



BASIC ASSESSMENT REPORT & ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

PREPARED FOR : PAN AFRICAN MINERAL DEVELOPMENT COMPANY (PTY) LTD

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REFERENCE NO : NC30/5/1/1/2/12532 PR

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mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

BASIC ASSESSMENT REPORT
And
ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

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

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File reference number SAMRAD: NC30/5/1/1/2/12532 PR

IMPORTANT NOTICE

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

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

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

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

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

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.

1. ACRONYMS

BAR	Basic Assessment Report
CBA	Critical Biodiversity Area
CITIES	Convention on International Trade in Endangered Species
DAFF	Department of Agriculture Forestry and Fisheries
DEA	Department of Environmental Affairs
DHSWS	Department of Human Settlement Water and sanitation
DMRE	Department of Mineral Resources and Energy
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officers
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMP	Environmental Management Plan
EMPRs	Environmental Management Programmes
EPA	Environmental Performance Assessment
ESA	Ecological support area
GDP	Gross Domestic Product
IAPs	Interested and Affected Parties
IDP	Integrated Development Plan
JSE	Johannesburg Stock Exchange
m	Meter
MPRDA	Mineral and Petroleum Resources Development Act
NEMA	National Environmental Management Act
NEMBA	National Environmental Management Biodiversity Act, 10 of 2004
NWA	National Water Act, Act 36 of 1998
PM	Project Manager
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resource Agency
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
SFSD	Strategic Framework for Sustainable Development

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PART A:

SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

1. Contact person and correspondence address

1.1. Details of the EAP

Table 1: EAP Details

Consultant Name	Joan Consulting (Pty) Ltd
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Report reviewed and Approved by (Principal EAP)	Lufuno Mutshathama lufuno@Joanprojects.co.za 073 912 0800
Postal address:	P O Box 4147, Honeydew,2040
Physical address:	09 Lourie Road, Randpark Ridge, Randburg, Johannesburg
Telephone:	011 791 5032
Fax:	86 5 5142

1.2. Expertise and qualifications of the EAP

(a) Expertise of the EAP that Prepared the Report

Mulalo Tshilimandila is an Environmental and Mineral Officer at Joan Consulting (Pty) Ltd. He holds a degree in Environmental Science from University of Venda, Introduction to SAMTRAC Certificate from NOSA. He is registered as Trainee Certificated Natural Scientist, level B with South African Council for Natural Scientific Professions ("SACNASP") with registration number 600002/15. EAP certificates are attached as **appendix A**.

Mr. Tshilimandila has expertise in a wide range of environmental disciplines, including Environmental Impact Assessment ("EIA"), Environmental Management Programmes ("EMPRs") and coordination and facilitation of the public participation processes ("PPP"). Drafting of informed recommendations on NEMA S24G applications and the correct application of S24G guidelines, Environmental Assessment policies and procedures. He reviewed and prepared recommendations and set permit conditions for EIAs at GDARD. EAP CV with Experience has been attached as **appendix B**.

(b) Expertise of the EAP that reviewed and approved the Report

Lufuno Mutshathama is an Environmental Scientist by profession, and registered as a Certificated Natural Scientist with the South African Council of Natural Scientific Professionals (SACNASP Reg: 114437). She holds a Bachelor of Environmental Sciences degree and has 11 years collective experience working in the mining industry specialising in mine environmental management and mineral licensing. Of the 10 years, 3 years were spent at the Department of

Mineral Resources and Energy (DMRE) as an Environmental Officer, 1.5 years were spent working at a Johannesburg Stock Exchange (JSE) listed mining company as the Group Environmental Officer and the 6 years to date were spent as a founder and Principal Consultant at Joan Consulting (Pty) Ltd, an environmental management and mineral licensing firm. EAP certificates are attached as **appendix A**.

Lufuno has extensive experience in mining environmental management areas such as water management, Environmental Management Programme (EMP) implementation, waste management, environmental audits, financial provision estimations and revision, mine rehabilitation and assessments such as Environmental Impact Assessment (EIA), Basic Assessment (BA), scoping, closure plans and environmental risk assessment. Mineral licensing which entails obtaining prospecting and mining rights, their variations and cessions (including environmental due diligence). EAP CV with Experience has been attached as **appendix B**.

1.3. Applicant of the Details

Table 2: Details of the Applicant

Project applicant:	Pan African Mineral Development Company (Pty) Ltd
Contact person:	Mr Emmanuel Mulenga
Physical address:	CEF House, Block C, Upper Greyston Office Park, 152 Ann Crescent, Strathavon, Sandton, Johannesburg
Postal address:	P.O. Box 786141, Sandton,
Postal code:	2146
Telephone:	011 201 4700
Fax:	011 201 4705
E-mail:	emmanuelm@pamdc-za.co.za
Cell:	073 092 4801

1.4. Location of the overall activity

The project site is located in the Northern Cape Province in South Africa. It is situated at approximately 80 km South-West and 120KM south west of Kuruman town. This area falls within the Kuruman Magisterial District within Joe Morolong Local Municipality ward 4 under John Taolo Gaetsewe Municipality (previously known as Kgalagadi) and Joe Morolong Local Municipality. The project site can be accessed through R380 provincial road.

