BASIC ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE MINING PERMIT APPLICATION ON PORTION 3 & 4 OF RHENOSTERFONTEIN FARM 86 JQ,BOJANALA DISTRICT MUNICIPALITY, NORTH WEST PROVINCE

DMR Ref: NW 10941 EM

: NW 10940 EM

DRAFT BAR

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF SECTION 16 OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT 28 OF 22 AS AMENDED BY SECTION 12 OF ACT 49 OF 2008.

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REPORT TITLE:	BASIC ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE PROSPECTING RIGHT APPLICATION ON PORTION 1 OF MOPHEPHE FARM 710 KURUMAN
PROJECT:	Mining Permit Application
DRAFT REPORT DATE:	10 May 2022
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Declaration:

Basia Environmental Consultants operate as independent consultants appointed in terms of Section 12 & 13 of the Environmental Impact Assessment Regulations (EIA) regulation 326, as amended in 2017 and 2021. Our practice is accredited under the auspices of the South African Council for Natural Scientific Professions (SACNASP) and Environmental Assessment Practitioners Association of South African (EAPASA). We are committed to objectively report and no information at our disposal has been intentionally omitted or inserted to favor or disadvantage the proposed project. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the EIA Regulation. We have no conflicting interests in the undertaking of this activity. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (time and budget) based on the principals of science.

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LIST OF ABBREVIATIONS, ACRONYMS AND KEY TERMS

Abbreviation/ Acronym	***Full term***	***Explanation***
1. EA	Environmental Authorisation	The authorisation by a competent authority of a listed activity or specified activity in terms NEMA.
2. EIA	Environmental Impact Assessment	A systematic process that recognises and analyses the environmental

		concerns and impacts due to development activities and evaluate the impacts before an authorisation is considered.
3. EAP	Environmental Assessment Practitioner	Is an individual responsible for the planning, management, coordination or review of environmental impact assessments, strategic environmental assessments, and environmental management programmes.
4. I&AP's	Interested and Affected Parties	Any person, group of people or organizations interested in or affected by an activity: those people who have a concern about a development, project, policy, or action and who need to be consulted.
5. PPP	Public Participation Process	Means a process in which the public, including interested and affected parties, are given an opportunity to comment on, or raise issues relevant to, specific matters.
6. EMPr/EMP	Environmental Management Programme Report/ Environmental Management Plan	Is an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning specific to a project are prevented; and that the positive benefits of the project are enhanced.
7. BID	Background Information Document	Is to provide a brief description of the project and EIA process that will be followed, and to obtain initial comments and contributions from Interested and Affected Parties (IAPs) on the issues relating to the proposed development.
8. PR	Prospecting Right	Is a permit which allows you or your company to survey or investigate an area of land for the purpose of identifying an actual or probable mineral deposit.
9. BAR	Basic Assessment Report	Is a standard report that may be required by a competent authority in terms of the EIA Regulations 2006, it enables a consolidated process to be conducted and facilitates the assessment of the cumulative impacts

		of the development.
10. IDP	Integrated Development Plan	Is a super plan for an area that gives an overall framework for development. It aims to coordinate the work of local and other spheres of government in a coherent plan to improve the quality of life for all the people living in an area.
11. Mine REHAB	Mine Rehabilitation	Is the process of repairing the damage done by the mining activities, the restoration of the post mined landscape.
12. PA	Proposed Activity	Means any activity or any major change to an activity subject to a decision of a competent.
13. BH	Borehole	A deep, narrow hole made in the ground, especially to locate water or oil.
14. NEMA	National Environmental Management Act	Is the statutory framework to enforce Section 24 of the Constitution of the Republic of South Africa 1998. The NEMA is intended to promote co-operative governance and ensure that the rights of people are upheld, but also recognising the necessity of economic development.
15. NEMAQA	National Environmental Management Air Quality Act	NEMAQA 39 of 2004 intends to reform the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development, to provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government; for specific air quality measures.
16. MPRDA	Mineral and Petroleum Resources Development Act	MPRDA 28 of 2002 intends to make provision for equitable access to and sustainable development of the nation's mineral and petroleum resources and to provide for matters connected.
17. GN	Government Notice	An announcement not of a legislative

		character made by or with the authority of the Governor in the Gazette.
18. GIS	Geographical Information System	A computer system for capturing, storing, checking, and displaying data related to positions on Earth's surface.
19. HA	Hectare	A metric unit of square measure, equal to 100 ares.
20. CA	Competent Authority	Is any person or organization that has the legally delegated or invested authority, capacity, or power to perform a designated function.
21. SAMRAD	South African Mineral Resources Administration	Is the South African Mineral Resources Administration System where the general public can view the locality of applications, rights and permits made or held in terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002), (The MPRDA), and where applications in terms thereof can be submitted electronically.
22. SAHRA	South African Heritage Resources Agency	Is a statutory organisation established under the National Heritage Resources Act, No 25 of 1999, as the national administrative body responsible for the protection of South Africa's cultural heritage.
23. SANBI	South African National Biodiversity Institute	Contributes to South Africa's sustainable development by facilitating access to biodiversity data, generating information and knowledge, building capacity, providing policy advice, showcasing and conserving biodiversity in its national botanical and zoological gardens.
24. NWA	National Water Act	The National Water Act 36 of 1998 intends to provide for fundamental reform of the law relating to water resources; to repeal certain laws; and to provide for matters connected therewith.

EXECUTIVE SUMMARY

The purpose of this document is to provide supporting environmental insights to an application for a mining permit for Iron ore and Manganese ore on portion 3 and 4 of the farm Rhenosterfontein 86 JQ situated in the magisterial district of Bojanala. The total mining area for both mining permits covers an area of 5 hectares. This document constitutes two mining permit application that are lodged in terms of Section 27 of the MPRDA (Act 28 of 2002). The mineral applied for is **iron ore** and **manganese ore**.

Application 1: by **Quadrant Resources (Pty) Ltd,** reference is **NW 10941 EM** on portion of portion 3 of farm **Rhenosterfontein** 86 JQ. Accepted on the 11 October 2021.

Application 2: by **Pinafore Resources (Pty) Ltd,** reference is **NW 10940 EM** on portion of portion 4 of farm **Rhenosterfontein** 86 JQ. Accepted on the 21 October 2021.

An extension was requested on the 17 January and granted, the submission of the documents is on the **25 March 2022**.

The commencement of the proposed mining project will result in the undertaking of activities that are considered as listed activities, listing no. 21 and 27 of NEMA; EIA Regulation 327 as amended.

Basia Environmental Consultant, as an independent Environmental Assessment Practitioner, to undertake and manage the environmental authorisation application. The public participation process (PPP) and stakeholder engagement process, as part of the Environmental Authorisation process, is conducted in terms of Section 41 of NEMA: EIA regulation 326 of 2017 (as amended) which provides clear guidelines for PPP and stakeholder engagement during Basic Assessment process. One of the general objectives of integrated environmental management is to ensure the

“adequate and appropriate opportunity for public participation in decisions that may affect the environment”.

Before an EAP submits a final report they must have given registered I&AP’s access to, and an opportunity to comment on the report prior to the submission of the final report to the competent authority for approval. Stakeholders, I&AP’s will therefore be invited to participate in the public review of the Draft BAR from **23 February 2022 to 23 March 2022** (period of 30 days). Copies are also sent to all registered I&AP’s for review. After the public review period, the report will be updated with comments received from stakeholders, I&AP’s as well as comments received during the public participation meeting.

This document provides a basic assessment study with identified environmental impacts, mitigation measures and Environmental Management Plan (EMP) for the proposed mining permit applications. This document focuses on providing an insight of the proposed activities and their potential effects on the receiving environment, and how the identified potential impacts will be managed. Hence, this document is compiled in line with the NEMA: EIA Regulation 326 of 2017 as amended.

PART A: BASIC ASSESSMENT REPORT

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

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

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

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

2. DETAILS OF THE APPLICANTS AND EAP's

a. CONTACT PERSON AND CORRESPONDENCE ADDRESS

Applicant's Contact Details

ITEM	COMPANY CONTACT DETAILS
Name	
Cellular no:	
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E-mail address:	
Postal address:	

Details of the EAP	
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Expertise of the EAP

The qualifications of the EAP

1) He holds a Master of Technology in Environmental Management from Tshwane University of Technology (TUT) which was completed in 2016. His research project was titled “Determination of mercury and its fractionation products in gold mine tailings dams and their surrounding areas in Gauteng. He was able to publish two scientific papers in reputable journals from this project and co-authored two scientific publications. He is registered as a Professional Natural Scientist with SACNASP in the field of Environmental Science (SACNASP: Reg no; 117391) and with Environmental Assessment Practitioners Association of South Africa (EAPASA: Reg: 2020/1413).

2) Ms. M. Thema holds a National Diploma in Environmental Sciences from Tshwane University of Technology (TUT) which was completed in 2019 and she is currently in pursuit of an Advanced Diploma qualification in the same field.

3) Lesego Montshiwa is an Environmental Sciences student at Tshwane University of Technology, done with her course work and recently completed her Work Integrated Learning in October 2021.

Summary of the EAP’s experience

1) Mr. Tshia Malehase is an Environmental Assessment Practitioner with extensive experience in a wide range of environmental related projects, processes and Mining permit applications.

Mr. T. Malehase has been trained and worked in different Environmental Consulting Company for six (6) years, where he was groomed and exposed into different environmental applications, processes and documentation. This includes Environmental Impact Assessment, Basic assessment, and Water Use Licenses. He also had a privilege to work at the Department of Mineral resources where he was exposed to the process for Mining permit, and mining rights applications including the contingency plans and rehabilitation strategies.

He has undertaken environmental compliance (including basic assessments, water use license applications, social and environmental management systems, mining

permits and prospecting right applications) and public participation processes. Overall, he has been in the field of environmental science and management, environmental chemistry and mining for over twelve (12) years. Please refer to Appendix A for Malehase's CV which provides a detailed list of projects which illustrate Mr. Malehase's competence in carrying out the EIA process.

2) Ms. M. Thema is an Environmental Assessment Practitioner (Junior) with over one year experience in a wide-range of environmental related projects, processes and Mining permit applications. She has been training and working in an Environmental Consulting Company where she is being groomed and exposed into different environmental applications, processes and documentation. This includes Environmental Impact Assessment, Basic assessment and Water Use License.

As a student, Ms. Thema was part of the green campus initiative team which was responsible for promoting green leadership on campus by raising environmental awareness and building sustainable living practices through advocating for water conservation, energy conservation and efficiency, recycling and waste reduction. She would attend Educational excursions which involved training on aspects of wetland and nature reserve science and the facilitation of wetland education.

3) Ms. Montshiwa is an Environmental Science intern, she is currently being trained and is working in an Environmental Consulting Company where she is being groomed and exposed into different environmental applications, processes and documentation.

3. DETAILS OF THE PROPOSED PROJECT

(a) Location of the overall Activity

Table 1: Location of overall activity

Farm Name	Portion of Portion 3 & 4 of the Farm Rhenosterfontein 86 JQ

Application area (Ha)	5 hectors
Magisterial district	Mangwase
Distance and direction from nearest town	40 km North of Rustenburg
21 digit Surveyor General Code for each farm portion	T0JQ00000000008600003 T0JQ00000000008600004

Table 2: Details of the farms

An investigation is still underway on the details of the landowners, and the details will be updated as new information emerges. Particularly after the consultation process.

LIST OF LANDOWNERS AND CONTACT DETAILS				
FARM NAME	**PORTION NUMBER**	**OWNER**	**DEEDS NUMBER**	**CONTACT PERSON**
RHENOSTERFONTEIN 86 JQ	3	MAREUME & MATSIELA FAMILY TRUST	T83774/2015	
RHENOSTERFONTEIN 86 JQ	4	DANIEL JOB MATSIELA TRUST	T47470/2008	

(b) Locality Map

The proposed Mining Permit application area is in Moses kotane Local Municipality within the Bojanala District Municipality. The proposed areas is located on portion 2 and 4 of the farm Rhenosterfontein 86 JQ Moses Kotane as shown in the figure 1 below.

The Bojanala District Municipality is known for its exceptional botanic and fauna aspects. It thus has nature reserves and conservation areas.

The locality map and google map are provided for you to locate the project location.

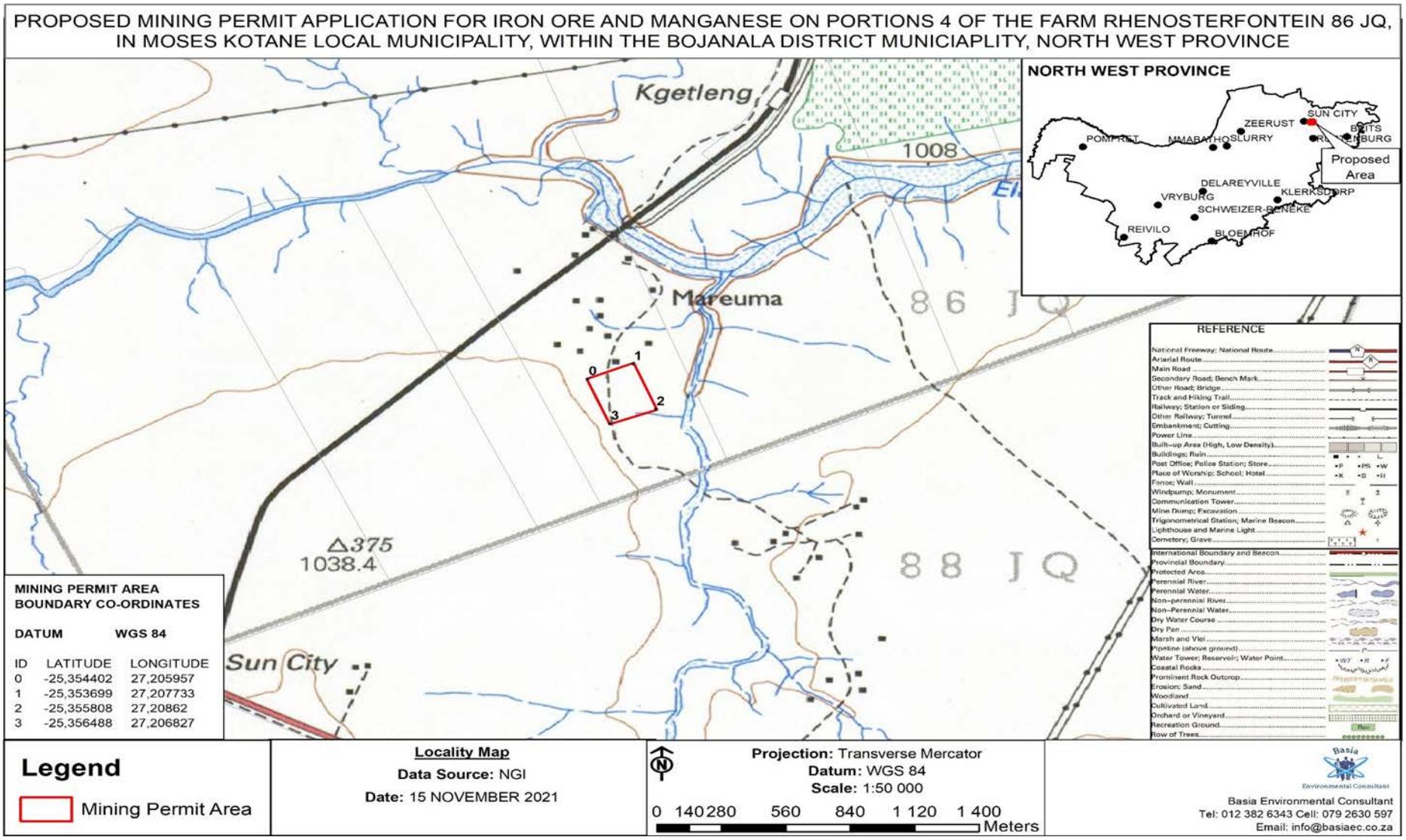

Figure 1: Locality map showing the proposed area.

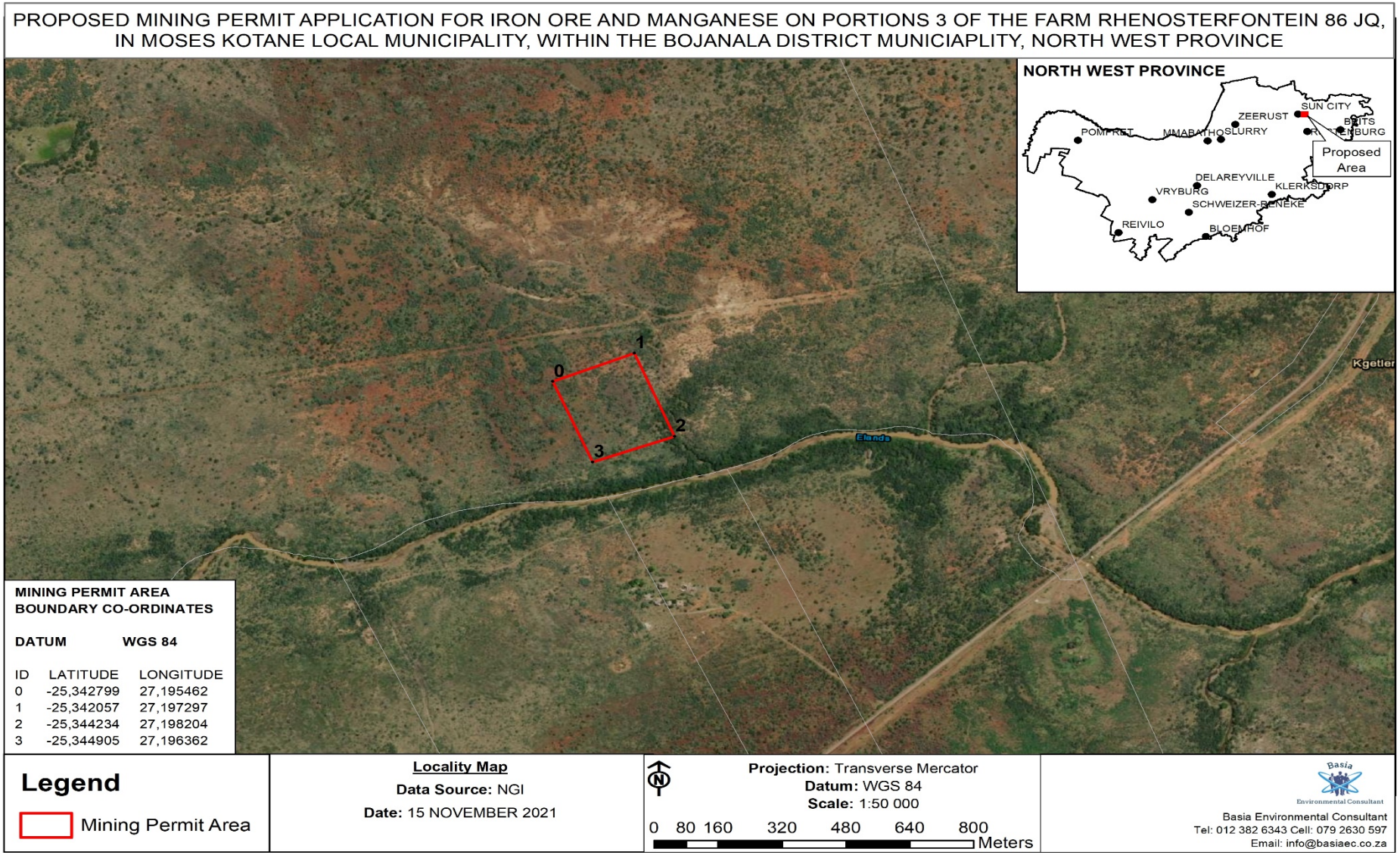

Figure 2: Google map showing the proposed area

Land Use on the proposed area and its surrounding

The proposed area is located on a scattered farmland, where the farmers mainly farm livestock and wildlife. Most of the land is covered low dense open woodland, shrubs and thorny trees. In particular, the North West of the land covers is dominated by woodland and low shrubland.

Small portions of barren land are scattered all over the area, including those found within the proposed prospecting right area. The surrounding areas are rural farm lands with scattered and clustered settlements in different areas.

The South African Landcover (SANLC) shows that the proposed area falls within an open woodland wing natural grass land. The proposed area is located on a farmland. Most of the land is covered by natural grassland and open woodland (trees that are not very close together), and some parts of the open woodlands are characterized by dense forests and woodlands. The southern part is characterised by natural grassland while the far end of south west is covered with a small portion of fallow land and old fields and there is a small scale of annul crops. There are small portions of barren land which is unproductive land characterized by infertile soils.

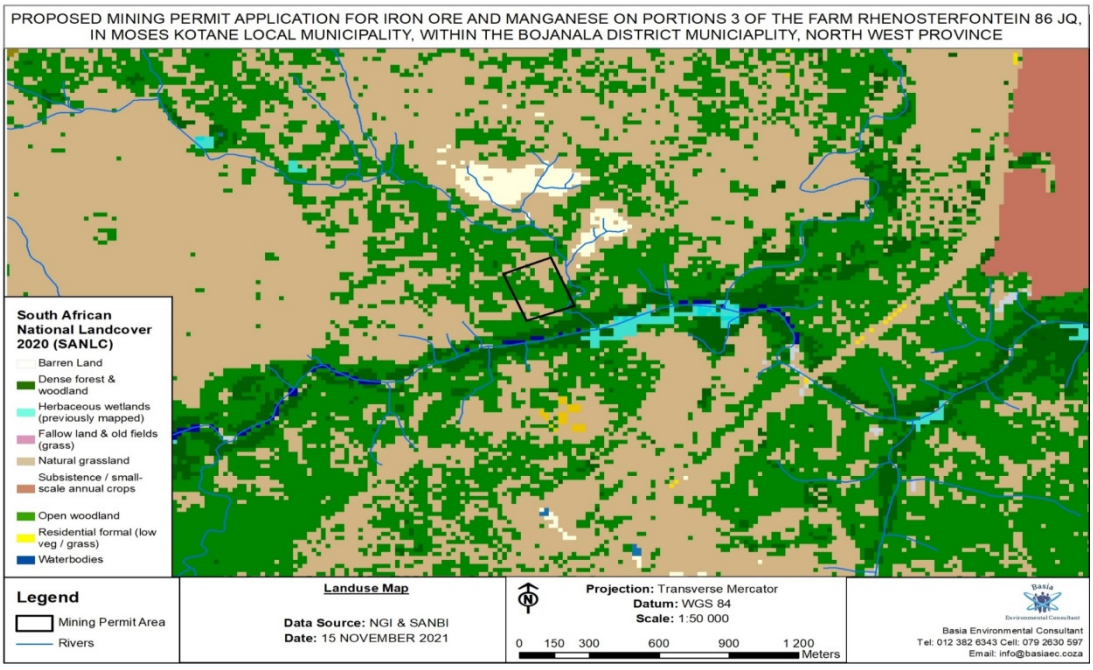

Figure 3: Land use map.

