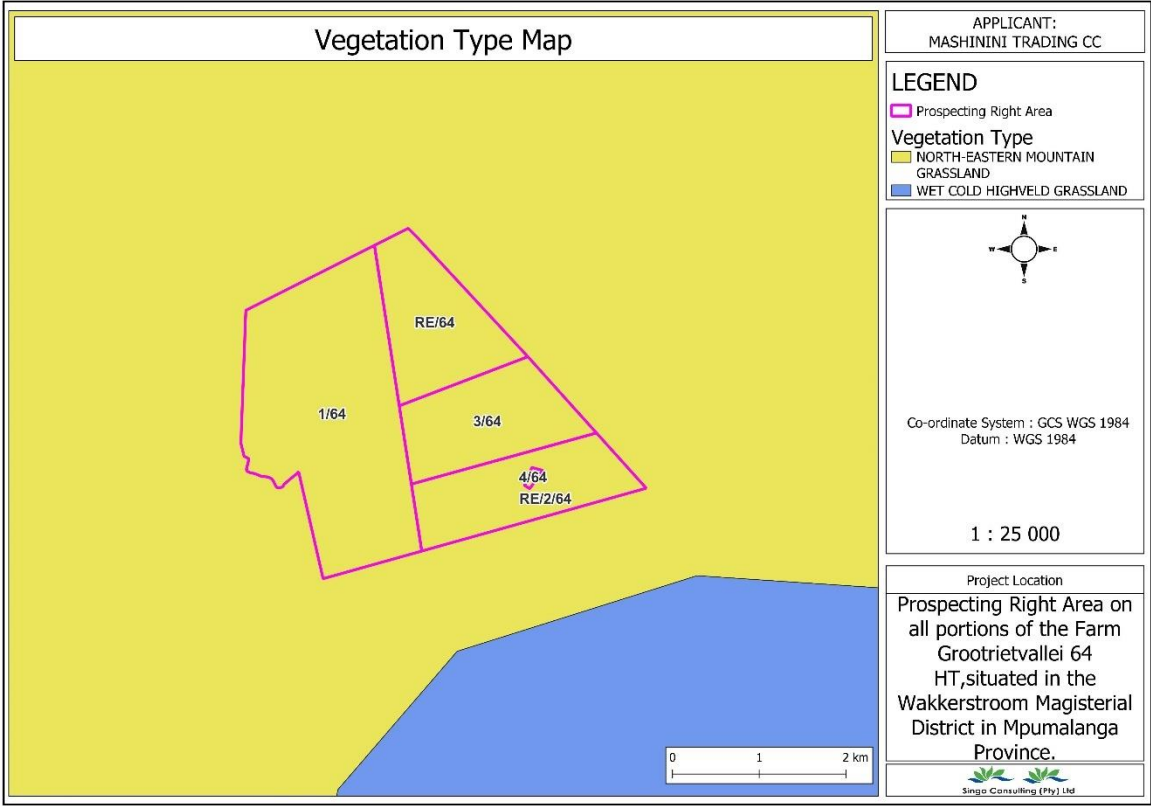
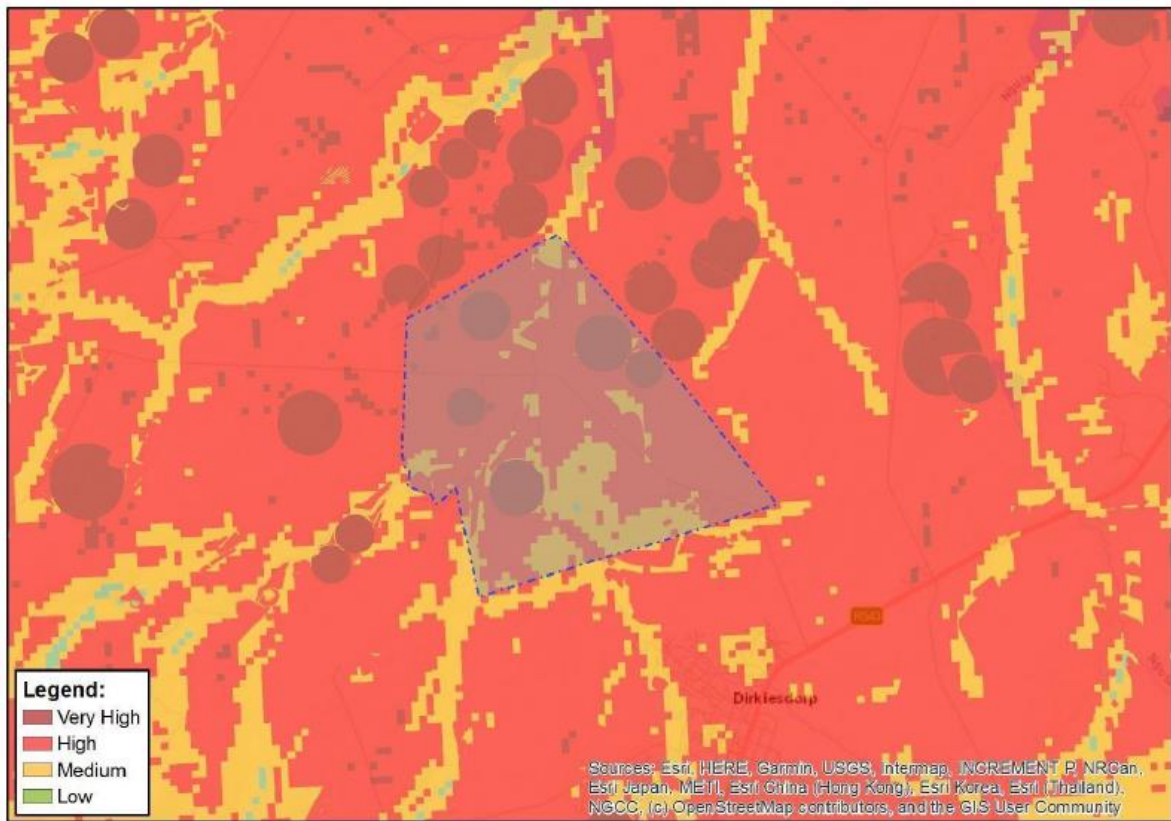


Figure 19:Vegetation Type of the project area

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.



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity	Feature(s)
High	Land capability;09. Moderate-High/10. Moderate-High
High	Annual Crop Cultivation / Planted Pastures Rotation;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	Subsistence Farming 1;Land capability;09. Moderate-High/10. Moderate-High
High	Subsistence Farming 1;Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate
High	Old Fields;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

Figure 20: Map of Relative Agriculture Theme Sensitivity



Photo 5: Type of Vegetation on site

Texture class is one of the first things determined when a soil is examined. It is related to weathering and parent material. The differences in horizons may be due to the differences in texture of their respective parent materials. Texture class can be determined fairly well in the field by feeling the sand particles and estimating silt and clay content by flexibility and stickiness. There is no field mechanical-analysis procedure that is as accurate as the fingers of an experienced scientist, especially if standard samples are available. A person must be familiar with the composition of the local soils. This is because certain characteristics of soils can create incorrect results if the person does not take these characteristics into account.

In some environments clay aggregates form that are so strongly cemented together that they feel like fine sand or silt. In humid climates iron oxide is the cement. In desert climates silica is the cement and in arid regions lime can be the cement. It takes prolonged rubbing to show that they are clays and not silt loams.

Some soils derived from granite contain grains that resemble mica but are softer. Rubbing breaks down these grains and reveals that they are clay. These grains resist dispersion in the field, and laboratory determinations may disagree.

Many soil conditions and components mentioned earlier cause inconsistencies between field texture estimates and standard laboratory data. These are, but not limited to, the presence of cements, large clay crystals, and mineral grains. If field and laboratory determinations are inconsistent, one or more of these conditions is suspected.

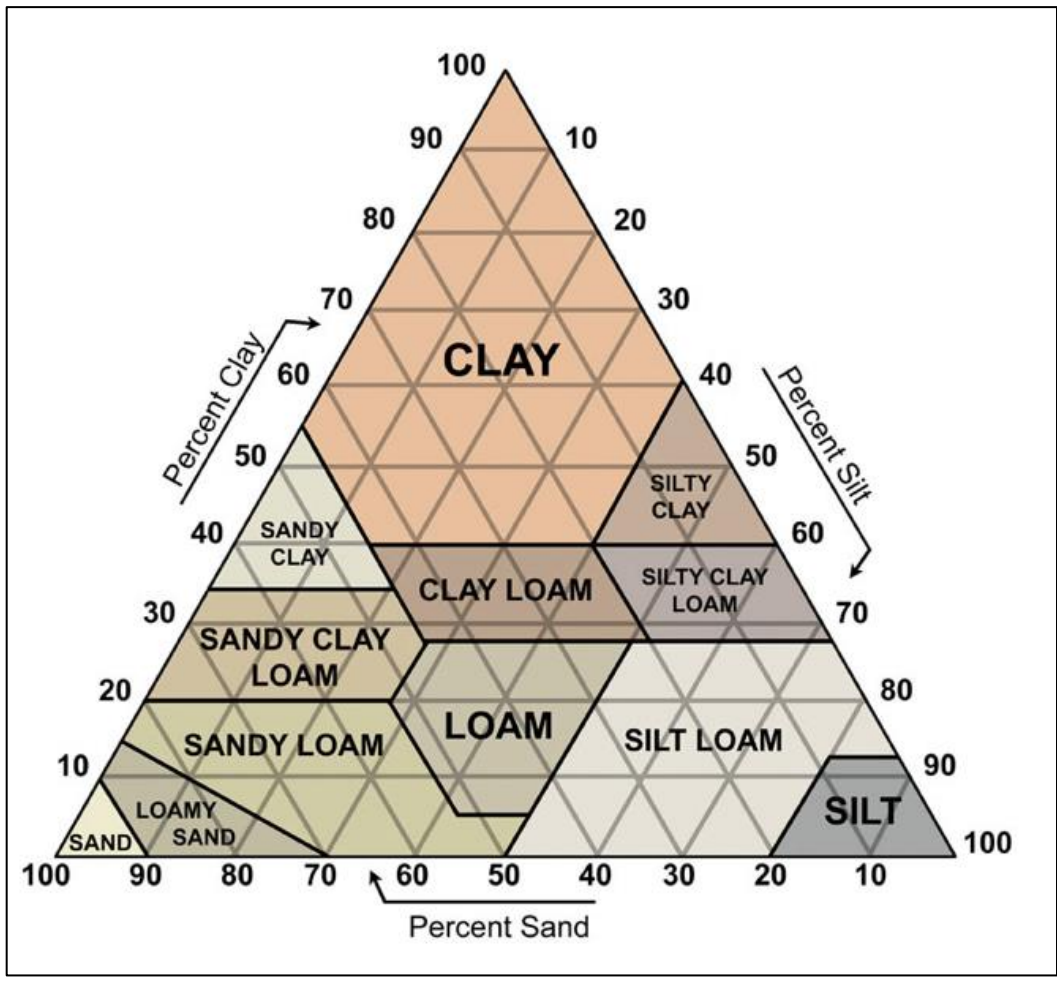


Figure 21: Soil Chart

The prospecting right area is covered with Association of Classes 1 to 4: Undifferentiated structureless soils and freely drained, structureless soils. 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 Arable and grazing land. Arable land is any land capable of being ploughed and used to grow crops and a field covered with grass or herbage and suitable for grazing by livestock and arable land is the land that is being worked regularly, generally under a system of crop rotation.

Soil Drainage

Soil drainage is a natural process by which water moves across, through, 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.

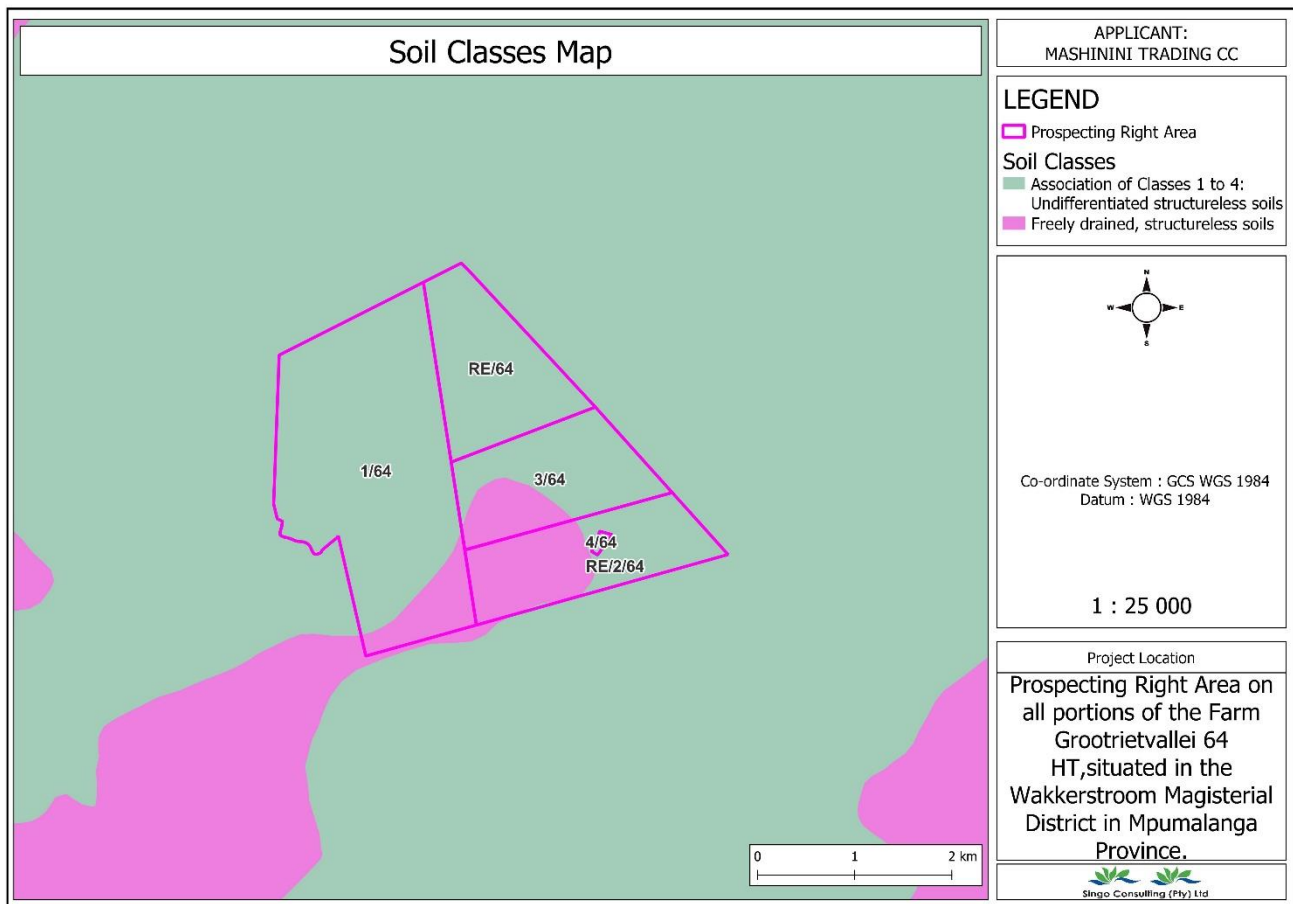


Figure 22: Soil Type on the project Area



Photo 6: Type of soil found on site

16.3.3 Heritage Resources

Heritage resources may be tangible, such as buildings and archaeological artefacts or intangible such as landscapes and living heritage. Their significance is based upon their aesthetic, architectural, historical scientific, social, spiritual, linguistic economic or technological values; their representation of a particular period; their rarity and their sphere of influence.

Heritage Impact Assessment was not undertaken as part of the development of the impact assessment. Based on available Geographic Information System data and site assessment," graves are present within the prospecting area.

As outlined in this report, prospecting will be undertaken in phases; the first phase being a desktop assessment, followed by drilling. Based on the outcome of these activities, desktop study and potential drill sites will be determined. Potential heritage impact will only occur once desktop study has been used to identify sites for drilling, and it is therefore recommended that the Heritage Impact Assessment be undertaken prior to drilling activities, and that the Heritage Impact Assessment be conducted over identified localized drill sites and access routes, as opposed to the entire exploration area. This recommendation will be submitted to the South African Heritage Resource Agency (SAHRA) for approval which was also consulted using the SAHRIS online system. From the screening report conducted, the proposed prospecting area has an archaeological and cultural heritage of low sensitivity.

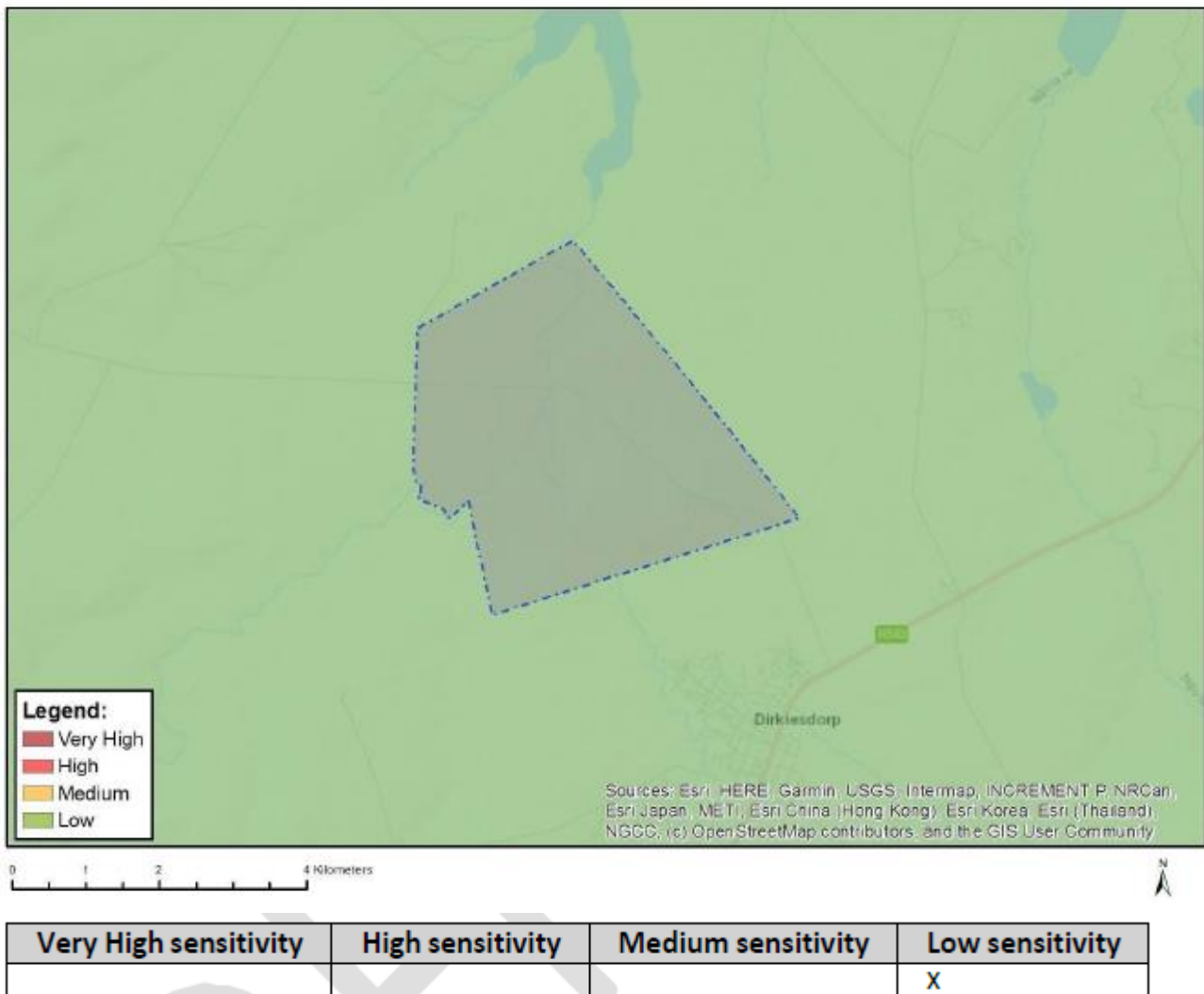


Figure 23: Map of Relative Archaeological and Cultural Heritage Theme Sensitivity

16.3.4 Socio-Economic

The proposed project area is under Dr Pixley Ka Isaka Seme Local Municipality which is situated on the eastern border between Mpumalanga and Kwa-Zulu Natal (Newcastle Local Municipality). Furthermore, the municipal area is framed by the Mkhondo Municipality in the east, Msukaligwa Municipality to the north and Lekwa Municipality to the west and it falls under the Gert Sibande District. For the purposes of the Dr Pixley Ka Isaka Seme Integrated Development Plan the boundaries as proclaimed in terms of Section 21 (B) of the Local Government: Municipal Demarcation Act, 1998 (Act 27 of 1998).

The Municipality has a Total Population of 85 395 with 22546 households which amounts to a household size of 3.8 persons per household according to the 2016 Community Survey data. In 2016, 62% of the Municipality's population was under the age of 30 years, 22% between the ages 30 to 49 years and 16% ages 50 years and older. This analysis therefore puts major pressure on the Municipality to prioritize for youth development and

empowerment programmes as one of the key drivers towards sustainable development of the Municipality. Moving ahead the implication of the aforementioned growth serves as a key developmental indicator in influencing the manner in which a municipality plans its infrastructure development to pro-actively alleviate against undersupply or oversupply of services in certain wards as a result of failure to pre-determine infrastructural needs complimented by every increase in the population. In the spirit of trying to make sure that the correct planning is undertaken by the Municipality population projections are made using the growth rate as calculated above per age group. Figure below outlines the population projections for 2017, 2018 and 2019 respectively.

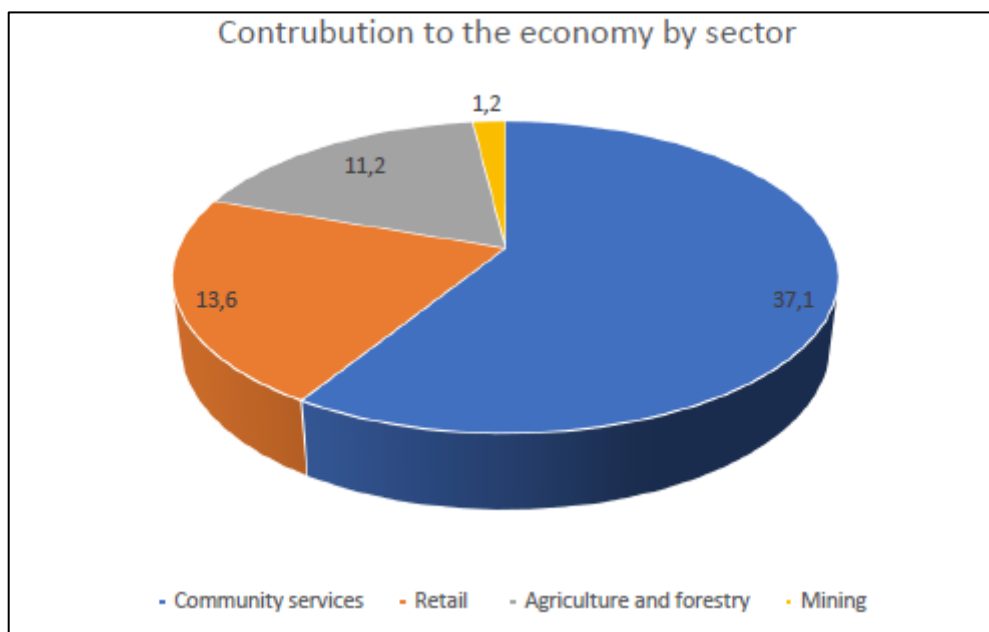


Figure 24: population projections

Positive impacts resulting from prospecting activities will be the creation of employment, which is required in the region. Should adequate Gold, Cobalt, Chrome, Copper, Iron, be found in the project area, Mashinini will be able to mine the available reserves. This will result in job creation and support to local businesses is continued. Mashinini expects that substantial benefits from the project (should adequate reserves be found and confirmed) will accrue to the immediate project area.