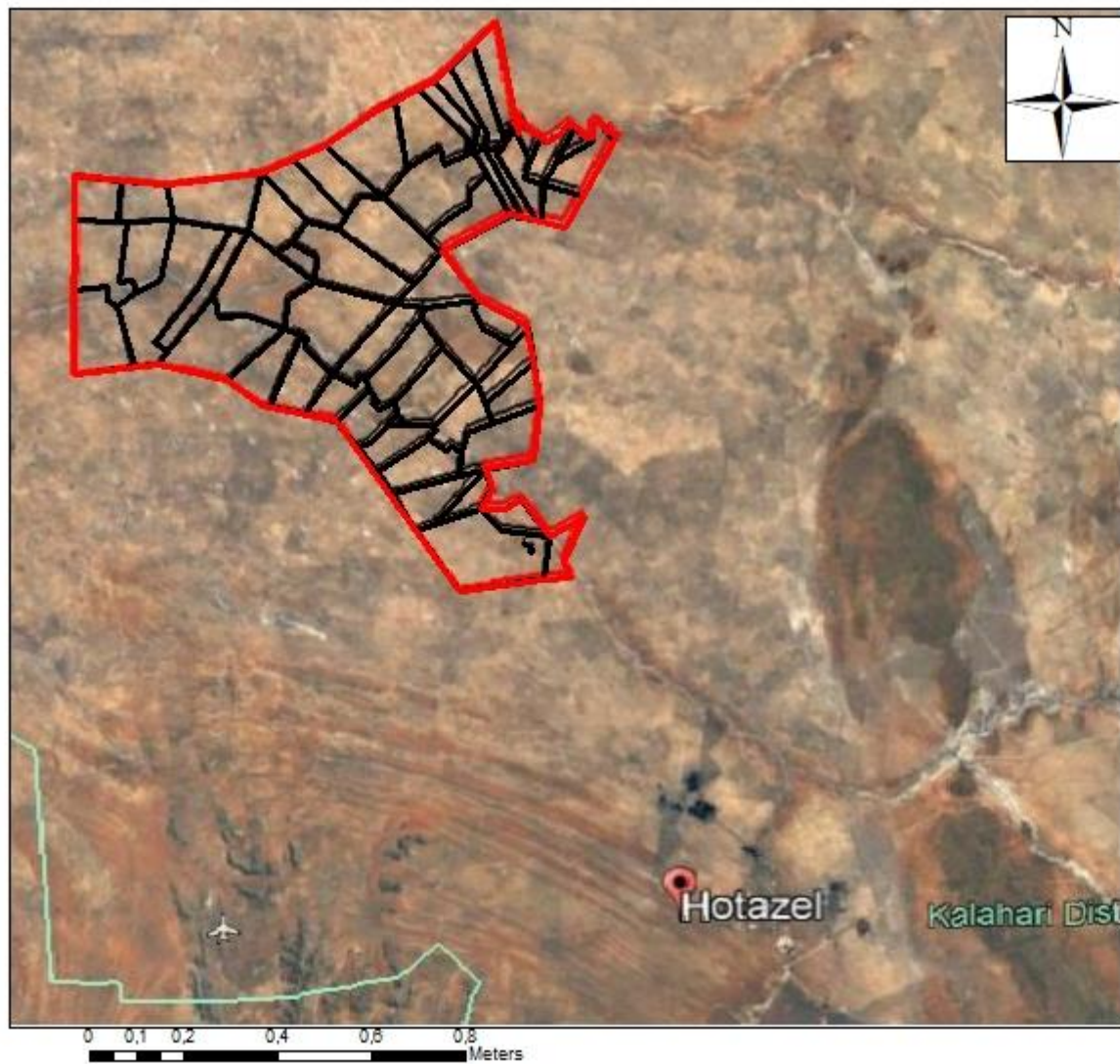
Table 3: Property details

Application area (Ha)	The area is approximately 106966 ha in extent
Magisterial district:	Kuruman Magisterial District
Distance and direction from nearest town	Approximately 80 KM south west of Hotazel town and 120 South west of Kuruman town in Northern cape province.



Table 4:21-digit Surveyor General Code for each farm portion

21-digit Surveyor General Code for each farm portion	Farm Name
C04100000000070300012	Overland 703/12
C04100000000070300067	703/67
C04100000000070300066	703/66
C04100000000070300065	703/65
C04100000000070300011	Concordia 703/11
C04100000000070300010	Goedemoed 703/10
C04100000000070300083	703/83
C04100000000070300046	Eden 703/46
C04100000000070300078	703/78
C04100000000070300068	703/68
C04100000000070300047	Eldorado 703/47
C04100000000070300079	703/79
C04100000000070300009	Tantalus 703/9
C04100000000070300082	703/82
C04100000000070300048	Besluit 703/48
C04100000000070300081	703/81
C04100000000070300064	703/64
C04100000000070300052	Boomplaas 703/52
C04100000000070300008	Meyer 703/8
C04100000000070300117	703/117
C04100000000070300061	703/61
C04100000000070300001	Witstraat 703/1
C04100000000070300080	703/80
C04100000000070300013	Golden Valley 703/13
C04100000000070300002	Kalkrandjes 703/2
C04100000000070300003	Clydesdale 703/3
C04100000000070300005	Bella Vista 703/5
C04100000000070300014	Bucklands 703/14
C04100000000070300062	703/62
C04100000000070300007	Le Roux 703/7
C04100000000070300063	703/63
C04100000000070300018	Die Doorns 703/18
C04100000000070300015	Wentworth 703/15
C04100000000070300004	Langlaagte 703/4
C04100000000070300006	703/6
C04100000000070300112	703/112
C04100000000070300087	703/87
C04100000000070300017	Witputs
C04100000000070300110	703/110
C04100000000070300072	703/72
C04100000000070300016	Westward Ho 703/16
C04100000000070300069	703/69
C04100000000070300024	Keega 703/24