Climate and weather in the region

Rhenosterfontein has the semi-arid climate prevailing. It hardly rains here. The average annual temperature for Rhenosterfontein is 25° degrees and there is about 353 mm of rain in a year. It is dry for 215 days a year with an average humidity of 52% and an UV-index of 5. (Besttimetovisit.co.in, n.d.)

Table 1: Bojanala annual climate

Climate table of Rhenosterfontein

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Day temp. (°C)	29	28	27	24	22	19	19	22	27	28	28	29
Night temp. (°C)	18	17	16	12	10	7	6	9	13	16	16	17

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Precipitation (mm)	79	46	41	18	5	3	0	2	8	40	45	65
Days with rain	21	17	16	9	3	1	1	1	4	10	15	20
Dry days	10	11	15	21	28	29	30	30	26	21	15	11

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sun hours per day	12	12	10	8	7	7	7	7	10	12	12	12
Wind force (Bft)	2	2	2	2	2	2	2	2	2	2	2	2
UV-index	6	6	6	5	4	4	4	5	5	6	6	6

(Besttimetovisit.co.in, n.d.)

Surface water on the proposed area

The Elands River originates west of Koster, North West Province, flowing northwards across Swartruggens into the Lindleyspoort Dam. A few kilometres downstream from the dam wall it bends eastwards east of Silwerkrans and goes meandering in an ENE (east north east) direction across the veld for many miles. Further east it flows right south of the Pilanesberg, barely 1.5 km from the outer perimeter of the ancient crater formation. The Elands continues flowing eastward to the Vaal Kop Dam. Finally, 5,5 km downstream, it joins the Crocodile River's left bank. Its main tributaries are the Koster

River, Selons River and Hex River, the latter joining its right bank at the Vaal Kop Reservoir (Wikipedia, n.d.).

There are about 11 wetlands surrounding the mining permit area which are over 2 km away from the proposed site.

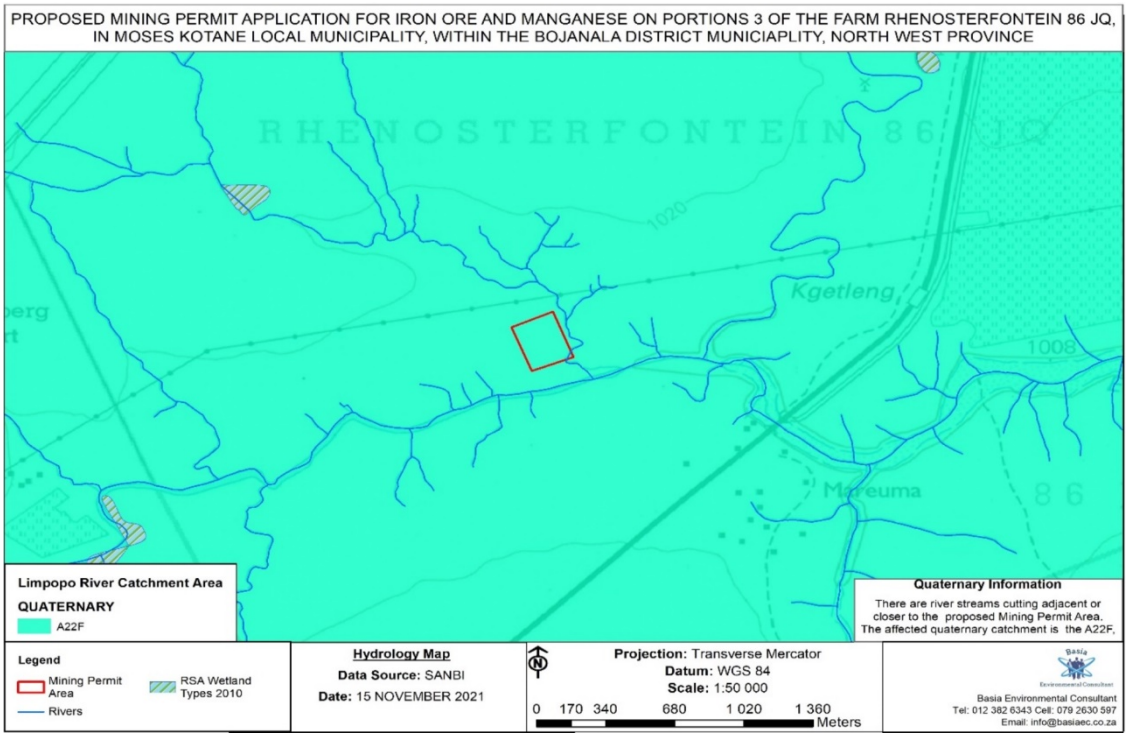

Figure 4: Hydrology map of the proposed area

Mining and Biodiversity

The Mining and Biodiversity Guideline, 2013 was developed by the Department of Mineral Resources, Department of Mineral Resources, Chamber of Mines, South African National Biodiversity Institute and the South African Mining and Biodiversity Forum, with the intention to find a balance between economic growth and environmental sustainability. the Guideline categorises biodiversity priority areas into 4 classes with the following levels of risk for mining attached to them:

A. Legally protected areas, where mining is prohibited

B. Ares of highest biodiversity importance, which are at the highest risk for mining

C. Areas of high biodiversity importance, which are at a high risk for mining

D. Areas of moderate biodiversity importance, which are at a moderate risk for mining

(Rights, n.d.)

The figure below indicates that the proposed site has the highest biodiversity importance meaning there's high risk of mining in the proposed site. This falls within the category B which has the highest biodiversity importance hence it is high risk to mine there.

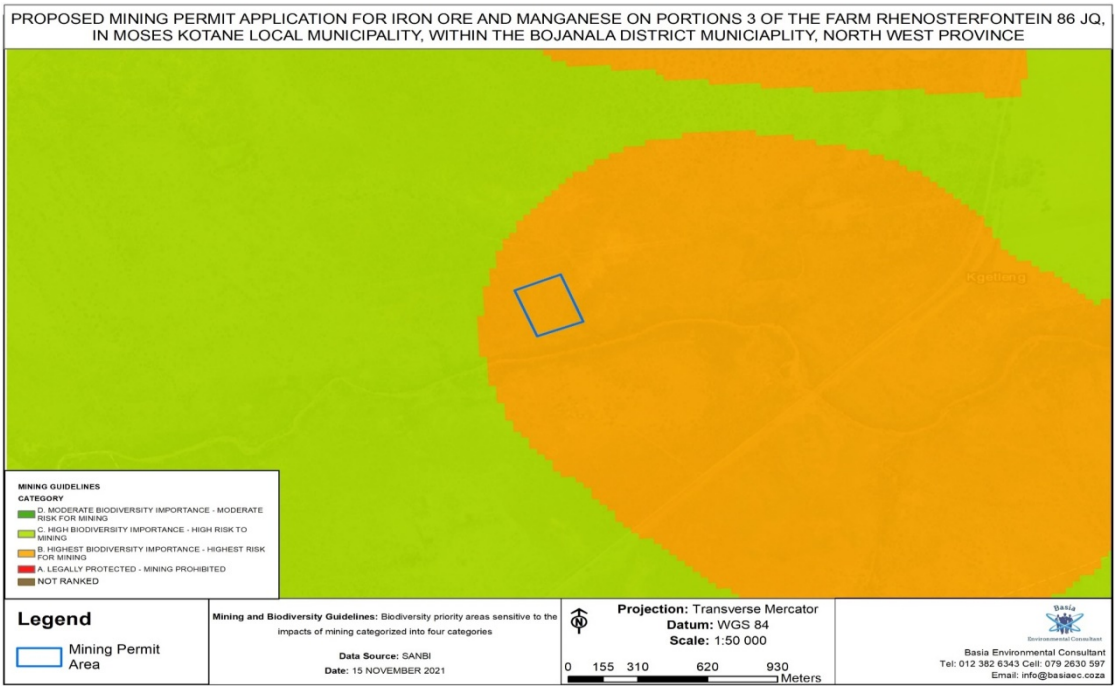

Figure 4: Mining and biodiversity guideline map

Vegetation on the proposed area

The proposed area is located within the Zeerust Thornveld of the Central Bushveld Bioregion of the Savanna Biome.

The Savanna Biome is the largest Biome in southern Africa, occupying 46% of its area, and over one-third the area of South Africa.The plants of the savannahs are mainly xeromorphic, i.e. adapted to the lack of water, including graminaceous plants, bushes and different species of trees. These adaptations are generally aimed at preventing water evaporating: falling of leaves during the dry season (such as the acacia) or reduction of foliar surface or development of leathery shells to protect leaves (sclerophyillia), such as the euphorbia. Another form of adaptation to the lack of water is the development of very deep roots to go searching for moisture (such as the Cactaceae) or fleshy stalks or roots to trap water inside (such as the Cactaceae,

Euphorbiaceae, Liliaceae or Leguminosae). The typical trees of this biome are acacias with their typical umbrella-shaped foliage, but there are also plenty of other leguminous plants bristling with thorns whose purpose is to defend them from herbivores and prevent water fromvaporating (SANBI, 2013).

Important Taxa Tall Trees: *Acacia burkei* (d), *A. erioloba* (d). Small Trees: *Acacia mellifera* subsp. *detinens* (d), *A. nilotica* (d), *A. tortilis* subsp. *heteracantha* (d), *Rhus lancea* (d), *Acacia fleckii*, *Peltophorum africanum*, *Terminalia sericea*. Tall Shrubs: *Diospyros lycioides* subsp. *lycioides*, *Grewia flava*, *Mystroxylon aethiopicum* subsp. *burkeanum*. Low Shrubs: *Agathisanthemum bojeri*, *Chaetacanthus costatus*, *Clerodendrum ternatum*, *Indigofera filipes*, *Rhus grandidens*, *Sida chrysantha*, *Stylosanthes fruticosa*. Graminoids: *Eragrostis lehmanniana* (d), *Panicum maximum* (d), *Aristida congesta*, *Cymbopogon pospischilii*. Herbs: *Blepharis integrifolia*, *Chamaecrista absus*,*tenuissimus* (Van der meulen & Waterfall, 1980)

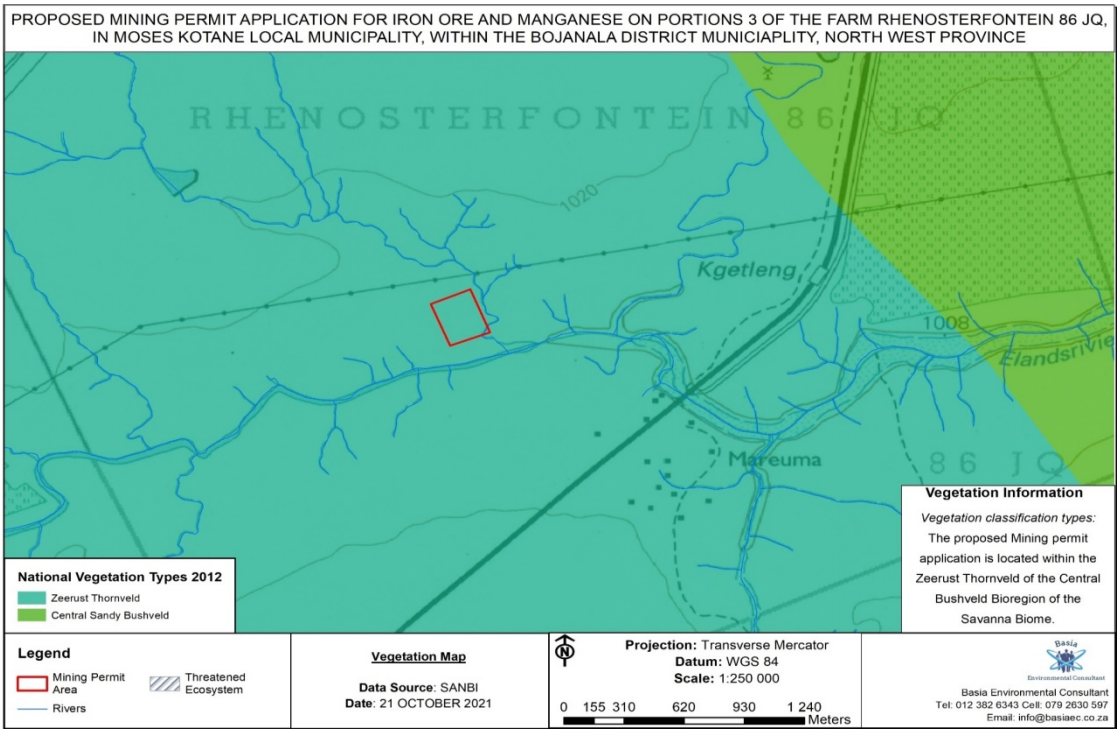

Figure 5: Vegetation map of the proposed area

Geology

The study area is underlain by the Bierkraal Magnetite Gabbro (BMG) from the Rustenburg Layered Suite of the Bushveld Complex.

The Bierkraal Magnetite Gabbro (BMG) is classified as a ferrogabbroic Upper Zone according to the Standard zonal subdivision. The BMG of the Rustenburg Layered Suite consists of magnetite gabbro, diorite and a magnetite layer (Kimopax, 2018).

Bierkraal Magnetite Gabbrro is charaterised by Magnetite gabbro with layers of magnetite and anorthosites. The ore-hosting magnetite gabbro is located in the upper portions of the intrusion's stratigraphical column, reaching 100-200 m in thickness and 19 km in lateral extent in the Porttivaara block of the intrusion (Taipale, 2013). Magnetite Gabbro Exhibits pigeonite inverted to orthopyroxene with two generations of exsolved augite lamellae. Also, augite with very fine lamellae of exsolved orthopyroxene. Preferred orientation of pyroxenes and plagioclase is parallel to larger scale layering (Taipale, 2013).

The Bushveld Complex consists of four distinct igneous suites, namely, in age order, early mafic sills, the Rooiberg Group felsites, multiple mafic and ultramafic layers of the Rustenburg Layered Series which host platinum group element mineralisation and the latest Lebowa Granite Suite which cross-cuts the 110 km thick Rustenburg Series. Covering of the Bushveld by younger sediments and intrusion of later magmas means that the outcrop of the Rustenburg? Layered Series is limited to two basin-like lobes to the west and east and a linear lobe to the north (Magagula, 2018).

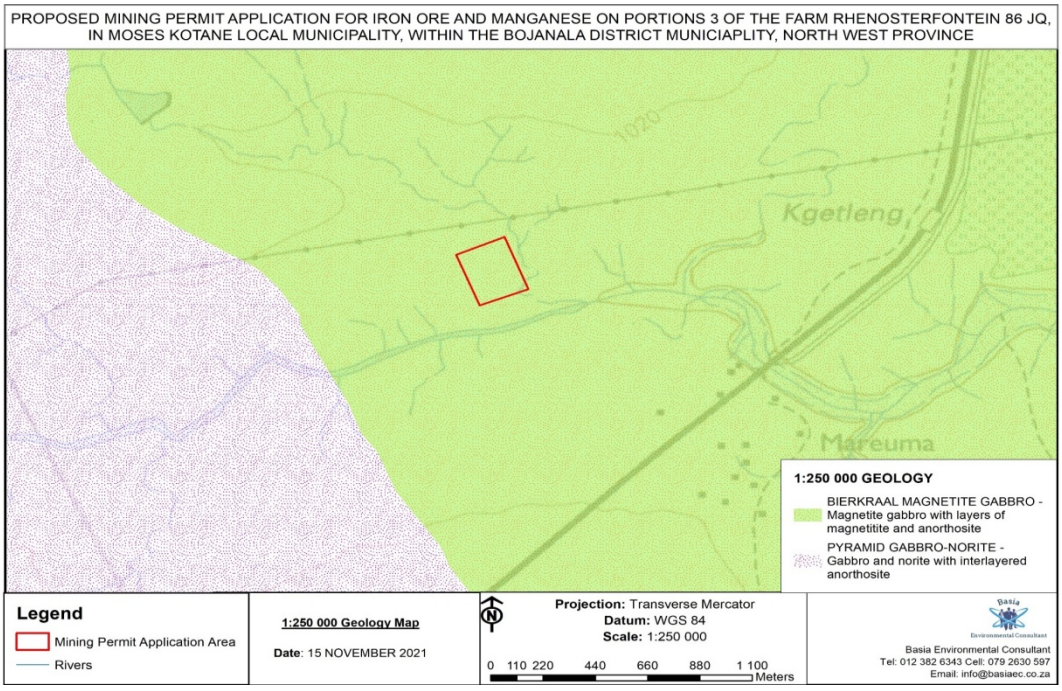

Figure 6: Geology map of the area

Sensitivity

There are Elands River streams that are adjacent to the proposed area and there are water heads closer to the proposed area, whereby the buffer zone falls within the proposed site. The acceptable buffer zone is 50m, for the protection of the water courses. There is a critical biodiversity area 2 (CBA2) within the proposed area, this

implies that this area is required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan. (SANBI, 2021). Most of the vegetation found on site is Zeerusut Thornveld of the Central Bushveld Bioregion and Pilanesberg Mountain Thornveld of Savanna Biome. No protected areas are located or found within the proposed mining permit application area.

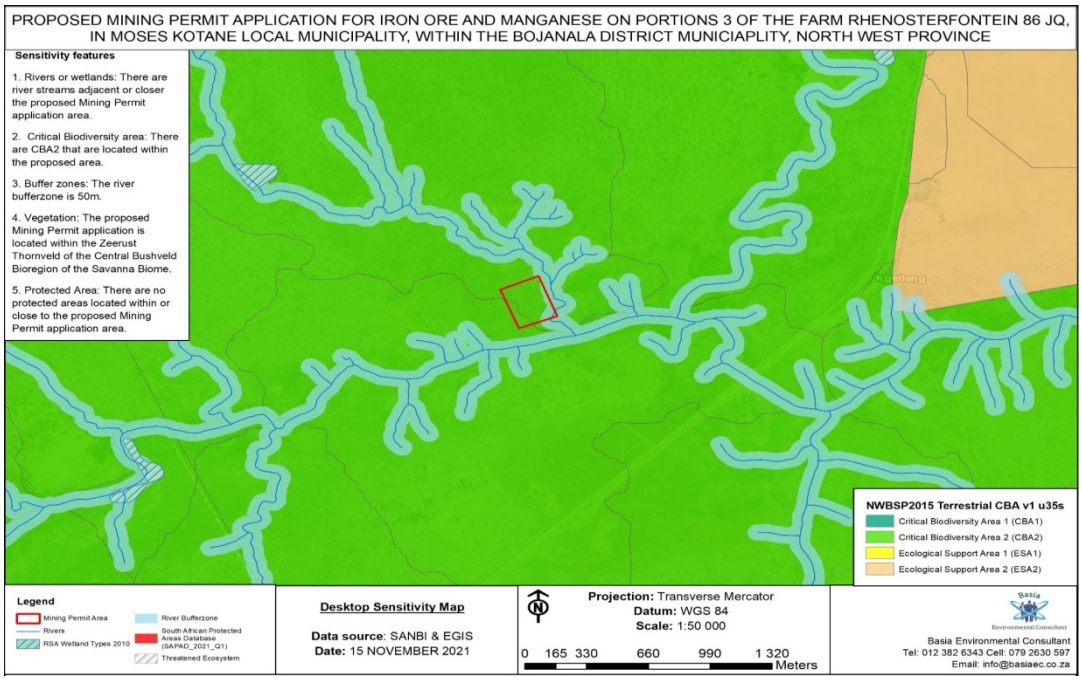

Figure 7: Sensitivity map of the area

4. DESCRIPTION OF THE RECEIVING ENVIRONMENT AND REGIONAL SETTING

Baseline Environment

Locality of the proposed site

The proposed mining permit application study area is located on portions 3 and 4 of Farm Rhenosterfontein 86 JQ. In Moses Kotane Local Municipality, North West, Province.

Photo 1

The Proposed site is located 4.35 KM South West with respect to Mogwase, 3.07 KM South with respect to Mabele-a-Podi and 7.15 KM North East of Sun City in Moses Kotane Local Municipality. The Site is accessed through R556 National Road

Access Road

Photo 2

Photo 3

There are few tracks roads within these farm portions. The pictures depict the entrances to the farm portions and track access roads inside the farm portions

Photo 4

Photo 5

The farm portions are all gated and locked. Anuthorised entry to the farms is prohibited. During Site Assesments the gates were all locked however there are other pathways of getting to the site.

Photo 6

Photo 7

Geology and Soils

The Soil Surface is composed Rocky Soil with small to medium rock particles that are underlying, precaution must be taken when walking in the area.

Photo 8

Photo 9

There are lots of rock particles that were found in the area, some of the rocks found there are Glacial landforms, Landscape rocks and red chippings (Inspected by eye)

Photo 10

Photo 11

Iron ore rocks particles were also spotted near the proposed mining right area.

Photo 12

Photo 13

Biodiversity

The proposed Mining Right application is located within the Zeerust Thornveld of the Central Bushveld Bioregion of the Savanna Biome.

Photo 14

Photo 15

The vegetation found there is open to dense short thorny woodland, dominated by *Acacia* species with herbaceous layer of mainly grasses on deep, high base-status, Tall Trees: *Acacia burkei* (d), *A. erioloba* (d). Small Trees: *Acacia mellifera.*

Photo 16

Photo 17

Photo 18

Photo 19

Some of the grazing cattlestock animals were also spotted during the site assessment within the proposed farm portions

Hydrology

Elandsrivier cuts through the proposed Mining Right application area. There are also about 2 Wetlands located within the study the area.

Photo 20

Photo 21

There is also another water course that is seasonal that is located in the proposed Mining Right area. When it rains it gets flooded and access is prohibited when flooded.

Photo 22

Photo 23

There are water pipelines that are located within the mining right area

Photo 24

Photo 25

There are Dry Water Courses that are located near the proposed Mining Right area.

Photo 26

Photo 27

Land Use

There is Mogwase Correctional Service, Prison located 1.68Km North East of the Proposed Mining Site.

Photo 28

Photo 29

International Airport is located on the Northern part of the proposed Mining area. There is also a Sky Dive Pilanesburg. There is a School, Holy Family Secondary School that is located 4.31Km North East from the proposed site.