16.4 Environmental and current land use map.

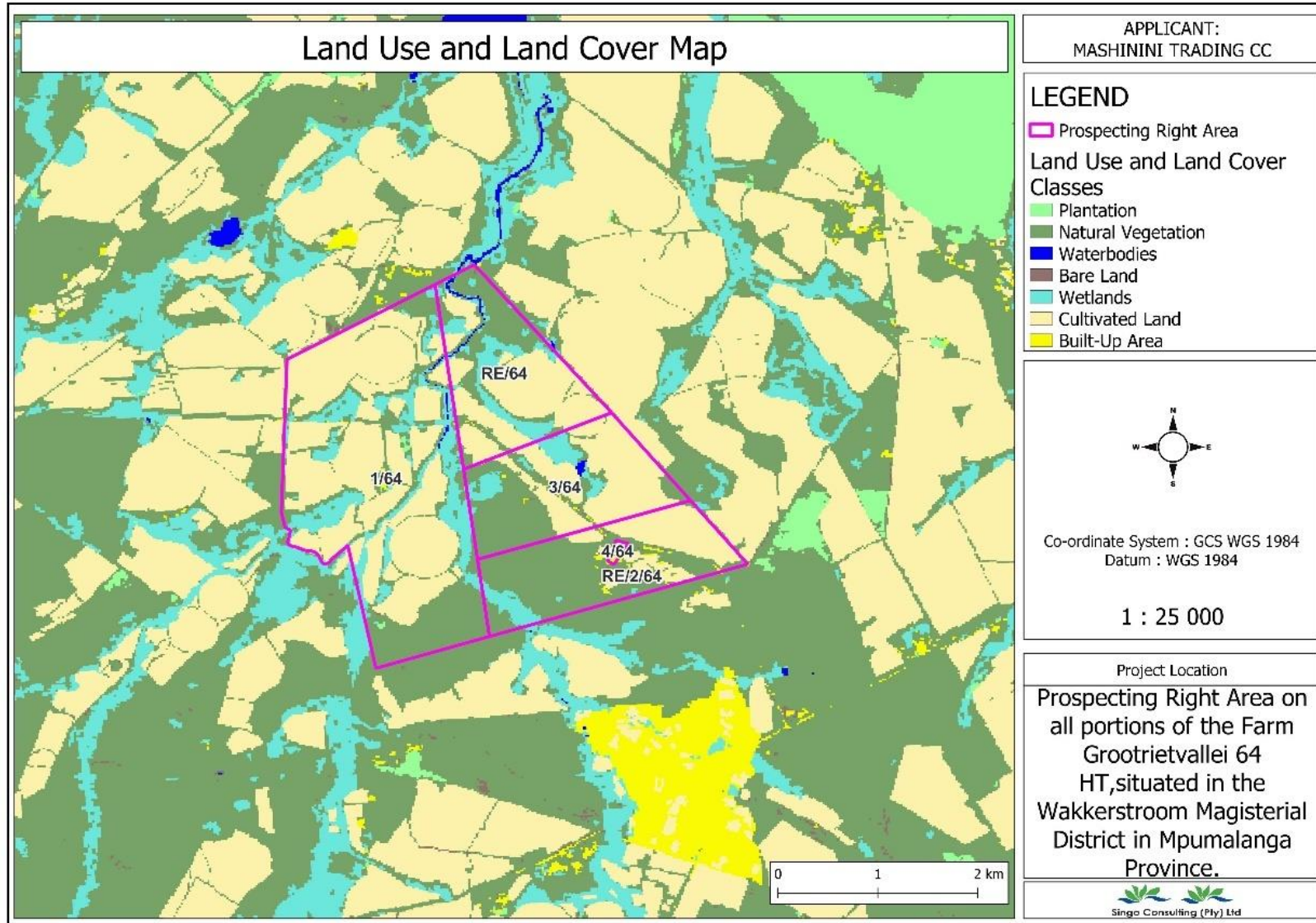


Figure 25: Land use Map

17 Impacts and Risks Identified

Table 13-1 provide a high-level assessment of the potential impacts and associated mitigation measures which could result from the proposed mine during construction, operation and decommissioning/closure. These impacts will be further refined and assessed according to the impact assessment methodology in Section 14.

Table 13-1: Summary of Potential Environmental Impacts Associated with the Proposed Development

Element of Environment	Potential Impact Descriptions
Socio-Economic	Possible job opportunities during the construction and operation.
Hydrogeology	Possible groundwater contamination.
Surface water	Possible surface water contamination.
Air Quality	Possible impact on Air Quality in the area.
Climate Change	Possible contribution to climate change through emission of Green House Gases
Noise	Possible generation of noise during construction and operation.
Soils/Land Use/Land Capability	Loss of soil resource and change in land capability and land use.
Biodiversity	Disturbance and loss of biodiversity, especially SCC.
Aquatic ecology	Possible loss, sedimentation and contamination of aquatic resources
Heritage	Possible impact on heritage and cultural resources (including graves) in the area.
Traffic	Potential safety issues due to the increased traffic.
Cumulative Impacts	Cumulative Impacts

17.1 Construction

During the construction phase of the project, site establishment for surveying and pegging sites will be the main activities. Environmental impacts on the biophysical and socio-economic environment which are anticipated to occur throughout the construction were identified as follows:

17.1.1 Socio-Economic

There will be benefits emanating from the prospecting activities. The main positive impacts of the prospecting activities will be the temporary creation of jobs during the construction phase of the project. The project may also result in a temporary boost in small local businesses in the area.

□

Activities relating to site establishment may result in grievance as a result of possible grave relocation. It is expected that the final site layout will consider all the sensitive environment in the area and will avoid graves and other heritage and cultural resources in the area. Other health and safety risks may be as a result on construction workers lighting fires on site, littering and lack of housekeeping. Potential increase in social pathologies and negative health impacts due to potential squatting of job seekers and increase in nuisance dust may also occur.

17.1.2 Groundwater

Groundwater resources are vulnerable to prospecting activities. The use of earth moving machinery and construction vehicles on site poses the risk of chemical spillages including fuel and oils, which may leach into the groundwater. The removal of vegetation could furthermore lower the evapotranspiration rates, thereby allowing a greater volume of potentially contaminated water to percolate to the underlying aquifer in the event of an accidental spill from the machinery. It must however be noted that the removal of vegetation will be limited to the required footprints for the access roads, the boreholes and sumps as well as the camp sites. The impact on evapotranspiration is therefore expected to be negligible.

Construction activities such as site clearing, and grubbing is unlikely to materially affect the groundwater within the project area. However, care should be taken during the utilisation and storage of hydrocarbons and chemicals, which may have an impact on groundwater quality as a result of spillages and uncontrolled release.

17.1.3 Surface water

The main users of surface water resources are agricultural irrigation, domestic, industrial, mining and power generation, while plantation forestry intercepts and reduces runoff before it reaches the rivers and groundwater.

The potential impacts on surface water during the construction phase of the proposed project are as follows:

- Accidental spillages of hazardous substances from construction vehicles used during construction of the crossings, as well as from hazardous storage areas;
- Contamination of runoff by poor materials/waste handling practices;
- Debris from poor handling of materials and/or waste blocking watercourses;
- Contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality;
- Increase in turbidity of the local water streams as a result of runoff of cleared areas; and

- Increase of surface runoff and potentially contaminated water that needs to be controlled in the areas where site clearing occurred.

Some level of sedimentation is expected to occur in the drainage line that traverse the project area as runoff is naturally anticipated to pick up environmental debris as it crosses natural areas. Increased turbidity is reversible and surface water should return to pre-impact turbidity levels once sediment levels entering the watercourse are reduced. Settled sediments should naturally move downstream during periods of high flow flowing storm events.

17.1.4 Aquatic Ecosystems

The removal of vegetation from the construction area is also expected to have an impact on the provision of ecological and sociocultural services by aquatic ecosystems. In addition, construction waste dumping and oil leakages from construction vehicles will alter biodiversity maintenance of the aquatic ecosystems, which endangers the survival of aquatic ecosystem and riparian species inhabiting the area. Impacts on the aquatic ecosystems and will include:

- Loss of habitat and aquatic ecosystem and riparian ecological structure as a result of site clearance activities and uncontrolled aquatic ecosystem and riparian habitat degradation;
Impact on the aquatic ecosystem and riparian systems as a result of changes to the sociocultural service provisions though site clearance, waste management and riparian disturbance;
- Impact on the hydrological functioning of the aquatic ecosystem and riparian systems;
- Soil compaction and levelling as a result of construction activities and vehicle movement leading to loss of riparian habitat; and
- Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of riparian resources.

The proposed project will only involve drilling and not trenching or pitting, there are also no major surface water sources and for that reason, it is not anticipated that there will be significant impact on aquatic life, if any.

The final layout plan will be dependent on the location of local heritage and archaeological resources. The siting of the boreholes and infrastructure will be in such a way as to avoid sensitive environments, which include graves and archaeological resources as far as is practicable.



17.1.5 Palaeontology Impacts

Earth moving activities such as vehicle and machinery movement, site clearance and excavation may result in the destruction of fossils (if any).

17.1.6 Biodiversity

All South Africans depend on healthy ecosystems for economic and livelihood activities, including agriculture, tourism and several incomes generating and subsistence level activities. These natural ecosystems are under pressure from land use change and related processes causing degradation, as well as invasive alien species.

Biodiversity is crucial to ecosystem health, and healthy ecosystems are central to human well-being. Healthy ecosystems interlinked with working landscapes and other open spaces form the ecological infrastructure of the country and are the foundation for clean air and water, fertile soil and food.

Flora

The project may result in the following impacts on the floral environment during the construction phase:

- Impact on floral diversity as a result of site clearance, anthropogenic activity, and possible uncontrolled fires;
- Destruction of potential floral habitats for species of conservational concern as a result of site clearing, alien species, waste management and soil compaction;
- Vegetation clearance may lead to floral habitat loss of potential species of conservational concern;

Potential spreading of alien invasive species as a result of floral disturbance;

- Generation of waste and incorrect disposal from construction material leading to disturbance of natural vegetation; and
- Habitat fragmentation because of construction activities leading to loss of floral diversity.
- Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase;

Fauna

The project may result in the following impacts on the faunal environment during the construction phase:

- Loss of faunal habitat and ecological structure as a result of site clearing, alien invasive species, erosion, and general construction activities;
- Loss of faunal species due to collisions with construction vehicles and machinery;
- Loss of faunal diversity and ecological integrity as a result of construction activities, erosion, poaching and faunal specie trapping;
- Impact on faunal species of conservational concern due to habitat loss and collision with construction vehicles;
- Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts on faunal habitat during the operation phase.

The loss of biodiversity is expected be insignificant as it will be limited to the footprints of the required infrastructure. However, mitigation and management of species of conservational concern, if any, needs to be adhered to.

17.1.7 Air Quality

The air quality of the area can be described as good because there is very little air pollution compared to urban areas. Problems such as acid rain do not occur in the area. The few cases of air pollution which occur are mostly because of smoke from the burning of vegetation such as reeds along the river, and, to a lesser extent, from certain households. Legislation relating to air pollution (Part III of Act 45 of 1965) is applicable to the region and was promulgated in the Government Gazette R1255 of 19 July 1978. This act is specifically applicable to households with coal stoves, as well as any fuel burning appliance installed at a business or any other property which would make use of it.

With the above said, the movement of construction vehicles and earth moving machinery as well as the stripping of vegetation may still likely result in an increase in nuisance dust, PM10 and PM2.5. There is also potential for increase in carbon emissions and ambient air pollution due to the movement of vehicles and construction machinery. It is expected that the implementation of dust suppressing mitigation measures will result in the reduction in nuisance dust.

17.1.8 Visual

The following impacts on the visual character as a result of the proposed project are envisaged during the construction phase:

- Scaring of the landscape as a result of the clearance of vegetation;
Visual intrusion as a result of the movement of machinery and the erection of contractor camps; and
- Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.

17.1.9 Ambient Noise

The use of vehicles and machinery may result in an increase in ambient noise in the immediate vicinity of the project. To alleviate this, work will be limited to day hours and the field staff will be supplied with hearing protection PPE such as earmuffs and ear plugs.

17.1.10 Soil Land Use and Land Capability

During the construction phase, all infrastructure and activities required for the operational phase will be established. The main envisaged activities include the following:

- Movement of construction vehicles, machinery and workers in unprotected areas (bare) may result in compacting of the soil of the existing roads. Fuel and oil spills from vehicles may result in soil chemical pollution;
- Clearing of vegetation will result in the soils being particularly more vulnerable to soil erosion. The impact can persist long after cessation of prospecting activities depending on mitigation and rehabilitation strategies. Strategic stormwater management should be put in place to minimise soil losses.

- Soil contamination as a result of construction activities can be as a result of a number of activities (i.e., incorrect hazardous substance storage, incidental hydrocarbon leakages from construction vehicles);
- Loss of soil resource and utilisation as a result of the cleaning and topsoil stripping of the construction footprint. Although soils will be stripped and stockpiled, loss of seed reserve and organic matter depletion through decomposition during stockpiling will severely reduce soil quality and its ecological function if not managed appropriately. Re-vegetation should be imposed as far as is possible to maintain soil fertility through natural nutrient cycling during soil storage prior to rehabilitation phase;
- Other activities in this phase that will impact on soil are the handling and storage of building materials and different kinds of waste. This will have the potential to result in soil pollution when not managed properly; and
- In areas of permanent changes such as the borehole and sump area, access roads (tracks), the erection of infrastructure and stockpiles, the current land capability and land use will be lost permanently. This will however be localised to the footprint of the infrastructure.

17.1.11 Traffic

There will be a need for vehicles to move in and out of the project site during the construction stage. Vehicles and other machinery in the project area will result in an increase in traffic on the roads.

17.1.12 Climate Change

Climate change poses a threat to the environment, its residents, and future development. Actions are required to reduce carbon emissions (mitigation) and prepare for the changes that are projected to take place (adaptation) in the District.

The movement of vehicles and earth moving machinery may result in the production of carbon dioxide (Green House Gas), which may have an impact on the climate in the area.

The above-mentioned impacts were assessed based on the quantitative impact assessment methodology described in Section 14 of this Report. For each impact assessed, mitigation measures have been proposed to reduce or avoid negative impacts and enhance positive impacts. These mitigations were also incorporated in the EMP to ensure that they are implemented during the various phases of the proposed

project. The summary of the impact assessment during the construction phase is provided in Table 13-2.

Table 13-2: Impact Assessment Table for the Construction Phase

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation								
		Consequence			Probability		Frequency: Impact	Significance		Significance Rating	Consequence			Probability		Frequency: Impact	Significance	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Activity					Severity	Spatial	Duration	Frequency: Activity	Frequency: Activity			
							Management and Mitigation Measures											
Site Establishment: Establishment of the access (tracks) to the prospecting site, Establishment of the campsite, site physical surveying and pegging of drilling sites																		
Social	Influx of job seekers will have a negative social impact on the landowners and land occupiers.	2	2	3	2	2	28	Medium Low	Random and regular alcohol and drug testing shall be conducted on all personnel responsible for operating machinery and driving construction vehicles to ensure the safety of the public; Security and safety should be emphasised; Recruitment will not be undertaken on site; Recruitment practises will favour locals, but farm labourers will not be employed unless agreed to with the farm owners; Liaise with the existing forums in order to implement effective crime prevention strategies; and No construction workers shall be allowed to access private properties without the owner's knowledge and consent.	1	1	1	1	2	9	Low		
	Unauthorised access to private property outside of the demarcated areas will result in conflict with landowners.	2	2	3	2	2	28	Medium Low		1	1	1	1	2	9	Low		
	Increased traffic in the area will increase the likelihood of accidents on the roads, posing a health and safety issue for the landowners and land occupiers.	2	2	3	2	2	28	Medium Low		1	1	1	1	2	9	Low		
	The influx of job seekers in the area may result in an increase in petty crimes.	2	2	3	2	2	28	Medium Low		1	1	1	1	2	9	Low		
	Ineffective communication channels leading to community unrest.	2	2	3	2	2	28	Medium Low		1	1	1	1	2	9	Low		
	Negative impact because of the dissection of land by clearing and excavations for construction of infrastructure, constraints to access to cultivated land to farmers, impacting on day-to-day farm activity.	3	1	3	2	2	28	Medium Low		1	1	1	1	2	9	Low		
	Possible boost in short term local small business opportunities.	3	1	3	2	2	28	Medium Low positive		3	1	3	2	2	28	Medium Low positive		
Groundwater	Localised spillages of oils from machinery leaching to groundwater contamination.	3	2	2	2	2	28	Medium Low	2	1	1	2	2	16	Low			

Existing boreholes within the prospecting area may create conduits of flow to the groundwater unless sealed.	3	2	2	2	2	28	Medium Low	<p>No washing of vehicles shall be allowed outside demarcated areas. The bays will be clearly demarcated and will not be allowed to contaminate any surface runoff; Sufficient areas shall be provided for the maintenance and washing of vehicles;</p> <p>Refuelling of vehicles will only be allowed in designated areas;</p> <p>All construction equipment shall be parked in a demarcated area.</p> <p>Drip trays shall be used when equipment is not used for some time;</p> <p>On surface bulk storage of hydrocarbons must be situated in a dedicated area which will include a bund or a drain where necessary to contain any spillages during the use, loading and off-loading of the material;</p> <p>Bund areas shall contain 110% of the stored volume;</p> <p>Bund areas must be impermeable;</p> <p>Bund areas must have a facility such as a valve/sump to drain or remove clean stormwater;</p> <p>Contaminated water shall be pumped into a container for removal by an approved service provider;</p> <p>Regular inspections shall be carried out to ensure the integrity of the bundwalls;</p> <p>All preventative servicing of earth moving equipment and construction vehicles shall be undertaken off site;</p> <p>Runoff from this area shall be contained;</p> <p>Spill kits shall be made available, and all personnel shall be trained on how to use the kits and training records shall be</p>	2	1	1	2	2	16	Low
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Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation						Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation					
		Consequence			Probability				Consequence	Probability				
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance		Significance Rating	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact
Management and Mitigation Measures														

									made available on request.								
Surface Water	Increase in silt load in runoff due to site clearing, grubbing and the removal of topsoil from the footprint area associated with the drill sites and associated infrastructure.	2	3	2	2	2	28	Medium Low	Ensure that topsoil is properly stored, away from the streams and drainage areas; No construction activities will be undertaken within 100 metres of the nearby streams and 500 meters from riparian areas without consent from the DWS; Vehicle and personnel movement within watercourses and riparian areas shall be strictly prohibited; Adequate stormwater management must be incorporated into the design of the project in order to prevent contamination of water courses from dirty water.	1	1	1	2	2	12	Low	
	Potential deterioration in water quality due to the potential accidental spillages of hazardous substances.	2	3	2	2	2	28	Medium Low		1	1	1	2	2	12	Low	
	Debris from poor handling of materials and/or waste blocking watercourses, resulting in flow impediment and pollution.	2	2	2	2	2	24	Low		1	1	1	2	2	12	Low	
	Contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality.	2	3	2	2	2	28	Medium Low		1	1	1	2	2	12	Low	
	Increase of surface runoff and potentially contaminated water that needs to be maintained in the areas where site clearing occurred.	3	2	2	2	2	28	Medium Low		1	1	1	2	2	12	Low	
Aquatic Ecosystems	Localised changes to the riparian areas as a result of vegetation clearing.	2	2	2	2	3	30	Medium Low	Adequate stormwater management must be incorporated into the design of the project in order to prevent erosion and the associated sedimentation of the aquatic system; No construction activities shall be allowed within 500 m of riparian zones without consent from the DWS; No vehicles may be allowed to indiscriminately drive through the riparian areas or within the active stream channels; All disturbed areas shall be re-vegetated with indigenous species; All construction materials shall be kept out of the riparian areas; and All vehicles shall be regularly inspected for leaks. Refuelling must take place outside the project area, on a sealed surface area to prevent ingress of hydrocarbons into topsoil and aquatic ecosystems	1	1	1	1	1	6	Low	
	Loss of habitat and aquatic ecological structure as a result of site clearance activities and uncontrolled aquatic ecosystem degradation.	3	2	2	2	2	28	Medium Low		1	1	1	1	1	6	Low	
	Impact on the aquatic ecological systems as a result of changes to the sociocultural service provisions.	3	2	2	2	2	28	Medium Low		1	1	1	1	1	6	Low	
	Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of riparian resources.	3	2	2	2	2	28	Medium Low		1	1	1	1	1	6	Low	
	Soil compaction and levelling as a result of construction activities and vehicle movement leading to loss of riparian habitat.	3	2	2	2	2	28	Medium Low		1	1	1	1	1	6	Low	
	Impact on the hydrological functioning of the aquatic ecosystems.	3	2	2	2	2	28	Medium Low		1	1	1	1	1	6	Low	
Heritage Resources	The proposed project has the potential to impact on local graves within the area (if any).	2	1	2	2	2	20	Low	Prior to the site establishment, a heritage impact assessment must be undertaken and mitigation and /or	1	1	1	1	1	6	Low	

	The proposed project has the potential to impact on sites of archaeological importance.	2	1	2	2	2	20	Low	management measure for the protection of such resources must be implemented; No construction activities may be undertaken within 50 m of the heritage and/or cultural sites; If archaeological sites or graves are exposed during construction work, it should immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.	1	1	1	1	1	6	Low
Palaeontological Resources	Drilling of exploratory boreholes has potential to impact on palaeontological resources	2	1	2	2	1	20	Low	Should fossils be exposed during construction work, it should immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.	1	1	1	1	1	6	Low

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation								
		Consequence			Probability		Frequency: Impact	Significance		Significance Rating	Consequence			Probability		Frequency: Impact	Significance	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Severity					Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance			
Flora	Loss of localised biodiversity habitats within sensitive areas due to site clearance and establishment of drill sites.	2	1	2	2	2	20	Low	The Contractor shall be on the lookout for SCC and any floral SCC encountered within the development footprint are to be relocated to areas with suitable habitat, outside the disturbance footprint; Floral species of conservation concern, if encountered within the development footprint, are to be handled with	1	1	1	1	2	9	Low		
	Loss of localised floral species diversity including RDL and medicinal protected species due to site clearance and establishment of drill sites.	2	1	2	2	2	20	Low		1	1	1	1	2	9	Low		