21-digit Surveyor General Code for each farm portion	Farm Name
C04100000000070300027	Diamond 703/27
C04100000000070300051	Angora 703/51
C04100000000070300026	Afskeid 703/26
C04100000000070300020	Merinovale 703/20
C04100000000070300055	Water Draai 703/55
C04100000000070300071	703/71
C04100000000070300023	Friesland 703/23
C04100000000070300025	Hereford 703/25
C04100000000070300056	Wit Bank 703/56
C04100000000070300030	Wanganella 703/30
C04100000000070300101	703/101
C04100000000070300102	703/102
C04100000000070300057	Doorn Draai 703/57



Legend

-  Proposed Area
-  Farm Boundaries

Title: PAMDC Locality Map
Project 2

Date: 19 December 2019

Projection: Transverse Mercator
WGS 84'

Client: PAMDC (Pty) Ltd



Prepared By: Joan
Consulting(Pty) Ltd

Figure 1:Locality Map

2. Description of the scope of the proposed overall activity.

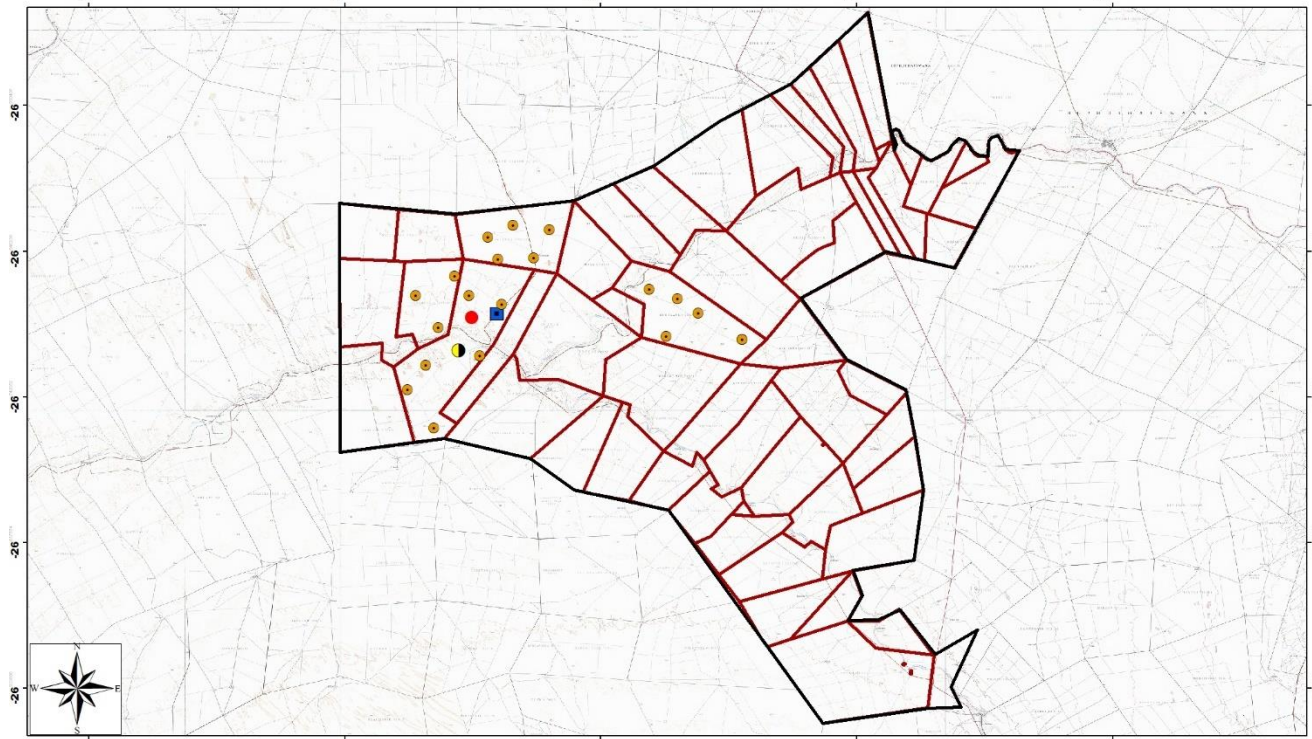
Provide a plan drawn to a scale acceptable to the competent authority but not less than 1: 10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site

The following activities will be undertaken on site including associated infrastructure as part of the site establishment.

- Diesel power source vehicles and machineries will be used for the proposed activities.
- There are currently existing roads that give access to the proposed site. In areas where it's problematic or with no access at all, temporary roads will be established (through trucks moving through the bush, not bush clearing).
- It is mandatory under the health and safety act that ablution facilities are made available where people will be undertaking any activities. Chemical toilets will be erected on site for the sanitation purposes.
- Temporary contractor's yard will be erected on site and will entail site offices, ablution facilities as well as parking areas. No workers will stay on site.
- Storage and handling of hydrocarbons which is limited to fuel (diesel) and a minimum of less than 30m³ will be stored on site powering the machineries.
- Water for prospecting purposes will be brought to site. Portable water for contractors will be provided and will be stored on site in a tanker of 12 000 litres capacity.

It must be noted that the site plan is subjected to change depending on the findings of the desktop study, geophysical and geochemical surveys to be undertaken as part of the prospecting activities.