Photo 30

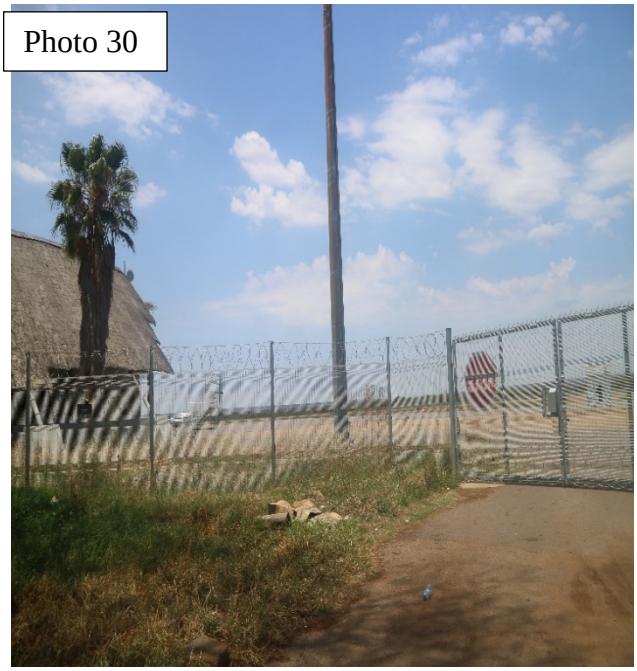

Photo 31

There is an unathorised illegal waste dumping near the proposed Mining Right area.

Photo 32

Photo 33

There are several Lodges around/near the proposed Mining Right area. There is Pilansburg National Park ,0.22Km North of the proposed site, Sun Vacation Club is 0.55Km East, The Kingdom Resort 3.03Km West,6.95Km Suncity Resort.

Photo 34

Photo 35

Settlement

The nearest community is Mabele-a- Podi located 3.26Km away from the Proposed Mining area, North East. The Township is composed of clustered residential houses.

Heritage and Culture

No graves or burial grounds were observed on site. No mining activities shall be undertaken on those areas and a 50 m buffer zone distance from those areas will be maintained.

Servitudes

There are several Eskom power lines providing electrical energy.

Photo 36

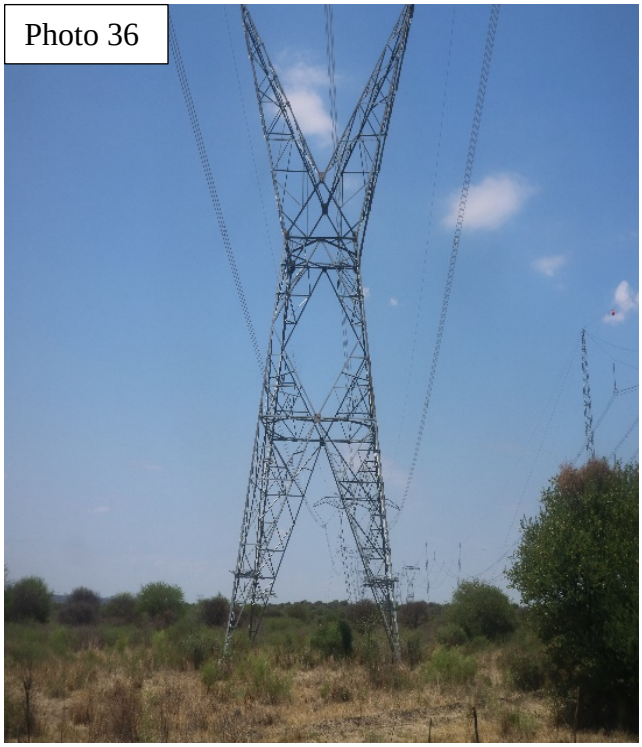

Photo 37

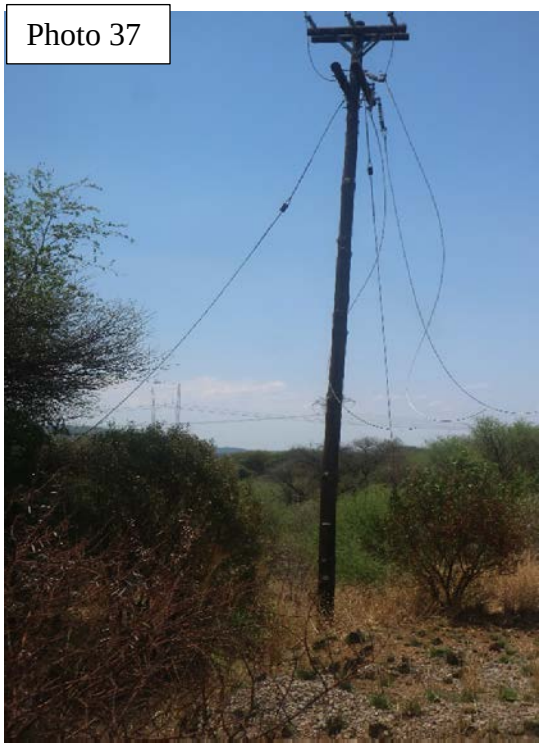

Photo 38

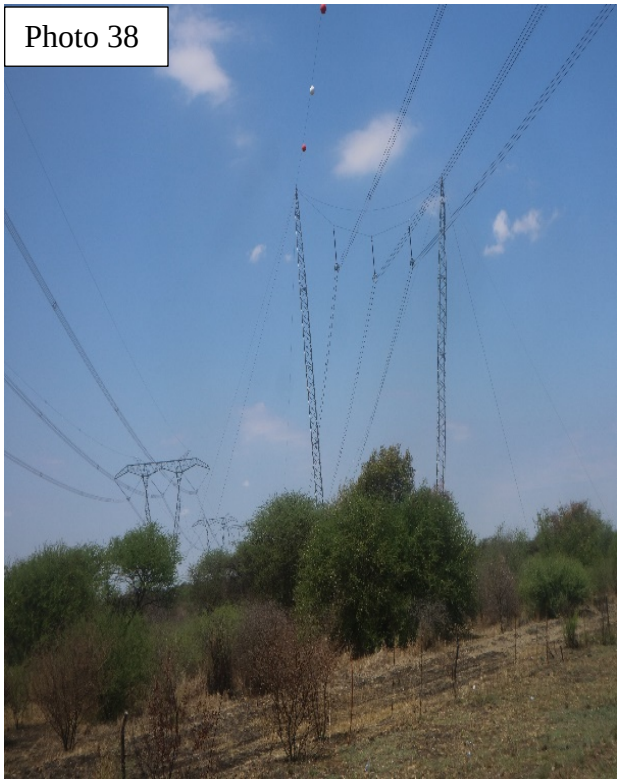

Photo 39

The farm portions are all fenced and gated.

Photo 40

Photo 41

There is a railway crossing through the proposed site boundaries. The railway is still in operation.

Photo 42

Photo 43

6.DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY

6.1. Mining Activity to be performed (Invasive)

6.1.1. Diamond/core drilling

Diamond/core drilling operations will be carried out for the purpose of retrieving core samples and laboratory analyses will be performed on the core samples to establish the quality of tin ore, rare earths, niobium ore (columbium), phosphate, gold ore, fluorspar, Chrysoberly (Gemstone) and Beryl (Gemstone) and rock properties. No pits or trenches will be created during this activity. **Ten (10)** exploration boreholes will be executed over the period of 3 years, however drilling will be done as quick as possible to avoid prolonged stay on the farms. Each borehole will be drilled up to a depth of approximately 200m for the current application. The rate per meter is R300 on average a borehole takes approximately one (1) to five (5) days to complete. There will be no additional drilling, exceeding the number stipulated above.

The map below show the proposed positions of the boreholes, although the locations might slightly change due to new finding on the ground. The positions of the borehole have considered the 100m bufferzone of the proposed. However the buffer zone stipulated will be maintained.

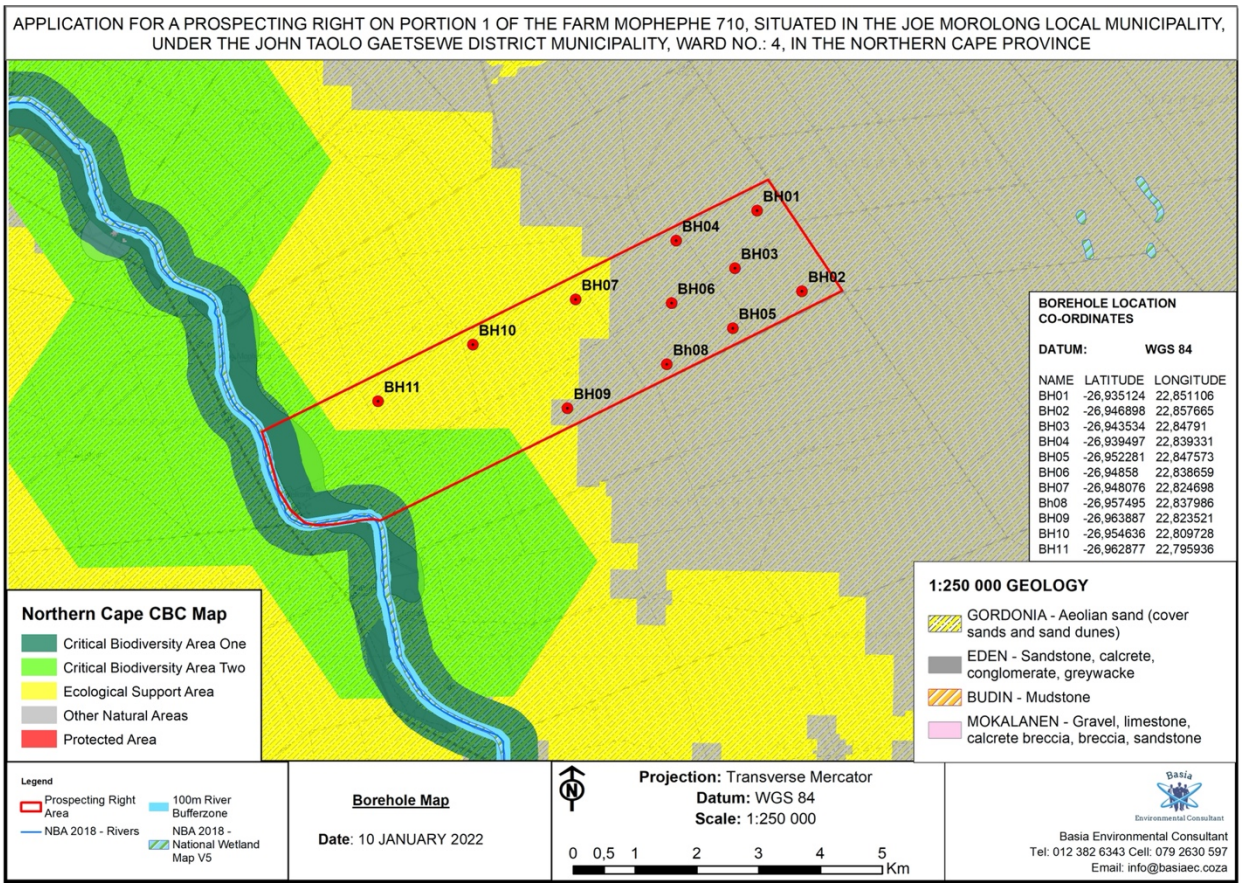

Figure 8: Proposed positions on the site

6.1.2. Required Equipment

A truck mounted with a drill rig of about 4 tons will access the site and drive to the pre-determined position where drilling will be undertaken (see figure 10 for the positions of the boreholes). A bakkie will be used to collect and transport the samples to the laboratory. All equipment that are required for prospecting will cover only 0.06 ha. Drill rig of about 4 tons, water storage tank of about 160 litters, Equipment storage 50 m^2, Security offices 40 m^2, Ablution facilities 10 m^2 and Sample storage 40 m^2.

Table 4: Equipment's to be used or needed

Equipment and/or Technology to be	1 drill rig mounted on a 10-tonne truck or trailer
	2X (4X4) Bakkies
Materials required	Diesel
	Grease
	Hydraulic Oil
	One 50 kg Bag of cement/ Expansion foam per borehole, 50m PVC pipes
	Picks, shovels,
Spillage control	Dip trays
Sanitation Facility	Chemical toilets
Waste Management	Waste skip and Bins
Safety	Safety Boards

Images showing typical activities during prospecting works, before rehabilitation.

6.1.3. Summary of precautions and measures taken;

The proposed position of the boreholes have taken into account the following aspects:

- Geology of the area is preferred
- Sensitive area biophysical (such as watercourses and critical biodiversity)
- No borehole is positioned within 100m from the above sensitive areas. Where it cannot be avoided mitigation measures outlined in the EMP will be strictly adhered to.

Table 5: Estimated cost for prospecting 10 boreholes

Activity	Year 1 Expenditure	Year 2 Expenditure
Phase 1 (6 boreholes with the depth of 50m within 12 months)		
Drilling (diamond/core)	R 125 000	
Rehabilitation costs	R 25 000	
Analytical cost	R 10 000	
Site establishment-accessibility, landowner consultation, water-supply, setup of field camp and	R 20 000	
Owner compensation	R 30 000	
Environmental Control Officer	R 50 000	
Ecologist	R 50 000	
Phase 2 (4boreholes with the depth of 50m from 12-24 months)		
Drilling (diamond/core)		R 75 000
Rehabilitation costs		R 15 000
Analytical cost		R 6 000
Site establishment-accessibility, landowner consultation, water-supply, setup of field camp and		R 20 000
Owner compensation		R 30 000
Environmental Control Officer		R 50 000
Ecologist		R 30 000
Annual total	**R 310 000**	**R 246 000**
Grand total		**R 556 000**

7. DESCRIPTION OF PLANNED NON-INVASIVE ACTIVITIES

7.1. Data collection methods

Several studies outlined below will be conducted to supported and inform the economic and environmental and economic feasibility of the proposed projects.

7.1.1. Laboratory analysis

Material obtained from drilling will be surveyed and sampled. Samples will be transported to an accredited laboratory for analysis of the mineral content and quality.

7.1.2. Geophysical survey work to be undertaken

Down-hole geophysical methods using wire-line geophysical instruments will be used to gather geological and rock quality information of boreholes. Ad hoc down-hole

geophysical investigation will be timeously conducted to verify lithological and structural properties of the subsurface in relation to the minerals proposed area.

7.1.3. Geohydrological survey

The boreholes will also be used to gather geohydrological information with specific reference to aquifer yield testing and gathering of water samples for analytical purposes. Baseline preliminary conceptual groundwater flow models to estimate inflow rates into a probable underground mining operation using hydraulic aquifer parameters obtained during aquifer yield-testing will also be conducted in order to inform the type of mining to be applied for.

7.1.4. Rock distribution and reserve estimation

Rock distribution and reserve estimation relate to computerized desk studies which encompass the following main actions:

7.1.5. Data processing and validation

Data obtained during the drilling project needs to be processed and validated versus stratigraphic, structural and analytical data received and correlated with surrounding boreholes in the reserve area.

7.1.6. Lithofacies and rock quality modelling

Variations in a stratigraphic unit across the reserve area are illustrated by contoured maps showing lateral trends of most significant properties. This is done by the utilization of computerized geological software. Detailed in situ reserve and quality determinations will then be possible through computer based modelling, and qualitative and quantitative calculations.

7.1.7. Consultation with landowners

The database of I&AP's collected during the consultation process will be used to inform parties about the activities that will be conducted prior to execution and the timeframes. This will be a responsibility of the Prospecting Rights Officer. All issues relating

to the prospecting programme such as dates, access routes, availability of water, and rehabilitation of the drill sites and any other items of mutual concern. The discussion and agreement between the parties will be captured in writing.

Table 6: Proposed expertise, prospecting phases and time frames

Activity	Skill(s) required	Timeframe	Outcome	Timeframe for outcome	Technical expert to sign off on the
Invasive Prospecting works					
Diamond/core drilling (10 boreholes)	Geologist	1 Week to 1-36 months	Positions, depth and quality of the minerals prospected.	Month 1-36	Geologist Engineering Laboratory analyst
Non-invasive Prospecting works					
Ecologist assessment	Ecologist	1 Week to 1-36 months	Assess, prevent, and mitigate ecological risks	Month 1-36	Ecologist Environmentalist
Laboratory analysis	Analytical chemistry	1 Week to 1-36 months	Quality and concentration of minerals	Month 1-36	Geologist
Geophysical survey Rock distribution and reserve estimation Lithofacies and rock quality modelling	Geophysicist Geologist	1 Week to 1-36 months	Geological and structural formation of the proposed area	Month 1-2	Geophysicist
Geohydrological survey	Geohydrologist	1 Week to 1-36 months	Geohydrological data of the proposed area.	Month 1-12	Geohydrologist
Consultation with I&AP's and landowners	Environmentalist	1 Week to 1-36 months	Understanding and consensus between prospecting activities and affected parties	1 Week to 1-36 months	

8. Site layout

The main operational site layout will be established depending on the location of the boreholes and have to taken into account the sensitivity of the environment in the area and have to avoided impeding critical biodiversity and water resources in the area. This is where equipment’s will and samples will be stored before transportation.

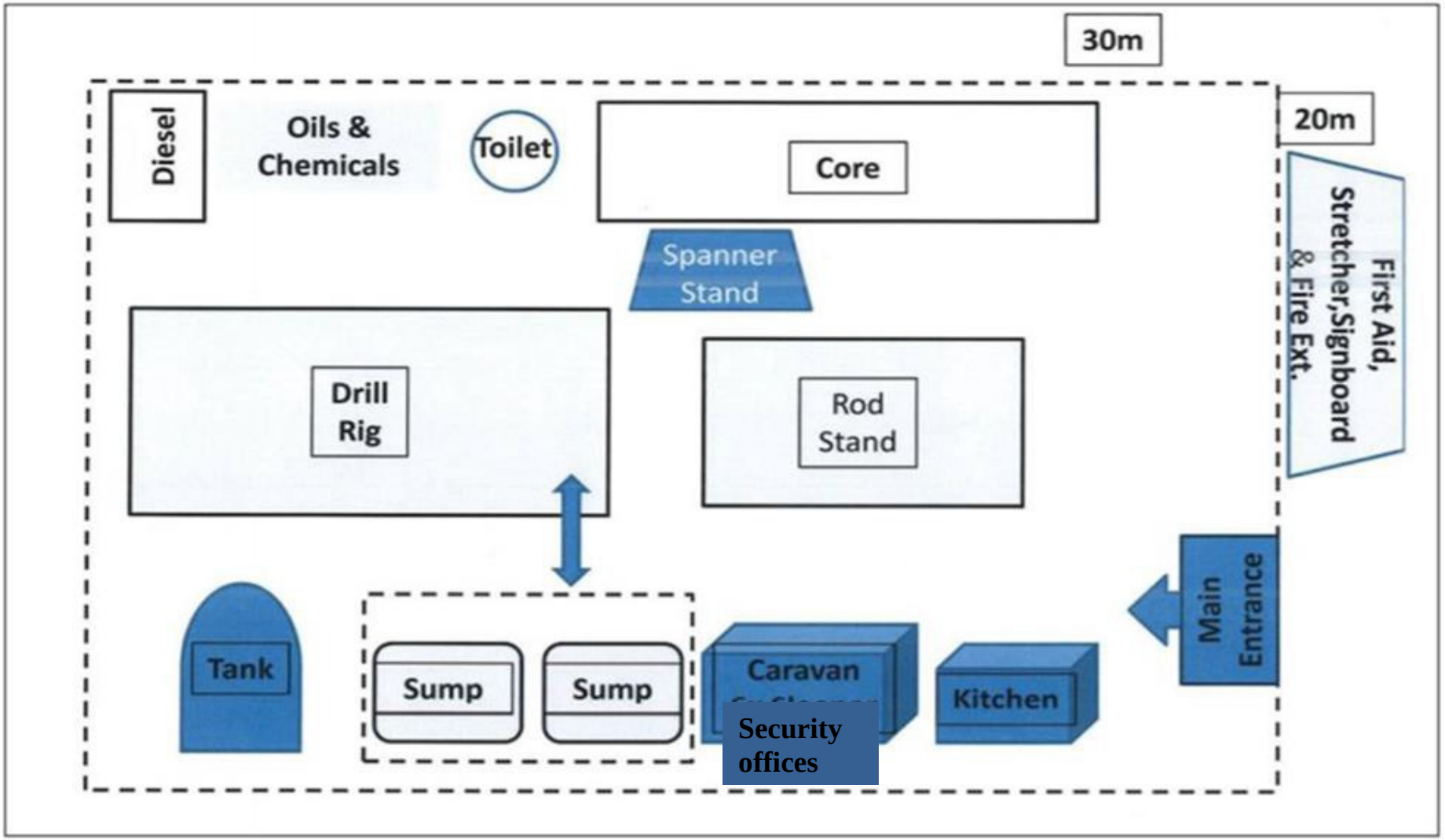

Figure 11.1: Layout plan showing the facilities to be placed on the proposed site

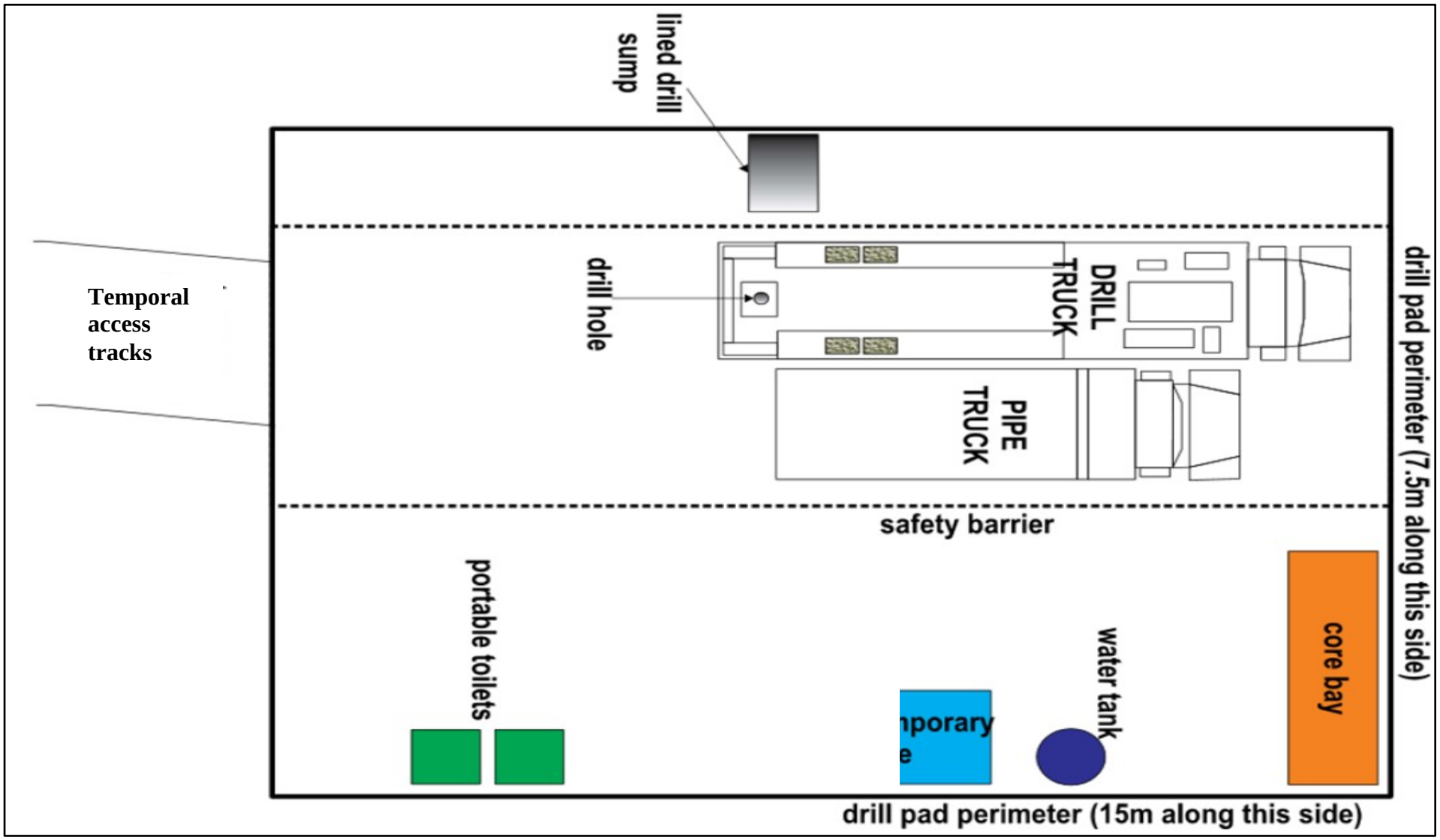

Figure 9. Showing equipment's and space that will be utilized on the drilling site

Figure 10: Shows a typical drilling site, drilling equipment's and personnel

9. LISTED AND SPECIFIED ACTIVITIES

The proposed prospecting activity triggers activities listed in NEMA:EIA Regulations 327 as amended in 2017 & 2020 (Listing Notice 1) which read as follows:

Activity 20: "*Any activity including the operation of that activity which requires a prospecting right in terms of Section 16 of the Minerals and Petroleum Resources Development Act, 2002 (Act 28 of 2002), including associate infrastructure, structures and earthworks, directly related to prospecting of a mineral resource*".