<p>Potential spreading of alien invasive species as indigenous vegetation is removed, and pioneer alien species are provided with a chance to flourish.</p>	2	1	2	2		2	20	Low	<p>care and the relocation of sensitive plant species to suitable similar habitat is to be overseen by a botanist;</p> <p>The proposed development footprint shall be kept to the minimum;</p> <p>All disturbed areas must be concurrently rehabilitated during construction;</p> <p>Prohibit the collection of any plant material for firewood or medicinal purposes;</p> <p>The existing integrity of flora surrounding the study area shall be upheld and no activities shall be carried out outside the footprint of the construction areas;</p> <p>Edge effect control shall be implemented to avoid further habitat degradation outside of the proposed footprint area;</p> <p>All sensitive open space areas will be demarcated and access into these areas shall be prohibited;</p> <p>Protected floral species occurring within the vicinity of the study area, but outside the disturbance footprint shall be fenced for the duration of the construction activities;</p> <p>Monitoring of relocation success will be conducted during the operational phase;</p> <p>Construction related activities shall be kept strictly within the development footprint;</p> <p>Construction vehicles shall only be allowed on designated roadways to limit the ecological footprint of the project.</p> <p>Alien Invasive Plant Species Management plan to be implemented;</p> <p>Edge effects of activities including erosion and alien/ weed control will be strictly managed in the riparian area;</p> <p>All sites disturbed by construction activities shall be monitored for colonisation by exotic or invasive plants;</p> <p>Exotic or invasive plants shall be controlled as they emerge;</p> <p>An alien vegetation control program must be developed and implemented within all disturbed areas. After removal of alien vegetation, the affected areas must be re-assessed to determine the success of the program and any follow up measures that may be required;</p>	1	1	1	1	2	9	Low
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									methods must be favoured for the removal of alien invasive species. Chemical removal shall only be undertaken by a suitably qualified and approved person; and As much vegetation growth as possible must be promoted in order to protect soils. In this regard, special mention is made of the need to use indigenous vegetation species where hydro seeding, rehabilitation planting (where applicable) is to be implemented.							
Fauna	Vegetation clearance may result in loss of faunal habitat ecological structure, species diversity and loss of species of conservation concern.	2	1	2	2	2	20	Low	The proposed development footprint areas shall remain as small as possible and where possible be confined to already disturbed areas;	1	1	1	1	2	9	Low
	Habitat fragmentation as a result of construction activities of leading to loss of floral diversity.	2	1	2	2	2	20	Low	No trapping or hunting of fauna shall be permitted; Edge effects of all construction and operational activities, such as erosion and alien plant species proliferation, which may affect faunal habitat, need to be strictly managed;	1	1	1	1	2	9	Low
	Loss of faunal diversity and ecological integrity as a result of construction activities, erosion, poaching and faunal specie trapping.	2	2	2	2	2	24	Low	Should any SCC be encountered within the study area, these species will be relocated to similar habitat within or in the vicinity of the study area with the assistance of a suitably qualified specialist;	1	1	1	1	2	9	Low
	Movement of construction vehicles and machinery may result in collision with fauna, resulting in loss of fauna.	2	2	2	2	2	24	Low	No informal fires in the vicinity of construction areas shall be permitted; An alien vegetation control plan must be developed and implemented in order to manage alien plant species occurring within the study area, and to prevent further faunal habitat loss.	1	1	1	1	1	6	Low
Air Quality	Possible increase in dust generation, PM ₁₀ and PM _{2.5} as a result of bulk earthworks, operation of heavy machinery, and material movement.	2	2	2	2	2	24	Low	Dust suppression measures shall be implemented on dry weather days and periods of high wind velocities;	1	2	1	1	2	12	Low

Increase in carbon emissions and ambient air pollutants (NO ₂ and SO ₂) as a result of movement of vehicles and operation of machinery/equipment.	2	2	2	2	2	24	Low	<p>Appropriate dust suppression measures may include spraying with water;</p> <p>Where practical rehabilitation should be undertaken in tandem with the construction activities;</p> <p>A speed limit of 40 km/hr shall apply to limit vehicle entrained dust from the unpaved road;</p> <p>All construction equipment must be scheduled for preventative maintenance to ensure the functioning of the exhaust systems to reduce excessive emissions and limit air pollution;</p> <p>Dust control suppression shall be implemented on dry weather days and periods of high wind velocities;</p> <p>Appropriate dust suppression measures may include limiting the extent of open areas, reducing the frequency of disturbance and spraying with water;</p> <p>Where practical rehabilitation should be undertaken progressively;</p> <p>Materials transported on public roads must be covered;</p> <p>Odours:</p> <p>Putrescible waste must be handled, stored and disposed of before the probability of it generating odours; and</p> <p>Chemical toilets must be emptied / serviced on a regular basis. Proof of this must be provided to the Engineer.</p>	1	2	1	1	2	12	Low
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Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation								
		Consequence			Probability		Frequency: Impact	Significance		Significance Rating	Consequence			Probability		Frequency: Impact	Significance	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Severity					Spatial	Duration	Frequency: Activity	Severity	Spatial			
Visual	Scaring of the landscape as a result of the clearance of vegetation.	2	1	2	2	2	20	Low	The number of construction vehicles and machinery to be used shall be kept to a minimum; Movement of vehicles shall be kept to outside busy hours to minimise the visual impacts on the residents;	1	1	1	1	2	9	Low		
	Visual intrusion as a result of the movement of machinery and the establishment of the required infrastructure.	2	1	2	2	2	20	Low		1	1	1	1	2	9	Low		

	Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.	2	1	2	2	2	20	Low	Materials transported on public roads must be covered; and Where possible, rehabilitation of the work areas shall be undertaken in tandem with construction to ensure that areas stripped of vegetation are kept to a minimum.	1	1	1	1	2	9	Low
Noise	The use of vehicles and machinery during the construction phase may generate noise in the immediate vicinity.	2	2	2	2	2	24	Low	Adjacent landowners must be advised of any work that will take place outside of normal working hours, that may be disruptive (e.gw. noise) in advance; Surrounding communities must be notified in advance of noisy construction activities; All equipment should be provided with standard mufflers; Muffling units on vehicles and equipment must be kept in good working order. Construction staff working in areas where the 8-hour ambient noise levels exceed 85 Dba should wear ear protection equipment; Where possible, operation of several equipment and machinery simultaneously must be avoided; All equipment must be kept in good working order, with immediate attention being paid to defective silencers, slipping fanbelts, worn bearings and other sources of noise; Equipment must be operated within specifications and capacity (e.g., no overloading of machines); Regular maintenance of equipment must be undertaken, particularly with regard to lubrication; Equipment shall be switched off when not in operation; Appropriate directional and intensity settings must be maintained on all hooters and sirens; The Contractor must ensure that the employees conduct themselves in an appropriate manner while on site; and Noise/vibration producing activities shall be limited to daylight hours (Monday to Friday 07H00 to 18H00 and Saturday 07H00 -14H00).	1	1	1	2	1	9	Low
Soil, Land use and Land	Localised chemical pollution of soils as a result of vehicle hydrocarbon spillages and compaction.	2	1	2	2	2	20	Low	Contaminated soil shall be removed and disposed of to an appropriate licensed landfill site in terms of NEMWA,	1	1	1	2	1	9	Low

Capability	Localised clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion.	2	1	2	2	2	20	Low	or can be removed by a service provider that is qualified to clean the soil; The time in which soils are exposed during construction activities should remain as short as possible;	1	1	1	1	2	9	Low
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Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation								
		Consequence			Probability		Frequency: Impact	Significance		Significance Rating	Consequence			Probability		Frequency: Impact	Significance	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Severity					Spatial	Duration	Frequency: Activity	Severity	Spatial			
							Management and Mitigation Measures											
	Localised loss of resource and its utilisation potential due to compaction over unprotected ground/soil.	2	1	2	2	2	20	Low	Erosion control measures shall be implemented where deemed necessary; In general, all steep slopes steeper than 1:3 or where the soils are more prone to erosion must be stabilised; If stockpiles are not going to be used immediately the stockpiles shall be rehabilitated to prevent erosion; Runoff from stockpiles shall be detained in order to support growth of vegetation; Runoff from the stockpiles shall be suitably managed to ensure that the runoff volumes and velocities are similar to pre disturbed levels;	1	1	1	1	2	9	Low		
	Localised loss of soil and land capability due to reduction in nutrient status - de-nitrification and leaching due to stripping and stockpiling footprint areas.	2	1	2	2	2	20	Low	Vegetation shall be used to promote infiltration of water into the stockpile instead of increasing runoff; A monitoring programme will be implemented if the stockpiles are not used within the first year whereby the vegetation of the stockpiles is monitored in terms of basal cover and species diversity; If it is noticed that the vegetation on the stockpiles is not sustainable, appropriate corrective actions shall be taken to rectify the situation; Stockpiles shall be maintained until the topsoil is required for rehabilitation purposes; Topsoil stockpiles shall be monitored regularly to identify alien vegetation, which shall be removed as soon as possible to prevent further distribution of any alien vegetation.	1	1	1	1	2	9	Low		

Traffic	Increase in traffic volumes as a result of pre-construction activities which may lead to an increase in traffic congestion along the Secondary and N14 roads as well as the farm roads around the prospecting area.	2	3	2	2	2	28	Medium Low	Local speed limits and traffic laws shall apply at all times to minimise the occurrences of accidents on public roads; The number of construction vehicles and trips shall be kept to a minimum; and Where possible the transportation of construction materials and rubbish shall be undertaken outside traffic peak hours to minimise inconveniencing residents.	2	2	2	1	2	18	Low		
Climate	Emissions of Green House Gases as a result of the use of plant, heavy moving machinery, generators etc.	2	2	2	2	2	24	Low	All the construction vehicles shall undergo maintenance on a regular basis to improve on the combustion engine vehicle efficiency.	1	2	1	1	1	8	Low		
Waste Management	Potential water and soil pollution as a result of inappropriate waste management practices.	2	3	2	2	2	28	Medium Low	Separation of waste: All waste shall be separated into general waste and hazardous waste; Hazardous waste shall not be mixed with general waste and in doing so increase the quantities of hazardous waste to be managed; General waste can further be separated into waste that can be recycled and or reused; No littering shall be allowed in and around the site, a sufficient number of bins shall be provided for the disposal of waste; Where necessary dedicate a storage area on site for collection of construction waste. Storage of waste: No stockpiling of debris shall be permitted within 100 m of any water courses and drainage lines, or within 500 m of	2	2	2	1	2	18	Low		
Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation			Impact Significance Before Mitigation			Impact Management Actions (Proposed Mitigation Measures)			Environmental Impact Significance After Mitigation							
		Consequence			Probability						Consequence			Probability				
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating	Management and Mitigation Measures			Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating

17.2 Operational Phase

The operation phase of the project will comprise of diamond core drilling.

17.2.1 Social-Economic

It is expected that during the operation phase the project will not result in the creation of employment as prospecting requires highly specialised personnel. The applicant will make use of qualified contractors for the drilling and sampling of the sites. The community will however continue to benefit as a result of the continued boost in small local businesses. The socio-impacts expected during the operation phase include:

- Impact on the day-to-day operation by landowners in the area, which may have an impact on their livelihoods;
- Negative impacts on health and safety of the local communities as a result of additional vehicles on the roads;
- Negative impact on, local community health and safety due to influx of employees, the presence of job seekers, which may lead to prostitution and conflict with the local communities. Illegal informal settlement of job seekers in the area may exacerbate the situation; and
- Potential damage to adjacent landowners'/occupiers' infrastructure as a result of drilling activities.

17.2.2 Groundwater

The drilling process will involve the use of vehicles which may result in the spillages of hydrocarbons from vehicles and machinery. This will result in the contamination of soils and groundwater.

The prospecting operations will require the drilling of boreholes, which may result in the drawdown, which may affect the yield to the surrounding groundwater users.

Material used for backfilling boreholes may leach pollutants, which will result in the contamination of surrounding groundwater regime. This may spread beyond the backfilling site via plume migration.

17.2.3 Surface water

Drilling operations may result in the generation of surface water runoff contaminated with drill muds and cuttings, should spillage occur. The runoff containing sediments will have negative impacts on the water quality due to increase turbidity and sedimentation of water courses. This will also have an impact on aquatic habitats.

17.2.4 Aquatic Ecology

In addition to the impacts on aquatic habitats as explained above, the operation phase of the project is expected to have the following impacts on aquatic ecosystems:

- Loss of habitat and aquatic ecological structure as a result of continual disturbance and uncontrolled degradation;
- Impact on the aquatic ecological systems as a result of changes to the sociocultural service provisions through continued uncontrolled vegetation clearance, waste management and disturbance; and
- Impact on the hydrological functioning of the aquatic ecological and riparian systems as a result of reduced aquatic ecosystem and riparian footprints and uncontrolled disturbance.

17.2.5 Flora

The project may result in the following impacts on the floral environment during the operation phase:

- Destruction of potential floral habitats as a result of continual disturbance of soil, leading to altered floral habitats, erosion and sedimentation;
- Impact on floral diversity as a result of possible uncontrolled fires;
- Potential spreading of alien invasive species as a result of floral disturbance; and
- Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase.

17.2.6 Fauna

The project may result in the following impacts on the faunal environment during the operation phase:

- Migration of fauna from the prospecting area due to noise as a resulting of drilling activities;
- Loss of faunal species due to collisions with vehicles and machinery;
- Loss of faunal diversity and ecological integrity as a result of poaching and faunal species trapping;
- Failure to initiate a rehabilitation plan and alien control plan during the operation phase may lead to further impacts during the operation phase.

17.2.7 Soils, Land Use and Land Capability

Spillages of hydrocarbons from the vehicles and machinery may result from vehicle movement during the drilling. This will result in the contamination of soils. The material from the drilling site may result in the contamination of soils, which may render the land not usable after backfilling operation.

17.2.8 Air Quality

The movement of vehicles and drilling machinery will likely result in an increase in nuisance dust. There is also potential for increase in carbon emissions and ambient air pollution due to the movement of vehicles and construction machinery. It is expected that the implementation of dust suppressing mitigation measures will result in the reduction in nuisance dust.

17.2.9 Visual

The drill rigs and towers used during the drilling operation phase will be visible from nearby locations and will have visual impact on the local communities near the prospecting area.

17.2.10 Heritage, Archaeological Resources

The drilling operations may result in the destruction of graves and other heritage resources that may be on site.

17.2.11 Palaeontology Impacts

Earth moving activities may result in the destruction of fossils (if any).

17.2.12 Ambient Noise

The use of vehicles and machinery may result in an increase in noise in the immediate vicinity of the project. The drilling activities will also result in an increase in noise in the vicinity of the project.

17.2.13 Traffic

The movement of vehicles in the project area will result in an increase in traffic on the roads.

17.2.14 Climate

The movement of vehicles and machinery may result in the production of carbon dioxide (Green House Gas), which may have an impact on the climate in the area.

17.2.15 Vibrations

Drilling ground vibrations may result in possible damage to infrastructure and private property.

The summary of the impact assessment during the operation phase is provided in Table 13-3.

	landowner's/occupiers' infrastructure								Drill sites shall be located as far from private property as is possible to minimise damage to infrastructure;									Rating
	As a result of drilling, there is potential for the occurrence of subsidence, impacting on the safety surface land dwellers and users.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Should private property be damaged due to operation activities, property owners shall be appropriately compensated.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Groundwater	The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination of the vegetation cover and soils. The material removed from the drilling exercises will contain carbonaceous material, which has a potential for pollution should it be allowed stay for a prolonged period at the drilling site.	3	2	2	2	2	28	Medium Low	Ensure that the drilling of the exploration boreholes is conducted in such a manner that the environment is protected from probable spillages and contamination. All boreholes and sumps will be rehabilitated to pre-drilling conditions. Tarpaulins will be placed on the ground to prevent oil, grease, hydraulic fluid and diesel spills during emergency repairs. All oil spills will be remedied using approved methodologies. The contaminated soils will be removed and disposed of at a licensed waste disposal facility.	2	1	2	1	2	15	Low		
	Storage of hydrocarbons and chemicals, which may impact on groundwater as a result of spillages and uncontrolled release.	3	2	2	2	2	28	Medium Low	All waste generated from the drilling sites and the campsite will be collected in proper receptacles and removed to a registered disposal facility e.g., sewage treatment plant, solid waste disposal site or hydrocarbon recycling or treatment facilities.	2	1	2	1	2	15	Low		

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation								
		Consequence			Probability		Frequency: Impact	Significance		Rating	Consequence			Probability		Frequency: Impact	Significance	Rating
		Severity	Spatial	Duration	Frequency: Activity	Severity					Spatial	Duration	Frequency: Activity					
	The prospecting operations will require the drilling of boreholes. The boreholes may result in the drawdown, which may affect the yield to the surrounding groundwater users. Material used for backfilling may leach pollutants that will result in the pollution of the surrounding groundwater regime. This may even spread beyond the backfilling site via plume migration.	2	2	2	2	2	24	Low	Ensure that the landowners' borehole yields are monitored during the drilling operation. Should it be proven that the operation is indeed affecting the quantity and quality of groundwater available to users and surrounding water resources, the affected parties must be compensated.	2	1	2	1	2	15	Low		

Surface Water	The drilling operations may result in the generation of surface water runoff contaminated with drilling muds and cuttings should spillages occur. The sedimentation and possible contamination with carbonaceous material will have negative impacts on the surrounding clean water environment. These will cause an increase in the turbidity and will decrease acidity of the water in the streams, which will affect the aquatic habitat, hence important habitats may be lost.	2	2	2	2	2	24	Low	No prospecting operations will be undertaken within 100 metres from the nearby streams and 500 meters from riparian areas without consent from the DWS; Sumps will be excavated for the collection mud and excess water from the drilling sites; The sumps will be sized such that they will be able to contain the water and mud that will be generated during the prospecting operation; Storm water generated around the drilling site will be diverted away to the clean water environment; No concrete mixing and vehicle maintenance will be allowed on site. All hydrocarbons will be stored on protected storage areas away from the streams.	2	1	2	1	2	15	Low
Biodiversity	Continued destruction of potential floral habitats for species of conservational concern as a result continual disturbance of soils leading to altered floral habitats, erosion and sedimentation.	2	1	3	2	2	24	Low	All disturbed areas must be rehabilitated in tandem with construction activities. The collection of any plant material for firewood or medicinal purposes shall be strictly prohibited.	2	1	1	1	1	8	Low
	Impact on floral species of conservational concern as a result of an increased in alien species proliferation and ineffective rehabilitation of exposed areas	2	1	3	2	2	24	Low	The existing integrity of flora surrounding the study area shall be upheld and no activities shall be carried out outside the footprint of the demarcated drill sites.	2	1	1	1	1	8	Low
	Loss of faunal habitat and ecological structure as a result of increased fires during operation and introduction of alien species, leading to transformation of the natural habitat	2	1	3	2	2	24	Low	The rehabilitation of the disturbed areas must be conducted such that the rehabilitated areas will encourage the migration of animals back into the rehabilitated areas. The proposed development footprint areas shall remain as small as possible and where possible be confined to already disturbed areas. No trapping or hunting of fauna shall be permitted. Edge effects of all operational activities, such as erosion and alien plant species proliferation, which may affect faunal habitat shall be strictly managed. No informal fires in the vicinity of drill sites shall be permitted. An alien vegetation control plan must be implemented in order to manage alien plant species occurring within the study area, and to prevent further faunal habitat loss. Poaching of wild animals and livestock will be prohibited.	1	1	1	1	1	6	Low

Soils Land use and Land Capability	Topsoil removal, storage and replacement during the excavation of the sumps will result. This will result in the disruption of the soils profile.	2	1	2	2	2	20	Low	Ensure that topsoil is properly stored, away from the streams and drainage areas. The soils must be used for the backfilling and rehabilitation of the sumps.	1	1	1	1	1	6	Low
	Soil contamination as a result of operational activities can be as a result of a number of activities (i.e., hazardous substance storage, incidental hydrocarbon leakages from construction vehicles).	3	1	2	2	2	24	Low	The rehabilitated sump must be seeded with recommended seed mix consisting of indigenous species. Tarpaulins will be placed on the ground to prevent oil, grease, hydraulic fluid and diesel spills during emergency repairs. Soil disturbance within the drill sites shall be kept to a minimum.	2	1	1	1	1	8	Low

Rating

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation								
		Consequence			Probability		Frequency	Impact Significance		Significance Rating	Consequence			Probability		Frequency: Impact	Significance	Significance
		Severity	Spatial	Duration	Frequency: Activity	Severity					Spatial	Duration	Frequency: Activity	Severity	Spatial			
Air Quality	The prospecting operation will require vehicular movement which may result in Possible increase in dust generation, PM10 and PM2.5 as a result of stockpiling material, use of heavy machinery, and material movement.	2	3	2	2	2	28	Medium Low	Dust suppression must be conducted during the operational phase of the project. Correct speed will be maintained at the proposed project site.	1	1	1	1	1	6	Low		

	Increase in carbon emissions and ambient air pollutants (NO2 and SO2) as a result of movement of vehicles and operation of machinery/equipment.	2	3	2	2	2	28	Medium Low	<p>Vehicle maintenance must be conducted regularly to avoid excessive diesel fumes.</p> <p>Where practical possibly rehabilitation should be undertaken progressively.</p> <p>A speed limit of 40 km/hr shall apply to limit vehicle entrained dust from the unpaved roads.</p> <p>All construction equipment must be scheduled for preventative maintenance to ensure the functioning of the exhaust systems to reduce excessive emissions and limit air pollution.</p> <p>Dust control suppression shall be implemented on dry weather days and periods of high wind velocities;</p> <p>Appropriate dust suppression measures may include limiting the extent of open areas, reducing the frequency of disturbance and spraying with water;</p> <p>Materials transported on public roads must be covered; and</p> <p>Where practical rehabilitation should be undertaken progressively.</p> <p>Odours</p> <p>Putrescible waste must be handled, stored and disposed of before the probability of it generating odours; and</p> <p>Chemical toilets must be emptied / serviced on a regular basis.</p> <p>Proof of this must be provided to the Engineer.</p>	1	1	1	1	1	6	Low
Visual	The drill rigs and towers used during the drilling operations will be visible from the nearby residents and properties.	2	2	3	2	3	35	Medium Low	<p>Ensure that the time period used for the drill rigs is optimised to ensure that the drill rigs are moved from one site to another over short periods.</p> <p>Materials transported on public roads must be covered.</p>	1	1	1	1	1	6	Low
Heritage Resources	The drilling operation may result in the destruction of graves and any other heritage that may exist on site during operational phase of the project.	3	2	2	1	2	21	Low	<p>Locate exploration borehole more than 50 m from the identified heritage sites.</p>	1	1	1	1	1	6	Low
Noise	The use of vehicles and machinery during the construction phase may generate noise in the immediate vicinity	2	2	2	2	2	24	Low	<p>Ensure that proper management measures as well as technical changes are undertaken to reduce the impacts on surrounding residents and employees. This include ensuring that less noisy</p>	1	1	1	1	1	6	Low

									Noise/vibration producing activities shall be limited to daylight hours (Monday to Friday 07H00 to 18H00 and Saturday 07H00 14H00).							
Traffic	Increase in traffic volumes as a result of preconstruction activities which may lead to an increase in traffic congestion along the Secondary and N14 roads as well as the farm roads around the prospecting area.	2	3	1	2	2	24	Low	Local speed limits and traffic laws shall apply at all times to minimise the occurrences of accidents on public roads; and Where possible the transportation of construction materials and rubbish shall be undertaken outside traffic peak hours to minimise inconveniencing residents.	1	2	1	1	1	8	Low
Climate	Emissions of Green House Gases as a result of the use of plant, heavy moving machinery, generators etc.	2	2	2	2	2	24	Low	The number of construction vehicles and trips shall be kept to a minimum. All the vehicles shall undergo maintenance on a regular basis to improve on the combustion engine vehicle efficiency.	1	1	1	1	1	6	Low
Drilling and Vibrations	Impact of drilling ground vibration on houses, boreholes and roads, resulting in possible damage to infrastructure	2	1	1	2	2	16	Low	Drill sites shall be located as far from private property as is possible. Affected property owners shall be notified of any drilling activities before commencement of the activities.	1	1	1	1	1	6	Low
	Fly rock impact on houses, boreholes and roads, resulting in possible damage to infrastructure;	2	1	1	2	2	16	Low	Should there be damage to private property as a result of drilling activities, property owners shall be appropriately compensated.	1	1	1	1	1	6	Low

Waste Management		2	1	1	2	2	16	Low	<p>Storage of waste</p> <p>General waste will be collected in an adequate number of litter bins located throughout the construction site; Bins must have lids in order to keep rainwater out;</p> <p>Bins shall be emptied regularly to prevent the bins from overflowing;</p> <p>All work areas shall be kept clean and tidy at all times;</p> <p>All waste management facilities will be maintained in good working order;</p> <p>Waste shall be stored in demarcated areas according to type of waste;</p> <p>Runoff from drill sites will be contained, treated and reused;</p> <p>Flammable substances must be kept away from sources of ignition and from oxidizing agents;</p> <p>No storage of waste shall be permitted within 100 m of the water courses or within 500 m of riparian areas;</p> <p>Demolition waste and surplus concrete shall be disposed of responsibly;</p>	1	1	1	1	1	6	Low			
Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation									
		Consequence			Probability		Frequency:	Impact Significance	Significance Rating			Consequence			Probability		Frequency: Impact	Significance	Significance
		Severity	Spatial	Duration	Frequency: Activity				<p>Waste shall not be buried or burned on site; and</p> <p>The maximum retention time for temporary storage of waste generated shall not exceed 30 days, provided the waste does not present a health hazard or risk of odour.</p> <p>Disposal of hazardous waste</p> <p>No dumping shall be allowed in or near the construction site;</p> <p>Hazardous containers shall be disposed of at an appropriate licensed site;</p> <p>Hazardous waste will be removed and managed by an approved service provider;</p>										

Rating

								<p>A safe disposal certificate will be provided by the approved service provider as proof of responsible disposal of hazardous waste; and</p> <p>The safe disposal certificate shall be stored and provided on request.</p> <p>Disposal of general waste</p> <p>No dumping shall take place in or near the drill sites; and</p> <p>All general waste shall be disposed of to the nearest licensed landfill site.</p>							
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17.3 Decommissioning and Closure

The impacts for the decommissioning and closure phases will be like the impacts during the construction phase and have not been assessed in detail (please refer to the construction phase assessment). The most significant impacts will be:

17.3.1 Soils and Land Capability

The affected soil and land use will be restored after rehabilitation of the drilling sites and associated access infrastructure. This will also result in the resumption of the use of the land since the infrastructure would have been removed. However, should the rehabilitation of affected sites not be conducted properly, it may result in loss of usable soils and agricultural land, resulting in reduced land capability.