Site Plan for PAMDC for Prospecting Right Application



Legend

Infrastructure Layout

- Ablution Facilities
- Equipment Storage
- Core yard
- Borehole (Inclusive of Water Sump)
- Project Boundary
- Farm Portions

0 7 000 14 000 28 000 Meters

Date: 28 November 2020

Coordinates System: GCS WGS 1984
Datum: 1984
Unit: Degree

Drawn By: Joan Consulting Pty Ltd



Prepared for: PAMDC Pty Ltd

Figure 2: Site Map

3. Listed and specified activities

Section 16 of the Mineral and Petroleum Resources Development Act (Act No. 28 of 2002) requires, upon request by the Minister, that an Environmental Management Programme is submitted and that the applicant must notify and consult with Interested and Affected Parties (I&APs). Section 24 of the NEMA requires that activities which may impact on the environment must obtain authorisation from the relevant authority before commencing with the activity. Such activities are listed under Regulations Listing Notice 1 Government Notice (GN) 327, Listing Notice 2 GN 984 and Listing Notice GN 324 of NEMA- as amended in April 2017. Please refer to Table 5 for details of the listed activities triggered by the proposed development.

Table 5: NEMA triggered activities

NAME OF ACTIVITY E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc.	Aerial extent of the Activity Ha or m ²		LISTED ACTIVITY Mark with an X where applicable or affected.	APPLICABLE LISTING NOTICE (GNR 544, GNR 545 or GNR 546)
Establishment of Drill site (Drilling)	2000 m ²	0.2ha	X	Activity 20 - GNR R327 of 2017
Site Establishment <ul style="list-style-type: none"> • Workshop Area • Storage Yard • Ablution facility 	2000 m ²	0.2ha	X	Activity 20- GNR R327 of 2017
Access road (Existing)	–	–		N/A
Water Sump	80m ² x 4m ² x 20 holes	0.064ha		N/A
Total Vegetation removed	4000 m ²	0.4ha		Activity 20 - GNR R327 of 2017

4. Description of the activities to be undertaken

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

The application has been lodged for the prospecting right for Manganese, Lead, Zinc, Limestone, Cobalt, Copper and Iron. The prospecting method that will be used is drilling, using the drill rig and no bulk sampling will be undertaken. The development will primarily entail drilling a total of 20 boreholes. Each drill site will be about 100m². The drilled boreholes will be between 50 and 150m deep. Each site will comprise of a borehole, drill rig site and a water sump. Recovered cores will be taken from each borehole to test for the targeted minerals at the laboratory.

Beside the drilling of holes which is the invasive method, there are also other prospecting activities to be undertaken which are non-invasive, thus methods that do not have physical contact with the environment. Non-invasive methods will be undertaken in phase 1 and invasive methods in phase 2 and 3 as explained below. The invasive activities will be undertaken as a result of the positive outcome of phase 1.

Each drilling site will be rehabilitated concurrently with the drilling process. The intended phases and the full description of what each phase entails are indicated below in a sequential order.

4.1. Phase 1

Literature Review

Literature survey is a comprehensive review of published and unpublished work from secondary data sources. In order to conduct the exploration programme in an efficient and effective manner, there will be an acquisition and review of information and data gathered during historical exploration on the properties (and in the general area). A short economic costing study may be undertaken to determine the likelihood of mineral concentration required to make the project feasible (and direct further work). This may also include photo-geological and satellite interpretations. Data will be sourced from the Council for Geoscience (including high resolution aeromagnetic data sets), Universities and other libraries and previous explorers may be approached with a view to gain results. The re-evaluation of previously explored areas of similar nature is very important at this stage to build conceptual geological model.

Geological Mapping

The area will be geologically mapped on a regional basis to update information on a 1:50 000 scale using photo-geological interpretations and satellite imagery, remote sensing technologies, and using the interpretations from the previous phase as a guide. This data with assistance of 1:10 000 ortho-photo maps (and those gathered from the desktop study efforts) will be integrated in GIS systems and an upgraded digital geological model will be compiled.

Some detailed field mapping will be required in areas outlined by the quality of the information gained from historical archives. The conceptual geological model will then be upgraded prior to conducting any diamond drilling. The end product of geological mapping is a map which

accurately documents rock types, alteration mineralogy, and structural data such as faults, folds, and dip of strata.

Geochemical Sampling & Anomaly Screening

The target mineralization identified during the desktop study and mapping exercise will be further defined using surveyed line/grid based traversing geochemical soil/stream sediment and grab/float sampling activities. An orientation survey will be undertaken prior to this and is usually undertaken along existing roads, survey tracks and open areas to test the effectiveness of the technique in the specific terrain.

Geochemical target anomalies identified from the soil/sediment and grab sampling coupled with geophysical magnetic/gravity anomalies and possible airborne survey verification would be integrated on GIS application and followed by homing in over selected target areas and follow-up by further detailed geological mapping if possible, mainly to determine possible extent and depth of orebody. Also, if possible, an attempt at possible structural complexities will be determined at this stage.

Geophysical Surveys

Various methods of geophysical applications will be applied on the target areas and include: ground magnetics, gravity and radiometric traversing on irregular grids where road infrastructure allows for it and symmetrical grid traversing in areas possible.

4.2. Phase 2 - Construction, Operational And Deccomissioning Phase

Following Phase 1 - non-invasive activities, Phase 2 will commence with reconnaissance/stratigraphical drilling. The construction part entails of the site preparation and clearing the site and bringing the equipment such as the drill rig and mobile toilets on site. Five (5) of twenty (20) reconnaissance diamond drill holes are planned at this stage. These holes will serve to establish the stratigraphy of the project area and to establish mineralized portions within the stratigraphy. The boreholes will be drilled to a depth of approximately 150m.