Table 7: Summary of NEMA listed activities being applied for

NAME OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY	LISTED ACTIVITY	APPLICABLE LISTING NOTICE
Area applied for	9738.994089	Activity 20	GNR 327 Listing Notice 1
Drilling area (boreholes)	0.002 Ha	Activity 20	GNR 327 Listing Notice 1
Security offices	$40m^2$	Activity 20	GNR 327 Listing Notice 1
Ablution facilities	$10m^2$	Activity 20	GNR 327 Listing Notice 1
Equipment storage	$50m^2$	Activity 20	GNR 327 Listing Notice 1
Sample storage	$40m^2$	Activity 20	GNR 327 Listing Notice 1
Access roads (tracks)	$40m^2$	Activity 20	GNR 327 Listing Notice 1

9.1. Required expertise

Engineering personnel*:* An engineer with at least 5 years of experience must be responsible to ensure that drilling and rehabilitation program is implemented as outlined. The engineer must also enforce the following;

- confirming that workers are trained and competent for the task undertaken
- providing clear work instructions
- inspecting and monitoring workplace conditions
- continuously evaluating worker performance and correcting unsafe acts
- reporting and rectifying hazards
- assuring implementation of the company's safety systems
- demanding compliance with safety rules and procedures
- conducting meaningful observations, consultation and interventions

Environmental, Health and safety personnel: with at least 5 years' experience in relevant fields of environmental assessment, monitoring and rehabilitation.

- Monitor and report the potential environmental, health and safety risk

- Identify priorities for replacing or modifying the rehabilitation plan.
- Develop an action plan with due dates and responsibilities for the rehabilitation process
- Conduct an audit of rehabilitation to ensure that all practical measures have been taken to control risk associated
- Produce and environmental, health and safety report monthly and quarterly

Geologist: with at least 5 years' experience on exploration of tin ore, rare earths, niobium ore (columbium), phosphate, gold ore, fluorspar, Chrysoberly (Gemstone) and Beryl (Gemstone) or relevant work.

- Will be responsible for identifying and assessing the location, quantity and quality of mineral deposits.
- Planning programmes for drilling and taking samples
- Collecting and recording samples and data from test sites
- Analysing geological data using specialist computer applications
- Produce a report on quantity, quality and depth of tin ore, rare earths, niobium ore (columbium), phosphate, gold ore, fluorspar, Chrysoberly (Gemstone) and Beryl (Gemstone) reserves

Ecologist: with at least 5 years minimum experience

- Responsible for assessing the site specific ecological risk by walking around the area to be prospected and ensure that plants and animals are not harmed or affected by the activities.
- Keep a register of identified species.
- Recommend alternatives and mitigation measures.

10. DESCRIPTION OF ASSOCIATED ACTIVITIES TO BE UNDERTAKEN

The following section presents detailed description of all the activities associated with the proposed prospecting application.

10.1. Fencing the office and storage site

Fencing of the site for temporal offices and storage site will be required as a means of ensuring safety and restricting trespassers. The fencing however will be ecologically sensitive to ensure that species habitat is not divided. Fences will be clearly demarcated and appropriate signage will be displayed, similar to the signs in the images below. The necessary signage will also be erected in the vicinity of the sites to ensure visitors can easily and safely access the premises.

10.2. Temporary site and security offices

The site offices for the project, including a small security hut at the entrance of the office and storage site will consist of container-type offices that is commercially available as off the shelve products, as illustrated in the image below. This ensures minimal construction requirements on site and also minimal degradation footprint. Keeping the disturbance area minimal and ensuring ease of closure and rehabilitation after life of prospecting make the temporary offices ideal, especially considering the short duration of the proposed activities and requirement of these offices. The visual impact associated with the structures will also be considered and natural colour paint will be applied to the structures to blend in with the background features.

Storm water management around the facilities must be considered. No housing facilities will be required as personnel will not be allowed to reside on site for the duration of the project but instead live off site from the area. The security will however be present 24 hours a day on the area for the duration of the project and even longer during the closure and rehabilitation period.

Image 1: A temporal security office

Image 2: A temporary site offices

10.3. Temporary sanitation (Ablution facilities) and change house

Similar to the structure indicated in the section above, the temporal sanitation and change house will be a container type facilities which can easily be brought to site and also removed after life of prospecting. A two change rooms must be provided, one for designated for male and the other for females. Four temporal toilets must be provided, two for females and two for males. The prospecting area will not constitute or host more than 15 people/personnel at the same time. Temporal toilets will be supplied and serviced by an independent contractor whom will be responsible for the management and disposal of waste.

This ensures no major construction and approval is required for a full scale sewage treatment facility. Water requirements relating to ablutions and drinking water are expected to be minimal and will be brought to the site by a tanker. The current expectation is that 15 employees will require 45 liter per person per day (liter pp/day) amounting to 1350 liters per day.

Image 3: A temporal toilet

10.4. Drilling (Prospecting):

Please refer above section for a detailed description of the prospecting activities to be undertaken.

10.5. Access Roads

The site can be accessed via Voortrekker Road (R31) and subsequent tracks, no new roads will be established, and no vegetation will be removed or uprooted for the purpose of accessing the area.

10.6. Power

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

10.7. Water Supply

RC drilling in general does not require water while a continuous water supply is needed during core drilling.

The water will be purchased from local contractors and brought onto site by water tank truck to the identified drill sites. Portable on-site storage tanks (water bowsers) will be installed for the water supply. Water bowsers with the capacity of 500 gallon will be deployed to the sites and filled with water that will be used during the operational phase such as for dust suppression or core drilling. Consumable waste for personnel will be purchased from local stores.

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

The rate of water use required for the operation is about 150 liters a day which is;

- 100 liters for drilling equipment's;
- 50 liters for drinking and sanitation.

Has a water use license has been applied for?

There will be no abstraction of water from the watercourses nor working on the river bed. No listed activity on Section 21 of the Water Act has been triggered.

10.9. Waste management

The necessary waste receptacles will be in place for general domestic waste separation and management. Two mobile Waste Skips (one for hazardous waste and one for non-hazardous waste) and four mobile waste bins (two for hazardous waste and two for non-hazardous waste) to be clearly labeled and place in strategic area on site to ensure easy access. These waste bins will be used for collection of different types of waste and will be removed from the site to a licensed waste facility by a registered and approved contractor. The diagram below show the mobile waste skips and waste bins. Mobile waste skips ensures minimal impact on the environment they are placed on.

Image 85: Mobile waste skips

Image 86: Mobile waste skips

Waste will be generated from the start to the decommissioning of the project. It is proposed that the waste that would be generated on site would be managed by reducing, reusing and recycling as far as possible. A certified and approved external contractor will be responsible for the removal and disposal of the waste at a registered landfill. The overall aim of the project is to keep the carbon footprint of the entire project as small as possible. This will include the use of “green” products as far as possible.

Several waste streams are likely to originate from the activities associated with day to day activities in the workplace. Some of these waste streams may not be hazardous, but the majority may contain a component(s) that may need special treatment. The nature of these waste streams may also vary due to composition and physical form. In order to make informed decisions on determining the appropriate waste management options to handle, treat and dispose of waste, the different waste streams must be identified in terms of hazardous and non-hazardous wastes.

Waste streams can be categorised into 6 (six) different streams, based on similar health and environmental concerns namely:

- ***Inorganic wastes*** – acids, alkalis and other solid residues.
- ***Oily wastes*** – primarily from the processing, storage and use of mineral oils.
- ***Organic wastes*** – halogenated solvents residues, non-halogenated solvent residues, polycarbon based (PCB) wastes from paint and resin wastes.
- ***Putrescible Organic Waste*** – wastes from production of edible oils, slaughter houses, tanneries and other *animal based products.*
- ***High Volume/Low Hazard Wastes*** – waste based on their intrinsic properties present relatively low hazards but may pose problems due to high volumes such as plastics
- ***Miscellaneous Wastes*** – infectious waste from diseased human/animal tissue, redundant chemicals, laboratory wastes and explosive wastes from manufacturing operations or redundant munitions.

General waste to be generated from the proposed project area will include domestic waste which includes old food, polystyrene, old stationary, discarded Personal Protective Equipment (PPE) and old clothing generated from the drilling and campsites. ***Hazadous waste*** hazardous waste to be generated includes mineral residue, hydrocarbon wastes (oil and liquid fuel wastes) and sewage waste. Mineral residue will include cores, 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.

The following shall apply to the temporary storage of waste at source:

- The employer shall provide adequate and appropriate containers/receptacles for the temporary storage of waste at source;
- Adequate containers must be available to store different types of waste separately to allow for recycling and disposal according to the integrated waste management plan;

- Dedicated storage areas for various types of waste must be allocated and clearly demarcated;
- Waste collected at source shall be collected on a daily basis;
- Waste must be stored in such a manner that it can be safely accessed and loaded;
- Should waste be stored in containers, drums or skips care must be taken that:
    - Waste types (special vs. controlled vs. general waste) are not mixed.
    - Waste is not kept in a corroded or worn container.
    - The container is secure so as to prevent accidental spillage or leakage.
    - All waste skips and containers are labelled with their contents.
    - Skips or containers do not overflow.
    - Skips for special waste is always covered.
    - Skips for controlled waste is covered skips wherever possible.
- Waste must be kept in such a way as to prevent it falling while in storage or while it is being transported;
- Waste must be protected from scavenging by people and animals;
- Do not dispose of (burn, bury or treat) waste on site;
- Collection of waste must be scheduled and the site/location manager must be notified beforehand of collection times and type of waste to be collected; and
- Implement dust suppression measures, such as wetting of access routes and accumulated controller waste.

Mineral residue will include cores, 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. During the drilling activities, limited quantities of diesel fuel, oil and lubricants will be stored on site. The only dangerous good that will be stored in any significant amount will be the diesel fuel. No more than 30 m^3 will be stored above ground in diesel storage tank.

11. POLICY AND LEGISLATIVE CONTEXT

Table 8: Policy and Legislative context

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT
Constitution of South Africa (Act 108 of 1996)	Everyone has the right to a safe environment	Social and environmental impact assessment were conducted, and potential measures are being outlined in the
Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA)	The department of Mineral Resources is a custodian of minerals in South Africa. An Application for Prospecting has been logged and accepted.	A prospecting right application was submitted to the DMR and due processes are followed.
National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA)	There are no aspects of heritage importance within the proposed area.	There are no aspects of heritage importance within the proposed area.

National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) Joe Morolong Local Municipality Solid Waste Management plan	EIA regulations and guidelines are being followed throughout the application process.	This BA is being undertaken in terms of NEMA in order to determine any possible impacts on the environment and to undertake mitigation measures that reduce any potential harm to the environment. An application for an Environmental Authorisation is submitted to the DMR with supporting documents. The (Economic Development, Tourism and Environmental Affairs EDTEA Northern Cape has been consulted for comments.
National Environmental Management: Waste Act (Act No. 59 of 2008) (NEM: WA) Joe Morolong l Municipality Solid Waste Management plan	Waste will be generated during prospecting activities	The EDTEA Northern Cape has been consulted for comments. Mitigation measure are put in place
Joe Morolong l Municipality Noise Control by-laws	Drilling equipment and vehicles may create noise	The EDTEA Northern Cape and local municipality has been consulted for comments. Mitigation measure are put in place.
Municipal Integrated Development Plans (IDPs) Joe Morolong Spatial development plan Joe Morolong Land use scheme	The proposed activity is within the Joe Morolong Local Municipality	One of the key issues identified by the IDPs is to facilitate the land claims. Municipal plans were used to identify relevant socio- economic information and spatial development information within which the area falls under.

Occupational Health and Safety Act: Act (No 85 of 1993)	The health of personnel and surrounding community have to be safeguarded	Health and Safety are key components of any mining activity. Health and Safe measured are provided in Part D of this document. Measures included are in accordance with this Act
Conservation of Agricultural Resources Act (No 43 of 1983)	Conservation of forests and critical biodiversity in the area is important.	It is located within the CBA and Agricultural area, measures has been put in place in accordance with the act not to affect the agricultural resources.
National Environmental Management: biodiversity Act (No 10 of 2004)	Conservation of critical biodiversity in the area is important.	It is located within the CBA and Agricultural area, measures has been put in place in accordance with the act not to affect the agricultural resources.
Environmental Conservation Act (No 73 of 1989)	Conservation of critical biodiversity in the area is important.	Elements of this Act were used as a guideline for best practice
National Environmental Management: Air quality Act 39 of 2004) Joe Morolong local municipality Air Qulality Management by-laws	Drilling equipment and vehicles may create dust and air pollution	The EDTEA Northern Cape and local municipality has been consulted for comments. Mitigation measure are put in place

12. NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES

12.1. Environmental desirability

The proposed prospecting site is a semi-arid, dry and hot climate, which are convenient to prospect throughout the year, hence even future mining will be favored. The proposed area is located within the Savanna Biome. Major climatic traits of the Savanna Biome include seasonality of precipitation; with wet summer and dry winter periods, as well as sub-tropical thermal regime with no frost.

12.2. Socio-economic desirability

Although prospecting activities are not labour intensive, few people will be hired to assist with general activities. The services required can also be sourced locally depending on their availability thus growing the economy of the area.

Additionally, the mineral prospecting activities will stimulate an income for the local minority that will be involved in the activity. The result will provide a gateway for the stimulation of sustainable income for local community at the operational stage of mining.

The mining industry is of great importance to the South African economy and it is currently ranked 5th internationally in terms of mining contribution to GDP.
Joe Morolong Municipal area's contribution of mining to GDP is significant at 73.3%. General government contributes 5.8% to the GDP and its contribution to the Wholesale and retail trade, catering and accommodation (4.7%) (Joe Morolong Municipality), 2018-19).

12.3. Overall desirability

Assessment of the geological data available has determined that the area in question may have the proposed minerals. In order to ascertain the above and determine the nature, location and extent of the subject minerals 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 subject minerals.

A prospecting right allows a company to survey or investigate the area of land for the purpose of identifying an actual or probable mineral deposit. The data that will be obtained from the prospecting of the minerals being applied for will be necessary to determine how and where the minerals will be extracted and how much economically viable mineral reserves are available within the proposed prospecting area.

12.4. Motivation for the overall preferred site, activities and technology alternatives

Mining is important for economic development, to construct durable, modern structures, employment creation and revenue collection. Pre-feasibility and desktop study was conducted before the application was lodged.

The preferred site was chosen, as it will result in minimal adverse socio-economic impacts and a level of environmental impacts that can be managed and rehabilitated through effective EMPr and rehabilitation plan implementation. The technology to be used, involve using a drill rig. Minimal infrastructure will result in cheaper and more effective rehabilitation.

The methods to be used have been determined in the design phase and have considered potential environmental impacts when identifying the preferred methods.

13. DESCRIPTION OF TECHNOLOGICAL ALTERNATIVES

13.1. Diamond drilling:

This is a drilling method whereby a solid core is extracted from depth, for examination on the surface. The key technology of the diamond drill is the actual diamond bit itself. It is composed of industrial diamonds set into a soft metallic matrix. As shown in the figure, the diamonds are scattered throughout the matrix, and the action relies on the matrix to slowly wear during the drilling, so as to expose more diamonds. The bit is mounted onto a drill stem, which is connected to a rotary drill. Water is injected into the drill pipe, so as to wash out the rock cuttings produced by the bit and also to reduce the heat produced due to friction which causes less wear and tear of the bits.

The drill rigs are truck-mounted and equipped with diesel driven engines to provide power to the drill. A truck fitted with a water tank is used to provide the water supply

for the drilling process. The drill site is not larger than 30 m x 30 m (900 m²) and consists of a drill rig, water pump, caravan and portable chemical toilet.

Except for the sump required by the drill rig, no excavations will be required. The dimension of the boreholes with be 20 cm and the average depth is estimated to be 50 m. On completion, a PVA pipe of the same size with the hole will be inserted up to the bottom, fill will concrete cement and capped.

13.2. Core drilling:

Merely advancing the drill by rotary action (and washing) causes a core to be extracted inside the barrel. The core is then retrieved and taken to the surface. Constantly withdrawing the entire heavy drill pipe is impractical, so methods were developed to pull up the core inside the barrel. If the rock would always be solid granite, and the core would always break at the drill bit, then it would be a simple matter to stop the drilling, and lower a simple grabbing device by a wire and pull up the core. Unfortunately, many applications require an undisturbed core in fractured rock, which calls for elaborate wire-line devices.

The drill rigs are truck-mounted and equipped with diesel driven engines to provide power to the drill. The drill site is not larger than 30 m x 30 m (900 m²) and consists of a drill rig, water pump, caravan and portable chemical toilet.

Except for the sump required by the drill rig, no excavations will be required. The dimension of the boreholes with be 30 cm and the average depth is to be 50 m. On completion, a PVA pipe of the same size with the hole will be inserted up to the bottom, fill will concrete cement and capped.

<u>Other options could might be employed</u>

13.3. Percussion drilling:

The drill site is not larger than 30 m x 30 m (900 m²) and consists of a diesel powered truck mounted drill rig, a truck transporting drill rods and other equipment, a compressor and portable chemical toilet. Rock fragments are blown out the top of the hole and are collected at 1m depth intervals and arranged on the ground to enable continuous detailed lithological descriptions of the stratigraphic horizons to

be made. Percussion holes will either be cemented if not further utilized, or will be fitted with a cap and be used for water levels and water quality monitoring.

13.4. Directional drilling:

The drill site is not larger than 150 m x 150 m (22 500 m²) and consists of a drilling water sumps, a diesel powered drill rig, a truck transporting drill rods and various other equipment, a generator, portable offices and chemical toilets. There are access control and a security fence around the site. On completion, the site will be rehabilitated to acceptable standards.

Rock fragments are washed out the top of the hole and are sampled at 10m depth intervals and collected on small bottles and sent to the laboratory for rock analysis. All percussion holes are sealed with cement up to the depth of start of rock. Full description of the process followed to reach the proposed preferred alternatives within the site

Pre-feasibility study were conducted before the application was lodged. The site have deemed desirable for prospecting due to its geological and logistical location. Hence, there is no alternatives.

13.5. The operational aspects of the activity

No permanent services in terms of water supply, electricity, and or sewage facilities will be required. Temporary access track will be used to access the site on areas where there are no existing access routes. The activities commenced on different phases which includes desktop studies, geological mapping and environmental assessment was undertaken. This phases forms an integral part of the intended prospecting work.

Phase 2 will entail the invasive prospecting drilling campaign where the extent of mineralisation will be defined and the geological continuity of the geological continuity of the mineralised zone will be determined. The drilling information will also be used to construct ore thickness, overburden thickness and basement elevation contour plans.

13.6. 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 (tin ore, rare earths, niobium ore (columbium), phosphate, gold ore, fluorspar, Chrysoberly (Gemstone) and Beryl (Gemstone)) 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 investigate and know the amount of tin ore, rare earths, niobium ore (columbium), phosphate, gold ore, fluorspar, Chrysoberly (Gemstone) and Beryl (Gemstone) reserves will be lost.

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

Pre-feasibility study were conducted before the application was lodged. The site have deemed desirable for prospecting and future mining. Hence, there is no alternatives.

14.1. The operational aspects of the activity

No permanent services in terms of water supply, electricity, and or sewage facilities will be required. The activities will commence with Phase 1, during which desktop studies will be conducted. After the desktop studies, geological mapping will be undertaken to ensure that all the targets with the minerals outcrop identified during the desktop study are not cultural features. 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. The drilling information will also be used to construct ore thickness, overburden thickness and basement elevation contour plans.

Phase 3 of the process will entail core sampling to establish the grade and viability of the minerals for mining.

14.2. The option of not implementing the activity

The option of not implementing the activity will result in a loss of valuable information regarding the minerals status 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 utilize the reserves will be lost and contribute to the growth of the country’s economy.

15. DETAILS OF THE PUBLIC PARTICIPATION PROCESS FOLLOWED

The Public Participation Process (PPP) has been structured to provide I&APs with an opportunity to gain more knowledge about the proposed project, to provide input through the review of documents/reports, and to voice any issues or concern at various stages throughout the EIA process. This process includes all I&AP's (e.g. directly affected landowners, national-, provincial- and local authorities, and local communities etc.). The Public Participation Process (PPP) was conducted in terms of Chapter 6 of the National Environmental Management Act, 1998 (Act 107 of 1998).

The Public Participation Process conducted to date is summarised below, please refer to Appendix for a detailed Stakeholder Engagement Report.