17.3.2 Land Use

Positive impacts will result due to the reduction in areas of disturbance and the return of land use of the affected areas and making available an area that was covered by the drilling sites.

17.3.3 Soils and Vegetation

The use of vehicles/machinery during the rehabilitation of the exploration sites may result in the compaction of soils and in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination and destruction of the vegetation cover, soils and groundwater.

17.3.4 Surface Water and Aquatic Ecosystems

During the decommissioning and closure phases equipment will be removed, stockpiled soils will be used for rehabilitation, remaining sumps will be backfilled, levelled, top soiled and the area re-seeded. During the process of rehabilitation surface water runoff from the rehabilitation site may have elevated silt load, which may cause pollution of the nearby water courses.

17.3.5 Air Quality

Rehabilitation and removal of the prospecting sites and equipment will require vehicular movement. This will result in the generation of dust by movement of vehicles and due to blowing winds. Vehicles and machinery will also generate diesel or petrol fumes. Generated dust will migrate towards the predominant wind direction and may settle on surrounding properties including nearby vegetation.

17.3.6 Noise

Noise will be generated during the removal of equipment and rehabilitation of the sites. The noise is not expected to exceed occupational noise limits and will be short lived.

The summary of the impact assessment during the decommissioning and closure phase is provided below ..

Table 13-4: Impact Assessment Table for the Decommissioning and Closure Phase

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Likelihood (Probability)	Frequency: Impact	Significance	Significance Rating		Consequence			Likelihood (Probability)	Frequency: Impact Significance	Significance Rating	
		Severity	Spatial	Duration	Frequency: Activity					Severity	Spatial	Duration	Frequency: Activity			
Management and Mitigation Measures																
Soils, Land Capability and Land Use	The removal of the campsite equipment and the rehabilitation of the drilling sites and associated access infrastructure will result in the affected soil and land use being restored. This will also result in the resumption of the use of the land since the infrastructure would have been removed.	N/A	N/A	N/A	N/A	N/A	0	N/A	Ensure that contamination of the rehabilitate area by hydrocarbon liquids is prevented. Ensure that the rehabilitation work is done in such a manner that the environment is protected from probable spillages. All boreholes and sumps will be rehabilitated to pre-drilling conditions. Tarpaulins will be placed on the ground to prevent oil, grease, hydraulic fluid and diesel spills during emergency repairs. All oil spills will be remedied using approved methodologies. The contaminated soils will be removed and disposed of at a licensed waste disposal facility.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Land Use	Positive impacts will result due to the reduction in areas of disturbance and the return of land use of the affected areas and making available an area that was covered by the campsite and drilling sites.	N/A	N/A	N/A	N/A	N/A	0	N/A	All waste generated from the rehabilitation sites will be collected in proper receptacles and removed to registered disposal facilities e.g., sewage treatment plant, solid waste disposal site or hydrocarbon recycling or treatment facilities.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Soils and Vegetation	The use of vehicles/machinery during the rehabilitation of the exploration sites may result compaction of soils and in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination and destruction of the vegetation cover and soils.	2	1	2	2	2	20	Low (-)		1	1	2	1	2	12	Low (-)

Surface water, wetlands, riparian areas and aquatic ecosystem	During the decommissioning and closure phases equipment will be removed, stockpiled soils will be used for rehabilitation, remaining sumps will be backfilled, levelled, top soiled and the area re-seeded. During the process of rehabilitation, surface water runoff from the rehabilitation site may have elevated silt load, which may cause pollution of the nearby water environment.	2	3	2	2	2	28	Medium Low (-)	Ensure that water leaving the site does not have elevated silt load. Adequate stormwater management shall be conducted on site to ensure that dirty water is kept separate from clean water. Ensure that the rehabilitated areas are free draining and that water from these areas is clean.	2	1	2	2	2	20	Low (-)
Air Quality	Rehabilitation and removal of the prospecting sites and equipment will require vehicular movement. This will result in the generation of dust by movement of vehicles and due to blowing winds. Vehicles and machinery will also generate diesel or petrol fumes. Generated dust will migrate towards the predominant wind direction and may settle on surrounding properties including nearby vegetation.	1	3	2	2	2	24	Low (-)	Dust suppression must be conducted during the decommissioning phase of the project whenever excessive dust is generated. Vehicle maintenance must be conducted regularly to avoid excessive diesel fumes.	1	1	1	1	2	9	Low (-)

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation						Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation											
		Consequence			Likelihood (Probability)				Frequency: Impact	Significance	Significance Rating	Consequence			Likelihood (Probability)			Frequency: Impact	Significance	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Severity	Spatial					Duration	Frequency: Activity							
Noise	Noise will be generated during the removal of equipment and rehabilitation of the sites. This noise is not expected to exceed	2	1	2	2	2	20	Low (-)	Where necessary, provide employees with ear plugs and employees must be instructed to use the ear plugs. Ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures.	1	1	1	1	2	9	Low (-)				

18 Impact Assessment Methodology

All the identified potential impacts were assessed according to the following Impact Assessment Methodology as described below. This methodology has been utilised for the assessment of environmental impacts where the consequence (severity of impact, spatial scope of impact and duration of impact) and likelihood (frequency of activity and frequency of impact) have been considered in parallel to provide an impact rating and hence an interpretation in terms of the level of environmental management required for each impact.

The first stage of any impact assessment is the identification of potential environmental activities, aspects and impacts which may occur during the commencement and implementation of a project. This is supported by the identification of receptors and resources, which allows for an understanding of the impact pathway and an assessment of the sensitivity to change. Environmental impacts (social and biophysical) are then identified based on the potential interaction between the aspects and the receptors/resources.

The significance of the impact is then assessed by rating each variable numerically according to defined criteria as outlined in Table 14-1. The purpose of the rating is to develop a clear understanding of influences and processes associated with each impact. The severity, spatial scope and duration of the impact together comprise the consequence of the impact and when summed can obtain a maximum value of 15. The frequency of the activity and the frequency of the impact together comprise the likelihood of the impact occurring and can obtain a maximum value of 10. The values for likelihood and consequence of the impact are then read off a significance rating matrix table as shown in Table 14-1. This matrix thus provides a rating on a scale of 1 to 150 (low, medium low, medium high or high) based on the consequence and likelihood of an environmental impact occurring.

Natural and existing mitigation measures, including built-in engineering designs, are included in the pre-mitigation assessment of significance. Measures such as demolishing of infrastructure, and reinstatement and rehabilitation of land, are considered post-mitigation.

Consequence

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105
	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135
Likelihood	10	20	30	40	50	60	70	80	90	100	110	120	1	140	150

	High	76 to 150	Improve current management
	Medium High	40 to 75	Maintain current management
	Medium Low	26 to 39	
	Low	1 to 25	No management required

SIGNIFICANCE = CONSEQUENCE x LIKELIHOOD

19 Positive and Negative Impacts

The alternative sites will be identified based on the location of sensitive environments such as heritage sites (graves etc.), aquatic ecosystems, riparian zones, and areas with Red Data Species. Changes in the layout plan will be discussed and agreed on with the affected landowners and the layout map amended accordingly. The impacts of the proposed site layout will be the same as those of the alternative sites that may be identified during the prospecting exercise.

Positive impacts resulting from prospecting activities will be the creation of employment, which is required in the region. Should adequate Gold, Cobalt, Chrome, Copper, Iron, be found in the project area, Mashinini will be able to mine the available reserves. This will result in job creation and support to local businesses is continued. Mashinini expects that substantial benefits from the project (should adequate reserves be found and confirmed) will accrue to the immediate project area.

Minerals of interest, Iron ore, manganese and diamond mining in South Africa is of important economic value, especially for the construction and jewellery industries. The proposed prospecting project has a potential to decrease level of unemployment rate in proposed areas and surroundings. This prospecting project will bring revenue into the city and the province which will in turn boost the economy of the country.

Activities to be conducted have medium to low significance impacts, which will be short term activities in nature. The probability of occurrence of an impact was determined and most of the activities can be controlled and impacts can be reduced or avoided. The probability was also determined based on other prospecting activities of similar nature. It was found that generally prospecting activities have low impact on the environment.

Please refer to Section 13 for a comprehensive impact assessment.

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

Please refer to Section 13 for the management and mitigation measures.

21 Motivation where no alternative sites were considered.

The preferred site is in an area where there is potential for Gold, Cobalt, Chrome, Copper, Iron, due to the geology of the area. The site is therefore regarded as the preferred site and alternative sites are not considered. The alternative drill sites will be identified based on the location of sensitive environments such as heritage sites (graves etc.), aquatic ecosystems, riparian zones, and areas with Red Data Species. Changes in the layout plan will be discussed and agreed on with the affected landowners.

22 Statement motivating the alternative development location within the overall site. (Provide a statement motivating the final site layout that is proposed)

The location and extent of the prospecting activities will be derived from the desktop surveys as well as the specialist studies. Where practicable, the drilling sites and location of infrastructure will be selected to avoid sensitive environments such as aquatic ecosystems, riparian areas, watercourses, biodiversity of conservation importance and heritage features.

22.1 Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site.

To identify the potential impacts associated with the proposed prospecting activities, the following steps were undertaken:

- The stakeholder consultation process is currently underway in a manner to be interactive, providing the landowners and identified stakeholders with an opportunity to provide input into the project. This is considered a key focus as the local residents have capabilities of providing site-specific information, which may not be available in desktop research material. Stakeholders were requested, as part of the notification letter, to provide their views on the project, and to state any potential concerns they may have. All comments and responses provided will be collated into the Comments and Responses Register, which will be attached to the final BAR, and will also be incorporated into the final impact assessment.
- A thorough desktop study 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:
 - o The South African National Biodiversity Institute (SANBI) Biodiversity Geographic

Database LUDS System;

- o The Municipal Integrated Development Plan for the Dawid Kruiper Local Municipality; and
- o The Spatial Development Framework for the ZF Mgcawu

District Municipality.

The rating of the identified impacts was undertaken in a quantitative manner as provided in Section 11 (impact rating). The ratings were undertaken in a manner to calculate the significance of each of the impacts. The identification of management and mitigation measures was done based on the significance of the impacts and measures included are considered sufficient, appropriate and practical to protect the environment.

23 Assessment of each identified potentially significant impact and risk.

Table 19-1: Assessment of each identified potentially significant impact and risk.

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
Data Collection and Assessment	Desktop Study	None	N/A	Planning	N/A	Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	N/A
Geological Mapping		None	N/A	Planning	N/A	Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	N/A
Planning for Drilling Surveys		None	N/A	Planning	N/A	Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	N/A
Access Roads	Physical surveying of the site and pegging of drilling boreholes	None	N/A	N/A	N/A	Rehabilitation of areas cleared of vegetation and dust control	Low
Drill Sites		Contamination of groundwater from hydrocarbon spillages	Groundwater	Construction	Medium Low	Control through management and monitoring of spillages. Where spillages occur, the soil must be stripped and disposed of as stipulated in the EMPr.	Low
Temporary Soil Storage Area		Contamination of surface water due to erosion of soils which will lead to increased turbidity as well as contamination from hydrocarbon spillages	Surface water	Construction	N/A	Monitoring through rehabilitation and management of spoil sites	Low
Hydrocarbon Storage Area		None	N/A	Construction	N/A	Control through clear demarcation of prospecting areas to ensure avoidance of graves and other heritage sites	Low
Contractors Camp		None	N/A	Construction	N/A	Management of drill sites. Should any fossils be discovered, operations must cease and SAHRA must be notified	Low

Mobile Ablution Facility	Loss of natural vegetation in the affected areas	Flora	Construction	Low	Rehabilitation of areas cleared of vegetation. Control of alien invasive plant species	Low
	Migration of fauna due to disturbance caused by the proposed project	Fauna	Construction	Low	Relocation of affected species of conservation importance	Low
	Air pollution through nuisance dust, PM 10 and PM2.5 as well as emissions from construction vehicles and machinery.	Air Quality	Construction	Low	Dust control measures	Low
	Increase in ambient noise due to movement of construction vehicles and machinery	Noise	Construction	Low	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g., noise mufflers Control through the limiting of the activities to the daytime and the implementation of an open and transparent channel of communication	Low
	Visual impacts as a result of vegetation clearance	Visual	Construction	Low	Rehabilitation of areas cleared of vegetation	Low

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
		Increased traffic on the roads due to additional construction vehicles	Traffic, Socio-economic	Construction	Medium Low	Speed control and limitation of the times when construction vehicles may be on the roads	Low
		Impact of carbon dioxide (GHG) produced by construction vehicles on the local climate	Climate Change	Construction	Low	Control and keep to a minimal the number of vehicles used for construction. Vehicles must be maintained to ensure efficient use of fuel.	Low
RC and Diamond Core Drilling	Drilling and Sampling	It is expected that during the operation phase the project will not result in the creation of employment as prospecting requires highly specialised personnel. The applicant will make use of qualified contractors for the drilling and sampling of the sites. The community will however continue to benefit as a result of	Socio-Economic	Operation	Low	Control of times during which operation activities will take place	Low

		the continued boost in small local businesses. Drilling has potential to affect the day-to-day operations by affected landowners					
		The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbons from vehicles and machinery. This will result in the contamination of soils and groundwater. The prospecting operations will require the drilling of boreholes, which may result in the drawdown, which may affect the yield to the surrounding groundwater users. Material used for backfilling boreholes may leach pollutants, which will result in the contamination of surrounding groundwater regime. This may spread beyond the backfilling site via plume migration.	Groundwater	Operation	Medium Low	Rehabilitation of affected areas and control using bunds	Low
		Drilling operations may result in the generation of surface water runoff contaminated with drill muds and cuttings, should spillage occur. The sedimentation will have negative impacts on the water quality due to increase turbidity in the watercourses. This will have an impact on aquatic habitats.	Surface Water	Operation	Low	Control through management and monitoring of surface runoff	Low
		The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbons from the vehicles and machinery. This will result in the contamination of soils. The material from the drilling site may result in the contamination of soils, which may render the land not usable after backfilling operation.	Soils Land use and Land Capability	Operation	Low	Rehabilitation of affected areas	Low
		The movement of vehicles and drilling machinery will likely result in an increase in nuisance dust, PM10 and PM2.5. There is also potential for increase in carbon emissions and ambient air pollution due to the movement of vehicles and construction machinery.	Air Quality	Operation	Medium Low	Dust control measures	Low
		The drill rigs and towers used during the drilling operation phase will be visible from nearby locations and will have visual impact on the local communities in close proximity to the prospecting area.	Visual	Operation	Medium Low	Strategic location of rigs and towers to areas where there may be some tree cover, as far as practicable	Low

		The drilling operations may result in the destruction of graves and other heritage resources that may exist on site.	Heritage Resources	Operation	Low	Control through clear demarcation of prospecting areas to ensure avoidance of graves and other heritage sites	Low
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NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
		Earth moving activities may result in the destruction of fossils (if any).	Palaeontological Resources	Operation	Low	Management of drill sites. Should any fossils be discovered, operations must cease and SAHRA must be notified	Low
		The use of vehicles and machinery may result in an increase in noise in the immediate vicinity of the project. The drilling activities will also result in an increase in noise in the vicinity of the project.	Noise	Operation	Low	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g., noise mufflers	Low
		The movement of vehicles in the project area will result in an increase in traffic on the roads.	Traffic	Operation	Low	Speed control and limitation of the times when construction vehicles may be on the roads	Low
		The movement of vehicles and machinery may result in the production of carbon dioxide (Green House Gas), which may have an impact on the climate in the area.	Climate	Operation	Low	Control and keep to a minimal the number of vehicles used for operations. Vehicles must be maintained to ensure efficient use of fuel.	Low
		Drilling ground vibrations may result in possible damage to infrastructure.	Drilling and Vibrations	Operation	Low	Drill sites must be located as far from infrastructure as is possible to avoid damage to infrastructure	Low
Data Analysis	Feasibility Studies	None	N/A	Operation	N/A	N/A	N/A
Feasibility Studies Report		None	N/A	Operation	N/A	N/A	N/A
Borehole capping Removal of equipment and infrastructure	Closure and Rehabilitation of borehole and infrastructure sites	The rehabilitation of the drilling sites and associated access infrastructure will result in the affected soil and land use being restored. This will also result in the resumption of the use of the land since the infrastructure would have been removed.	Soils, Land Capability and Land Use	Decommissioning and Closure	N/A	N/A	N/A

		Positive impacts will result due to the reduction in areas of disturbance and the return of land use of the affected areas and making available an area that was covered by the drilling sites.	Land Use	Decommissioning and Closure	N/A	N/A	N/A
		The use of vehicles/machinery during the rehabilitation of the exploration sites may result compaction of soils and in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination and destruction of the vegetation cover and soils.	Soils and Vegetation	Decommissioning and Closure	Low	Control and prohibit access of vehicles and machinery to areas outside of established access tracks. Control through the clear delineation of the prospecting area. Control through the implementation of environmental induction and toolbox talks, as well as the implementation of a fine system. Control through the implementation of a soil management programme in terms of the correct tops oil removal, stockpiling and rehabilitation practices as discussed in the EMPr.	Low
		During the decommissioning and closure phases equipment will be removed, stockpiled soils will be used for rehabilitation, remaining sumps will be backfilled, levelled, top soiled and the area re-seeded. During the process of rehabilitation surface water runoff from the rehabilitation site may have elevated silt load, which may cause pollution of the nearby water environment.	Surface Water	Decommissioning and Closure	Medium Low	Control through the clear delineation of the prospecting area. Control through the implementation of environmental induction and toolbox talks, as well as the implementation of a fine system. Control through the implementation of the NWA GN 704 water management principles.	Low
NAME OF ACTIVITY	POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated	
		Rehabilitation and removal of the prospecting sites and equipment will require vehicular movement. This will result in the generation of dust by movement of vehicles and due to blowing winds. Vehicles and machinery will also generate diesel or petrol fumes. Generated dust will migrate towards the	Air Quality	Decommissioning and Closure	Low	Dust control measures and rehabilitation of areas stripped of vegetation	Low

		predominant wind direction and may settle on surrounding properties including nearby vegetation.				
		Noise will be generated during the removal of equipment and rehabilitation of the sites. This noise is not expected to exceed occupational noise limits and will be short lived.	Noise	Decommissioning and Closure	Low	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g., noise mufflers

The supporting impact assessment conducted by the EAP must be attached as an appendix, marked Appendix.

Please refer to Appendix 5.

24 Summary of specialist reports.

No specialist studies were conducted as part of this application. Desktop information was used to compile the report and to conduct the impact assessment.

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.
Soil Study	<p>Drilling activity should not be conducted near these water resources; the exploration geologists will be advised to drill and sample away from rivers and wetlands on site.</p> <ul style="list-style-type: none"> ➤ Extreme caution should be taken during prospecting, owing to the perennial and non-perennial rivers and the wetlands, existing within the project area. 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. ➤ 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 ➤ Absorbent Spill kits will be made available near the drill rigs during drilling activities 	N/A	N/A

Attach copies of Specialist Reports as appendices (N/A)

25 Environmental impact statement

25.1 Summary of the key findings of the environmental impact assessment.

Impacts may occur on soils, natural vegetation, surface water, groundwater, sensitive landscapes, air quality, noise, visual aspects, and sites of archaeological and cultural importance should the EMPr not be adhered to.

Mashinini will undertake measures to ensure that the identified impacts are minimised. Assessment of the impacts with the proposed mitigation measures has shown the significance of the impacts on all affected environmental aspects to be reduced from medium and low to low and negligible significance.

Landowners and land occupiers within the proposed project area may be affected although on a temporary basis due to the need to access the sites. Measures such as safety along the roads and dust suppression will be undertaken to ensure that the impacts on the landowners and land occupiers are minimised.

Storm water runoff from the dirty water areas of the drilling sites, may have a detrimental impact on the surrounding water environment should this water be released to the environment. To prevent the occurrence of the above-mentioned impacts, dirty water collection sump will be used to collect all dirty water from the drilling site. The water collected from the sump will be re-used, evaporated and the sump will be rehabilitated once the drilling is finished. Sediments will be created from the site during the construction, operational and decommissioning phase, which may impact negatively on the surrounding water environment. The sediments will be treated should they contain hydrocarbon waste.

Employees will undergo training and will be given strict instruction not to undertake activities that will affect the environment and that may have an impact on the landowners. Waste generated from the site will be collected in proper receptacles and disposed of in registered waste disposal sites.

Key findings of the environmental impact assessment include:

- Identified impacts will be localised, short term and will have a medium and low significance. The significance of potential environmental impacts can be reduced to low and very low significance with implementation of mitigation measures and monitoring.
- Cumulative noise, visual and air quality (dust) impacts are deemed to not be significant (low) when proper mitigation measures are implemented.
- During the construction phase of the project, vegetation loss is inevitable. This will however be limited to the footprint of the infrastructure (boreholes). Care must be taken to manage any species of special concern as well as the proliferation of alien invasive plant species.