The two boreholes will be correlated to establish the preliminary strati-graphical column. Secondly, the boreholes will be sampled and analysed for mineral content and the results of the sampling will be used as a basis for the next phase of exploration drilling.

Infill Resource Diamond Drilling

Drilling targets for this phase of drilling will be based on the results of the five boreholes drilled during the reconnaissance phase coupled with the conceptual geological/structural model to be established from the geophysical studies and associated interpretation. If mineralized horizons are intersected, fifteen (15) follow-up boreholes will be drilled. These fifteen boreholes will also be sampled, analyzed and the results of the sampling will be used as a basis for Phase 3 resource definition/exploration drilling.

If economically viable reefs are intersected in all the 20 boreholes drilled during reconnaissance and resource drilling campaigns, then a drill grid will be established as Phase 3 drilling. This follow-up exploration drilling program will be conducted as the source for gaining ground truth information of the potential ore body and to prove continuity in the third dimension in detail, addressing reef facies, structure and metallurgical parameters. This drilling phase will define the

orientation and shape of the orebody and also define the grade and tonnage and improve the geological confidence.

Any further follow up/infill boreholes will be planned and those will have to be drilled at a grid of 150 m. It is estimated that the depth of each borehole will range from 50 - 150 m. Drilled core will be logged (structure, lithology and facies), sampled and analyzed for Manganese, Lead, Zinc, Limestone, Cobalt, Copper and Iron. Additional hole-deflections or holes will be drilled for value verification and to ascertain variance in metallurgical and mineralogical parameters.

The current planning suggests that a total of 20 initial exploration boreholes are planned. This drilling programme should lead into a maiden inferred to indicate resource definition.

Decommissioning and Rehabilitation

Upon completion of the drilling and logging process, the drilling equipment and all machineries will be removed from site. The drilled boreholes will be closed with a steel casing to suitable depth and a concrete cap will be placed on top with the exception of locations where boreholes will be drilled on cultivated land. Topsoil that will be removed from drill sites will also be replaced, and all disturbed areas (including roads) will be ripped and allowed to return to the natural state. The denuded area will be re-vegetated by spreading a seed mixture that represent the local vegetation.

4.3. Phase 3

Pre-Feasibility Study

A multi-disciplinary pre-feasibility study will be done based on the geological model and Indicated Resource outlined in the previous phases. The outcome of the pre-feasibility Study will be a complete mine and plant design, together with a preliminary EMP for the operations. The associated infrastructure, human resourcing, and social and labour plan will have been completed to a lesser accuracy. Should this prove positive, feasibility study work will commence.

Other Activities Listed on Table 3 Are Outlined Below

- Diesel powered vehicles and machineries will be used for the proposed activities.
- There are currently existing roads that give access to the proposed site. Apart from the existing road, the area is not concentrated with dense vegetation which will allow vehicles to move in with ease, hence no new roads will be established. Temporary roads will be established (through trucks moving through the bush, not bush clearing).
- It is mandatory under the Health and Safety Act that ablution facilities are made available where people will be undertaking any activities. Chemical mobile toilets will be placed on site for the sanitation purposes.
- Temporary contractor's yard will be erected on site and will entail site offices, ablution facilities as well as parking areas. It should be noted that no workers will be staying on site unless agreed with land owners.
- Storage and handling of hydrocarbons which is limited to fuel (diesel) and oil will be stored on site.
- If water is available on each site, about 1 cubic meter of water will be taken from the borehole for cooling down the drill rig. The 1 cubic metre will be used in one drill site. This amounts to a total of about 20 cubic meters of water for the 20 boreholes to be drilled on site. Potable water for contractors will be provided and will be stored on site.

5. Policy and Legislative Context

Table 6: Applicable legislation to this Application

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT?
Minerals and Petroleum Resources Development Act (No 28 of 2002).	Prospecting Right Application	Regulations in terms of Section 107 (1) of the Act were published in Government Notice No, R 526 on the 23rd of April 2004. The regulations provide details of the procedures to be followed in applying for or renewing mining and prospecting rights and permits and for the closure of mining operations as provided and described in the Mineral and Petroleum Resources Development Act (M&PRDA). The applicant lodged a Prospecting right as per the legislation.
National Environmental Management Act, 1998 [Act 107 Of 1998], as Amended	Environmental Authorisation Application and BAR	The prospecting or exploration activities requires a Basic Assessment to be Conducted in terms of the NEMA Regulations of 2014 as amended in April 2017. The NEMA regulations identify DMRE as the Competent Authority and details out the Basic Assessment process to be followed. The Environmental Authorisation application has been lodged and the Basic Assessment report requirement is fulfilled by this report.
National Environmental Management: Air Quality Act (Act No 39 of 2004)	Prospecting Right Application	No permitting or licensing is required for this legislation; however, the Dust Control Regulations describe the measures for control and monitoring of dust. These regulations will be adhered to during the operation.
Environmental Impact Assessment (EIA) Regulations, 2014	Environmental Authorisation Application and BAR	This regulation gives guidelines in terms of methodology to be followed in terms of the requirement by NEMA and the content of the report thereof. This report forms part of the Basic Assessment of the EIA being undertaken and the EA application has been lodged.
National Environmental Management: Biodiversity Act 2004 (ACT NO. 10 OF 2004)	Vegetation clearance	BGIS LUDS has been consulted when determining the baseline environmental conditions for the areas impacted by proposed surface activities.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT?
National Environmental Management: Waste Act, 2008 (Act No.59 of 2008)	Prospecting Right Application	The principles of the NEM: WA will be applied to all aspects of the activities covered by this application. This will take in account all measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development.
National Water Act, 1998 (Act No. 36 of 1998)	Prospecting Right Application	The principles of the NWA will be applied to all physical activities implemented as part of ongoing drilling. The purpose of the National Water Act of 1998 (Act no.36 of 1998) is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in a manner that promotes equitability, efficiency and sustainability for present and future generations. The activities will comply with the GN 704 regulations and the provisions of the act during the operational.
National Heritage Resources Act, 1999 (Act No. 25 of 1999)	Prospecting Right Application	<p>All activities covered by this application will avoid any identified heritage resource to prevent the destruction or unsympathetic alteration of heritage resources that have either Formal or General Protection.</p> <p>A permit may be required should a cultural/heritage sites be identified on site be required to be disturbed or destroyed as a result of the proposed development.</p>
Spatial Planning and Land Use Management Act, 2013 (Act No. 16 of 2013)	Prospecting Right Application	Land use selected is compatible to the local spatial land use as the land already have an existing mining right
The Mine Health and Safety Act, 1996 (No 26 of 1996)	Prospecting Right Application	<p>The Mine Health and Safety Act, 1996 (No 26 of 1996) provides for the protection of health and safety of employees and other persons at mines and serves-</p> <ul style="list-style-type: none"> • To promote a culture of health and safety; • To provide for the enforcement of health and safety measurements; • To provide for appropriate systems for employee, employer and state participating to provide effective monitoring systems and inspections, investigations and inquiries to improve health and safety; • To promote training and human resource of development;