Table 9: Summary of the PPP undertaken

Task	Details	Date
I&AP notification		
I&AP identification	An I&AP database was developed for the project by establishing the jurisdiction of organisations, individuals and businesses in proximity to the project site or within an interest in the proposed development. The database of I&APs includes the landowner, the adjacent landowners, relevant district and local municipal officials, relevant national and provincial government officials, and organisations. This database is being augmented via chain referral during the BA process and will be continually updated as new I&AP's are identified throughout the project lifecycle.	Continuous process

Site notices	A2 Site notices were placed at strategic points to inform the general public of the proposed project and the PPP. Photos of the site notices have been included in Appendix B	18 January 2022
Comments received	No comments were received from the landowners and I&APs to date	Until 22 February 2022
Comment on DBAR	All the relevant stakeholders were notified of the availability of the DBAR to provide their comments.	10 February 2022 to 11 March 2022
Public participation meeting	The community meeting will announced to all registered I&AP's	22-28 February 2022

(i) Summary of issues raised by I&AP's

Please refer to Appendix (Public consultation report) for full details of the PPP processes.

16. METHODOLOGY USED IN DETERMINING AND RANKING THE NATURE, SIGNIFICANCE, CONSEQUENCES, EXTENT, DURATION AND PROBABILITY OF POTENTIAL ENVIRONMENTAL IMPACTS AND RISKS

All the identified potential impact 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 risk ratings and significance are indicated in the tables below.

TABLE 10: SEVERITY

How severe does the aspects impact on resource quality (flow regime, water quality, geomorphology, biota, habitat)?

Insignificant / non –harmful	1
Small / potentially harmful	2
Significant / slightly harmful	3
Great/ harmful	4
Disastrous / extremely harmful and /or wetland(s) involved	5
Where "or wetland(s) are involved" it means that the activity is located within the delineated boundary of any wetland. The score of 5 is only compulsory for the significance rating.	

TABLE 11: SPATIAL SCALE

How big is the area that the aspect is impacting on?

Area specific (at impact site)	1
Whole site (entire surface right)	2
Regional / neighbouring areas	3
National	4
Global (impacting beyond SA boundary)	5

TABLE 12: DURATION

How long does the aspect impact on the environment and resource quality?

One day to one month, PES, EIS and /or REC not impacted	1
One month to one year, PES, EIS and /or REC impacted but no change in status	2
One year to 10 years, PES, EIS and /or REC impacted to a lower status but can be improved over this period through mitigation	3
Life of the activity, PES, EIS and /or REC permanently lowered	4
More than life of the organisation /facility, PES and EIS scores, a E or F	5

PES and EIS (sensitivity) must be considered.	

TABLE 13: FREQUENCY OF THE ACTIVITY

How often do you do the specific activity?

Annually or less	1
6 monthly	2
Monthly	3
Weekly	4
Daily	5

TABLE 14: FREQUENCY OF THE INCIDENT/ IMPACT

How often does the activity impact on the environment?

Almost never / almost impossible / >20%	1
Very seldom / highly unlikely / >40%	2
Infrequent / unlikely / seldom / >60%	3
Often / regularly/ likely / possible / >80%	4
Daily / highly likely / definitely / >100%	5

TABLE 15: LEGAL ISSUES

How is the activity governed by legislation?

No legislation	1
Fully covered by legislation	5
Located within the regulated areas	

TABLE 16: DETECTION

How quickly can the impacts/risks of the activity be observed on the resource quality, people or property?

Immediately	1

Without much effort	2
Need some effort	3
Remote and difficult to observe	4
Covered	5

TABLE 17: RATING CLASSES

Rating	Class	Management description
1-55	(L) Low risk	Acceptable as is or consider requirements for mitigation. Impact to watercourses and resource quality small and easily mitigated
56-169	(M) Moderate risk	Risk and impact on watercourses are notably and require mitigation measures on a higher level, which costs more and require specialist input. Licence required.
170-300	(H) High risk	Watercourse(s) impacts by the activity are such that they impose a long-term threat on a large scale and lowering of the Reserve. Licence required.

A low risk class must be obtained for all activities to be considered for a GA

TABLE 18: CALCULATION

Consequence = Severity + Spatial Scale + Duration
Likelihood = Frequency of Activity + Frequency of Incident + Legal Issues + Detection
Significance \Risk = Consequence X Likelihood

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

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

- Desktop studies were initially conducted with a greater focus on sensitive phenomenon in the area.
- Site assessment was undertaken on the ground as well as verifying the finding of the desktop study.
- The consultant process was undertaken 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 provide are collated in the Comments and Responses Register are attached.

A detailed 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:

- The South African National Biodiversity Institute (SANBI) Biodiversity Geographic Database LUDS System;
- The Department of Environmental Affairs 2015 Landcover and Landuse Mapping Database;
- Department of Water and Sanitation information documents such as the Internal Strategic Perspective (ISP) and Groundwater Vulnerability Reports
- Municipal Integrated Development Plans for Local and district Municipalities; and
- The Provincial Spatial Development Framework for the Limpopo Province. The rating of the identified impacts was undertaken in a quantitative manner as provided in Section V (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.

16.2. Findings of risk assessment and risk rating

The following table present the identified impacts associated with the proposed activity. The impacts have been rated based on the method outlined below. As it can be see in the table, all risks identified are moderate before the implementation of mitigation and prevention measures.

TABLE 19: IMPACT ASSESSMENT TABLE FOR THE CONSTRUCTION PHASE

Environmental Aspect	**Nature of potential impact/risk**	**Environmental Impact Significance Before Mitigation**										
		Severity	Spatial Scale	Dura-tion	**Conseq-uence**	Frequ-ency of Activity	Freque-ncy of impact	Legal issues	Detection	**Likeli-hood**	Signif-icance/risk	Risk Rating
Social	Influx of job seekers will have a negative social impact on the landowners and land occupiers.	2	1	3	**6**	4	2	5	1	**12**	72	Moderate
	Unauthorised access to private property outside of the demarcated areas will result in conflict with landowners.	2	1	3	**6**	4	2	5	1	**12**	72	Moderate
	Increased traffic in the area will increase the likelihood of accidents on the roads, posing a health and safety issue for the land owners and land occupiers.	2	1	3	**6**	4	2	5	1	**12**	72	Moderate
	The influx of job seekers in the area may result in an increase in petty crimes.	2	1	3	**6**	4	2	5	2	**13**	78	Moderate

	Possible boost in short term local small business opportunities.	3	3	3		**9**		4	2	5	1		**12**		108		Moderate
Ground water	Localised spillages of oils from machinery leaching to groundwater contamination.	2	1	3		6		4	2	5	1		**12**		78		Moderate
	Existing boreholes within the prospecting area may create conduits of flow to the groundwater unless sealed.	2	1	3		**6**		4	2	5	1		**12**		78		Moderate
Surface Water	Increase in silt load in runoff due to site clearing, grubbing and the removal of topsoil from the footprint area associated within the drill sites and associated infrastructure.	2	3	1		**6**		4	2	5	1		**12**		78		Moderate
	Potential deterioration in water quality due to the potential accidental spillages of hazardous substances.	2	3	2				4	2	5	1		12		78		Moderate
	Debris from poor handling of materials and/or waste blocking watercourses, resulting in flow impediment and pollution.	2	2	2													Moderate

	Contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality.	2	3	2	6	4	2	5	1	12	78		Moderate
	Increase of surface runoff and potentially contaminated water that needs to be maintained in the areas where site clearing occurred.	2	2	2	6	4	2	5	1	12	78		Moderate
Wetlands and Aquatic Ecosystems	Localised changes to the riparian areas as a result of the impact to vegetation.	3	3	3	9	4	2	5	1	12	108		Moderate
	Loss of habitat and wetland ecological structure as a result of site activities and leading to wetland degradation.	3	3	3	9	4	2	5	1	12	108		Moderate
	Impact on the wetlands systems as a result of changes to the sociocultural service provisions.	3	3	3	9	4	2	5	1	12	108		Moderate
	Increased runoff due to topsoil removal and vegetation effect leading to possible erosion and sedimentation of wetland and riparian resources.	3	3	3	9	4	2	5	1	12	108		Moderate
	Soil compaction and	3	3	3	**9**	4	2	5	1	12	108		Moderate

	levelling as a result of construction activities and vehicle movement leading to loss of wetland and riparian habitat.												
	Impact on the hydrological functioning of the wetland systems.	3	3	3	**9**	4	2	5	1	12	108		Moderate
Flora	Loss of localised biodiversity habitats within sensitive areas due to drilling activities and establishment of drill sites.	2	1	2	5	4	2	5	1	12	60		Moderate
	Loss of localised floral species diversity including RDL and medicinal protected species due to site activities and establishment of drill sites.	2	1	2	5	4	2	5	1	12	60		Moderate
	Potential spreading of alien invasive species as indigenous vegetation is removed and pioneer alien species are provided with a chance to flourish.	2	1	2	5	4	2	5	1	12	60		Moderate
Fauna	Tracks of vegetation	2	1	2	5	4	2	5	1	12	60		Moderate

	may result in loss of faunal habitat ecological structure, species diversity and loss of species of conservation concern.												
	Habitat fragmentation as a result of construction activities of the access roads leading to loss of floral diversity.	2	1	2	5	4	2	5	1	12	60		Moderate
	Loss of faunal diversity and ecological integrity as a result of construction activities, erosion, poaching and faunal specie trapping.	2	1	2	5	4	2	5	1	12	60		Moderate
	Movement of construction vehicles and machinery may result in collision with fauna, resulting in loss of fauna.	2	1	2	5	4	2	5	1	12	60		Moderate
Air Quality	Possible increase in dust generation, PM10 and PM2.5 as a result of bulk earthworks, operation of heavy machinery, and material movement.	2	1	2	5	4	2	5	1	12	60		Moderate
	Increase in carbon emissions and ambient air pollutants	2	2	2	6	4	2	5	1	12	78		Moderate

	(NO2 and SO2) as a result of movement of vehicles and operation of machinery/equipment.												
Visual	Scaring of the landscape as a result of the effects on vegetation.	2	1	2	5	4	2	5	1	12	60		Moderate
	Visual intrusion as a result of the movement of machinery and the establishment of the required infrastructure.	2	2	2	6	4	2	5	1	12	78		Moderate
	Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.	2	2	2	6	4	2	5	1	12	78		Moderate
Noise	The use of vehicles and machinery during the construction phase may generate noise in the immediate vicinity.	2	2	2	6	4	2	5	1	12	78		Moderate
Soil, Land use and Land Capability	Localised chemical pollution of soils as a result of vehicle hydrocarbon spillages and compaction.	2	1	2	6	4	2	5	1	12	78		Moderate
	Localised clearing of vegetation and compaction of the	2	1	2	6	4	2	5	1	12	78		Moderate

	construction footprint will result in the soils being particularly more vulnerable to soil erosion.													
	Localised loss of resource and its utilisation potential due to compaction over unprotected ground/soil.	2	1	2	6	4	2	5	1	12	78		Moderate	
	Localised loss of soil and land capability due to reduction in nutrient status - de-nitrification and leaching due to drilling footprint areas.	2	1	2	6	4	2	5	1	12	78		Moderate	
Traffic	Increase in traffic volumes as a result of pre-construction activities which may lead to an increase in traffic congestion along the roads as well as the farm roads around the prospecting area.	2	3	2	7	4	2	5	1	12	84		Moderate	
Climat e	Emissions of Green House Gases as a result of the use of plant, heavy moving machinery, generators etc.	2	2	2	6	4	2	5	1	12	78		Moderate	
Waste Manag	Potential water and soil pollution as a	2	3	2	6	4	2	5	1	12	78		Moderate	

ement	result of inappropriate waste management practices.															

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

Several potential impacts of the activity are highlighted above. The impacts of the proposed activity have no alternative, but to be mitigated. The only available option is to keep required bufferzone from sensitive environments such as watercourses.

The positive impacts of the activities are the creation of employment, which is required in the region. Should the minerals be found in the project area, Goakantswe Projects (Pty) Ltd will be able to mine the available reserves after the mining rights reserves. This will result in job creation and support to local businesses is continued. Goakantswe Projects (Pty) Ltd expect that substantial benefits from the project (should minerals be found) will accrue to the immediate project area, the sub-region and the province of Northern Cape. This prospecting activity has a potential to decrease level of unemployment rate in proposed areas and surroundings. This prospecting activity will bring revenue into the city and the province which will in turn boost the economy of the country.

The proposed activities 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.

PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME

17.1. PHASES OF THE PROJECT

The point of departure for this EMP is to take a pro-active routes by addressing potential problems before they occur. This will limit corrective measures needed during the planning, operational (drilling) and sampling phases of the proposed development. Additional mitigation will be included throughout the project's various phases, as required and if necessary. Hence the EMP is the leaving document.

The Planning Phase

This EMP offers an ideal opportunity to incorporate pro-active environmental management measures with the goal of attaining sustainable development. While there is still the chance of accidental impacts taking place; however, through the incorporation of contingency plans (e.g. this EMP) during the planning phase, the necessary corrective action can be taken to further limit potential impacts.

The Site establishment Phase

This phase involves movement of the drilling truck and rigs to where the location where the borehole will be drilled. This might result into immediate impacts (e.g. noise, dust, land degradation and water pollution). If the site is monitored on a continuous basis during this phase, it is possible to identify and mitigate these impacts as they occur. These impacts can then be mitigated through the methods and procedures identified in the EMP, together with a commitment to sound environmental management.

The Operational (drilling) Phase

By taking pro-active measures during the planning and site establishment phases, potential environmental impacts emanating during the operational phase will be minimised. This, in turn, will minimise the risk and reduce the monitoring and rehabilitation effort, but it does not make monitoring obsolete.

The Decommissioning Phase

The proposed prospecting activity is a short-term socio-economic development in its nature, and this EMP encourages the activity to be done as soon as possible to minimize social and environmental impacts. However, when the drilling company have completed the proposed activities, they will have to rehabilitated and decommission the site. The decommissioning phase is associated with activities related to the removal of any infrastructure, equipment's and then rehabilitate the disturbed areas. This section includes principles for the Decommissioning Phase of the proposed development.

17.2. IDENTIFIED ISSUES MANAGEMENT ACTION, RESPONSIBILITY AND MONITORING FREQUENCY

The following table forms the core of this EMP for all the phases of the proposed prospecting activity. This table must be used as a checklist on site, especially during the drilling phase. Compliance with this EMP must be monitored daily and must be audited once a month during the site establishment and drilling phase and once again immediately after completion of drilling. This must be followed up by an annual audit report to be submitted to the competent authority. The responsible case officer must be informed prior the commencement of drilling, during and after in order to keep updated and also monitor the progress of the proposed activities.

Table 20: Environmental Management Plan during Preconstruction, Construction and operation Phases

ACTIVITY / ISSUE	ACTION REQUIRED / MANAGEMENT ACTION	RESPONSIBLE PARTY	FREQUENCY
1. PLANNING PHASE			
1.1 Planning	To consult with I&AP's with regards to the inception of the proposed project, particularly the landowners for consent	Applicant	30 days before inception, Once off
	Best and suitable drilling plan (PWP) that is in consideration of the social and environmental impacts.	Applicant	30 days before inception, Once off
	The drilling must conform to both the applicable EMP and EA conditions and applicable regulations, standards and by-laws.	Applicant	Before inception
	It is the duty of the Applicant to ensure that the Minimum Requirements for the proposed activities are applied to the satisfaction of both the community, landowner and the competent authorities (DMRE).	Applicant	Continuous
	Before inception there must be sufficient equipment, necessities and human resources (trained labour force) to ensure that the drilling can conform to both the planning, design and relevant Minimum Requirements.	Applicant	7 days before inception, As and when necessary

ACTIVITY / ISSUE	ACTION REQUIRED / MANAGEMENT ACTION	RESPONSIBLE PARTY	FREQUENCY
	All prospecting activities must be limited to daylight hours (from 8h30 to 17h00). Should there be a need to undertake drilling at night, such will require approval from the landowners and community representative. The independent Environmental Officer and the relevant competent authorities be notified of such intentions.	Applicant	7 days before inception, As and when necessary
1.2. Recruitment of labour	The contractor must make use of local labour where possible in order to stimulate the local economy. The recruitment agreement must be made between local people and the applicant, by using an in-depended on person.	Contractor	Once off, As and when necessary
	The drilling contractor must appoint one of his employees to act as an Environmental Liaison Officer. This person will be required to monitor the situation with a direct hands-on approach and work together with the ECO.	Contractor	Once off, As and when necessary
1.3. Social well-being	The number of vehicles on the roads must be kept to a minimum; in an interval of 10 minutes. Materials transported on public roads must be covered. To avoid any social and environmental impact.	ECO, Contractor	Continuous
	Prospecting activities and machinery must be limited between 08h30 and 17h00 on weekdays. However, if activities need to be outside of these times or on weekends, this needs to be approved by the community representatives and landowners and the Authorities must be informed.	ECO, Contractor	Continuous

ACTIVITY / ISSUE	ACTION REQUIRED / MANAGEMENT ACTION	RESPONSIBLE PARTY	FREQUENCY
	Any site camp required by the drilling contractor must be established in an area as agreed with the ECO and landowners. The site for the site camp must not be within 100m of the environmentally sensitive area outlined in the sensitivity map. Steep slope or on erosive soils area. The area must be properly demarcated prior to establishment to prevent the camp from being unnecessarily large. The ECO must liaise with surrounding parties to ensure that the site camp is not located in an area where it will cause a nuisance.	ECO, Contractor	Once off
1.4. Social security, crime combat and safety	The drilling company must have a proper uniform, reflectors and personal identification cards for every staff member. Uniform and personal identification cards must be in the position of the personnel at all times.	Contractor	Once off, As and when necessary
	All staff members must be screened for criminal offences and must provide police clearance form before appointment.	Contractor, Applicant	Once off, As and when necessary
	Personnel must use the identified access road all the time. And trespassing on unidentified roads or farms must be prosecuted.	Applicant, Contractor, ECO	Once off, As and when necessary
	Ensure staff cars can be identified, e.g. with cards and/or printed reflector stickers.	Applicant, ECO, Contractor	Once off, As and when necessary
	Access to private property and areas outside the designated operation areas is strictly prohibited.	ECO, Contractor	Before commences & As and when necessary

ACTIVITY / ISSUE	ACTION REQUIRED / MANAGEMENT ACTION	RESPONSIBLE PARTY	FREQUENCY
	Ensure vehicles that only suitably qualified personnel use construction vehicles.	ECO, Contractor	Before construction commences & Continuous
1.2 Appointment and Duties of ECO	The Applicant must appoint an independent Environmental Control Officer (ECO) who must monitor the drilling contractor's compliance with the environmental management plan (EMP).	Applicant	Once-off, for the duration of the activities
	The Applicant must provide the ECO and contractor with a copy of the EMP.	Applicant	Once-off,
	The priority of the ECO is to maintain the integrity of the EMP and EA conditions outlined and must ensure that they are enforced and adhered to at all time.	ECO	Continuous
	The ECO must form part of the project management team and attend all project meetings.	ECO	Continuous
	The drilling contractor must ensure that the drilling crew attend an environmental briefing and training session presented by the ECO prior to commencing activities on site.	ECO, Contractor	Once-off
	The ECO is be required to monitor the situation with a direct hand- on approach, and ensure compliance and co-operation of all personnel. He/she must be fluent in the languages of the employees.	Contractor	Once-off
1.3 EMP	This EMP must be made binding to the main contractor as well as individual contractors and must be included in tender documentation for the construction contract. The copy EMPr must always be available on the site.	Applicant, Contractor and ECO	Once-off
1.4 Permits and	The Drilling contractor must ensure that all pertinent permissions and certificates required for this activity have been obtained from relevant people prior to any	Contractor,	Continuous

ACTIVITY / ISSUE	ACTION REQUIRED / MANAGEMENT ACTION	RESPONSIBLE PARTY	FREQUENCY
Permissions	drilling activities commencing on site and ensure that the agreements are strictly enforced/adhered to. The Drilling contractor must maintain a database of all pertinent permits and permissions required for the contract as a whole and for critical activities, for the duration of the contract.	Applicant	
1.5 Drilling methods and Method Statements	The Drilling Contractor must adhere to the drilling methods and PWP activities as outlined in the Basic Assessment report (BAR). Deviations to such must be report to the CA for approval. Major activities include: ▪ Storage facilities for any hazardous substances ▪ The storage provisions for the materials and/or equipment ▪ Emergency procedures ▪ Site establishment ▪ Removal and clearing of vegetation ▪ Camp establishment ▪ Transporting the materials and/or equipment to, from and within the site ▪ The Drilling methods ▪ Other information deemed necessary by the Project Manager or ECO. Method Statements must be submitted at least ten working days prior to the proposed commencement of work on an activity to allow the competent authority, landowners and community time to study and approve the proposed changes.	Contractor, ECO	As necessary
	The drilling contractor must not commence work on that activity until such time as the Method Statement has been approved in writing by all representatives of affected parties.	Contractor, Applicant, ECO	Continuous

ACTIVITY / ISSUE	ACTION REQUIRED / MANAGEMENT ACTION	RESPONSIBLE PARTY	FREQUENCY
	The Contractor must carry out the activities in accordance with the approved Drilling and Method Statement.	Contractor, Applicant, ECO	Continuous
	Approved drilling and Method Statements must be readily available on the site and must be communicated to all relevant personnel. Approval of the drilling and Method Statement must not absolve the Drilling Contractor from any of his obligations or responsibilities in terms of the EMP specifications.	Contractor, Project Manager, ECO	Continuous
1.6 Existing Services and Infrastructure	The Contractor must ensure that existing services (e.g. roads, pipelines, powerlines, fence and telephone services) are not damaged or disrupted unless it is inevitable. In the case where damage is inevitable the permission must be granted by the affected parties.	Contractor, Project Manager, ECO	Continuous
	The Drilling Contractor must be responsible for the repair and reinstatement of any existing infrastructure that is damaged or services which are interrupted. The applicant must fund the cost of repairing.	Contractor, Applicant	As necessary
	Such repair or reinstatement will be to the Applicants cost and must receive top priority over all other activities.	Applicant	Continuous
	A time limit for the repairs may be stipulated by the Applicant in consultation with the Contractor.	Contractor, Applicant	Continuous
1.7 Environmental incidents	The drilling contractor must take corrective action to mitigate an incident appropriate to the nature and scale of the incident and must also rehabilitate any residual environmental damage caused by the incident or by the mitigation measures themselves.	ECO, Contractor	Continuous
2. SITE ESTABLISHMENT AND OPERATIONAL (DRILLING) PHASE			