25.2 Final Site Map

Please refer to Appendix 6 for the preliminary site map which includes the environmental sensitive areas.

The final map showing the layout of the proposed project will be submitted to the DMRE on granting of the prospecting right. The map will be developed to superimpose the proposed prospecting project and associated infrastructure together with the environmentally sensitive areas such as heritage sites, wetland and riparian areas, water courses and Red Data Listed floral species within the proposed project site.

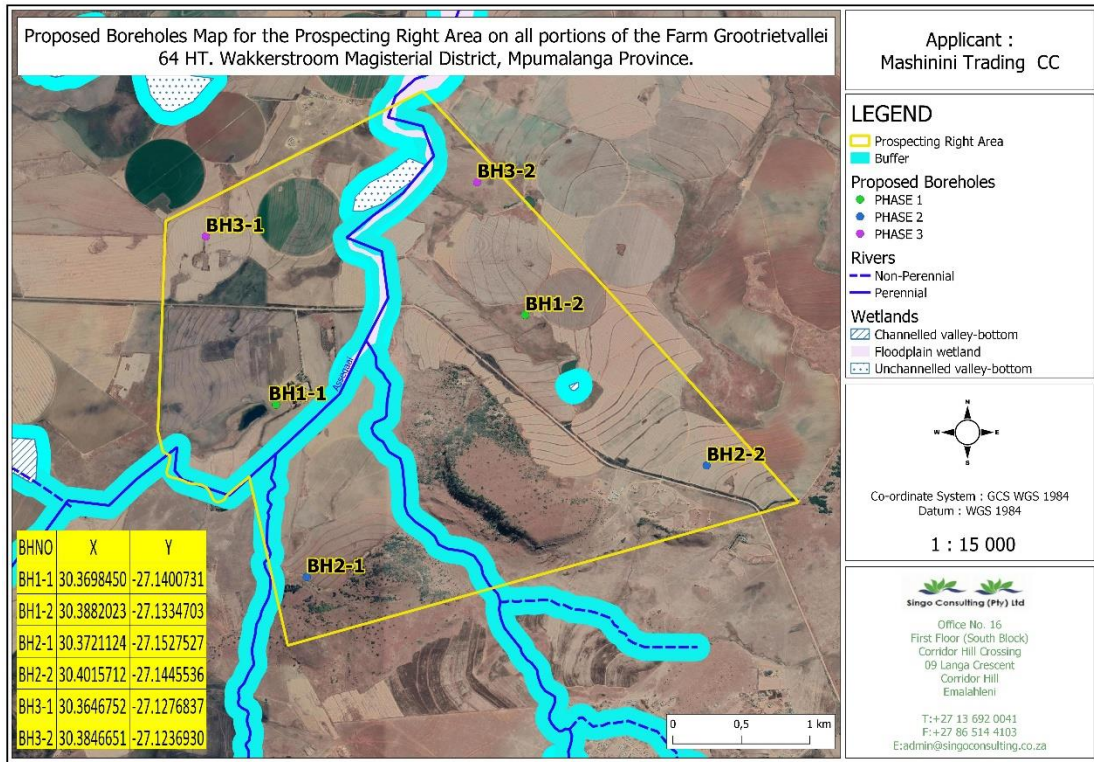


Figure 26: Proposed boreholes

25.3 Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.

After assessing the impacts that the proposed activities will have on the environment, it was determined that they will be of medium and low significance and will be short term activities. The probability of occurrence of an impact was determined and most of these activities can be controlled and impacts can be reduced or avoided. Generally prospecting activities have low impact on the environment. The planned activities' negative impacts can be controlled and avoided or minimised. Mitigation measures will be used to manage and control any potential impact. The main impacts will include:

- Increased ambient noise levels resulting from drilling activities and increased traffic movement;
- Potential water and soil pollution resulting from hydrocarbon spills and soil erosion which may impact on the water resources utilised by the communities and landowners;

- Potential water and soil pollution resulting from hydrocarbon spills and soil erosion which may impact on ecosystem functioning;
- Increased vehicle activity within the area resulting in potential destruction and disturbance of flora and fauna;
- Poor access control to farms may impact on cattle movement, breeding and grazing practices;
- Influx of job seekers to site may result in increased opportunistic crimes;
- Potential visual impacts by drilling activities as well as vegetation clearance;
- Prospecting will be undertaken by special sub-contractors and it is not anticipated that employment opportunities for local and/or regional communities will result from prospecting activities; and
- Short term boost for local businesses.

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

The objectives of the EMPr will be to:

- Provide sufficient information to strategically plan the prospecting activities as to avoid unnecessary social and environmental impacts;
- Provide sufficient information and guidance to plan the prospecting activities in a manner that will reduce impacts (social, physical and biological) as far as is practically possible;
- Ensure an approach that will provide the necessary confidence in terms of environmental compliance; and
- Provide a management plan that is effective and practical for implementation.

It is anticipated that the identified impacts can be managed and mitigated effectively through the implementation of the identified proposed mitigation measures. All the impacts were assessed to have significance ranging between medium and low without the implementation of mitigation measures. All the identified impacts will have a reduced significance of low when the mitigation measures have been implemented.

27 Aspects for inclusion as conditions of Authorisation.

The following conditions should be included in the Environmental Authorisation:

- A minimum distance of 100 m from any dwellings or infrastructure must be kept;
- Landowners as well as land occupiers must be re-consulted at least 30 days prior to any prospecting activities undertaken on their properties;
- A map detailing the drilling locations should be submitted to the relevant landowners, the DWS and DMRE prior to the commencement of the prospecting activities;
- No activities may be undertaken within 500 m of riparian areas/wetland areas and/or within 100 m of watercourses without approval from the DWS;
- No relocation or destruction of heritage resources may be undertaken without the approval of SAHRA;
and
- Heritage Impact Assessment must be undertaken where infrastructure and drilling sites will be located, prior to commencement of the prospecting activities.

28 Description of any assumptions, uncertainties and gaps in knowledge.

The following assumptions, uncertainties and gaps are applicable to this project:

- The Stakeholder Consultation is not yet complete. The Draft BAR will be updated once the 30day public review and comment period has lapsed. Comments from the stakeholders will be incorporated into the Final BAR to be submitted to the DMRE;
- Details on the Water Use Licence requirements are not available;
- No Heritage Impact Assessment was undertaken therefore details on the SAHRA permit requirement are not available;
- No wetland/riparian area delineation was undertaken;
- No detailed site layout is currently available due to the nature of the prospecting activities. The impact assessment was undertaken as a holistic assessment for the overall site.

29 Reasoned opinion as to whether the proposed activity should or should not be authorised.

29.1 Reasons why the activity should be authorized or not.

The EAP's opinion is that the activity may be authorised. Should the project not be approved, this will result in a significant loss of valuable information regarding the mineral status (in terms of Gold, Cobalt, Chrome, Copper, Iron,), present on the identified properties. In addition, should economical reserved be present and the applicant does not have the opportunity to prospect the opportunity to utilize these reserves for future phases will be lost.

As stated in the impact assessment undertaken for the proposed project, the impacts of the project are of medium and low significance. The significance of the impacts can be reduced to low and very low when the mitigation measures are implemented.

The project will also have positive impacts due to the employment to be created although for a short term, as well as a short boost to local businesses.

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

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 layout plan and the management and mitigation measures contained within the EMPr compiled for the project, which are expected to be effectively implemented, there will be significant reduction in the significance of potential impacts.

29.2 Conditions that must be included in the authorisation.

See Section 23 of the BAR.

30 Period for which the Environmental Authorisation is required.

The renewal of prospecting right has been applied for a period of 3 years. The Environmental Authorisation should therefore allow for 3 years of prospecting.

31 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 by the EAP and the client is provided in Section 41 of the EMPr.

32 Financial Provision

Work will be carried out by the contractors and consultant. The closure costs were calculated to be R 43 469. 66 as shown in Table 28-1.

Table 28-1: Cost Estimate Expenditure

CALCULATION OF THE QUANTUM								
Applicant: MASHININI (PTY) LTD		Ref No.: DMRE REF MP 30/5/1/1/2/17003 PR						
Evaluator: Tshifhiwa Netshivha		Date: Mar-22						
No.	Description	Unit	A	B	C	D	E=A*B*C*D	
			Quantity	Master Rate	Multiplication factor	Weighting factor 1	Amount (Rands)	
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	0	17.4	1	1	0	
2 (A)	Demolition of steel buildings and structures	m2	0	238.71	1	1	0	
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	351.79	1	1	0	
3	Rehabilitation of access roads	m2	0	42.72	1	1	0	
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	414.61	1	1	0	
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	226.15	1	1	0	
5	Demolition of housing and/or administration facilities	m2	0	477.42	1	1	0	
6	Opencast rehabilitation including final voids and ramps	ha	0	242984.15	1	1	0	
7	Sealing of shafts adits and inclines	m3	0	128.15	1	1	0	
8 (A)	Rehabilitation of overburden and spoils	ha	0	166847.44	1	1	0	
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0	207805.47	1	1	0	
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	603565.59	1	1	0	
9	Rehabilitation of subsided areas	ha	0	139709.6	1	1	0	
10	General surface rehabilitation	ha	0.6	132171.31	0.34	1	26962.94724	
11	River diversions	ha	0	132171.3	1	1	0	
12	Fencing	m	0	150.77	1	1	0	
13	Water management	ha	0.08	50255.25	1	1	4020.42	
14	2 to 3 years of maintenance and aftercare	ha	0	17589.34	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	30983.36724	
1	Preliminary and General		3718.004069	weighting factor 2			3718.004069	
2	Contingencies		3098.336724		1		3098.336724	
						Subtotal 2	37799.71	
SIGN	Netshivha Tshifhiwa						VAT (15%)	5669.96
DATE	02/03/2022						Grand Total	43,469.66

32.1 Explain how the aforesaid amount was derived.

The financial provision for the environmental rehabilitation and closure of any mine/prospecting and its associated operations forms an integral part of the MPRDA. Sections 41 (1) and, 41 (2), 41 (3) and 45 of the MPRDA deal with the financial provision for rehabilitation and closure. During 2012, the DMRE made updated rate available for the calculation of the closure costs, where contractor's costs are not available, these apply.

The "Guideline Document for the Evaluation of Financial Provision made by the Mining Industry" was developed by the DMR in January 2005 to empower the personnel at Regional DMRE offices to review the quantum determination for the rehabilitation and closure of mining sites.

With the determination of the quantum for closure, it must be assumed that the infrastructure had no salvage value (clean closure). The closure cost estimate (clean closure) was determined in accordance with the DMR guidelines.

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

The amount required to cover the rehabilitation is estimated to be R 43 469. 66 at this stage.

Mashinini will fund the operation.

The applicant hereby confirms that the amount is anticipated to be an operating cost and is provided for as such in the Prospecting Work Programme.

33 Specific Information required by the competent Authority.

33.1 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:

-

33.1.1 Impact on the socio-economic conditions of any directly affected person.

No specific report was generated for the purposes of the socio-economic conditions. Current land uses inside the prospecting area, such as farming and grazing, may be temporarily impacted through the presence of the fenced areas that drill rigs will operate within. These will, however, be small areas. These areas will be rehabilitated post drilling activities and the areas will once again become available for grazing. Other potential socio-economic impacts will include:

- Nuisance noise due to on site activities and drilling;
- Poor access control resulting in impacts on cattle movement, breeding and grazing practises;
- Influx of job seekers to site, which may result in an increase in opportunistic crime;
- Uncontrolled access to private property outside of the demarcated boundaries; and
- Visual impact because of the vegetation clearance.

Prospecting will be undertaken by sub-contractors and it is not anticipated that employment opportunities for local and/or regional communities will result from the prospecting activities during the drilling phases.

Management and mitigation measures must be implemented to prevent environmental pollution which may impact on environmental resources utilised by communities, landowners and other stakeholders. Measures to manage the potential impacts on communities, individuals or competing land uses in close proximity include;

Noise due to construction activities and drilling:

- Directly affected and adjacent landowners and land occupiers must be informed of the planned dates of the drilling activities and a grievance lodging mechanism must be made available to the stakeholders.
- Site activities shall be concluded during daytime hours (07:00 to 17:30), to avoid night-time noise disturbances and night-time collisions with fauna.

Poor access control resulting in impacts on cattle movement, breeding and grazing practices:

- Access control procedures must be agreed on with the farm owners and all on site personnel shall be trained on these procedures.

Influx of job seekers to the site which may result in increased opportunistic crime:

- Casual labour shall not be recruited at the site. This will eliminate the incentive for people to travel to site seeking employment. Where necessary, a recruitment centre may be established in the major town areas;
- The landowners shall be notified on unauthorised persons encountered on site; and
- Where necessary, the South African Police Service (SAPS) will be notified of unauthorised persons encountered on site.

Visual Impact:

- Dust suppression will be undertaken to manage nuisance dust from construction vehicle movements and other construction activities as and when necessary;
- The portable ablution facilities and any other infrastructure will be acquired with a consideration for colour. Natural earth, green and mat black options which blend with the surrounding must be favoured;
- A waste management system will be implemented, and sufficient waste bins will be provided for on site. A fine system must be implemented to further prohibit littering and poor housekeeping practices; and
- Vegetation cover shall be used where drill rigs will be located to minimise visual impacts.

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

As outlined in Section 7 of this report, prospecting will be undertaken in phases. The first phase will be a desktop study, which will be followed by drilling.

Drill sites will be determined based on the outcome of the desktop studies activities and geological mapping. Potential heritage impacts will only occur once the drilling sites have been identified. It is therefore recommended that if the HIA is to be undertaken, it should be done so prior to the commencement of the drilling activities, and that the HIA be conducted over the identified localised drill sites and access routes, as opposed to the entire exploration area.

This recommendation will be submitted to the SAHRA for approval.

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

The location of the infrastructure will be determined based on the location of the prospecting activities, which will only be determined during Phase 1 of the Prospecting Works Programme, as well as the presence of sensitive environmental attributes such as wetlands, watercourses, protected flora. All infrastructures will be temporary and/or mobile (Refer to Section 7.6) of this report).

In addition, the proposed technologies have been chosen based on long term proven success in prospecting.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

34 Draft environmental management programme.

34.1 Details of the EAP

Details of the EAP are included in Part A Section 3

34.2 Description of the Aspects of the Activity

The EAP hereby confirms 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 11 of this report as required.

34.3 Composite Map

Please refer to Appendix 7 for the composite map. No specific heritage sites have been identified and therefore have not been included in the preliminary composite map. The composite map will be updated once all the sensitive environmental sites have been identified. The current composite map includes red flag areas which include the following:

- Water Course and 100m regulated buffer area;
- Wetlands and regulated 500m areas;
- CBAs and ESAs; and
- Protected Areas.

35 Description of Impact management objectives including management statements.

35.1 Determination of closure objectives.

As previously mentioned, each phase of the prospecting activities is dependent on the success of the preceding phase. Depending on the findings from Phase 1, Phase 2 will be initiated. The location and extent of the drill sites can therefore not be determined at this stage of the process.

The rehabilitation plan was developed on the basis that the rehabilitated areas will be made safe, stable, non-polluting and will be able to support self-sustaining ecosystems, similar to surrounding natural ecosystems.

To ensure that the rehabilitation plan is aligned with the closure objective, high-level risk assessment of the prospecting components was undertaken to establish the potential risks associated with therewith.

The closure objectives are to:

- Eliminate any safety risks associated with drill holes and sump through adequate drill hole capping and backfilling;
- Remove and/or rehabilitate all pollution and pollution sources such as waste materials and spills;
- To establish rehabilitated areas to a state which with no susceptible to soil erosion which may result in loss of soil, pollution of water resources;
- Restore disturbed areas and re-vegetate these areas with plant species naturally occurring in the area to restore the ecological function of the affected areas as far as practicable; and
- Eliminate all alien invasive plant species from the disturbed areas.

36 Volumes and rate of water use required for the operation.

The operation will require about 30 000l for 10 boreholes .

37 Has a water use licence has been applied for?

A meeting with the DWS will be organised to determine whether abstraction of water will be required. Based on the outcomes of the discussions with the DWS, any potential abstraction of water due to drilling activities will be clarified. At this stage it is not anticipated that abstraction will be required.

Water will be used for dust suppression purposes, consumption by field staff as well as for a few diamond core drilling holes. Furthermore, depending on the DWS opinion, Section 21 (c) and (i) WUL may not be required. This will also be clarified with the DWS. Should it be deemed necessary, on instruction by the DWS, the applicant will submit a water use licence application.

38 Impacts to be mitigated in their respective phases.

Table 34-1: Environmental Management Programme for the proposed Mashinini Prospecting project

NAME OF ACTIVITY		PHASE	SIZE AND SCALE of disturbance	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
Data Collection and Assessment	Desktop Study	Planning	N/A	N/A	Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	Throughout the planning phase
Geological Mapping			N/A	N/A		
Planning for Drilling Surveys			N/A	N/A		
Access Roads	Physical surveying of the site and pegging of drilling boreholes	Construction	N/A	<u>Loss of soils, erosion of the soils and impacts on landowner's livelihood:</u> No soil stripping will be allowed during site establishment;	the mitigation of impacts will ensure that the development is in the development capability.	During the construction phase
Drill Sites			Total 35 RC and Diamond core drilling sites with a total footprint of 0.2ha	Should it be necessary to conduct geophysical surveys and geological mapping, ensure minimal disturbance of soil; Any activity that may result into the disturbance of the soils must be rehabilitated immediately on discovery;		
Temporary Soil Storage Area			0.01 ha	Any hydrocarbon spill from the site establishment will be remediated as soon as possible;		
Vegetation Clearance			<0.1 ha	Use sites that are unused and that are in the degraded state for the proposed development. This must be done in agreement with the landowner. The siting of the boreholes must be conducted such that rocky ridges, sensitive grass lands, indigenous trees and shrubs, sites of geological importance and farmlands actively used for crop farming are avoided;		
Vehicle Parking Area			0.02 ha			
Contractors Camp			0.025 ha	Contaminated soil shall be removed and disposed of to an appropriate licensed landfill site in terms of NEMWA, or can be removed by a service provider that is qualified to clean the soil;		
Ablution Facility			0.02 ha	The time in which soils are exposed during construction activities should remain as short as possible; Erosion control measures shall be implemented where deemed necessary; In general, all steep slopes steeper than 1:3 or where the soils are more prone to erosion must be stabilised;		