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT?
		<ul style="list-style-type: none"> • To regulate employers' and employees' duties to identify hazards and eliminate, control and minimise the risk to health and safety; • To entrench the right to refuse to work in dangerous conditions
South African National Biodiversity Institute (SANBI) Biodiversity GIS (bgis.sanbi.org)	Baseline environmental description	Used during desktop research to identify sensitive environments within the right area.
National Road Traffic Act (Act No 93 of 1996)	Prospecting Right Application	<ul style="list-style-type: none"> • An abnormal load/vehicle permit may be required for the drill rig to be taken to the site. • These include route clearances and permits will be required for vehicles carrying abnormally heavy or abnormally dimensioned loads.

6. Need and desirability of the proposed activities.

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

Assessment of the geological data available has indicated that the area in question may have Manganese, Lead, Zinc, Limestone, Cobalt, Copper and Iron Ore minerals.

In order to ascertain the above minerals and determine the nature, location and extent of the subject minerals within the proposed prospecting area, it will be necessary that prospecting activities be undertaken. Prospecting activities will also determine if there are any features that may have an impact on the economic extraction of the subject minerals. As such, a prospecting right is required to allow Pan African Mineral Development Company (Pty) Ltd 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 activities of the subject minerals will be necessary to determine the economic viability of the anticipated mineral reserves within the proposed prospecting area. Should the feasibility study prove positive, the project will graduate to a mining right project which will positively contribute to the socio-economic development of the nation through job creation and local business expansion.

Given the nature of the proposed exploration project, all impacts identified and discussed below, will be limited to the footprint of the exploration sites. The proposed site is situated far away from the homesteads/ villages and therefore, people's health and wellbeing will not be impacted and all mitigation measures proposed in the EMPr will be adhered to.

Although mining's contribution to South Africa's GDP has declined over the past 10-20 years, the industry remains one of the country's critical economic cornerstones and contributes to its economic activity, job creation and foreign exchange earnings, therefore it is of outmost important that continuous exploration is undertaken to discover new resources that will lead to the reboot of the mining sector again.

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

The preferred site was selected based on the underlying geology of the area. The information on the geology of the area was gathered by the use of historical data available, which will be confirmed by the prospecting activities to be undertaken. The geology of the area contributed greatly in giving the insight of the preferred site.

In order to confirm the viability of Manganese, Lead, Zinc, Limestone, Cobalt, Copper and Iron minerals, it is necessary that exploration be undertaken., hence the preferred activity is exploration.

The diamond core drill is the preferred technology for this proposed project. This technology is preferred because it is cost efficiency as well as well as their limited environmental footprint.

An environmental authorisation will allow PAMDC (Pty) Ltd to survey or investigate the site and identify an actual or probable mineral deposit. Data obtained from prospecting activities be necessary for the determination and modelling of the resource viability, as well as planning of the mine.

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

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

8.1. Details of the development footprint alternatives considered.

The location of the activity, the type of the activity, the design or layout plan and operational aspects of the activity were all determined by the type of the mineral, availability and positioning.

8.2. The property on which or location where it is proposed to undertake the activity;

The preferred location/property was chosen based on the underlying geology of the farm. The underlying formations on the farm may potentially contain Manganese, Lead, Zinc, Limestone, Cobalt, Copper and Iron reserves that may be possibly mined feasibly. However, the sensitive pockets of the project area will be taken into consideration when locating the prospecting activities area.

8.3. The type of activity to be undertaken;

The type of activity is determined by the proponent who in this regard wants to undertake prospecting activity, and therefore cannot assess alternative activity. The prospecting activity will be undertaken through the drilling (for core extraction). These methods provide feasible and cost-effective measures of obtaining ore samples from underground, which will then be analysed for the presence, quantity and grade of Manganese, Lead, Zinc, Limestone, Cobalt, Copper and Iron. Before the drilling can take place, non-invasive methods of prospecting such as geophysical mapping and desktop study will be undertaken.