ACTIVITY / ISSUE	ACTION REQUIRED / MANAGEMENT ACTION	RESPONSIBLE PARTY	FREQUENCY
2.1 Site establishment	The working width of the Drilling area must be clearly demarcated by the installation of colored pegs prior to site establishment. The area must not exceed 20m^2.	ECO, Contractor	Once off, monitor weekly
	A 100m buffer zone must be maintained on all sensitive areas such as water course, houses and CBA area and such features nearby must be demarcated with danger tape.	ECO, Contractor	Once off, monitor weekly
	The lateral spread of the construction must be monitored on a weekly basis.	ECO, Contractor	Monitor monthly
	The ECO must monitor unauthorised movement of construction crew and vehicles.	ECO, Contractor	Once off, monitor daily
	A general notice board must be erected at the site entrance, as per requirements for information required to be on the notice board as per the specifications.	ECO, Contractor	Once off, monitor daily
	The drilling contractor must provide waste bins to be used during site preparation and drilling.	Contractor	Continuous, monitor daily
	To prevent excessive disturbance of natural vegetation, the drilling contractor must use existing disturbed area or access roads wherever possible.	Contractor	Continuous, monitor daily
	To prevent the deterioration of surface water quality, the drilling contractor must provide adequate ablution facilities. Toilets are to be serviced twice a week as a minimum and as and when required thereafter, throughout the necessary phases. Every effort must be made to prevent the contamination of surface or sub-	ECO, Contractor	Continuous, monitor daily

ACTIVITY / ISSUE	ACTION REQUIRED / MANAGEMENT ACTION	RESPONSIBLE PARTY	FREQUENCY
	surface water.		
	Ensure that invasive species are removed and controlled during the execution of the proposed activities.	ECO, Contractor	Continuous, monitor weekly
2.2. Flora and fauna	Ensure that the established site is above 100m from the CBA (animals and plants).	ECO, Contractor	Continuous, monitor weekly
	Ensure that where the site is established there are not existing fauna, if so they must be given enough time to escape the area. No fauna haching/nest habitat should be impeded by the site establishment. An alternative arrangement must be made.	ECO, Contractor	Continuous, monitor weekly
	Prevent the introduction of noxious weeds and alien vegetation (typical to areas of disturbance).	ECO, Contractor	Continuous
	No hunting or killing of species is allowed, or cutting or digging of flora for medicinal or personal use.	ECO, Contractor	Continuous
2.3. Aquatic species (Flora and fauna)	A serviced powder fire extinguisher (to neutralise pH levels if a spill occurs) must be available on site in the event that wet concrete is accidentally spilled into the dam.	ECO, Contractor	As and when necessary
	Prevent any hydrocarbons (oil, diesel, petrol) spills from occurring. If a spill occurs it is to be cleaned up immediately and Reported to the appropriate authorities.	ECO, Contractor	Continuous
	Stream and wetland banks must be monitored for any signs of sedimentation, and measures must be taken to minimize the sedimentation as soon as	ECO, Contractor	Continuous

ACTIVITY / ISSUE	ACTION REQUIRED / MANAGEMENT ACTION	RESPONSIBLE PARTY	FREQUENCY
	possible.		
	Drilling activities must preferably take place during the dry winter season. If drilling activities take place in the wet season appropriate measures must be taken to control stormwater and implemented to prevent soil erosion and sedimentation.	Contractor	Once off
	All mechanical objects fueled or filled by hydrocarbons must be equipped with a drip tray to retain any oil leaks, when stationary. No machinery must be parked overnight within 100m of the watercourse.	ECO, Contractor	Continuous
2.4 Surface water and Groundwater	Ensure that extracted and stockpiled soil material is stored and bermed on the higher lying areas to prevent erosion and silting up of nearby stream and dam.	ECO, Contractor	Continuous
	No prospecting works must take place within 100m of the water resource or CBA. Ensure that all Drilling equipment, materials and spoil are stockpiled well outside the bufferzone of sensitive features.	ECO, Contractor	Continuous
	Vegetation clearance must be kept to a minimum to reduce the risk of siltation.	ECO, Contractor	Continuous
	Adequate provision must be made for sanitation for the construction workers. Chemical toilets on site are to be emptied weekly.	Contractor	Once off, Monitor daily
	Construction vehicles are to be maintained in good working order, to reduce the probability of leakage of fuels and lubricants. No servicing of vehicles is to be undertaken in close proximity to watercourses.	ECO, Contractor	As and when necessary
	Prevent any spills from occurring; If a spill occurs it is to be cleaned up immediately and Reported to the appropriate authorities.	ECO, Contractor	Continuous
	Effectively manage prospecting activities to prevent contaminants entering into surface water resource i.e. prevent leaks, store chemicals safely, prevent	Contractor, ECO	Continuous

ACTIVITY / ISSUE	ACTION REQUIRED / MANAGEMENT ACTION	RESPONSIBLE PARTY	FREQUENCY
	erosion and loss of soil through run-off.		
2.5 General: waste	Litter generated by the personnel crew must be collected in rubbish bins and disposed of weekly at registered waste disposal sites.	ECO, Contractor	Weekly
	All solid and liquid waste etc must be disposed of as necessary at an appropriately licensed waste disposal facility.	ECO, Contractor	Once off, as necessary
	Ensure that no refuse wastes are burnt on the premises or on surrounding premises. No fires will be allowed on site, unless in designated areas approved by the ECO.	ECO, Contractor	Monitor daily
	The construction site must be kept in a clean and orderly state at all times.	ECO, Contractor, Construction crew	Monitor daily
	Ensure that no litter, refuse, wastes, rubbish, rubble, debris and builders wastes generated on the premises be placed, dumped or deposited on adjacent/surrounding properties during or after the construction period of the project are disposed of at dumping site as approved by the Authorities.	ECO, Contractor	Monitor daily - weekly
2.6 Fire Prevention and Control	The Contractor must take all reasonable and precautionary steps to ensure that uncontrolled fires are not started as a consequence of his activities on site.	Contractor	Daily
	The Contractor must ensure that there is basic fire-fighting equipment available on site as per requirement of the local Emergency Services.	Contractor, ECO	Continuous
	A serviced powder fire extinguisher must be available on site in the event that fire breakout.	Contractor, ECO	Daily
	The drilling Contractor must ensure that all site personnel are aware of the fire risks and how to deal with any fires that occur. This must include, but not be limited to: ▪ Regular fire prevention talks	Contractor, ECO	Continuous

ACTIVITY / ISSUE	ACTION REQUIRED / MANAGEMENT ACTION	RESPONSIBLE PARTY	FREQUENCY
	Posting of regular reminders to staff.		
	▪ Any accidental fires, which occur, must be reported immediately to the project manager and then to the relevant authorities.	Contractor	Continuous
	The drilling Contractor must submit Method Statements covering the procedures and response plan for the main activities, which could generate emergency situations through accidents or neglect of responsibilities. These situations include, but are not limited to: ▪ Accidental fires; ▪ Accidental leaks and spillages; Vehicle and plant accidents.	Contractor	As necessary
2.7 Emergency Procedures	***Accidental leaks and spillages*** ▪ The Drilling contractor must ensure that his employees are aware of the procedure for dealing with spills and leaks. ▪ The Contractor must also ensure that the necessary materials and equipment for dealing with the spills and leaks is available on site at all times.	Contractor	Continuous, weekly
	Hydrocarbon spills ▪ The source of the spill must be isolated and the spillage contained using sand berms, sandbags, sawdust, absorbent material and/or other materials approved by the ECO. ▪ The area must be cordoned off and secured. ▪ The Drilling Contractor must ensure that there is always a supply of absorbent material readily available to absorb/breakdown the spill. ▪ The Drilling Contractor must notify the relevant authorities of any spills	Contractor	As necessary

ACTIVITY / ISSUE	ACTION REQUIRED / MANAGEMENT ACTION	RESPONSIBLE PARTY	FREQUENCY
	that occurs.		
	The Drilling Contractor must assemble and clearly list the relevant emergency telephone contact numbers for staff and brief staff on the required procedures.	Contractor	Weekly
	If potentially hazardous substances are to be stored on site, the Contractor must provide a Method Statement detailing the substances/materials to be used together with the procedures for the storage, handling and disposal of the materials in a manner which will reduce the risk of pollution that may occur from day to day storage, handling, use and/or from accidental release of any hazardous substances used.	Contractor	Monitor daily
2.8 Hazardous Substances	Hazardous chemical substances used during drilling activities (e.g. ablution, hydrocarbons, toilet cleaners) must be stored in appropriate containers.	Contractor	Monitor daily - weekly
	If potentially hazardous substances are to be stored on site, the Contractor must provide a Method Statement detailing the substances/materials to be used together with the procedures for the storage, handling and disposal of the materials in a manner which will reduce the risk of pollution that may occur from day to day storage, handling, use and/or from accidental release of any hazardous substances used.	Contractor,	Monitor daily - weekly
	The relevant Material Safety Data Sheets (MSDS) must be available on Site. Procedures detailed in the MSDS must be followed in the event of an emergency.	Contractor	Monitor daily - weekly
	The Contractor must ensure that all hazardous chemical substances are labelled, packed, transported and stored accordingly in order to avoid the spread of contamination.	Contractor & Applicant	Monitor daily - weekly
	All hazardous chemical substance waste must be disposed of in accordance	Contractor &	Monitor daily -

ACTIVITY / ISSUE	ACTION REQUIRED / MANAGEMENT ACTION	RESPONSIBLE PARTY	FREQUENCY
	with the Hazardous Chemical Substances Regulations, 1995 (Regulation 15).	Applicant	weekly
	The waste, resulting from the use of hazardous materials, must be disposed of at the accredited/licensed hazardous waste disposal site. Storage and disposal of waste is regulated through other legislation, which must be complied with i.e. the Occupational Health and Safety Act (85 of 1993).	Contractor & Applicant	Monitor daily - weekly
2.9 Health and Safety	The drilling Contractor must comply with all standard and legally required health and safety regulations as promulgated under the Occupational Health and Safety Act (85 of 1993) and associated regulations.	Contractor, RE	Daily
	The Applicant must provide and maintain personal protective equipment and facilities to employees working with hazardous chemical substances.	Contractor	As and when necessary
	Official training in the correct fit, use, care, storage and limitations of all Personal Protective Clothing, Respiratory and Hearing Equipment must be given to the employees.	Contractor	As and when necessary
	The Contractor must provide a standard first aid kit at the site office of each camp and/or at additional identified locations where needed.	Contractor	Daily
	Site Safety checks must be carried out in accordance with the pertinent Occupational Health and Safety requirements prior to site closure.	ECO	Continuous
	Telephone numbers of emergency services must be posted conspicuously in the office for use in emergency situations.	Contractor, ECO	Continuous
2.10 Dust impact and climate change	Unsurfaced roads and temporary roads must be regularly watered to control and suppress dust.	Contractor	Daily, As and when necessary
	Measures must be taken to immediately mitigate a situation in which excessive	Contractor	As and when

ACTIVITY / ISSUE	ACTION REQUIRED / MANAGEMENT ACTION	RESPONSIBLE PARTY	FREQUENCY
	fugitive dust is observed. Works being undertaken must be undertaken with caution, or phase down while the source is being actively investigated and suppression measures are implemented.		necessary
	All areas disturbed during proposed activities must be revegetated.	Contractor	As and when necessary
	Disturbed soils, slopes and areas of uncovered surface must be minimised to avoid wind erosion.	Contractor	As and when necessary
	Diesel exhaust emissions from heavy drilling machinery on site must be controlled and minimised by regular checks and servicing of vehicles. Any vehicle found to be emitting excessive smoke must be stopped from the operations for some mechanical attention before it could continue.	Contractor	As and when necessary
2.11 Visual impact	Security lights are to be angled downwards to avoid disturbance to nearby landowners. Illuminating objects must consider the possible distraction glare might have on motorists and nearby landowners.	Contractor, ECO	Continuous
	Nighttime light sources must be directed away from habitats and grazing area of fauna (e.g. livestock) as this may be the cause of ecological disturbance.	Contractor, ECO	Continuous
	The rehabilitated area must blend with the existing landscape of the area.	Contractor, ECO	Continuous
2.12 General: noisy activities	Institute noise control measures throughout the prospecting phases for all applicable activities.	ECO, Contractor	Once off, as necessary
	Inform the community liaison personnel and landowners of planned noisy activities outside the timeframes stated above.	ECO, Contractor	Once off, as necessary
	Construction activities must abide by the national noise laws and the municipal noise by-laws with regard to the abatement of noise caused by mechanical equipment. In the absence of bylaws, national regulations on noise control must	ECO, Contractor	Continuous

ACTIVITY / ISSUE	ACTION REQUIRED / MANAGEMENT ACTION	RESPONSIBLE PARTY	FREQUENCY
	be complied with		
	Ensure that the vehicles are under the control of competent personnel and are in proper working order.	ECO, Contractor	Continuous
	No sound amplification equipment to be used on site.	ECO, Contractor	Continuous
	Limit vehicles travelling to and from the site to minimise traffic noise to the surrounding environment at least at 10 minutes interval.	ECO, Contractor	Continuous
2.13 Vegetation removal	The topsoil cleared must be retained. The topsoil contains most of the inorganic matter, decomposed organisms and nutrients, thus the removal of the topsoil constitutes a major loss in terms of ecosystem function. In order to ensure that the minimal amount of soil is removed with vegetation clearance, it is strongly advised that vegetation be harvested as close to ground level as possible before earthworks machinery is utilised. Soil removed in this manner will contain the existing seed bank, stolons, rhizomes and runners as well as an additional supply of organic matter that will be beneficial during the early stages of vegetation reinstatement. Harvested grass must be retained and used as a mulch to combat erosion.	ECO, Contractor	Once weekly off, monitor weekly
	Topsoil must not be stockpiled for an extensive period (> months). This is to prevent the redundancy of the existing seed bank as well as the alteration of the soil characteristics (permeability, bulk density etc.).	ECO, Contractor	Monitor weekly
2.14 Drilling	Erect signs and/or danger tape around the drilling site to warn the public of the inherent dangers.	ECO, Contractor	Continuous
	Drilling trucks and sampling barkies can cause compaction of soil if new pathways are created. Vehicles must, therefore, use existing roads. If the creation of new tracks is unavoidable, these temporary tracks must be ripped	ECO, Contractor	Monitor weekly

ACTIVITY / ISSUE	ACTION REQUIRED / MANAGEMENT ACTION	RESPONSIBLE PARTY	FREQUENCY
	and re-vegetated after use, if necessary.		
	Ensure that core extracts and soil material are stored and bermed on the even lying areas of the site and not in any storm water run-off channels or any other areas where it is likely to cause erosion or where water would naturally accumulate.	ECO, Contractor	Continuous
	The areas where extracted, core samples material will be stockpiled must be bordered by berms to prevent soil loss caused by runoff erosion.	ECO, Contractor	Continuous
	Minimise the area cleared for drilling to only what is ultimately required and no additional clearance or disturbance of unnecessary areas.	Contractor	Continuous
2.15 Archaeological findings	Archaeological material, by its very nature, occurs below the surface. If any are noticed, construction personnel must be alerted and must inform the local South African Heritage Resource Agency (SAHRA) should they come across any cultural/archaeological findings. Work must be stopped in the area until such time when the archaeologist or SAHRA or both had observed the area and recommended a way forward.	Applicant, ECO, Contractor	As and when necessary
	Should any archaeological artefacts be exposed during excavation, work on the area where the artefacts were found, must cease immediately and the ECO must be notified as soon as possible.	ECO, Contractor	Monitor daily
	Upon receipt of such notification, the ECO will arrange for the archaeological artefacts to be examined by an Archaeologist as soon as possible.	ECO, Contractor	As necessary
2.16 Protection of Sensitive features, Environments and Natural	Prevent unnecessary removal of vegetation outside the width of the working area by clearly demarcating the working area.	ECO, Contractor	Continuous
	Sensitive environments and natural features within and/or close to a proposed site are outlined in the BAR, and are designated as 'no-go' areas and will be subject to the conditions described in the BAR and EA.	Contractor, ECO	As necessary
	Any taxa, especially those of conservation concern (as per the ecological report) exposed during the construction activities must be allowed to	Contractor, ECO	As necessary

ACTIVITY / ISSUE	ACTION REQUIRED / MANAGEMENT ACTION	RESPONSIBLE PARTY	FREQUENCY
	escape to adjacent suitable habitat.		
	All geophytes and medicinal plants from affected vegetation units must be removed with the necessary permits and established in a nursery. After prospecting works, the species must be replanted during the rehabilitation phase. A management plan (to be compiled by the ECO) must be implemented to ensure proper establishment of ex situ individuals, and must include a monitoring programme for at least two years after re-establishment (to ensure successful translocation).	Contractor, ECO	As necessary
	Remove vegetation only within the minimum width necessary for the prospecting work.	ECO, Contractor	Once off
	Revegetate disturbed ground in the working area by seeding and spreading of vegetation that has been removed during site establishment.	ECO, Contractor	Continuous
	A monitoring and eradication programme must be put in place to manage alien and invasive species.		
	Progressively rehabilitate the site, where possible, so that the rate of rehabilitation is maximized as early as possible.	ECO, Contractor	Continuous
2.17 Monitoring	A daily monitoring program must be established by the ECO in respect of the BAR and EMP as well as the EA conditions. To ensure compliance with all the specification.	ECO	Once off, before commencement and update when necessary
	The mechanical equipment must be regularly monitored for leaks. If leaks are identified or reported by the public, immediate actions must be taken to repair these leaks.	ECO	Continuous
	Develop and implement a monitoring programme for water quality before, during and after drilling.	ECO	Monthly or as approved by the lead authority

ACTIVITY / ISSUE	ACTION REQUIRED / MANAGEMENT ACTION	RESPONSIBLE PARTY	FREQUENCY
2.18 Waste composition, inventory and inspection	Information on waste register must include the origin of waste, type of waste, and outline the identity of the producer and collector.	ECO	Continuous
	Regular visual inspection of the waste at the point of deposit (waste bins) must be undertaken to ensure that waste is properly sorted/ separated at the site.	ECO	Continuous
2.19 Traffic and transportation	Sprinkling of water for dust suppression of unpaved roads must be conducted as and when required.	Contractor, ECO	As and when necessary
	Ensure that unnecessary traffic is reduced.	Contractor, ECO	As necessary
	Employ speed control measures on roads to control dust and wearing of roads. No vehicle must exceed 40km/h speed within the site.	Contractor, ECO	As necessary
	An emergency plan (including fire management) must be developed and implemented. Ensure that all fire extinguishers are replaced on or before their expiry dates.	ECO	Once off
2.20 Transportation of samples	Polyethylene bags must be used to take adequate samples to the designated laboratory.	ECO, Contractor	Once off, monitor weekly
3. Decommissioning Phase			
3.1. Site clearing and cleaning	Removal of any equipment, waste collectors, camps, ablution facilities that would contribute to a negative impact in the area. All foreign matter has been removed from site; the areas must be cleared of any contaminated soil.	ECO, Contractor	Continuous
3.2. General Rehabilitation	Update a rehabilitation plan prior to decommissioning which includes detailed surveys of the pre-site establishment, drilling and environment to ensure the landscape can be restored to the pre-construction environment as close as feasible.	Applicant, ECO	Once off
	Minimise the long-term visual impact by creating landforms which are compatible with the surrounding landscape.	Applicant, ECO	Continuous

ACTIVITY / ISSUE	ACTION REQUIRED / MANAGEMENT ACTION	RESPONSIBLE PARTY	FREQUENCY
	Drilled boreholes must be backfilled as outlined in the rehabilitation plan and topped with fertile soil and levelled to flash with the area landscape. No foreign matter such as cement or other rubble must be introduced when backfilling, except the PVC pipes.	Contractor	Continuous
	Rehabilitation of the new landscape would be done in such a manner to blend in with the surrounding landscape and allow normal surface drainage to continue.	Contractor	Continuous
	Reshape the land disturbed by machinary so that it is stable, adequately drained and suitable for the desired long-term land use.	ECO, Contractor	Once off
	Minimise the potential for erosion by wind and water both after decommissioning.	ECO, Contractor	Continuous
3.3. Re-vegetation	The affected surface must be ripped or ploughed to a depth of at least 300mm and the topsoil be spread evenly to its original depth over the whole area. The area must then be fertilized and seeded with a vegetation seed mix adapted to reflect the local indigenous flora. Where sites have been rendered devoid of vegetation or where soils have been compacted by heavy machinery, the surface must be scarified and ripped adequately.	Contractor, ECO	Once off
	If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, it may be required that soil be analysed and any effects be corrected. The area must then be reseeded seeded with a seed mix recommended by the a study.	Applicant, ECO	Once off
	The seed mix must therefore take into account the availability of indigenous grass seeds as per the above, different soil situations and the prevailing climatic conditions of the area.	Applicant, ECO	Once off
3.4. Monitoring and Maintenance	Prior to decommissioning a monitoring programme must be developed in accordance with the specifications of this EMPr. The program is to include proposed monitoring during and after the rehabilitation and decommissioning.	Applicant	Once Off

ACTIVITY / ISSUE	ACTION REQUIRED / MANAGEMENT ACTION	RESPONSIBLE PARTY	FREQUENCY
	Provision must be made to monitor any unforeseen impact that may arise as a result of the proposed activities.		Continuous
	The post-monitoring period following decommissioning of prospecting activities must be implemented by a suitable qualified independent party (ID) for a minimum of 2 years unless otherwise specified by the competent authority.	Applicant	Continuous, Quarterly monitoring
	Inspect re-vegetation rate and remedy erosion around rehabilitated sites.	ECO	Quarterly monitoring
	Remove alien invader species	ECO, Independent Party	Quarterly
	Produce Annual Environmental Monitoring Report that be submitted to the competent Authority (case officer). The monitoring reports must include a list of any remedial action required to ensure that the site remains safe and pollution free after decommissioning. Progress of vegetation growth and cover as well as removal of alien species.	Independent Environmental Specialist	Annually
3.5 Closure	Closure of the site must be accomplished after two years of monitoring and maintenance.	Applicant	Once off
	Photographs of before the drilling, during and after rehabilitation and closure, must be taken at selected fixed points and kept for record keeping.	ECO, Applicant	Continuous
	Confirm acceptable vegetation cover has been achieved in areas where indigenous vegetation was seeded.	Independent Environmental Specialist	Once off
	Confirm all affected sites are free from pollution after decommissioning.	Independent Environmental Specialist	Once off
	Confirm that all boreholes, access tracts, storage and camp sites are safely rehabilitated and not posing any potential hazard to humans, wild animals or	Independent Environmental	Once off

ACTIVITY / ISSUE	ACTION REQUIRED / MANAGEMENT ACTION	RESPONSIBLE PARTY	FREQUENCY
	livestock.	Specialist	

17.3. Summary of Rating of the impacts after mitigation measures

This section outlines the risk rating after the mitigation measure are implemented. The management plan is a living document that will be improved whenever necessary.