				<p>Institute adequate sedimentation control measures where necessary when excavation or disturbance of the riverbanks takes place;</p> <p>The time in which soils are exposed during construction activities;</p> <p>If stockpiles are not going to be used immediately the stockpiles shall be rehabilitated to prevent erosion and resulting in the increase in turbidity;</p> <p>Runoff from stockpiles shall be detained in order to support growth of vegetation;</p> <p>Runoff from the stockpiles shall be suitably managed to ensure that the runoff volumes and velocities are similar to pre disturbed levels;</p> <p>Vegetation shall be used to promote infiltration of water into the stockpile instead of increasing runoff;</p> <p>A monitoring programme will be implemented if the stockpiles are not used within the first year whereby the vegetation of the stockpiles is monitored in terms of basal cover and species diversity;</p> <p>If it is noticed that the vegetation on the stockpiles is not sustainable, appropriate corrective actions shall be taken to rectify the situation;</p> <p>Stockpiles shall be maintained until the topsoil is required for rehabilitation purposes;</p> <p><u>Loss of natural vegetation in the affected areas:</u></p> <p>Use sites with most disturbed vegetation cover for the development;</p> <p>No strip of topsoil and vegetation will be allowed during site establishment;</p> <p>Ensure minimal disturbance of vegetation when conducting geophysical surveys and geological mapping;</p> <p>Use existing track and roads in all instances as far as is practicable;</p> <p>Avoid significant vegetation such as trees and large shrubs in the event that driving</p>	<p>and infrastructure of detrimental impact soils, land use and le</p> <p>The mitigation associated</p> <p>implementation measures that the establishm inspecting site and structure/equipment detrimental impact</p>	
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				<p>through the veld is required to access an identified sampling site;</p> <p>Any area that may result into the disturbance of the vegetation cover must be rehabilitated immediately on discovery;</p> <p>The Contractor shall be on the lookout for SCC and any floral SCC encountered within the development footprint, are to be relocated to areas with suitable habitat outside the disturbance footprint;</p> <p>Floral species of conservation concern, if encountered within the development footprint, are to be handled with care and the relocation of sensitive plant species to suitable similar habitat is to be overseen by a botanist;</p> <p>The proposed development footprint shall be kept to the minimum;</p> <p>All disturbed areas must be concurrently rehabilitated during construction;</p> <p>Prohibit the collection of any plant material for firewood or medicinal purposes;</p> <p>The existing integrity of flora surrounding the study area shall be upheld and no activities shall be carried out outside the footprint of the construction areas;</p> <p>Edge effect control shall be implemented to avoid further habitat degradation outside of the proposed footprint area;</p> <p>All sensitive open space areas will be demarcated and access into these areas shall be prohibited;</p> <p>Protected floral species occurring within the vicinity of the study area, but outside the disturbance footprint shall be fenced for the duration of the construction activities;</p> <p>Construction vehicles shall only be allowed on designated roadways to limit the ecological footprint of the project;</p> <p>Implementation of an Alien Invasive Plant Species Management plan;</p> <p>Edge effects of activities including erosion and alien/ weed control will be strictly managed in the affected areas;</p> <p>All sites disturbed by construction activities shall be monitored for colonisation by exotic or invasive plants;</p> <p>Exotic or invasive plants shall be controlled as they emerge;</p> <p>An alien vegetation control program must be developed and implemented within all disturbed areas;</p> <p><u>Migration of animal life due to disturbance caused proposed project:</u></p> <p>The proposed development footprint areas shall remain as small as possible and where possible be confined to already disturbed areas;</p> <p>Site activities will be conducted during daytime hours 07h00 – 17h30 to avoid night-time noise disturbances and night-time collisions with fauna;</p>	<p>area's flora, in particular species of conservation importance.</p> <p>at are</p> <p>and</p> <p>measures to protect animal life with not the proposed</p> <p>Mitigation of</p>	
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				<p>Vehicle speed will be reduced, particularly in highly vegetated areas to avoid deaths by vehicle impacts;</p> <p>No trapping or hunting of fauna shall be permitted;</p> <p>Edge effects of all construction and operational activities, such as erosion and alien plant species proliferation, which may affect faunal habitat, need to be strictly managed;</p> <p>Should any faunal SCC be encountered within the study area, these species will be relocated to similar habitat within or in the vicinity of the study area with the assistance of a suitably qualified specialist;</p> <p>No informal fires in the vicinity of construction areas shall be permitted;</p> <p>An alien vegetation control plan must be developed and implemented in order to manage alien plant species occurring within the study area, and to prevent further faunal habitat loss;</p> <p>Poaching will be prohibited at the prospecting site;</p> <p><u>Deterioration of water quality in in the nearby streams and within the groundwater regime:</u> No site establishment shall be permitted within sensitive landscapes;</p> <p>No construction activities shall be permitted within 100 meters of water courses and/or drainage lines and within 500 m of riparian zones without consent from the DWS;</p> <p>Avoid stripping of areas within the construction sites;</p> <p>Rehabilitate areas that may have been mistakenly stripped;</p> <p>Storm water upslope of the campsite and drill sites should be diverted around these sites;</p> <p>Proper waste management facilities will be put in place at the campsite and drilling site.</p> <p>Any hydrocarbon spill from the site establishment will be remediated as soon as possible;</p> <p>No washing of vehicles shall be allowed outside demarcated areas. Washing bays for</p>	<p>affected by the project.</p> <p>measures of the quality of groundwater will comply with target water object will be</p> <p>Implementation mitigation streams and quality construction</p>	
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				<p>vehicles and other equipment shall be provided with appropriate soakaways, will be clearly demarcated and will not be allowed to contaminate any surface runoff; Sufficient areas shall be provided for the maintenance and washing of vehicles;</p> <p>Refuelling of vehicles will only be allowed in designated areas;</p> <p>All construction equipment shall be parked in a demarcated area Drip trays shall be used when equipment is used for some time;</p> <p>On surface bulk storage of hydrocarbons must be situated in a dedicated area which will include a bund or a drain where necessary to contain any spillages during the use, loading and off-loading of the material;</p> <p>Bunded areas shall contain 110% of the stored volume;</p> <p>Bund areas must be impermeable;</p> <p>Bund area must have a facility such as a valve/sump to drain or remove clean stormwater,</p> <p>Contaminated water shall be pumped into a container for removal by an approved service provider;</p> <p>Regular inspections shall be carried out to ensure the integrity of the bundwalls;</p> <p>All preventative servicing of earth moving equipment and construction vehicles shall be conducted off site;</p> <p>Runoff from this area shall be contained;</p> <p>Spill kits shall be made available, and all personnel shall be trained, and training records shall be made available on request;</p> <p>Ensure that topsoil is properly stored, away from the streams and drainage areas;</p> <p>Vehicle and personnel movement within watercourses and riparian areas shall be strictly prohibited;</p> <p>Adequate stormwater management must be incorporated into the design of the project in order to prevent contamination of water courses from dirty water; <u>Water abstraction:</u></p> <p>Any abstraction of water for construction purposes must be approved by DWS'.</p> <p><u>Riparian and Aquatic Ecosystem Ecology destruction and loss of habitat:</u></p> <p>Construction activities will be limited to be more than 500 m from the edge of the riparian areas without consent from the DWS;</p>	<p>Compliance with the regulations under the GN704.</p> <p>Water abstraction will not be permitted unless authorisation is granted by DWS. Obtain all necessary authorisations in terms of Section 21 of the National Water Act (No.36 of 1998).</p>	
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				<p>Adequate stormwater management must be incorporated into the design of the project in order to prevent erosion and the associated sedimentation of the aquatic system;</p> <p>No vehicles may be allowed to indiscriminately drive through the riparian areas or within the active stream channels;</p> <p>All disturbed areas shall be re-vegetated with indigenous species;</p> <p>All construction materials shall be kept out of the riparian areas;</p> <p>All vehicles shall be regularly inspected for leaks. Re-fuelling must take place outside the project area, on a sealed surface area to prevent ingress of hydrocarbons into topsoil and aquatic ecosystem;</p> <p><u>Air pollution through air pollutants' emissions, from the construction site:</u></p> <p>Wet suppression using will be conducted at areas with excessive dust emissions;</p> <p>Dust suppression measures shall be implemented on dry weather days and periods of high wind velocities;</p> <p>Rehabilitation of disturbed areas shall be undertaken in tandem with construction activities;</p> <p>A speed limit of 40 km/hr shall apply to limit vehicle entrained dust from the unpaved roads;</p> <p>All construction equipment must be scheduled for preventative maintenance to ensure the functioning of the exhaust systems to reduce excessive emissions and limit air pollution;</p> <p>Appropriate dust suppression measures may include limiting the extent of open areas,</p>	<p>Implementation of mitigation measures will assist with maintaining the current state of the sensitive landscapes within the project area and will enable the project to comply with the requirements of the NWA.</p> <p>With the implementation of the mitigation measures, the construction will be undertaken such that the ambient air quality does not exceed the National Air Quality Standards.</p>	
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				<p>reducing the frequency of disturbance and spraying with water;</p> <p>Odours:</p> <p>Putrescible waste must be handled, stored and disposed of before the probability of it generating odours;</p> <p>Chemical toilets must be emptied / serviced on a regular basis. Proof of this must be provided to the Engineer;</p> <p>All the construction vehicles shall undergo maintenance on a regular basis to improve on the combustion engine vehicle efficiency;</p> <p>Traffic will be restricted to demarcated areas and traffic volumes and speeds within the construction site will be controlled; <u>Increased nuisance noise levels:</u></p> <p>The maximum speed limit shall be limited to 40 km/hr subject to risk assessment;</p> <p>Less noisy equipment will be used, the equipment will be kept in good working order and the equipment will be fitted with correct and appropriate noise abatement measures;</p> <p>Ensure that the employees are issued with earplugs and that they are instructed to use them;</p> <p>Educate employees on the dangers of hearing loss due to mine machinery noise;</p> <p>Adjacent landowners must be advised of any work that will take place outside of normal working hours, that may be disruptive (e.g., noise) in advance;</p> <p>Surrounding communities must be notified in advance of noisy construction activities;</p> <p>All equipment should be provided with standard mufflers;</p> <p>Muffling units on vehicles and equipment must be kept in good working order;</p> <p>Construction staff working in areas where the 8-hour ambient noise levels exceed 85 Dba should wear ear protection equipment;</p> <p>Where possible, operation of several equipment and machinery must be avoided;</p> <p>All equipment must be kept in good working order, with immediate attention being paid to defective silencers, slipping fanbelts, worn bearings and other sources of noise;</p> <p>Equipment must be operated within specifications and capacity (e.g., no overloading of machines);</p> <p>Regular maintenance of equipment must be undertaken, particularly with regard to lubrication;</p> <p>Equipment must be operated in such a way that the equipment is operated throughout the working periods instead of operating several items simultaneously;</p> <p>Equipment shall be switched off when not in operation;</p> <p>Appropriate directional and intensity settings must be maintained on all hooters and sirens;</p>	<p>The mitigation measures ensure that the noise levels from the construction sites will be managed and measures will be taken to ensure that noise levels are below the National Noise Control Regulations, SANS 10103:2008 Guidelines and will ensure that the noise levels emanating from the construction sites will not have detrimental effects on the prospecting staff and surrounding communities/landowners.</p>	
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				<p>The Contractor must ensure that the employees conduct themselves in an appropriate manner while on site;</p> <p>Adjacent landowners shall be notified in writing if work needs to be carried out after hours;</p> <p>Noise/vibration producing activities shall be limited to daylight hours (Monday to Friday 07H00 to 18H00 and Saturday 07H00 -14H00);</p> <p><u>Visual impacts on the surrounding communities and road users from the construction:</u></p> <p>The landowners will be informed on the type of machinery and equipment to be used at the prospecting sites;</p> <p>Lighting will be conducted in a manner that will reduce the impacts on visual aspects at night times;</p> <p>The number of construction vehicles and machinery to be used shall be kept to a minimum;</p> <p>Movement of vehicles shall be kept to outside busy hours to minimise the visual impacts on the residents;</p> <p>Where possible, rehabilitation of the work areas shall be undertaken in tandem with construction to ensure that areas stripped of vegetation are kept to a minimum; <u>Damage or destruction of sites with archaeological and cultural significance:</u></p> <p>Prior to the site establishment, a heritage impact assessment must be undertaken and mitigation and /or management measures for the protection of such resources must be implemented.</p> <p>If archaeological sites or graves are exposed during construction work, it should</p>	<p>Measures will be undertaken to ensure that the visual aspects from the site are complying with the relevant visual standards and objectives and ensure that all operations during the construction phase do not result in detrimental visual impacts on surrounding properties, communities and road users.</p> <p>The construction will be undertaken in compliance with the requirements of the National Heritage Resources Act, 1999 (Act 25 of 1999) and recommendations from the</p>	
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				<p>immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made;</p> <p>The establishment of the sites will be away from any identified grave site or heritage sites. A buffer of 50 m will be created between the sites and the proposed camp and drilling sites;</p> <p><u>Impact from the influx of job seekers and employment of farm labourers:</u></p> <p>Recruitment will not be undertaken on site;</p> <p>Recruitment process shall favour locals, but farm labourers will not be employed unless agreed to with the farm owners;</p> <p>Where required, liaise with the SAPD to ensure safety of landowners in the areas;</p> <p><u>Waste Management:</u></p> <p>Separation of waste</p> <p>All waste shall be separated into general waste and hazardous waste;</p> <p>Hazardous waste shall not be mixed with general waste and in doing so increase the quantities of hazardous waste to be managed;</p> <p>General waste can further be separated in waste that can be recycled and or reused;</p> <p>No littering shall be allowed in and around the site, a sufficient number of bins shall be provided for the disposal of waste;</p> <p>Where necessary dedicate a storage area on site for collection of construction waste.</p> <p>Storage of waste:</p> <p>No stockpiling of material shall be permitted within 100 m of water courses and/or drainage lines, or within 500 m of riparian areas;</p> <p>General waste will be collected in an adequate number of litter bins located throughout the construction site Bins shall be located no more than 50 m from construction sites;</p> <p>Bins must have lids in order to keep rainwater out;</p> <p>Bins shall be emptied regularly to prevent the bins from overflowing;</p> <p>All work areas shall be kept clean and tidy at all times;</p> <p>All waste management facilities will be maintained in good working order;</p> <p>Waste shall be stored in demarcated areas according to type of waste;</p> <p>Runoff from any area demarcated for waste will be contained, treated and reused;</p> <p>Flammable substances must be kept away from sources of ignition and from oxidizing agents;</p> <p>Waste shall not be buried or burned on site; and</p>	<p>specialist. The r mitigation ensure that the activities do detrimental imp heritage sites. mitigation</p> <p>The identified n result in minimal seekers to the si duced, will</p> <p>The mitigation r result in reducede mitigation of waste encourage re-us where possible Environmental of the material wl Disposal will be t last resort. measures will als the management be in accordar National Management: W: 2008 (Act 51 of 2008)</p>	
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				<p>The maximum retention time for temporary storage of waste generated shall not exceed 30 days, provided the waste does not present a health hazard or risk of odour; Disposal of hazardous waste:</p> <p>No dumping shall be allowed in or near the construction site;</p> <p>Hazardous containers shall be disposed of at an appropriate licensed site;</p> <p>Hazardous waste will be removed and managed by an approved service provider;</p> <p>A safe disposal certificate will be provided by the approved service provider as proof of responsible disposal of hazardous waste; and</p> <p>The safe disposal certificate shall be stored and provided on request;</p> <p>Disposal of general waste:</p> <p>No dumping shall take place in or near the construction site;</p> <p>All general waste shall be disposed of to the nearest licensed landfill site;</p> <p>Demolition waste and builder's rubble shall be disposed of to an appropriate licensed landfill site; and</p> <p>The necessary permissions must be obtained to dispose of waste to a registered landfill site; <u>Traffic:</u></p> <p>Where existing public roads are used to access the construction areas, adequate construction signage is in place to inform the public of increased construction activities in the affected areas by placing adequate signage;</p> <p>Traffic signs should warn community road users of the presence of construction vehicles;</p> <p>Local speed limits and traffic laws shall apply at all times to minimise the occurrences of accidents on public roads;</p>	<p>mitigation ensure road slow-moving</p> <p>Implementing r safety along the and onsite and tr awareness of vehicles.</p>	
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					<p>Where possible the transportation of construction materials and rubbish shall be undertaken outside traffic peak hours to minimise inconveniencing residents; The number of construction vehicles and trips shall be kept to a minimum.</p> <p>Materials transported on public roads must be covered.</p>		
RC and Diamond Core Drilling	Drilling and Sampling	Operation	35 Boreholes	<p><u>Soil profile disruption, contamination of soils, destruction of natural vegetation and loss of land use:</u></p> <p>The drilling of the exploration boreholes will be undertaken in such a manner that the environment is protected from probable spillages and contamination by carbonaceous material.</p> <p>All boreholes and sumps will be rehabilitated to pre-drilling conditions.</p> <p>Tarpaulins will be placed on the ground to prevent oil, grease, hydraulic fluid and diesel spills during emergency repairs.</p> <p>All oil spills will be remedied using approved methodologies.</p> <p>The contaminated soils will be removed and disposed of at a licensed waste disposal facility.</p> <p>All waste generated from the drilling sites and the campsite will be collected in proper receptacles and removed to registered disposal facilities e.g., sewage treatment plant, solid waste disposal site or hydrocarbon recycling or treatment facilities.</p> <p>No topsoil shall be stored within 100 m of water courses and drainage lines or within 500 m of riparian areas.</p> <p>The soils must be used for the backfilling and rehabilitation of the sumps.</p> <p>The rehabilitated sump must be seeded with recommended seed mix.</p>	<p>The implementation of the mitigation measures will ensure that the land use and capability of the sites where the operations will be undertaken will continue after the proposed project.</p>	<p>Upon cessation of the individual activity</p> <p>Throughout the operation phase</p>	

				<p><u>Migration of animal life due to disturbance caused proposed project:</u></p> <p>Where possible drill sites shall be located within degraded environments.</p> <p>Poaching will be prohibited at the prospecting sites.</p> <p><u>The drilling operation and use of campsite may result in the generation of surface water runoff contaminated with silt (sedimentation) and possibly hydrocarbon fluids should</u></p>	<p>Maintenance of the current status on animal life within the project area.</p>	
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Sampling				<p><u>spillages occur:</u></p> <p>No prospecting operations will be undertaken within 100 metres from the nearby streams and 500 meters from the riparian areas.</p> <p>Sumps will be excavated for the collection mud and excess water from the drilling sites. The sump will be sized such that it will be able to contain the water and mud that will be generated during the prospecting operation.</p> <p>Storm water generated around the drilling site will be diverted away to the clean water environment.</p> <p>No vehicle maintenance will be allowed on site. All hydrocarbons will be stored on protected storage areas away from the streams.</p> <p>The drilling of the exploration boreholes will be undertaken done in such a manner that the environment is protected from probable spillages and contamination by carbonaceous material.</p> <p>Tarpaulins will be placed on the ground to prevent oil, grease, hydraulic fluid and diesel spills during emergency repairs. All oil spills will be remedied using approved methodologies. The contaminated soils will be removed and disposed of at a licensed waste disposal facility.</p> <p>The landowners' borehole water quality and yield will be closely monitored during the drilling operation.</p> <p>Should it be proven that the operation is affecting the quantity and quality of groundwater available to users and surrounding water resources, the affected parties must be compensated.</p>	<p>The mitigation measures will ensure that the drilling operation does not have detrimental impacts on the surface and ground water environment, and that the activities will comply with the provisions of the NWA.</p>	
				<p>All boreholes and sumps will be rehabilitated to pre-drilling conditions.</p> <p>All waste generated from the drilling sites and the campsite will be collected in proper receptacles and removed to a registered disposal facility e.g., sewage treatment plant, solid waste disposal site or hydrocarbon recycling or treatment facilities.</p> <p>The contaminated soils will be removed and disposed of at a licensed waste disposal facility.</p> <p>All waste generated from the drilling sites and the campsite will be collected in proper receptacles and removed to registered disposal facilities e.g., sewage treatment plant, solid waste disposal site or hydrocarbon recycling or treatment facilities.</p> <p><u>Generation of dust and fuel fumes by vehicular movement:</u></p> <p>Dust suppression must be conducted during the operational phase of the project.</p> <p>Vehicle maintenance must be conducted regularly to avoid excessive diesel fumes.</p> <p>Maintain a speed limit of 20km/hr during the dry season and or when the wind velocity is likely to result in an increased nuisance dust.</p> <p>Materials transported on public roads must be covered.</p>	<p>The air quality in the vicinity of the drilling sites and sites' access routes will be maintained to stay within the national air quality standards.</p>	

				<p><u>Increased noise levels:</u></p> <p>Limit the maximum speed to 40 km/h or less, subject to risk assessment.</p> <p>Less noisy equipment will be used, the equipment will be kept in good working order and the equipment will be fitted with correct and appropriate noise abatement measures.</p> <p>Ensure that the employees are issued with earplugs and that they are instructed to use them.</p> <p>Educate employees on the dangers of hearing loss due to mine machinery noise.</p> <p>Drill sites shall be located as far from private property as is possible to minimise noise impacts.</p> <p><u>Visual impacts on the surrounding communities and road users from the construction:</u></p> <p>The landowners will be informed on the type of machinery and equipment to be used at the prospecting sites.</p> <p>Lighting will be conducted in manner that will reduce the impacts on visual aspects at night times.</p> <p>Materials transported on public roads must be covered.</p> <p>The number of construction vehicles and machinery to be used shall be kept to a minimum.</p> <p>Movement of vehicles shall be kept to outside busy hours to minimise the visual impacts on the residents.</p>	<p>The mitigation measures will ensure that the noise levels from the sites will be managed and measures will be taken to ensure that noise levels are below the National Noise Control Regulations, SANS 10103:2008 guidelines.</p> <p>Measures will be undertaken by the mine to ensure that the visual aspects from the site are complying with the relevant visual standards and objectives.</p>	
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				<p>All lighting shall be kept to a minimum within the requirements of safety and efficiency. Where such lighting is deemed necessary, low-level lighting, which is shielded to reduce light spillage and pollution, shall be used.</p> <p>No naked light sources shall be directly visible from a distance. Only reflected light shall be visible from outside the site.</p> <p>External lighting shall use down-lighters shielded in such a way as to minimise light spillage and pollution beyond the extent of the area that needs to be lit.</p> <p>Security and perimeter lighting shall be shielded so that no light falls outside the area needing to be lit.</p> <p>Drill rigs shall be located in areas with adequate tree and bush cover to minimise the visual impact on residents.</p> <p>Where no adequate vegetation cover is available for the drill rigs, shade cloths can be used to screen off the drill rigs.</p> <p>Where possible, rehabilitation of the work areas shall be undertaken in tandem with construction to ensure that areas stripped of vegetation are kept to a minimum.</p> <p><u>Damage or destruction of sites with archaeological and cultural significance:</u></p> <p>The drilling sites will be situated away from any identified grave site or heritage sites. A 50 m buffer will be created between the sites and the proposed camp and drilling sites.</p> <p><u>Safety, intrusion livelihood impacts on the landowners and occupiers:</u></p> <p>Residents shall be informed of any road closures and other disruptions and maintain roads used for the operation in good order. Clear signage shall be installed around the project area indicating the type of disruption and the time during which the disruptions will occur.</p> <p>Communication with landowners and land occupiers shall be kept open during the operational phase of the project. A record of such communication shall be kept on site.</p> <p>Ensure that negotiations on compensation are undertaken before the drilling programme can commence. This will include any other conditions that the landowners may deem necessary for the prospecting operation. The outcomes of the negotiations shall be recorded and kept in a file on site.</p>	<p>With the implementation of the mitigation measures, the drilling operations will be undertaken in compliance with the requirements of the National Heritage Resources Act, 1999 (Act 25 of 1999) and recommendations from the specialist.</p> <p>The mine will ensure that all safety standards are met and that access to landowners and occupiers are not detrimentally affected.</p>	
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				<p>Ensure that safety measures are implemented to prevent impacts on landowners and occupiers.</p> <p>Access to private property, outside of the demarcated drill sites, without landowner consent shall be strictly prohibited.</p> <p><u>Traffic:</u></p> <p>Local speed limits and traffic laws shall apply at all times to minimise the occurrences of accidents on public roads;</p> <p>Where possible the transportation of materials and rubbish shall be undertaken outside traffic peak hours to minimise inconveniencing residents;</p> <p>The number of construction vehicles and trips shall be kept to a minimum.</p> <p>All the construction vehicles shall undergo maintenance on a regular basis to improve on the combustion engine vehicle efficiency.</p> <p><u>Flora:</u></p> <p>All disturbed areas must be concurrently rehabilitated.</p> <p>Prohibit the collection of any plant material for firewood or medicinal purposes.</p> <p>The existing integrity of flora surrounding the study area shall be upheld and no activities shall be carried out outside the footprint of the construction areas.</p> <p>Edge effect control shall be implemented to avoid further habitat degradation outside of the proposed footprint area.</p> <p>All sensitive open space areas will be demarcated and access into these areas shall be</p>	<p>The objective is to warn the general public of construction traffic, and to manage traffic on site and implementing the mitigation measures will ensure road safety along the public roads and onsite and to increase awareness of slowmoving vehicles.</p> <p>The implementation of mitigation measures will ensure that the drilling and sampling activities do not have detrimental impact on the area's flora.</p>	
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					<p>prohibited.</p> <p>Protected floral species occurring within the vicinity of the study area, but outside the disturbance footprint shall be fenced for the duration of the drilling activities. Monitoring of relocation success will be conducted during the operational phase.</p> <p>Monitoring of relocation success shall continue during and beyond the decommissioning and closure phase.</p> <p>All disturbed areas shall be re-vegetated with indigenous riparian species.</p> <p>As much vegetation growth as possible must be promoted in order to protect soils. In this regard, special mention is made of the need to use indigenous vegetation species where hydro seeding, rehabilitation planting (where applicable) is to be implemented.</p> <p><u>Fauna:</u></p> <p>The rehabilitation of the disturbed areas must be conducted such that the rehabilitated areas will encourage the migration of animals back into the rehabilitated areas.</p> <p>The proposed development footprint areas shall remain as small as possible and where possible be confined to already disturbed areas. No trapping or hunting of fauna shall be permitted.</p> <p>Edge effects of all operational activities, such as erosion and alien plant species proliferation, which may affect faunal habitat, need to be strictly managed.</p> <p>No informal fires in the vicinity of construction areas shall be permitted.</p> <p>An alien vegetation control plan must be developed and implemented in order to manage alien plant species occurring within the study area, and to prevent further faunal habitat loss.</p> <p>Poaching of wild animals and livestock will be prohibited.</p>	Maintenance of the current status on animal life within the project area.	
Data Analysis	Feasibility Studies			N/A	N/A	N/A	N/A
Feasibility Studies Report				N/A	N/A	N/A	N/A
Borehole capping	Closure and Rehabilitation of borehole and			All the affected sites	<p><u>Compaction and contamination of soils within the rehabilitation site:</u></p> <p>All vehicles and machinery used at the rehabilitation site will be kept in good working order.</p>	Rehabilitated areas will be maintained to comply with the closure objectives.	Upon cessation of the aggregate stone-dolerite, Clay and sand

<p>Removal of equipment and infrastructure sites infrastructure</p>	<p>infrastructure sites</p>	<p>Decommissioning and Closure</p>		<p>No repairs of vehicles or machinery will be conducted at the rehabilitation site unless it is emergency repairs, which will be conducted on protected ground.</p> <p>Movement of mine vehicles and machinery will be limited to demarcated routes, which will be rehabilitated when no longer in use.</p> <p><u>Re-instatement of soil productivity, land capability and land use:</u></p> <p>All infrastructure will be removed from the site in accordance with the rehabilitation plan.</p> <p>Contaminated soils shall be cleaned or disposed of at a registered landfill site in terms of the requirements of the NEM: WA.</p> <p><u>Pollution of surface water environment:</u></p> <p>The site area will be rehabilitated to be free draining.</p> <p>Erosion protection measures such as the use of contour berms and repair of gullies will be undertaken until such time that the rehabilitated surfaces can be shown to be sustainable.</p> <p>Existing roads should be used where possible and new disturbed areas should be minimised.</p> <p><u>Air pollution from rehabilitation site:</u></p> <p>Where necessary, wet suppression will be conducted at areas with excessive dust emissions.</p> <p>Vehicles and machinery will be well maintained.</p> <p>The traffic volumes and speed within the rehabilitation site will be controlled.</p> <p><u>Nuisance Noise:</u></p> <p>Smaller or less noisy equipment should where possible be used when working near receptors.</p> <p>Equipment will be well maintained and fitted with the correct and appropriate noise abatement measures.</p> <p><u>Damage or destruction of sites with Archaeological and cultural significance:</u></p>	<p>Rehabilitated areas will be maintained to comply with the closure objectives.</p> <p>The surface water leaving the rehabilitation site will comply with the DWS target water quality parameters.</p> <p>Decommissioning and rehabilitation of the site will be conducted in such a manner that the ambient air quality does not exceed the air quality standards.</p> <p>Ensure that the noise from the rehabilitation activities do not exceed the SANS 10103 Rating Level.</p>	<p>prospecting</p>
				<p>A 50m buffer will be maintained between any site and the archaeological site.</p>	<p>Should heritage sites be identified, rehabilitation in close proximity to the sites will not be damaged or destroyed by the rehabilitation activities</p>	

39 Impact Management Outcomes

Table 35-1: Impact Management

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	MITIGATION TYPE	Standard to be achieved
Data Collection and Assessment	Desktop Study	None	N/A	Planning	Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	Remain within the ambits of the EMPr and Environmental Authorisation.
Geological Mapping		None	N/A	Planning	Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	Remain within the ambits of the EMPr and Environmental Authorisation.
Planning for Drilling Surveys		None	N/A	Planning	Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	Remain within the ambits of the EMPr and Environmental Authorisation.
Access Roads	Physical surveying of the site and pegging of drilling boreholes	Loss of soils, erosion of the soils and impacts on landowners' livelihood.	Soils, Land capability and Land use	Construction	Rehabilitation of areas cleared of vegetation and dust control	Retain topsoil integrity for the reuse in rehabilitation. Vegetation clearance shall be kept to a minimum. No clearance of vegetation outside demarcated areas
Drill Sites		Contamination of groundwater from hydrocarbon spillages	Groundwater	Construction	Control through management and monitoring of spillages. Where spillages occur, the soil must be stripped and disposed of as stipulated in the EMPr.	Comply with the EMPr. Retain topsoil integrity for the reuse in rehabilitation. Where required, disposal of contaminated soils shall be undertaken in terms of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEM: WA)
Temporary Soil Storage Area		Contamination of surface water due to erosion of soils which will lead to increased turbidity as well as contamination from hydrocarbon spillages	Surface water	Construction	Monitoring through rehabilitation and management of spoil sites	Retain topsoil integrity for the reuse in rehabilitation. Comply with the requirements of the NWA: no construction activities within 100 m of water courses and 500m of riparian zones without consent from the DWS.