The bulk sampling alternative or additional method of prospecting was assessed and was found to be not cost effective and not very environmentally friendly and that if avoided, the desired results will still be obtained.

8.4. The design or layout of the activity;

The proposed prospecting activities are designed such that they give a true reflection of the minerals within the selected site. The layout of the site is conceptual allowing change in the location on the drill holes as prospecting methods are applied.

8.5. The technology to be used in the activity;

The preferred prospecting method (drilling) is a proven prospecting method for this type of minerals. This prospecting method is also considered to have a low environmental impact if managed correctly. The bulk sampling alternative/or additional method of prospecting was assessed and was found to be not cost effective and not very environmentally friendly and that if avoided, the desired results will still be obtained.

8.6. The Operational Aspects of the Activity:

The operational aspect of the activity alternative was assessed, but no alternatives for the road, mineral and location of boreholes were considered because there will not be any construction of a new road and the minerals and location of the boreholes are dependent on the guidance of the geological map.

8.7. The option of not implementing the activity.

The option of not undertaking exploration activities on the project site was assessed and it entails that the site remains in its current state which is “previously disturbed but recovered”. This option will mean that there will not be any impacts on the biophysical environmental and there will also not be any improvement to the people’s livelihoods. In addition, this option will mean that the potential economical backreef cannot be quantified and therefore the socio-economic development potential cannot be evaluated

9. Details of the Public Participation Process Followed

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

9.1. Objectives of public participation Process

- Provide I&APs with sufficient and correct information to assist them to raise comments and make recommendations which are included in the Environmental Impact assessment process.
- Provides I&APs with the opportunity of suggesting ways of reducing or mitigating negative impacts of an activity and for enhancing positive impacts;
- Providing I&APs with sufficient and accessible information to assist them to Contribute local/indigenous knowledge to the process;
- Advise I&APs of the outcome of the environmental authorisation (i.e. DMRE decision), and the appeals process and procedure

9.2. Tasks undertaken for the Public Participation Process

This section of the report provides an overview of the tasks undertaken for the Public Participation Process (PPP). The PPP is conducted in terms of Chapter 6 of NEMA and included the following:

- Identification of key Interested and Affected Parties (affected and adjacent landowners) and other stakeholders (organs of state and other parties)
- Placement of site notices on farms, municipal area and other accessible public areas
- Formal notification of the application to key Interested and Affected Parties
- Consultation and correspondence with I&AP’s and Stakeholders and the addressing of their comments;
- Newspaper adverts.

9.2.1.1. Identification of key Interested and Affected Parties:

Public Participation is the involvement of all parties who are either potentially interested and/or affected by the proposed development. The principal objective of public participation is to inform and enrich decision-making. This includes landowners, adjacent landowners, organ of states and any interested and affected parties. Interested and affected party's database has been appended as **appendix D3** of this report.

9.2.1.2. Placement of site notices

Site Notices were placed around the site and in the adjacent farms. The placement of these notices is to allow those interested in the project and those affected by the project to register and form part of the project. Site notice pictures are attached on this report. Site Notices are attached as **appendix D1** of this report.

9.2.1.3. Newspaper adverts

A Newspaper Advertisement has been published on a local paper has been appended as **Appendix D6** of this report.

9.2.1.4. Availability Draft Basic Assessment Report

Draft Basic Assessment Report was sent to all registered interested and affected parties upon request for a period of 30 days.

9.2.1.5. Public Meeting

A public participation plan has been submitted for approval to the department of mineral resources and energy in northern Cape province. This plan has been approved and exempted Joan Consulting to conduct public meeting except meeting with committees, due to the Covid-19 circumstances. This is done to reduce risks of exposure to the virus. COVID 19 measures were followed for a meeting requested by various farmers' unions held at Doordraai Farmers' Hall on the 26 November 2020 at 10:00 am. Please refer to the minutes of the meeting attached as **appendix D5**.

9.2.1.6. Registered letter

Registered Letters, emails and facsimiles are composed and has been sent to the identified authorities, adjacent landowners, ward councilors and I&Aps including Joe Morolong Local Municipality Manager. Proof of Notification letters has been appended **appendix D4** of this report.

9.3. Summary of issues raised by I&Aps-

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

Table 7: Summary of issues raised by I&Aps

Interested and Affected Parties	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
Pieter Jacobus Grove, Boy Trust, Bucuci Trust 0832654729 pieter@oppiknoppi.co.za	23 February 2021	Vanilla cream / pale camel / white hole, superb tree		
		Groundwater- people and animals can't survive without clean drinking water		
		Survey - Any activities on the farm will have negative impact on the safety of the owners, workers and animals		
		Dust/ Ontploffings/Trucks		
		Light Pollution		
		Noise		
		pave infrastructure		
		Increase in traffic		
		influence on guest house		
		lowers farm value		
		Theft		
old Farm house - Family farm				
Markram Familie trust 0722392398 jmarkram@yahoo.com	23 February 2021	building over 60 years		
Kameeldoring Safaris (Pty) Ltd	23 February 2021	Shepered tree, Canel thorn tree, Pangli, Aardvark, Vulture, Cape Cobra,		

Interested and Affected Parties	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
wynand@gldf.co.za 0825584105		Boanslang, Bat eaved, Bat eaved fox kalahari		
Agw, Beg du Plooy Testamentere trust-Pja Du Plooy 0828735765 potamoywater@gmail.com	23 February 2021			
Isabella Elizabeth Erasmus 0726988848 inaputter@live.com	23 February 2021	disturbance of natural habitat with negative effect on humans, animals and plant populations		
		disturbance of natural habitat groundwater source		
		possible water and air pollution		
		impact on existing infrastructure		
		soil erosion		
		impact of mining operations on farming operations in the environment		
		the negative impact of prospecting boreholes on the water table		
		I hereby put-on record that to the west of my knowledge there are no such animals on the above-mentioned properties. further hereby put-on record that the said properties are part of a thriving stud and commercial Bonsmara breeding enterprise.		