Table 21: The possible mitigation measures that could be applied and the level of risk

Potential Impact	Significance Rating (before mitigation)	Significance Rating (after Mitigation)
Socio-Economic	Moderate	Low
Impact on health, and safety of workers.	Moderate	Low
Flora (Biodiversity and alien vegetation).	Moderate	Low
Air quality	Moderate	Low
Noise disturbances	Moderate	Low
Visual alteration	Moderate	Low
Generation of waste.	Moderate	Low
Groundwater and soil contamination.	Moderate	Low
Heritage resources (Fossils)	Moderate	Low
Soils Land use and Land Capability	Moderate	Low
Climate	Moderate	Low
Traffic	Moderate	Low

17.4. Impacts to be mitigated in their respective phases

Table 22: Measure to rehabilitate the environment affected by the undertaking of any listed activity

Detailed mitigation measure are outlined on table 20 above.

Impact	Potential Impact	Aspects Affected	Phase	Significance	Mitigation Type	Significance
Socio-economic	Disturbance on the existing socio-economic routines of the communities	Social and economic	ALL	Moderate	Education and environmental awareness on issues related to mining. Ensure local community members are given first priority during employment, service delivery and communication should	Low

					be enhance through the election of community liaising person.	
Ground water through soil contaminati on	Spillages of chemicals during the operation	Environmental	ALL	Moderate	Prevent by properly storing fuel on site and re-fuelling to be done from a bowser that do not drip.	Low
Surface Water through soil contaminati on	Erosion of contaminants and soil to nearby streams	Environmental	All	Moderate	- Erosion control measures - Storm water management measures	Low
Biodiversity (Flora and fauna)	Affecting flora and fauna during the execution of proposed activities	Environmental	All	Moderate	Re-vegetation of indigenous species Avoid killing species. If after two years	Low

					vegetation has not established sufficiently, taking into account environmental conditions, such as droughts, re-vegetation or other alternative remediation measures must to be undertaken. If any invasive alien vegetation is noted, it must be removed immediately. Alien vegetation clearing to be undertaken if non-invasive alien species increase to over 5% of the area	

Air Quality	Dust and emission of greenhouse gases from the equipment's and vehicles	Environment	All	Moderate	Control dust by wetting during dry, dusty conditions. Dust suppression Using less vehicles	Low
Visual	Prospecting associated activities will result in changes on the landscape	Social	All	Moderate	The visual impact would be addressed by means of: • Re-vegetation with grasses • Removal of any infrastructure, scrap, waste that would contribute to a negative impact	Low
Noise	Noise from trucks and equipment used	Social	All	Moderate	- Limit vehicles travelling to and from the site - Minimise traffic noise to the	Low

					surrounding environment. -Limit activities to day time hours	
Soil, Land use and Land Capability	Excavations will results in change on the surface	Environmental	All	Moderate	Prevent erosion by placing of berms Restoration of the landform and removal of infrastructure to reinstate land use potential Ensure rehabilitation plan is followed Implement erosion control measures Monitor erosion and remediate where necessary	Low
Traffic	Traffic on the affected roads will	Social	All	Moderate	Control impact on roads by properly	Low

	be affected.				servicing the operating trucks Speed limit should be 40 km per hr on gravel roads.	
Climate	Release of greenhouse gases	Environmental	All	Moderate	Service equipment and vehicles regularly. Minimise the use of equipment where is not necessary. Avoid burning of waste material	Low
Waste Management	Waste will be generated from offices, employers and other proposed activities	Environmental	All		Effective solid waste management Sufficient housekeeping Appropriate materials management	Low

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

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

- The stakeholder consultant process has been undertaken 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 provide have been recorded in this document (refer to Appendix).
- A detailed 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:

➢ The South African National Biodiversity Institute (SANBI) Biodiversity Geographic Database LUDS System;
➢ The Department of Environmental Affairs 2015 Landcover and Landuse Mapping Database;
➢ Department of Water and Sanitation information documents such as the Internal Strategic Perspective (ISP) for the Vaal River and Groundwater Vulnerability Reports
➢ Municipal Integrated Development Plans for Lephalale Local Municipality; and
➢ The Provincial Spatial Development Framework for the Limpopo Province.

The rating of the identified impacts was undertaken in a quantitative manner as provided in Section V (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.

19. Motivation where no alternatives sites were considered

As discussed above, the site is located in an area where the geology is known for having high mineral deposits. The site is therefore regarded as the preferred site and there is no alternatives sites. Changes in the layout plan will be discussed and agreed on with the affected landowners.

20. Statement motivating the alternative development location within the overall site

The location and extent of the prospecting activities will be based on the information derived from the desktop surveys. Where practicable, the drilling sites and location of infrastructure will be selected to avoid sensitive environments such as watercourses, biodiversity of conservation importance and heritage features.

21. Summary of specialist reports

The screening tool report have been generated in terms of EIA Regulations 2014 as amended. Amongst others the screening tool provide, development zone, minimum information requirement, Environmental Management Framework or bio-regional plan applies to a specific area. In addition the tool provides related exclusions and/ or specific requirements including specialist studies applicable to the proposed site and/or development, based on the national sector classification and the environmental sensitivity of the site. The Screening Tool allows for the generating of a Screening Report referred to in Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended whereby a Screening Report is required to accompany any application for Environmental Authorisation and as such the tool has been developed in a manner that is user friendly and no specific software or specialised GIS skills are required to operate this system (DFFE, 2021).

A table below show a brief summary of the screening tool.

Table 23 Showing the national screening tool rating.

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Agricultural sensitivity			x	

Animal species			x	
Biodiversity	x			
Archaeological and cultural heritage				x
Civil aviation				x
Palaeontology			x	
Plant species				x
Biodiversity	x			

As seen above, the low ranking means that the impacts is likely to happen. The medium ranking means that the impact is likely/almost probable to occur and whereas high means that the event can happen/almost certain. The ranking of very high means that certainly the impact will occur on the proposed environment.

The screening tool shows that the biodiversity of the area is high which means that there is a hight possibility of the impact to occur. The proposed site shows that the palaeontology impact is high-medium on the edge of the proposed site.

The EAP motivate that the following specialist studies should not be conducted;

a) Paleontology, agriculture, and animal species specialist study should not be conducted since the sensitive area is along the river at the edge of the stream and more than 100m bufferzone is proposed for the location of the boreholes.
b) A biodiversity specialist study should not be conducted since the proposed activity does not pose severe impacts to the biodiversity a small portion of about 5m^2 of vegetation will be impacted per borehole, hence the overall impact will be low when mitigation measured and rehabilitation plans are been implemented.

The specialist studies for high sensitivity environmental themes should be exempted on this study, the studies will be conducted during the Scoping and EIA processes that will be conducted in the case where the Applicant wishes to apply for the Mining Rights. Since the prospecting activities will pose medium to low environmental impacts.

In addition, useful and updated databases were used to map the area and recent site assessment and desktop information was used to compile the report and to conduct the impact assessment.

22. Environmental Impact statement

(i) Summary of the key findings of the environmental impact assessment;

During the proposed prospecting operation 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.

Goakantswe (Pty) Ltd must 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.

Land use must not be changed for the current. Several 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 and the establishment and use of the campsite. Measures such as safety along the roads and dust suppression must be undertaken to ensure that the impacts on the land owners and land occupiers are minimised.

Storm water runoff from the dirty water areas of the drilling sites, its associated surface infrastructure (campsite) may have a detrimental impact on the surrounding water environment should this water be released to the environment. In order to prevent the occurrence of the above-mentioned impacts, dirty water collection sump must be used to collect all dirty water from the drilling site. The water collected from the sump must be re-used, evaporated and the sump must 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 must be treated should they contain hydrocarbon waste.

The employees must undergo training and must 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 must be collected in proper receptacles and disposed of in registered waste disposal sites.

Key findings of the environmental impact assessment include:

- All the identified impacts must 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.
- Vegetation loss is unavoidable during the construction phase of the project. This will however be limited to the footprint of the infrastructure (access road, camp, boreholes). Care must be taken to manage any species of special concern as well as the proliferation of alien invasive plant species.

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

The proposed activities have 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;
- Influx of job seekers to site may result in increased opportunistic crimes;
- Potential visual impacts by drilling activities as well as vegetation effects;

- Prospecting will be undertaken by special sub-contractors and it is not anticipated that employment opportunities for local and/or regional communities result from prospecting activities; and
- Short term boost for local businesses (the mining company will outsource and hire security company, drilling company and the sanitation services company. Also, the close-by restaurants and shops will gain more customers.

28. 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, prior to the commencement of the prospecting activities;
- No activities may be undertaken within 100m of watercourses

29. DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE.

There are no assumptions, uncertainties or gaps on the proposed project.

30. REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORIZED

a. Reasons why the activity should be authorized or not

The option of not approving the activities sediments will result in a significant loss of valuable information regarding the mineral status, 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.

According to the impact assessment undertaken for the proposed project, the impacts of the project are considered to be 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.

b. Period for which the Environmental Authorisation is required

The prospecting right has been applied for a period of five (5) years. The Environmental Authorisation should therefore allow for 5 year of prospecting and associated activities.

31. FINANCIAL PROVISION

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

Table 23: COSTS WERE CALCULATED AS SHOWN IN TABLE BELOW

No.	Description	Unit	A Quantity	B Master Rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	**m3**	0	19	1	1	R0,00
2 (A)	Demolition of steel buildings and structures	**m2**	0	271	1	1	R0,00
2(B)	Demolition of reinforced concrete buildings and structures	**m2**	0	400	1	1	R0,00
3	Rehabilitation of access roads	**m2**	10	49	1	1,2	R588,00
4 (A)	Demolition and rehabilitation of electrified railway lines	**m**	0	471	1	1	R0,00
4 (A)	Demolition and rehabilitation of non-electrified railway lines	**m**	0	257	1	1	R0,00
5	Demolition of housing and/or administration facilities	**m2**	0	542	1	1	R0,00
6	Opencast rehabilitation including final voids and ramps	**ha**		284292	1	1,2	R0,00
7	Sealing of shafts adits and inclines	**m3**	10	146	1	1	R1 460,00
8 (A)	Rehabilitation of overburden and spoils	**ha**	0	189528	1	1	R0,00
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	**ha**	0	236054	1	1	R0,00
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	**ha**	0	685612	1	1	R0,00
9	Rehabilitation of subsided areas	**ha**	0	158701	1	1	R0,00
10	General surface rehabilitation	**ha**	0,1	150138	1	1,2	R18 016,56
11	River diversions	**ha**		150138	1	1	R0,00
12	Fencing	**m**		171	1	1	R0,00
13	Water management	**ha**	0	50255,25	1	1,2	R0,00
14	2 to 3 years of maintenance and aftercare	**ha**	1	57087	1	1,2	R68 504,40
15 (A)	Specialist study	**Sum**	0	0	1	1	R0,00
15 (B)	Specialist study	**Sum**	0	0	1	1	0
					Sub Total 1		**R88 568,96**

1	Preliminary and General		**weighting factor 2**	**R0,00**
2	Contingencies			**R0,00**
			Subtotal 2	**R88 568,96**
			VAT (15%)	**R13 285,34**
			Grand Total	**R101 854,30**

c. Explain how the aforesaid amount was derived

The financial provision for the environmental rehabilitation and closure of any 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 in order to empower the personnel at Regional DMR 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.

d. Confirm that this amount can be provided for operating expenditure

The amount required to cover the prospecting operation, including rehabilitation and closure is estimated to be **R 556 000** this stage. Goakantswe Projects (Pty) Ltd 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.

32. CLOSURE AND DECOMMISSIONING

Determination of closure objectives.

Rehabilitation actions for the proposed prospecting activities will be undertaken in three phase's namely concurrent rehabilitation, final decommissioning and rehabilitation, thereafter a closure.

Concurrent rehabilitation objectives include:

- Backfilling, sealing and capping of drilled boreholes

- Clean-up of surrounding areas, removing pollution and waste materials
- Spread overburden and topsoil evenly and re-vegetate disturbed areas
- Inspect rehabilitated areas to monitor re-vegetation rate and remove alien invader species that may establish in the area

Final decommissioning and rehabilitation objectives:

- Remove all temporary infrastructure from the site camp and at prospecting sites
- Rip and seed disturbed areas such as on tracks, camping sites, ablution facilities etc.
- Inspect rehabilitated areas to monitor re-vegetation rate as well as to remove alien invader species

It is recommended that concurrent rehabilitation is undertaken to improve the success of rehabilitation. The rehabilitated areas must be monitored to ensure that the objectives of rehabilitation are met, and correct rehabilitation process is followed.

The closure objectives are to:

- Make all areas safe for humans, wild animals and livestock
- Prevent soil, surface and groundwater contamination by managing runoff water on site
- Minimise negative health and environmental impacts
- Establish a sustainable cover to prevent erosion and enhance ecological succession
- Maintain and restore biodiversity levels to provide appropriate habitat for fauna
- Protected drainage lines and watercourses
- Do not leave any infrastructure onsite

- Use approved sites for safe disposal of all wastes from the drilling sites
- Monitor key environmental variables (i.e. soils, erosion, vegetation) to demonstrate stability of rehabilitated areas
- Adhere to all statutory and other legal requirements
- Report on the progress of the rehabilitation process

PART C: Rehabilitation plan

Rehabilitation involves restoring a drilled borehole on completion of the prospecting activity including the surrounding affected area where the activity was undertaken back to its initial state and sometimes improving it by using various reconstruction methods and treatments. This document supplies the Department of Mineral Resources (DMR) with information pertaining to rehabilitation and closure plan for the proposed prospecting as required in terms of the National Environmental Management Act 107 of 1998 (NEMA) and the Mineral and Petroleum Resources Development Act 28 of 2002.

The proposed prospecting activities will be conducted in the following phases:

- Site Preparation
- Invasive drilling and concurrent rehabilitation
- Final decommissioning, rehabilitation and closure

The aim of rehabilitation is to return the disturbed prospecting target areas to their natural state. It is important to rehabilitate disturbed areas to ensure a safe and stable land use after prospecting for humans, wild animals and livestock.

33. Summary of rehabilitation and closure actions

Rehabilitation actions for the proposed prospecting activities will be undertaken in three phase's namely concurrent rehabilitation, final decommissioning and rehabilitation, thereafter a closure.

Concurrent rehabilitation would include:

- Backfilling, sealing and capping of drilled boreholes
- Clean up of surrounding areas, removing pollution and waste materials
- Spread overburden and topsoil evenly and re-vegetate disturbed areas
- Inspect rehabilitated areas to monitor re-vegetation rate and remove alien invader species that may establish in the area.

33.1. Final decommissioning and rehabilitation:

- Remove all temporary infrastructure from the site camp and at prospecting sites
- Rip and seed disturbed areas such as on tracks, camping sites, ablution facilities etc.
- Inspect rehabilitated areas to monitor re-vegetation rate as well as to remove alien invader species

It is recommended that concurrent rehabilitation is undertaken to improve the success of rehabilitation. The rehabilitated areas must be monitored to ensure that the objectives of rehabilitation are met, and correct rehabilitation process is followed.

33.2. The importance of rehabilitation

There are a variety of reasons for rehabilitating the prospected area. Below we provide some of the reasons.

- Make all areas safe for humans, wild animals and livestock
- Prevent soil, surface and groundwater contamination by managing runoff water on site
- Minimise negative health and environmental impacts
- Establish a sustainable cover to prevent erosion and enhance ecological succession

- Maintain and restore biodiversity levels to provide appropriate habitat for fauna
- Protected drainage lines and watercourses
- Do not leave any infrastructure onsite
- Use approved sites for safe disposal of all wastes from the drilling sites
- Monitor key environmental variables (i.e. soils, erosion, vegetation) to demonstrate stability of rehabilitated areas
- Adhere to all statutory and other legal requirements
- Report on the progress of the rehabilitation process

33.3. Capping and plugging of drilled boreholes

- PVC drill hole collar of the same size “diameter & length” with the drill hole must be readily available, with a temporal and permanent cap/plug. The temporal cap can be pushed into the PVC collar to the bottom of the collar with the backfilling “un-contaminated soil” material. Thus, is to eliminate the movement of the backfilled material within the PVC collar to the outlet environment. See the figure below.

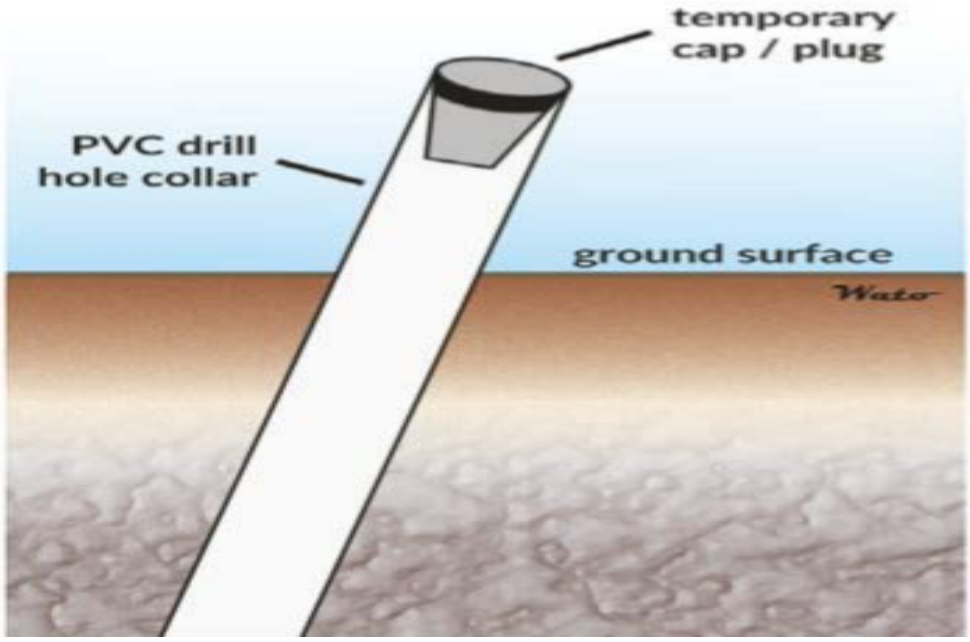

Figure 12: Showing the pvc drill hole collar of the same size “diameter & length” with the drill hole inserted.

- The PVC collars backfilling material must leave a space of 1 m below the surface, then a permanent cap/plug (non-degradable/metal plate) can be placed which can take up to 10 cm. The plug is to be at least 50 mm larger than the diameter of the drill hole, but depending on the nature of the ground, must be of sufficient size as to remain firmly in position.
- The remaining portion of a metre left on the PVC collar must be cut below ground level to a minimum depth of 1 m. See the figure below.

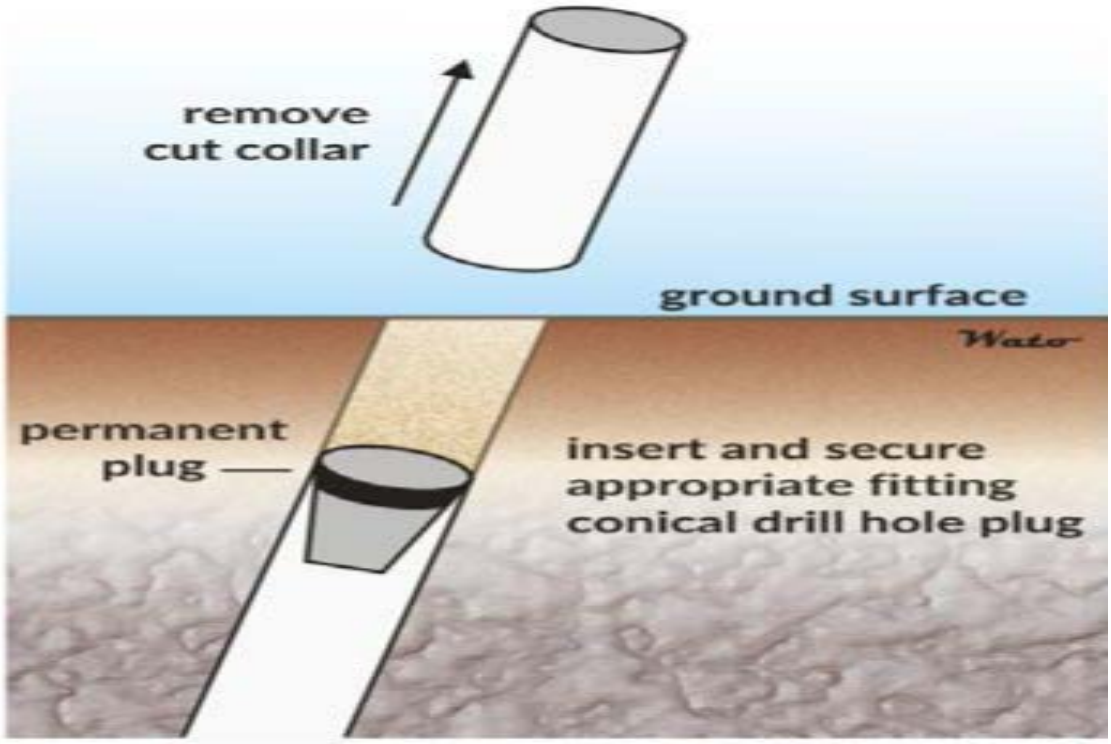

Figure 13: Showing the pvc collar cut at 1 m below the earth surface, the cap is then installed.

- After capping has stabilized, backfilling the remaining 1 m above the PVC collar with topsoil. The soil backfill should be compacted and mounded over the hole to allow for subsidence and to limit the pooling of surface water. The intention is that water shall not ingress the hole, causing erosion. Particular care is required to ensure the long term effectiveness of the plugging procedure.