Vegetation Clearance	None	N/A	Construction	Control of access to riparian areas and within the regulated 500 m buffer.	National Water Act, 1998 (Act 36 of 1998) No construction activities may be conducted within 500 m of riparian zones without approval from the DWS.
Vehicle Parking Area	None	N/A	Construction	Control through clear demarcation of prospecting areas to ensure avoidance of graves and other heritage sites	No destruction/loss of heritage resources
Contractors Camp	None	N/A	Construction	Management of drill sites. Should any fossils be discovered, operations must cease and SAHRA must be notified	No destruction/loss of fossils
Ablution Facility	Loss of natural vegetation in the affected areas	Flora	Construction	Rehabilitation of areas cleared of vegetation. Control of alien invasive plant species	Comply with existing legislation National Environmental Management: Biodiversity Act 2004 (Act No 10 of 2004) and Alien and Invasive Species Regulations, 2014. No vegetation clearance outside of demarcated areas
	Migration of fauna due to disturbance caused by the proposed project	Fauna	Construction	Relocation of affected species of conservation importance	Remain within the designated area demarcated for prospecting activities. Ensure minimal clearance of vegetation

NAME OF ACTIVITY	POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	MITIGATION TYPE	Standard to be achieved
	Air pollution through nuisance dust, PM 10 and PM2.5 as well as emissions from construction vehicles and machinery.	Air Quality	Construction	Dust control measures	Comply with the requirements of the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural communities. Comply with the requirements of the Minimum Emission Standards
	Increase in ambient noise due to movement of construction vehicles and machinery	Noise	Construction	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g., noise mufflers	Remain within the Noise Regulation Standards for Rural Areas.

					Control through the limiting of the activities to the daytime and the implementation of an open and transparent channel of communication	
		Visual impacts as a result of vegetation clearance	Visual	Construction	Rehabilitation of areas cleared of vegetation	Vegetation clearance must be limited to demarcated areas only
		Increased traffic on the roads due to additional construction vehicles	Traffic, Socioeconomic	Construction	Speed control and limitation of the times when construction vehicles may be on the roads	Minimise the number of vehicles used during construction. Movement of construction vehicles shall be limited to outside of busy hours
		Impact of carbon dioxide (GHG) produced by construction vehicles on the local climate	Climate Change	Construction	Control and keep to a minimal the number of vehicles used for construction. Vehicles must be maintained to ensure efficient use of fuel.	Comply with the EMPr. Minimise the number of vehicles used during construction. Regular maintenance of vehicles and machinery to improve fuel efficiency. Comply with requirements of the National Environmental Management: Air Quality Act, 2004
RC and Diamond core drilling	Drilling and Sampling	It is expected that during the operation phase the project will not result in the creation of employment as prospecting requires highly specialised personnel. The applicant will make use of qualified contractors for the drilling and sampling of the sites. The community will however continue to benefit because of the continued boost in small local businesses. Drilling has potential to affect the day-to-day operations by affected landowners	Socio-Economic	Operation	Control of times during which operation activities will take place	Maintain a 100% crime free area within the control of the prospecting. No complaints from landowners due to prospecting activities. Should there be conflicts, these must be resolved
		The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbons from vehicles and machinery. This will result in the contamination of soils and groundwater. The prospecting operations will require the drilling of boreholes, which may result in the drawdown, which may affect the yield to the surrounding groundwater users. Material used for backfilling boreholes may leach pollutants, which will result in the	Groundwater	Operation	Rehabilitation of affected areas and control using bunds	No soil contamination as a result of hydrocarbon spillages Rehabilitation and disposal of contaminated soils conducted in terms of the NEM: WA

	contamination of surrounding groundwater regime. This may spread beyond the backfilling site via plume migration.				
Sampling	Drilling operations may result in the generation of surface water runoff contaminated with drill muds and cuttings, should spillage occur. The sedimentation and possible contamination with carbonaceous material will have negative impacts on the water quality due to increase turbidity and an increase in acidity of the water in the streams. This will have an impact on aquatic habitats.	Surface Water	Operation	Control through management and monitoring of surface runoff	Retain topsoil integrity for the reuse in rehabilitation. No dirty runoff/stormwater entering water courses. The NWA: No activities within 100 m of watercourses and drainage without consent from the DWS. No soil contamination as a result of hydrocarbon spillages Rehabilitation and disposal of contaminated soils conducted in terms of

NAME OF ACTIVITY	POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	MITIGATION TYPE	Standard to be achieved
					the NEM: WA
	Uncontrolled movement within riparian zones may have an impact on the aquatic ecological habitat, ecological functioning and structure.	Aquatic Ecosystems	Operation	Avoidance of riparian areas	NWA: No activities shall be permitted within 500 m of riparian areas without prior approval from the DWS. Comply with requirements of the NWA
	The project may result in the following impacts on the floral environment during the operation phase: Destruction of potential floral habitats because of continual disturbance of soil, leading to altered floral habitats, erosion and sedimentation; Impact on floral diversity because of possible uncontrolled fires;	Flora	Operation	Rehabilitation of affected areas Monitoring of rehabilitated areas to ensure success.	No invasive plant species in rehabilitated areas No removal of vegetation outside of demarcated areas. Ensure successful rehabilitation and/or removal of contaminated soils

<p>Potential spreading of alien invasive species because of floral disturbance; and</p> <p>Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase</p>				
<p>The project may result in the following impacts on the faunal environment during the operation phase:</p> <p>Migration of fauna from the prospecting area due to noise as a resulting of drilling activities;</p> <p>Loss of faunal due to collisions with vehicles and machinery;</p> <p>Loss of faunal diversity and ecological integrity as a result of poaching and faunal species trapping;</p> <p>Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase.</p>	Fauna	Operation	<p>Rehabilitation of affected areas</p> <p>Drill holes must be temporarily plugged immediately after drilling is completed and remain plugged until they are permanently plugged below ground to eliminate the risk posed to fauna by open drill holes.</p> <p>Drill holes must be permanently capped as soon as is practicable</p>	<p>No removal of vegetation outside of demarcated areas.</p> <p>Successful plugging of drill holes, with no faunal casualties as a result of holes being left open</p>
<p>The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbons from the vehicles and machinery. This will result in the contamination of soils. The materials removed from the drilling sites will contain carbonaceous material, which has potential for contamination should it not be managed properly. The material from the drilling site may result in the contamination of soils, which may render the land not usable after backfilling operation.</p>	Soils Land use and Land Capability	Operation	Rehabilitation of affected areas	Retain topsoil integrity for the reuse in rehabilitation.
<p>The movement of vehicles and drilling machinery will likely result in an increase in nuisance dust, PM10 and PM2.5.</p> <p>There is also potential for increase in carbon emissions and ambient air pollution due to the movement of vehicles and construction machinery.</p>	Air Quality	Operation	Dust control measures	Remain within the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural as well as Minimum Air Emissions Standards

		The drill rigs and towers used during the drilling operation phase will be visible from nearby locations and will have visual impact on the local communities in close proximity to the prospecting area.	Visual	Operation	Strategic location of rigs and towers to areas where there may be some tree cover, as far as practicable	No removal of vegetation outside de of demarcated area to ensure as much vegetation cover for the rigs, as possible. Make use of rigs that have earthy cover to minimise the visual impact
		The drilling operations may result in the destruction of graves and other heritage resources.	Heritage Resources	Operation	Control through clear demarcation of prospecting areas to ensure avoidance of graves and other heritage sites	No destruction/loss of heritage resources Comply with requirements of the SAHRA

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	MITIGATION TYPE	Standard to be achieved
		Earth moving activities may result in the destruction of fossils (if any).	Palaeontological Resources	Operation	Management of drill sites. Should any fossils be discovered, operations must cease and SAHRA must be notified	No destruction/loss of fossils Comply with requirements of the SAHRA
		The use of vehicles and machinery may result in an increase in noise in the immediate vicinity of the project. The drilling activities will also result in an increase in noise in the vicinity of the project.	Noise	Operation	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g., noise mufflers	Remain within the Noise Regulation Standards for Rural Areas. National Noise Control Regulations, SANS10103:2008 guidelines.
		The movement of vehicles in the project area will result in an increase in traffic on the roads.	Traffic	Operation	Speed control and limitation of the times when construction vehicles may be on the roads	Minimise the number of vehicles on the roads and movement of vehicles shall be kept to outside busy times
		The movement of vehicles and machinery may result in the production of carbon dioxide (Green House Gas), which may have an impact on the climate in the area.	Climate	Operation	Control and keep to a minimal the number of vehicles used for operations. Vehicles must be maintained to ensure efficient use of fuel.	Remain within the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural as well as Minimum Air Emissions Standards Minimise the number of vehicles
		Drilling ground vibrations may result in possible damage to infrastructure.	Drilling and Vibrations	Operation	Drill sites must be located as far from infrastructure as is possible to avoid damage to infrastructure	No private infrastructure shall be damaged/lost due to drilling vibrations
Data Analysis	Feasibility Studies	None	N/A	Operation	N/A	N/A
Feasibility Studies Report		None	N/A	Operation	N/A	N/A

Borehole capping	Closure and Rehabilitation of borehole and infrastructure sites	The removal of the campsite equipment and the rehabilitation of the drilling sites and associated access infrastructure will result in the affected soil and land use being restored. This will also result in the resumption of the use of the land since the infrastructure would have been removed.	Soils, Land Capability and Land Use	Decommissioning and Closure	N/A	No removal of vegetation outside of demarcated areas. Ensure successful rehabilitation of contaminated soils. Rehabilitation of land to a state it was before prospecting activities
Removal of equipment and infrastructure		Positive impacts will result due to the reduction in areas of disturbance and the return of land use of the affected areas and making available an area that was covered by the campsite and drilling sites.	Land Use	Decommissioning and Closure	N/A	No removal of vegetation outside of demarcated areas. Ensure successful rehabilitation of contaminated soils. Rehabilitation of land to a state it was before prospecting activities
		The use of vehicles/machinery during the rehabilitation of the exploration sites may result in compaction of soils and in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination and destruction of the vegetation cover and soils.	Soils and Vegetation	Decommissioning and Closure	Control and prohibit access of vehicles and machinery to areas outside of established access tracks. Control through the clear delineation of the prospecting area. Control through the implementation of environmental induction and toolbox talks, as well as the implementation of a fine system. Control through the implementation of a soil management programme in terms of the correct tops oil removal, stockpiling and rehabilitation practices as discussed in the EMPr.	Vehicle movement shall be limited to areas demarcated as access tracks. Comply with the requirements of the EMPr
		During the decommissioning and closure phases equipment will be removed, stockpiled soils will be used for rehabilitation, remaining sumps will be backfilled, levelled, top soiled and the area reseeded. During the process of rehabilitation surface water runoff from the rehabilitation site may have elevated silt load, which may cause pollution of the nearby water environment.	Surface Water	Decommissioning and Closure	Control through the clear delineation of the prospecting area. Control through the implementation of environmental induction and toolbox talks, as well as the implementation of a fine system. Control through the implementation of the NWA GN 704 water management principles.	Maintain the water quality of water course in the project area. Ensure that dirty stormwater and runoff is diverted from the water courses and riparian areas. Comply with the requirements of GN704.
NAME OF ACTIVITY	POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	MITIGATION TYPE	Standard to be achieved	

		Rehabilitation and removal of the prospecting sites and equipment will require vehicular movement. This will result in the generation of dust by movement of vehicles and due to blowing winds. Vehicles and machinery will also be generated diesel or petrol fumes. Generated dust will migrate towards the predominant wind direction and may settle on surrounding properties including nearby vegetation.	Air Quality	Decommissioning and Closure	Dust control measures and rehabilitation of areas stripped of vegetation	Comply with the requirements of the National Environmental Management Air Quality Act, 2004 Dust Regulation guidelines for rural communities.
		Noise will be generated during the removal of equipment and rehabilitation of the sites. This noise is not expected to exceed occupational noise limits and will be short lived.	Noise	Decommissioning and Closure	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g., noise mufflers	Comply with the Noise Regulation Standards for Rural Areas.

40 Impact Management Actions

Table 36-1: Impact management actions

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	MITIGATION TYPE	Time Period for Implementation	Compliance with standards
Data Collection and Assessment	Desktop Study	None	Control potential deviations from the approved Prospecting Works Programme through the effective implementation of the data acquisition and desktop study.	Planning	Remain within the ambits of the EMPr and Environmental Authorisation.
Geological Mapping		None	Control potential deviations from the approved Prospecting Works Programme through the effective implementation of the data acquisition and desktop study.	Planning	Remain within the ambits of the EMPr and Environmental Authorisation.
Planning for Drilling Surveys		None	Control potential deviations from the approved Prospecting Works Programme through the effective implementation of the data acquisition and desktop study.	Planning	Remain within the ambits of the EMPr and Environmental Authorisation.
Access Roads	Physical surveying of the site and pegging of drilling boreholes	Loss of soils, erosion of the soils and impacts on landowners' livelihood.	Rehabilitation of areas cleared of vegetation and dust control	Construction	Retain topsoil integrity for the reuse in rehabilitation. Vegetation clearance shall be kept to a minimum. No clearance of vegetation outside demarcated areas
Drill Sites		Contamination of groundwater from hydrocarbon spillages	Control through management and monitoring of spillages. Where spillages occur, the soil must be stripped and disposed of as stipulated in the EMPr.	Construction	Comply with the EMPr. Retain topsoil integrity for the reuse in rehabilitation. Where required, disposal of contaminated soils shall be undertaken in terms of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEM: WA)
Temporary Soil Storage Area		Contamination of surface water due to erosion of soils which will lead to increased turbidity as well as contamination from hydrocarbon spillages	Monitoring through rehabilitation and management of spoil sites	Construction	Retain topsoil integrity for the reuse in rehabilitation. Comply with the requirements of the NWA: no construction activities within 100 m of water courses and 500m of riparian zones without consent from the DWS.
Vegetation Clearance		None	N/A	Construction	National Water Act, 1998 (Act 36 of 1998) No construction activities may be conducted within 500 m of riparian zones without approval from the DWS.

Vehicle Parking Area	None	N/A	Construction	No destruction/loss of heritage resources
Mobile office	None	N/A	Construction	No destruction/loss of fossils
Ablution Facility	Loss of natural vegetation in the affected areas	Rehabilitation of areas cleared of vegetation. Control of alien invasive plant species	Construction	Comply with existing legislation National Environmental Management: Biodiversity Act 2004 (Act No 10 of 2004) and Alien and Invasive Species Regulations, 2014. No vegetation clearance outside of demarcated areas
	Migration of fauna due to disturbance caused by the proposed project	Relocation of affected species of conservation importance	Construction	Remain within the designated area demarcated for prospecting activities. Ensure minimal clearance of vegetation
	Air pollution through nuisance dust, PM 10 and PM 2.5 as well as emissions from construction vehicles and machinery.	Dust control measures	Construction	Comply with the requirements of the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural communities. Comply with the requirements of the Minimum Emission Standards

NAME OF ACTIVITY	POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	MITIGATION TYPE	Time Period for Implementation	Compliance with standards
	Increase in ambient noise due to movement of construction vehicles and machinery	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g., noise mufflers Control through the limiting of the activities to the daytime and the implementation of an open and transparent channel of communication	Construction	Remain within the Noise Regulation Standards for Rural Areas.
	Visual impacts as a result of vegetation clearance	Rehabilitation of areas cleared of vegetation	Construction	Vegetation clearance must be limited to demarcated areas only
	Increased traffic on the roads due to additional construction vehicles	Speed control and limitation of the times when construction vehicles may be on the roads	Construction	Minimise the number of vehicles used during construction. Movement of construction vehicles shall be limited to outside of busy hours

		Impact of carbon dioxide (GHG) produced by construction vehicles on the local climate	Control and keep to a minimal the number of vehicles used for construction. Vehicles must be maintained to ensure efficient use of fuel.	Construction	Comply with the EMPr. Minimise the number of vehicles used during construction. Regular maintenance of vehicles and machinery to improve fuel efficiency. Comply with requirements of the National Environmental Management: Air Quality Act, 2004
RC and Diamond Core Drilling	Drilling and Sampling	It is expected that during the operation phase the project will not result in the creation of employment as prospecting requires highly specialised personnel. The applicant will make use of qualified contractors for the drilling and sampling of the sites. The community will however continue to benefit as a result of the continued boost in small local businesses. Drilling has potential to affect the day-to-day operations by affected landowners	Control of times during which operation activities will take place	Operation	Maintain a 100% crime free area within the control of the prospecting. No complaints from landowners due to prospecting activities. Should there be conflicts, these must be resolved
		The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbons from vehicles and machinery. This will result in the contamination of soils and groundwater. The prospecting operations will require the drilling of boreholes, which may result in the drawdown, which may affect the yield to the surrounding groundwater users. Material used for backfilling boreholes may leach pollutants, which will result in the contamination of surrounding groundwater regime. This may spread beyond the backfilling site via plume migration.	Rehabilitation of affected areas and control using bunds	Operation	No soil contamination as a result of hydrocarbon spillages Rehabilitation and disposal of contaminated soils conducted in terms of the NEM: WA
Sampling		Drilling operations may result in the generation of surface water runoff contaminated with drill muds and cuttings, should spillage occur. The sedimentation and possible contamination with carbonaceous material will have negative impacts on the water quality due to increase turbidity and an increase in acidity of the water in the streams. This will have an impact on aquatic habitats.	Control through management and monitoring of surface runoff	Operation	Retain topsoil integrity for the reuse in rehabilitation. No dirty runoff/stormwater entering water courses. The NWA: No activities within 100 m of watercourses and drainage without consent from the DWS. No soil contamination as a result of hydrocarbon spillages

				Rehabilitation and disposal of contaminated soils conducted in terms of the NEM: WA
	<p>The project may result in the following impacts on the floral environment during the operation phase:</p> <p>Destruction of potential floral habitats as a result of continual disturbance of soil, leading to altered floral habitats, erosion and sedimentation;</p> <p>Impact on floral diversity as a result of possible uncontrolled fires;</p>	Avoidance of riparian areas	Operation	<p>NWA: No activities shall be permitted within 500 m of riparian areas without prior approval from the DWS.</p> <p>Comply with requirements of the NWA</p>

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	MITIGATION TYPE	Time Period for Implementation	Compliance with standards
		<p>Potential spreading of alien invasive species as a result of floral disturbance; and</p> <p>Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase</p>			
		<p>The project may result in the following impacts on the faunal environment during the operation phase:</p> <p>Migration of fauna from the prospecting area due to noise as a resulting of drilling activities;</p> <p>Loss of faunal due to collisions with vehicles and machinery;</p> <p>Loss of faunal diversity and ecological integrity as a result of poaching and faunal species trapping;</p> <p>Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase.</p>	<p>Rehabilitation of affected areas</p> <p>Monitoring of rehabilitated areas to ensure success.</p>	Operation	<p>No invasive plant species in rehabilitated areas</p> <p>No removal of vegetation outside of demarcated areas.</p> <p>Ensure successful rehabilitation and/or removal of contaminated soils</p>

<p>The project may result in the following impacts on the faunal environment during the operation phase:</p> <p>Migration of fauna from the prospecting area due to noise as a resulting of drilling activities;</p> <p>Loss of faunal due to collisions with vehicles and machinery;</p> <p>Loss of faunal diversity and ecological integrity as a result of poaching and faunal species trapping;</p> <p>Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase.</p>	<p>Rehabilitation of affected areas</p> <p>Drill holes must be temporarily plugged immediately after drilling is completed and remain plugged until they are permanently plugged below ground to eliminate the risk posed to fauna by open drill holes.</p> <p>Drill holes must be permanently capped as soon as is practicable</p>	<p>Operation</p>	<p>No removal of vegetation outside of demarcated areas.</p> <p>Successful plugging of drill holes, with no faunal casualties as a result of holes being left open</p>
<p>The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbons from the vehicles and machinery. This will result in the contamination of soils. The materials removed from the drilling sites will contain carbonaceous material, which has potential for contamination should it not be managed properly. The material from the drilling site may result in the contamination of soils, which may render the land not usable after backfilling operation.</p>	<p>Rehabilitation of affected areas</p>	<p>Operation</p>	<p>Retain topsoil integrity for the reuse in rehabilitation.</p>
<p>The movement of vehicles and drilling machinery will likely result in an increase in nuisance dust, PM10 and PM2.5.</p> <p>There is also potential for increase in carbon emissions and ambient air pollution due to the movement of vehicles and construction machinery.</p>	<p>Dust control measures</p>	<p>Operation</p>	<p>Remain within the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural as well as Minimum Air Emissions Standards</p>
<p>The drill rigs and towers used during the drilling operation phase will be visible from nearby locations and will have visual impact on the local communities in close proximity to the prospecting area.</p>	<p>Strategic location of rigs and towers to areas where there may be some tree cover, as far as practicable</p>	<p>Operation</p>	<p>No removal of vegetation outside de of demarcated area to ensure as much vegetation cover for the rigs, as possible.</p> <p>Make use of rigs that have earthy cover to minimise the visual impact</p>
<p>The drilling operations may result in the destruction of graves and other heritage resources.</p>	<p>Control through clear demarcation of prospecting areas to ensure avoidance of graves and other heritage sites</p>	<p>Operation</p>	<p>No destruction/loss of heritage resources</p> <p>Comply with requirements of the SAHRA</p>
<p>Earth moving activities may result in the destruction of fossils (if any).</p>	<p>Management of drill sites. Should any fossils be discovered, operations must cease and SAHRA must be notified</p>	<p>Operation</p>	<p>No destruction/loss of fossils</p> <p>Comply with requirements of the SAHRA</p>