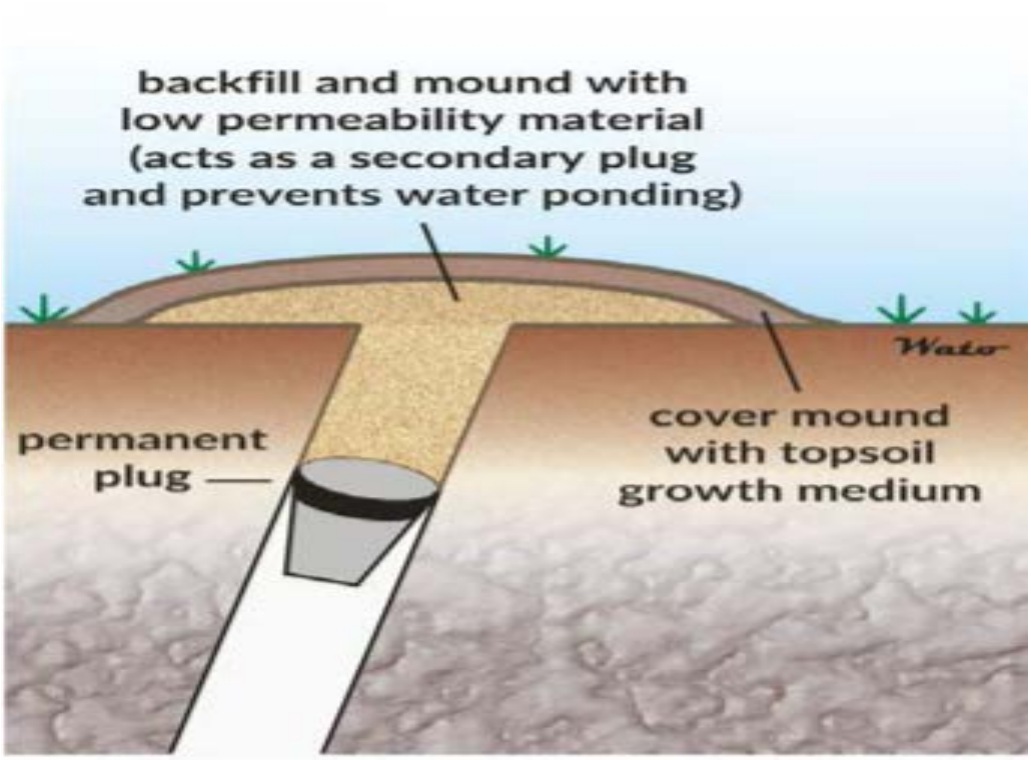

Figure 14: The remaining 1 m above the pvc collar with filled with topsoil

- **Capping and plugging of drill holes intersecting a single confined aquifer**

The main objectives of sealing drill holes in single confined aquifers is to contain water in the aquifer. Drill holes must be plugged across the aquifer confining bed interface for a thickness of about 4 m (2 m above the interface and 2 m below); and then backfilled or plugged as outlined previously.

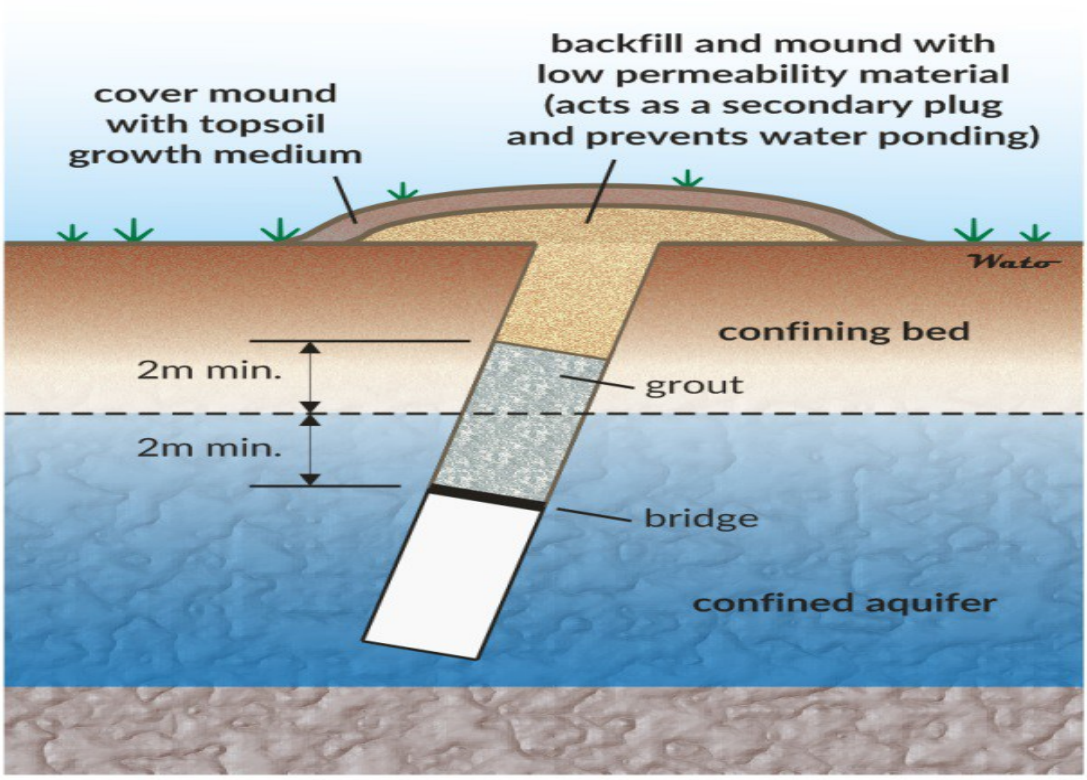

Figure 15: Sealing drill holes in single confined aquifers

33.4. Capping and plugging of drill holes intersecting multiple aquifers

- Major aquifers should be sealed to prevent inter-aquifer flow. Concrete plugs must be positioned at the interfaces between aquifers and the overlying confining beds. The concrete should be at least 4 m thick, with 2 m above and 2 m below the interface. Holes should then be backfilled or plugged as outlined previously, with compaction and mounding of backfilled material. Shallow drill holes can be backfilled from the base of the hole to the surface with concrete.

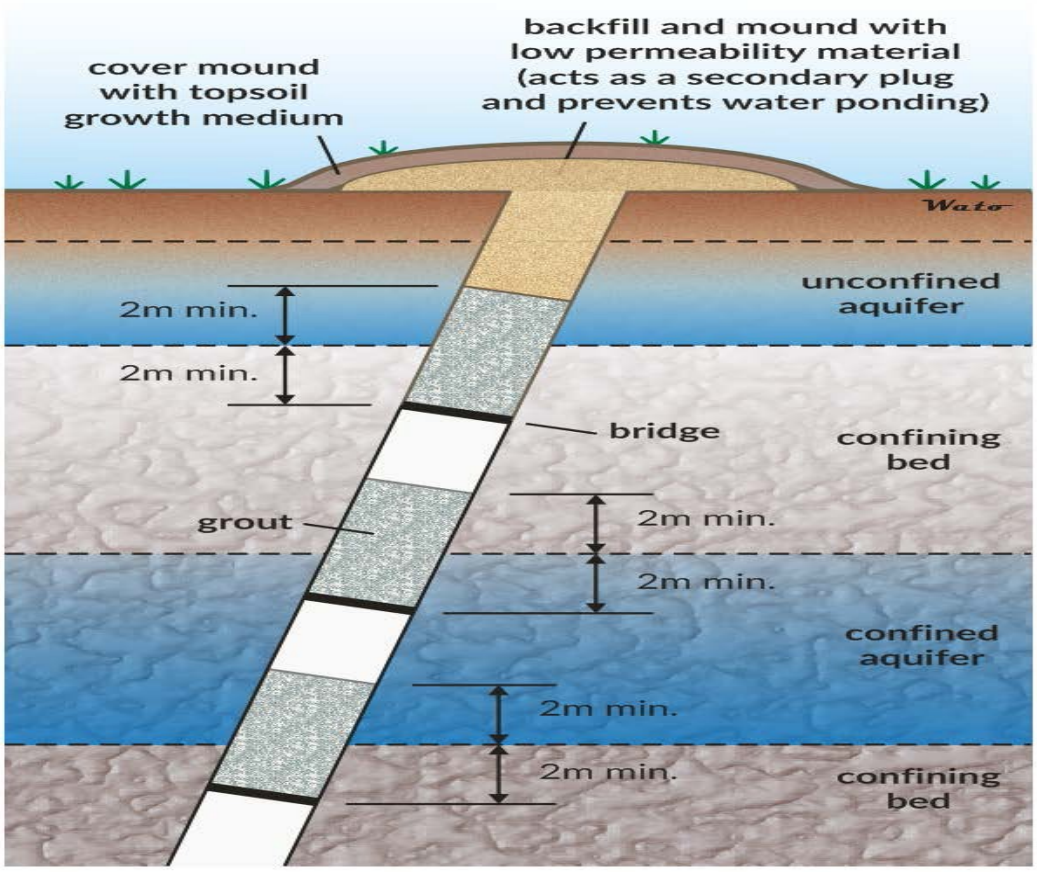

Figure 16: Showing how interfaces between aquifers and the overlying confining beds must be placed

33.5. Rehabilitation of the surrounding area of the drill site

- Dependent on site conditions and surrounding landscape, it may be necessary to conduct earthworks to stabilise and reshape the site. The site is required to be remediated to as near original condition as possible, following the completion of the drilling program.
- Ground which has become compacted by the use of heavy machinery and traffic is to be ripped along contour, not down slope, to loosen soil, promote water infiltration, aid re-vegetation and minimise soil erosion.
- Earth and overburden that was excavated from the pads and benches is required to be pushed, raked or pulled back over. The stockpiled topsoil and vegetation should be re-spread over the site.
- All sample bags, waste materials and contaminants must be removed from site and disposed of in an appropriate manner, following the completion of the drilling program.

- Drill cuttings that are acidic, radioactive or of a substantially different colour to the surface soil must be backfilled in the drill hole, sump or other excavation. All other cuttings are required to be dispersed around the site or raked over.
- Drill sumps must be backfilled with the excavated material and re-spread with stored topsoil.
- Permanent survey markers should be kept to a minimum and wooden pegs should be used in preference to steel pegs.
- Tracks constructed to access the drill site must be remediated, they must be ripped or ploughed, and where necessary fertiliser (based on soil analysis) applied to ensure the regrowth of vegetation.
- If reasonable assessment indicates that re-establishment of vegetation is unacceptably slow the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the prospecting operation, be correct and the area be seeded with seed mix to Regional Managers specification;

33.6. Decommissioning phase

- All bores that are to be permanently decommissioned must be sealed completely and filled in a manner that prevents vertical movement of water within the bore.
- The sealing material must not pose any potential human or environmental health risk and should be more impervious than the material through which the bore was drilled. Concrete cement should be used as the primary sealing material and should be placed from the base of the hole upwards.
- Fill material should consist of clean or disinfected sand, coarse stone, clay or drill cuttings.
- Boreholes with high flows and pressure should be sealed exclusively with concrete cement to a depth of the hole.
- All bores should be sealed with an approved sealing material from a depth of 1 m to around 30 c below the ground surface. Topsoil should be placed above this to assist in full rehabilitation. Surface casings may be left in place

if they have been pressure cemented or if they have been determined to be sound, in which case they must be bridged with concrete cement.

- Concrete bridges may be used where it is not practicable to fill the entire PVC drill hole collar. A minimum of 10 m is required for a bridge (20 m for a flowing bore). These will be set in impermeable strata immediately above and below each aquifer formation in the bore.
- Records should be complete and accurate regarding the location of borehole and the procedure used for decommissioning and rehabilitating the site.

33.7. Closure Period and Post Closure Requirements

The closure period is the period between stopping of prospecting activities and the completion of active rehabilitation processes on the disturbed areas. The nature of borehole and drill site rehabilitation is of such that closure may be implemented for individual boreholes as and when analysis ends.

The closure options together with monitoring must be undertaken for the period of 2 years post final decommission. Thereafter a closure can be achieved. This closure should be in line with the requirements of the MPRDA Regulations. Following successful completion of the closure actions it is suggested that a further post closure period of 2 years be assigned to monitor the success of closure. The post closure monitoring will include:

- Inspection of drill hole caps;
- Inspect and remedy any erosion around rehabilitated drill sites
- Inspect rehabilitated areas re-vegetation rate
- Remove alien invader species

33.8. Required expertise

Engineering personnel: An engineer with at least 5 years of experience must be responsible to ensure that the rehabilitation program is implemented as outlined. The engineer must also enforce the following;

- confirming that workers are trained and competent for the task undertaken
- providing clear work instructions
- inspecting and monitoring workplace conditions
- continuously evaluating worker performance and correcting unsafe acts
- reporting and rectifying hazards
- assuring implementation of the company's safety systems
- demanding compliance with safety rules and procedures
- conducting meaningful observations, consultation and interventions
-

Environmental, Health and safety personnel: with at least 3 years' experience in relevant fields of rehabilitation.

- Monitor and report the potential environmental, health and safety risk
- Identify priorities for replacing or modifying the rehabilitation plan.
- Develop an action plan with due dates and responsibilities for the rehabilitation process
- Conduct an audit of rehabilitation to ensure that all practical measures have been taken to control risk associated
- Produce and environmental, health and safety report monthly and quarterly

33.9. Recommendations

Compliance with Closure Plan

The closure objectives can only be achieved by fore filling the responsibilities as set out in this rehabilitation plan. Closure objectives cannot be achieved if the actions of the rehabilitation plan are not complied with resulting in an unsuccessful closure plan.

Annual update requirements of the plan

The rehabilitation and closure plan must be reviewed annually and updated as and when major changes are effected to the Prospecting Works Programme.

On-site documents

The closure plan must be available onsite as per the requirements of Regulation 26 (h) of NEMA EIA Regulations of 2014.

40. EXPLAIN WHY IT CAN BE CONFIRMED THAT THE REHABILITATION PLAN IS COMPATIBLE WITH THE CLOSURE OBJECTIVES.

Care and adherence to environmental issues is a priority. Most recent and sustainable technology will be used to restore the environment close to its initial state. Please refer to the rehabilitation plan above.

41. 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 prospecting and its associated operations forms an integral part of the MPRDA. Section 41 (1) and 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 in order to empower the personnel at Regional DMR offices to review the quantum determination for the rehabilitation and closure for mining sites.

Confirm that the financial provision will be provided as determined.

Goakantswe Projects (Pty) Ltd have finances allocated for the proposed project, a deposit will be made to the DMR trust fund account and proof of payment will be submitted.

42. MECHANISMS FOR MONITORING COMPLIANCE WITH AND PERFORMANCE ASSESSMENT AGAINST THE ENVIRONMENTAL MANAGEMENT PROGRAMME AND REPORTING THEREON INCLUDING

- The environmental Officer be employed on daily basis of the operation for monitoring of impact Management Actions
- The environmental Officer will generate daily and monthly monitoring reports, external audits will be conducted on quarterly basis
- The environmental officer is responsible for monitoring compliance
- Impacts should be immediately managed with urgency.
- Mechanism for monitoring compliance should be reviewed and updated.

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

Annual environmental audits must be undertaken to ensure compliance with the authorization conditions and EMPr.

43. ENVIRONMENTAL AWARENESS PLAN

MANNER IN WHICH THE APPLICANT INTENDS TO INFORM HIS OR HER EMPLOYEES OF ANY ENVIRONMENTAL RISK WHICH MAY RESULT FROM THEIR WORK.

Before the proposed project of prospecting commence, all the employees whom will be responsible for identifying environmental risks will go to training to get the insight information on how they will compile environmental risk study. It is a standard practice for all employees to attend induction training where environmental course will be explained in more detail related to the project. The training should cover the relevant part of the EMP which is formed as a guide to contractors and employees regarding environmental related issues and how to mitigate such issues

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

The Applicant, Goakantswe Projects (Pty) Ltd and contractors will be responsible for the implementation section 28 of NEMA at all times “duty of care” to mitigate any impacts in order to avoid pollution or degradation of the environment appropriate implementation of the recommended mitigation measures specified in the EMPr will be monitored through monthly site audits by an EAP and annual EMP audits undertaken by a third party.

The Following Documents Will Be Used As Reference For Identifying And Managing Impacts:

- Approved Empr;
- Approved EA; And
- Adoption and implementation Environmental Management Systems.

45. SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

No specific information was required by the competent authority.

PART D: PROSPECTING HEALTH AND SAFETY ISSUES

In the event of contractual agreements with service providers to such that if enhances health and safety. Owner or employer remains responsible for compliance

46. Hazard Identification and Risk Assessment

a) Task analysis for every operation to be conducted, and bigger to be broken down to smaller tasks.
b) Hazards to be identified on each and every task.
    - Drilling hazards

Drilling in any environment is potentially hazardous, but when risk are identified prior execution and mitigation measure are put in place. The risk of drilling becomes low on both the environment and human health.

There are hazards associated with the preparation of camps, work sites and drill pads, as well as those specific to the operation of drill rigs.

Western Australia's code of practice for mineral exploration drilling encourages operators to develop site-specific solutions for the major hazard categories identified for the remote exploration environment, including:

- rotating and moving parts
- hazardous substances and dangerous good
- manual tasks
- working in hot environments
- fatigue and mental wellbeing
- dust
- noise
- ionising radiation
- hot work
- extreme weather and bushfire

c) Risk assessment to be conducted for every identified hazard.

The EMP provides measures to be used when dealing with impacts. However, hazard specific assessment will be conducted based on the urgency of the identified hazard.

d) Effective measures to be put in place to deal with risks associated with identified hazards.

A standard operating procedure (SOP) that addresses the use of correct personal protective equipment, safe handling, safe use, and proper disposal should be established. Thorough training and drills should be conducted regarding the company's spill response plans and chemical hygiene plans.

Where there is a possibility of heat stress occurring, companies need to carry out a risk assessment that considers the work rate, working climate and worker clothing and respiratory protective equipment. Where possible, control the temperature using engineering solutions, provide mechanical aids where possible to reduce the work rate, and regulate the length of exposure to hot environments. Furthermore, personal protective equipment should be provided, such as specialised protective clothing that incorporates personal cooling systems or breathable fabrics. Furthermore, companies should provide training for workers, especially new and young employees, and monitor the health of workers at risk.

To protect workers against noise, the companies should evaluate working conditions and noise exposure through risk assessments. Avoiding and reducing exposure can be achieved by applying engineering controls at the noise source or along the noise path to reduce exposures, such as vibration dampeners or absorptive panels. Regular maintenance of machines is also essential to reducing noise. Employer must ensure proper use of personal hearing protection amongst.

Noise-exposed employees, while providing necessary health and safety training and maintaining up-to-date health surveillance records.

47. Standard Working Procedures and COP's

a) Compilation of all mandatory COP's prior to commencement of prospecting.

The purpose of this schedule is to ensure that employees are not only trained but that the principles are continuously re enforced.

Table 24: Working procedures

Activity	Time allocation and frequency	Objective
Induction (all staff and workers)	1-hour training on environmental awareness training as part of site induction	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. Establish a basic knowledge of the environmental legal framework and consequences of non-compliance. Clarify the content and required actions for the implementation of the Environmental Management Plan. Confirm the spatial extent of areas regarded as sensitive and clarify restrictions. Provide a detailed understanding of the definition, the method for identification and required response to emergency incidents
Monthly Awareness Talks (all staff and workers	30-minute 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 (Environmental officer, 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 daily as part of daily tool box talks.

Figure 17: Typical example of meeting before commencing with work

b) Based on the proposed effective measures and mandatory COP's safe and healthy working procedures must be formulated and documented.

c) Contents of the COP's must be properly communicated to different levels of the organization and effectively implemented.

48. 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.

48.1. 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) will be identified and the contact numbers obtained and made available on site. The procedure must be developed in consultation with all potentially affected landowners. In the event that risks are identified which may affect adjacent landowners (or other persons), the

procedure will include the appropriate communication strategy to inform such persons and provide response measures to minimise the impact.

48.2. Incident reporting procedure

Incident reporting will be undertaken in accordance with an established incident reporting procedure to (including but not limited to):

Provide details of the responsible person including any person who: (i) is responsible for the incident; (ii) owns any hazardous substance involved in the incident; or (iii) was in control when the incident occurred

- Provide details of the incident (time, date, location)
- The details of the cause of the incident
- Identify the aspects of the environment impacted
- The details corrective action taken
- The identification of any potential residual or secondary risks that must be monitored and corrected or managed

48.3. 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 Environmental Management Plan. Non-conformances will be identified and corrective action taken where required.

48.4. Health and Safety Equipment and Personal Protective Equipment

Ensure necessary and appropriate tools, fit for the purposes are provided for employees perform work.

Figure 18: Typical PPE

Use respiratory protection when needed. The controls cited in this report may greatly reduce worker exposure to dust; however, respirators may still be necessary to reduce exposure to crystalline silica below the NIOSH REL of 50µg/m3. Due to the health risk related to exposure to crystalline silica, proper personal respiratory masks are needed when drilling, and should continue to be used even after dust suppressive methods are established. Necessary personal protective equipment to be provided.

Figure 19: Health and Safety sign

c) All necessary adequate hygiene facilities to be provided.

48.5. Provision of potable and palatable water

The employer must ensure that sufficient potable and palatable water, which comply with the requirements set out, is readily available to all employees and clearly identified as drinkable.

Table 25: Categorization and minimum standards for strenuous work

Very Heavy	Manual Material Handling: Consists of 34-66% of the work shift (daily exposure). Work Environment: Manual material handling takes place in restricted work environments (ceiling heights of 0.850m - 1.5m). Heat Exposure: Daily exposure to high environmental heat loads for more than 34% of the work shift. Production / Non-production Related: Work tasks are imposed by a process (directly linked to production).
Heavy	Manual Material Handling: Consists of 34-66% of the work shift (daily exposure). Work Environment: Manual material handling takes place in unrestricted work environments. Heat Exposure: Daily exposure to high environmental heat loads for more than 34% of the work shift. Production / No-production Related: Work tasks are imposed by a process (directly or indirectly linked to production).
Moderate	Manual Material Handling: Load handling consists of less than 34% of the work shift on a daily basis or more than 34% of the work shift on an occasional basis. Work Environment: Unrestricted work environments or

	supervisory work in restricted environments. Heat Exposure: Occasional exposure or daily exposure in case of supervisory work. Production / Non-production Related: Work tasks indirectly linked to production.
Light	Manual Material Handling: Load handling consists of less than 34% of the work shift – occasional load handling. Work Environment: Unrestricted work environments and/or occasional exposure to restricted work areas. Heat Exposure: Occasional exposure. Production / Non-production Related: Work tasks indirectly linked to production.
Sedentary	Manual Material Handling: Load handling limited to loads of up to 10kg, occasional exposure only. Work Environment: Unrestricted. Work tasks take place in a seated/standing work position for at least 50% of the work shift. Heat Exposure: Not exposed to heat.
Roaming	Manual Material Handling: None. No external workloads required other than wearing PPE. Work Environment: Unrestricted. Heat Exposure: Low exposure to heat. Production / Non-production Related: Not linked to production.

49. UNDERTAKING

The EAP herewith confirms

a) The correctness of the information provided in the reports **X**
b) The inclusion of comments and inputs from stakeholders and I&APs **X**
c) The inclusion of inputs and recommendations from the specialist reports where relevant **X**
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 **X**

TSHIA MALEHASE

Signature of the Environmental Impact Practitioner

Name of Company: Basia Environmental Consultants

Date: 3 February 2021

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