NAME OF ACTIVITY	POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	MITIGATION TYPE	Time Period for Implementation	Compliance with standards
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		The use of vehicles and machinery may result in an increase in noise in the immediate vicinity of the project. The drilling activities will also result in an increase in noise in the vicinity of the project.	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g., noise mufflers	Operation	Remain within the Noise Regulation Standards for Rural Areas. National Noise Control Regulations, SANS10103:2008 guidelines.
		The movement of vehicles in the project area will result in an increase in traffic on the roads.	Speed control and limitation of the times when construction vehicles may be on the roads	Operation	Minimise the number of vehicles on the roads and movement of vehicles shall be kept to outside busy times
		The movement of vehicles and machinery may result in the production of carbon dioxide (Green House Gas), which may have an impact on the climate in the area.	Control and keep to a minimal the number of vehicles used for operations. Vehicles must be maintained to ensure efficient use of fuel.	Operation	Remain within the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural as well as Minimum Air Emissions Standards Minimise the number of vehicles
		Drilling ground vibrations may result in possible damage to infrastructure.	Drill sites must be located as far from infrastructure as is possible to avoid damage to infrastructure	Operation	No private infrastructure shall be damaged/lost due to drilling vibrations
Data Analysis	Feasibility Studies	None	N/A	Operation	N/A
Feasibility Studies Report		None	N/A	Operation	N/A
Borehole capping	Closure and Rehabilitation of borehole and infrastructure sites	The removal of the campsite equipment and the rehabilitation of the drilling sites and associated access infrastructure will result in the affected soil and land use being restored. This will also result in the resumption of the use of the land since the infrastructure would have been removed.	N/A	Decommissioning and Closure	No removal of vegetation outside of demarcated areas. Ensure successful rehabilitation of contaminated soils. Rehabilitation of land to a state it was before prospecting activities
Removal of equipment and infrastructure		Positive impacts will result due to the reduction in areas of disturbance and the return of land use of the affected areas and making available an area that was covered by the campsite and drilling sites.	N/A	Decommissioning and Closure	No removal of vegetation outside of demarcated areas. Ensure successful rehabilitation of contaminated soils. Rehabilitation of land to a state it was before prospecting activities
		The use of vehicles/machinery during the rehabilitation of the exploration sites may result compaction of soils and in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination and destruction of the vegetation cover and soils.	Control and prohibit access of vehicles and machinery to areas outside of established access tracks. Control through the clear delineation of the prospecting area. Control through the implementation of environmental induction and toolbox talks, as well as the implementation of a fine system.	Decommissioning and Closure	Vehicle movement shall be limited to areas demarcated as access tracks. Comply with the requirements of the EMPr

		Control through the implementation of a soil management programme in terms of the correct tops oil removal, stockpiling and rehabilitation practices as discussed in the EMPr.		
	During the decommissioning and closure phases equipment will be removed, stockpiled soils will be used for rehabilitation, remaining sumps will be backfilled, levelled, top soiled and the area re-seeded. During the process of rehabilitation surface water runoff from the rehabilitation site may have elevated silt load, which may cause pollution of the nearby water environment.	Control through the clear delineation of the prospecting area. Control through the implementation of environmental induction and toolbox talks, as well as the implementation of a fine system. Control through the implementation of the NWA GN 704 water management principles.	Decommissioning and Closure	Maintain the water quality of water course in the project area. Ensure that dirty stormwater and runoff is diverted from the water courses riparian areas. Comply with the requirements of GN704
	Rehabilitation and removal of the prospecting sites and equipment will require vehicular movement. This will result in the generation of dust by movement of vehicles and due to blowing winds. Vehicles and machinery will also be generated diesel or petrol fumes. Generated dust will migrate towards the predominant wind direction and may settle on surrounding properties including nearby vegetation.	Dust control measures and rehabilitation of areas stripped of vegetation	Decommissioning and Closure	Comply with the requirements of the National Environmental Management Air Quality Act, 2004 Dust Regulation guidelines for rural communities.
NAME OF ACTIVITY	POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	MITIGATION TYPE	Time Period for Implementation	Compliance with standards
	Noise will be generated during the removal of equipment and rehabilitation of the sites. This noise is not expected to exceed occupational noise limits and will be short lived.	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g., noise mufflers	Decommissioning and Closure	Comply with the Noise Regulation Standards for Rural Areas.

41 Financial Provision

41.1 Determination of the amount of Financial Provision.

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

Phases are dependent on the success of the previous one. The prospecting drilling will be initiated based on the outcome of the desktop and geological mapping phase. The location and extent of the drill and infrastructure sites cannot be determined at this stage. Mapping of the actual prospecting activities cannot be undertaken.

The rehabilitation plan was developed on the basis that the rehabilitated areas will be left safe, stable, non-polluting and able to support a self-sustaining ecosystem similar to the surrounding natural environment. To ensure that the rehabilitation plan is aligned with the closure objective, a high-level risk assessment of the prospecting components was undertaken to establish the potential risks associated therewith.

The closure objectives are to:

- Eliminate any safety risks associated with drill hole and sumps through adequate drill hole capping and backfilling;
- Remove and/or rehabilitate all pollution and pollution sources such as waste materials and spills;
- To establish a rehabilitated area that is not susceptible to soil erosion which may result in the loss of soil, degradation of water resources and aquatic environments;
- Restore disturbed areas and re-vegetate these areas with plant species naturally occurring the area to restore the ecological function of such areas, as far as is practicable; and
- To eradicate all alien invasive plant species that may colonise the areas that have been cleared of vegetation.

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

All registered I&APs will have access to the draft BAR and EMPr for a 30-day review and comment period.

All comments received and responses provided to the stakeholders will be incorporated into the final BAR and EMPr and will be collated into a Comments and Responses Register.

41.1.3 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.

Every phase of the prospecting activities is dependent on the success of the preceding phase. Depending on the outcome of the desktop and geological mapping phase, the prospecting drilling will be initiated. The location and extent of the drill and infrastructure sites cannot be determined at this stage. Mapping of the actual prospecting activities cannot be undertaken.

As a result of the nature of the activities, the potential impacts will be limited in spatial extent and will be 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. The impacts will be temporary in nature, and a detailed management plan has been provided to address the potential impacts associated with these activities.

The only rehabilitation that will specifically be required is borehole capping and revegetation:

- Borehole Capping: Drill holes will be permanently capped as soon as is practicable.
- Re-vegetation: A suitably qualified ecologist will be appointed to determine the appropriate species that may be used for re-vegetating the area.
- Re-vegetation efforts will be monitored every second month for a period of 6 months after the initial seeding. An effective vegetation cover of 45% must be achieved. Re-seeding will be undertaken if the vegetation cover has not been achieved after 6 months.

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

The nature of the activities is such that, its impacts will be very limited and of short duration. The management plan is in such a manner as to ensure concurrent rehabilitation. The areas for drilling purposes will be the main areas that will require rehabilitation at the end of the prospecting activities. The impacts of the drilling activities will be temporary in nature and a detailed management plan has been provided to address potential impacts.

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

The financial provision for the environmental rehabilitation and closure of any mine/prospecting and its associated operations forms an integral part of the MPRDA. Sections 41 (1) and, 41 (2), 41 (3) and 45 of the MPRDA deal with the financial provision for rehabilitation and closure. During 2012, the DMR made updated rate available for the calculation of the closure costs, where contractor's costs are not available, these apply.

The "Guideline Document for the Evaluation of Financial Provision made by the Mining Industry" was developed by the DMR in January 2005 to empower the personnel at Regional DMR offices to review the quantum determination for the rehabilitation and closure for mining sites.

With the determination of the quantum for closure, it must be assumed that the infrastructure had no salvage value (clean closure). The closure cost estimate (clean closure) was determined in accordance with the DMR guidelines.

Table 37-1: Cost Estimate Expenditure

CALCULATION OF THE QUANTUM							
Applicant: MASHININI (PTY) LTD		Ref No.: DMRE REF MP 30/5/1/1/2/17003 PR					
Evaluator: Tshifhiwa Netshivha		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	17.4	1	1	0
2 (A)	Demolition of steel buildings and structures	m2	0	238.71	1	1	0
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	351.79	1	1	0
3	Rehabilitation of access roads	m2	0	42.72	1	1	0
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	414.61	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	226.15	1	1	0
5	Demolition of housing and/or administration facilities	m2	0	477.42	1	1	0
6	Opencast rehabilitation including final voids and ramps	ha	0	242984.15	1	1	0
7	Sealing of shafts adits and inclines	m3	0	128.15	1	1	0
8 (A)	Rehabilitation of overburden and spoils	ha	0	166847.44	1	1	0
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0	207805.47	1	1	0
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	603565.59	1	1	0
9	Rehabilitation of subsided areas	ha	0	139709.6	1	1	0
10	General surface rehabilitation	ha	0.6	132171.31	0.34	1	26962.94724
11	River diversions	ha	0	132171.3	1	1	0
12	Fencing	m	0	150.77	1	1	0
13	Water management	ha	0.08	50255.25	1	1	4020.42
14	2 to 3 years of maintenance and aftercare	ha	0	17589.34	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							30983.36724
1	Preliminary and General	3718.004069			weighting factor 2 1		3718.004069
2	Contingencies				3098.336724		3098.336724
Subtotal 2							37799.71
SIGN		Netshivha Tshifhiwa			VAT (15%)		5669.96
DATE		02/03/2022			Grand Total		43,469.66

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

Mashinini will fund the operation and hereby undertakes to fund the operations and to manage the operations.

The applicant (Mashinini) hereby confirms that the financial provision will be provided as determined in Table 37-1.

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

42.1 Monitoring of Impact Management Actions

Please refer to Table 38-1.

42.2 Monitoring and Reporting Frequency

Please refer to Table 38-1.

42.3 Responsible Persons (Roles and Responsibilities)

Generic roles that require to be defined for the project include:

- Project Developer;
- Environmental Control Officer;
- Environmental Health and Safety (EHS) Manager; and
- Site Manager.

The typical requirements of each of the roles are provided in the following sections.

42.3.1 Project Developer

The Project Developer (Mashinini) is the 'owner' of the project and as such is responsible for ensuring that the conditions of the Environmental Authorisation issued in terms of NEMA (should the project receive such authorisation) are fully complied with, as well as ensuring that any other necessary permits or licenses are obtained and complied with. It is expected that Mashinini will appoint the Environmental Control Officer, EHS Manager and Site Manager.

42.3.2 Environmental Control Officer

An independent Environmental Control Officer (ECO) must be appointed to monitor the compliance of the proposed project with the conditions of Environmental Authorisation (should such authorisation be granted by DMR) during the construction phase (and possibly the operational phase, depending on the requirements of DMR). The ECO must also monitor compliance of the proposed project with environmental legislation and conditions of the EMP. The roles and responsibilities of the ECO should include the following:

- The ECO must undertake periodic environmental audits during the relevant phases of the proposed project to monitor and record environmental impacts and non-conformances. It is recommended that weekly or bi-weekly environmental audits be undertaken by the ECO during the construction phase.
-

- Environmental compliance reports must be submitted by the ECO to the DMR on an annual basis or as stipulated by the DMR.
- The ECO must maintain a diary of site visits and audits, a copy of the Environmental Authorisation (should such authorisation be granted by DMR) and relevant permits for reference purposes, a non-conformance register, a public complaint register, and a copy of previous environmental audits undertaken.
- Prior to the commencement of construction, the ECO must meet on site with the Site Manager to confirm the construction procedure and designated construction areas.

42.3.3 Environmental Health and Safety (EHS) Manager

The EHS Manager will be appointed to fulfil the roles of the Environmental Officer during the construction phase and the Environmental Manager during the operational phase. The responsibility of the EHS Manager include overseeing the implementation of the EMPr during the construction and operational phases, monitoring environmental impacts, record-keeping and updating of the EMPr as and when necessary. The EHS Manager is also responsible for monitoring compliance with the conditions of the Environmental Authorisation that may be issued to Mashinini .

The lead contractor and sub-contractors may have their own Environmental Officers or designate Environmental Officer functions to certain personnel.

During construction, the EHS Manager will be responsible for the following:

- Meeting on site with the Site Manager prior to the commencement of construction activities to confirm the construction procedure and sites allocated for the drill sites and infrastructure required for the project.
- Daily or weekly monitoring of site activities during construction to ensure adherence to the specifications contained in the EMPr and Environmental Authorisation (should such authorisation be granted by DMR), using a monitoring checklist that is to be prepared at the start of the construction phase.

42.3.4 Site Manager

The site manager will be responsible for the following:

- Overall construction programme, project delivery and quality control for the construction of the facility.
-

- Overseeing compliance with the Health, Safety and Environmental Responsibilities specific to the project construction.
- Promoting total job safety and environmental awareness by employees, contractors and sub-contractors and ensuring that all employees and contractors and sub-contractors are aware of the importance that the project proponent attaches to safety and the environment.
- Ensuring that each subcontractor employ an Environmental Officer (or have a designated Environmental Officer function) to monitor and report on the daily activities on-site during the construction period.
- Ensuring that safe, environmentally acceptable working methods and practices are implemented, and that sufficient plant and equipment is made available, is properly operated and maintained in order to facilitate proper access and enable any operation to be carried out safely.
- Meeting on site with the EHS Manager prior to the commencement of construction activities to confirm the construction procedure and designated activity zones.
- Ensuring that all appointed contractors and sub-contractors are aware of this EMPr and their responsibilities in relation to the programme.
- Ensuring that all appointed contractors and sub-contractors repair, at their own cost, any environmental damage as a result of a contravention of the specifications contained in the EMPr, to the satisfaction of the EHS Manager.

42.4 Time Period for Implementing Impact Management Actions

Please refer to Table 38-1.

42.5 Mechanism for Monitoring Compliance

Please refer to Table 38-1.

Table 38-1: Mechanisms 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
Site Clearance and removal of vegetation Drilling of prospecting boreholes (RC) Stockpiling material from site clearance Discarding material from drill sites Construction of temp/mobile site infrastructure and access routes Stormwater management Waste generation and management. Demolition and/or removal of temporary infrastructure/equipment Rehabilitation and restoration of disturbed areas	Soil Erosion	Management and monitoring of soil stockpiles. Soils must be stored properly and revegetated to prevent erosion and to enable re-use during rehabilitation. Stockpiles must be visually inspected daily to ensure that no erosion is taking place	ECO, Site Manager	Daily Monitoring and Monthly Reporting
	Loss of Indigenous plant Species	A suitably ecologist or horticulturist will be required to make recommendations regarding the collection, propagation/storage and transplantation of plants is advised.	ECO, Site Manager	Monthly monitoring and reporting. Monitoring will be required at all the construction and operational activities until such time that rehabilitation is completed, and sustainability of vegetation cover is achieved.
	Faunal Habitat Loss	Adhere to law and best practice guidelines regarding the displacement and relocation of CI fauna. Where required fauna shall be relocated to an area with a similar habitat as the project area Time construction activities to minimise faunal mortality. Poaching of fauna shall be prohibited. Uncontrolled fires shall not be permitted on site and persecution or hunting of fauna	ECO, Site Manager	Monthly monitoring and reporting. Monitoring will be required at all the construction and operational activities until such time that rehabilitation is completed, and sustainability of vegetation cover is achieved.
	Proliferation of alien invasive species	Declared weeds and alien invasive species must be eradicated. Management of alien invasive plant shall be undertaken though throughout the	ECO, Site Manager	Monthly monitoring and reporting. Monitoring will be required at all the construction and operational activities until such time that rehabilitation is completed and sustainable.
	Nuisance dust and air emissions generation	During dry seasons, ensure that cleared (excavated) areas and unpaved surfaces are sprayed with water obtained from an approved source to minimise dust generation.	ECO, Site Manager	Monthly monitoring and reporting

		Set up PM 2.5 and PM10 Monitoring sites in the area to monitor dust fall.		
	Loss of arable land/land for grazing	Ensure proper rehabilitation measures are adhered to in order to return the soil quality to its natural state.	ECO, Site Manager	Monitor monthly and report on an annual basis. Monitoring will be required until such time that rehabilitation is completed.
	Soil and groundwater contamination	Manage through the EMPr and develop a groundwater management programme. Collection of baseline hydrochemistry samples for analysis.	ECO, Site Manager	Monthly monitoring and reporting
	Groundwater extractions	Ensure that no groundwater extraction is undertaken without approval from the DWS. Monitoring water levels of the boreholes found in close proximity to the proposed mining site, through a flow meter and water level data logger.	ECO, Site Manager	Monthly monitoring and reporting
	Visual Intrusion and loss of sense of place	Ensure that infrastructure is kept to its most "natural" state and keep a tidy visually ordered site. Rubble/litter/waste removal and disposal to be monitored throughout construction. Complaints about night lights should be investigated and documented in a register	ECO, Site Manager	Monthly monitoring and reporting
	Increased pressure on the road network	Speed control and limitation of the times when construction vehicles may be on the roads	ECO, Site Manager	Monthly monitoring and reporting
	Soil disturbance resulting in the spread of alien	Alien invasive vegetation monitoring and control through Alien Invasive Management Plan	ECO, Site Manager	Monthly monitoring and reporting
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
	Surface water contamination	Monitor surface water quality upstream and downstream of the prospecting area to ensure that the prospecting activities are not contamination water resources	ECO, Site Manager	Monthly monitoring and reporting
	Riparian Area and Aquatic Ecosystem Loss	Ensure that there are construction activities that will be located within any riparian and aquatic ecosystem areas.	ECO, Site Manager	Monthly monitoring and reporting

Destruction of graves and cultural resources	No drilling sites shall impact graves and sites of heritage or cultural importance	ECO, Site Manager	Monthly monitoring and reporting
Water Use	No water may be sources from rivers and streams without approval from the DWS. No clean water shall be used for dust suppression		
Nuisance Noise	Measure noise levels routinely to ensure the noise levels are being kept within the acceptable ISO standards.	ECO, Site Manager	Monthly monitoring and reporting
Health and safety of personnel	Routine safety checks, safety training and Inspections to be carried out during the construction and operation phase to enforce the use of Personnel Protective Equipment (PPE). This must also be included in the safety requirements of the Contract.	ECO, Site Manager	Routine inspection and Quarterly reporting
Waste Management	Maintain a waste manifest book to record volumes of waste leaving the site, including recyclables. Keep safe disposal certificates on file on site for Hazardous waste. Way Bridge slips must be obtained for all other waste streams and kept on file on site	ECO, Site Manager	Monthly daily and report on a monthly basis
Stormwater Management	Visual monitoring based on sediment. Clean water must be kept separate from contaminated water emanating from the project sites	ECO, Site Manager	Monthly daily and report on a monthly basis
Rehabilitation	Monitoring of the following: <ul style="list-style-type: none"> • Basal Cover • Arial Cover • Species diversity 	ECO, Site Manager	Rehabilitation will be undertaken throughout all the project phases. The final rehabilitation will be undertaken when the prospecting activities have been finalised. The ECO shall inspect the affected areas 6 months after finalisation of rehabilitation to assess the success of the rehabilitation.

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

Environmental audits must be undertaken every year to ensure compliance with the EMPr and EA.

The audit reports must also include the financial provision. The reports must be submitted to the DMR.

44 Environmental Awareness Plan

44.1 Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work.

An Environmental Awareness and Risk Assessment Schedule has been developed and is outlined in Table 40-1. The purpose of this schedule is to ensure that onsite employees are not only trained, but that the principles are continuously re-enforced.

Table 40-1: Environmental Training and Awareness Schedule

Frequency	Time allocation	Objective
Induction (all staff and workers)	1-hour training on environmental awareness training as part of site induction	<p>Develop an understanding of what is meant by the natural environmental and social environment and establish a common language as it relates to environmental, health, safety and community aspects.</p> <p>Establish a basic knowledge of the environmental legal framework and consequences of non compliance.</p> <p>Clarify the content and required actions for the implementation of the Environmental Management Plan.</p> <p>Confirm the spatial extent of areas regarded as sensitive and clarify restrictions.</p> <p>Provide a detailed understanding of the definition, the method for identification and required response to emergency incidents.</p>
Monthly Awareness Talks (all staff and workers)	30 minutes awareness talks	Based on actual identified risks and incidents (if occurred) reinforce legal requirements, appropriate responses and measures for the adaptation of mitigation and/or management practices.
Risk Assessments (supervisor and workers involved in task)	Daily task-based risk assessment	Establish an understanding of the risks associated with a specific task and the required mitigation and management measures on a daily basis as part of daily toolbox talks.

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

As advised in Table 40-1, Task/Issue based Risk Assessments must be undertaken with all workers involved in the specific tasks to establish an understanding of the risks associated with a specific task and the required mitigation and management measures contained in this report.

Environmental Awareness Training Content- Induction Training: The following environmental awareness training will be provided to all staff and workers who will be involved in prospecting activities:

- Description of the approved prospecting activities and content of the prospecting right;
- An overview of the applicable legislation and regulations as they relate to environmental, health, safety and community;

Content and implementation of the approved EMPr specifically:

- Allocated roles and responsibilities;
- Management and mitigation measures; and
- Identification of risks and requirements adaptation.

Sensitive environments and features:

- Description of environmentally sensitive areas and features; and
- Prohibitions as it relates to activities in or in proximity to such areas.

Emergency Situations and Remediation:

- Methodology for the identification of areas where accidents and emergencies may occur, communities and individuals that may be affected;
- An overview of the response procedure;
- Equipment and resources;
- Designate of responsibilities;
- Communication, including communication with the potentially affected communities and responsible authorities; and
- Training schedule to ensure effective response.

Development of procedures and checklists: The following procedures will be developed, and all staff and workers will be adequately trained on the content and implementation thereof:

Emergency Preparedness and Response: The procedure will be developed to specifically include risk identification, preparedness, response measures and reporting. The procedure will specifically include spill and fire risk, preparedness and response measures. The appropriate emergency control centres (fire department, hospitals etc.) will be identified and the contact numbers obtained and made available on site. The procedure must be developed in consultation with potentially affected landowners.

Should risks be identified, which may affect adjacent landowners (or other persons), the procedure will include appropriate communication strategy to inform such persons and provide response measures to minimize the impact.

Procedure for Reporting Incident: Incident reporting will be undertaken in accordance with an established incident reporting procedure to:

Provide details of the responsible person, including any person who:

- Is responsible for the incident;
- Owns any hazardous substance involved in the incident;
- Was in control when the incident occurred.
- Provide details of the incident (time, date, location);
- The details of the cause of incident;
- Identify aspects of the environment affected;
- The details of corrective action taken; and
- The identification of any potential residual or secondary risks that must be monitored and corrected or managed.

Environmental and Social Audit Checklist: An environmental audit checklist will be established to include the environmental and social mitigation and management measures as developed and approved as part of the EMP. Non-conformances will be identified, and corrective action taken where required.

44.3 Specific information required by the Competent Authority.

No specific information was required by the Competent Authority.

45 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:

Date:

-END-