Interested and Affected Parties	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
		Any non-relate activity might have a negative effect on the ecological system including the farming enterprise.		
Netgrass Boerdery (EDMS) (Jahannes Jacobs Olivier) Joliver@xsinet.co.za 0723838455	23 February 2021	movement on the farm as little as possible and on existing roads to protect grazing		
		Impact on underground water for human and animal consumption		
		The negative impact on well managed natural grazing with climax grass species		
		The Kalahari is an arid area. I solely reliant on underground water from there borehole. Any impact of the proposed mining and prospecting activity on the water table will directly affect the viability of the farming activities.		
		I hereby put-on record that to the best of my knowledge there are no such minerals in the above-mentioned properties. I further put-on record that the said properties are part of a thriving stud and commercial bonsmara breeding enterprise. Any non-related activity might have a negative effect on the ecological system including the farming enterprise.		
Esther Visser 0828870725 Esther.Visser3@gmail.com	23 February 2021	The size of the grounds is going to make the policing of and regulations that have been agreed just impossible. Additional costs for security will definitely have to be taken into account. the species can cause. The rehabilitation of the environment, which has been paralyzed by droughts, is just not going to be possible		

Interested and Affected Parties	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
		<p>In closing The Tallulah Trust is explicitly critical of refraction and generally assumes that the socio-economic benefits that can result from the extraction of minerals may not be able to discount the ecological damage that results from them. The contrasts this ecological orientation to a large extent with most high-level government and private sector studies on refraction</p>		
		<p>The Kalahari region is best known for its seclusion, unique geography, natural beauty, cultural heritage and natural resources. It is possible that the Kalahari may lose this identity due to commercialization due to mining activities. Demolition and the creation of the infrastructure required for this can therefore have a negative effect on the identity of the area. The question is whether the region will be able to meet the needs associated with increased socio-economic prosperity and development, especially in light of the creation of housing and infrastructure, including roads, electricity and water supply</p>		
<p>Jan Christian Theart 082 776 627 janwitputs@gmail.com</p>	<p>23 February 2021</p>	<p>Extra use of roads will affect the already bad condition of roads, no extra water for mining activities, Influx of extra people will definate have impact on crime specifically stock theft.</p>		

Interested and Affected Parties	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
		The relative safe environment will define to be affected by the strangers that move into the area		
Gideon S 0833990400 hoode@gmail.com	23 February 2021	The kalahari has been robbed of in detention and it will be sat in sad day when our environment is dismantled by mine		
		objections will follow the zero negative consequences		
		Safety, theft, dust, gergas, discharges, roads, traffic jams, defeating our farm values, rehabilitation, draining our field, leaving open		

Please refer to **appendix D5** for the summary of the meeting.

10. The Environmental attributes associated with the alternatives.

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

10.1. Baseline Environment

This section is intended to provide environmental information which is interlinked with the proposed site. It will identify all environmental aspects within the site that will need special consideration during all the phases of the projects with the intent to minimize impacts.

Climate

11. Temperature

The monthly distribution of average daily maximum temperature shows that the highest average midday temperatures in Kuruman is 31°C, these highest temperatures occur in January which is the warmest month of the year. The monthly distribution of average daily minimum temperature shows that the lowest average temperatures in Kuruman is 9.6°C, these minimum temperatures occur in July which is the coldest month of the year.

12. Rainfall

Kuruman experiences significant seasonal variation in monthly rainfall. The rainy period of the year lasts for 7.9 months, from September 18 to May 15, the most rain falls during the 31 days centered around February 10. The rainless period of the year lasts for 4.1 months, from May 15 to September 18. The least rain falls around July 17. Kuruman normally receives about 452mm of rain per year, with most rainfall occurring mainly during the summer. The month which is the wettest on average is February which amounts to more mm of the rain that falls in Kuruman, averaging 60mm along with January averaging 48mm and March averaging 54mm. The month which is the driest on average is July, which receives the lowest amount of rainfall which can be so little to no rain at all.

13. Topography

Thornveld is the natural vegetation of the province, and the climate is generally hot and arid and it is characterised by some Campbell Group dolomite and chert and mostly younger, superficial Kalahari Group sediment, with red wind-blown (0.3-1.2m deep) sand. Locally, rocky pavements are formed in places. The topography of Kuruman is recognised as a powerful influence contributing to the high biodiversity of southern Africa.

Landscapes composed of spatially heterogeneous abiotic conditions provide a greater diversity of potential niches for plants and animals than do homogeneous landscapes. The species richness and biodiversity has been found to be significantly higher in areas of geomorphological heterogeneity. Ridges and rocky outcrops are characterised by high spatial variability due to the range of differing aspects, slopes and altitudes all resulting in differing soil (e.g. depth, moisture, temperature, drainage, nutrient content), light and hydrological conditions. Temperature and humidity regimes of microsites vary on both a seasonal and daily basis. Moist cool aspects are more conducive to leaching of nutrients than warmer drier slopes.

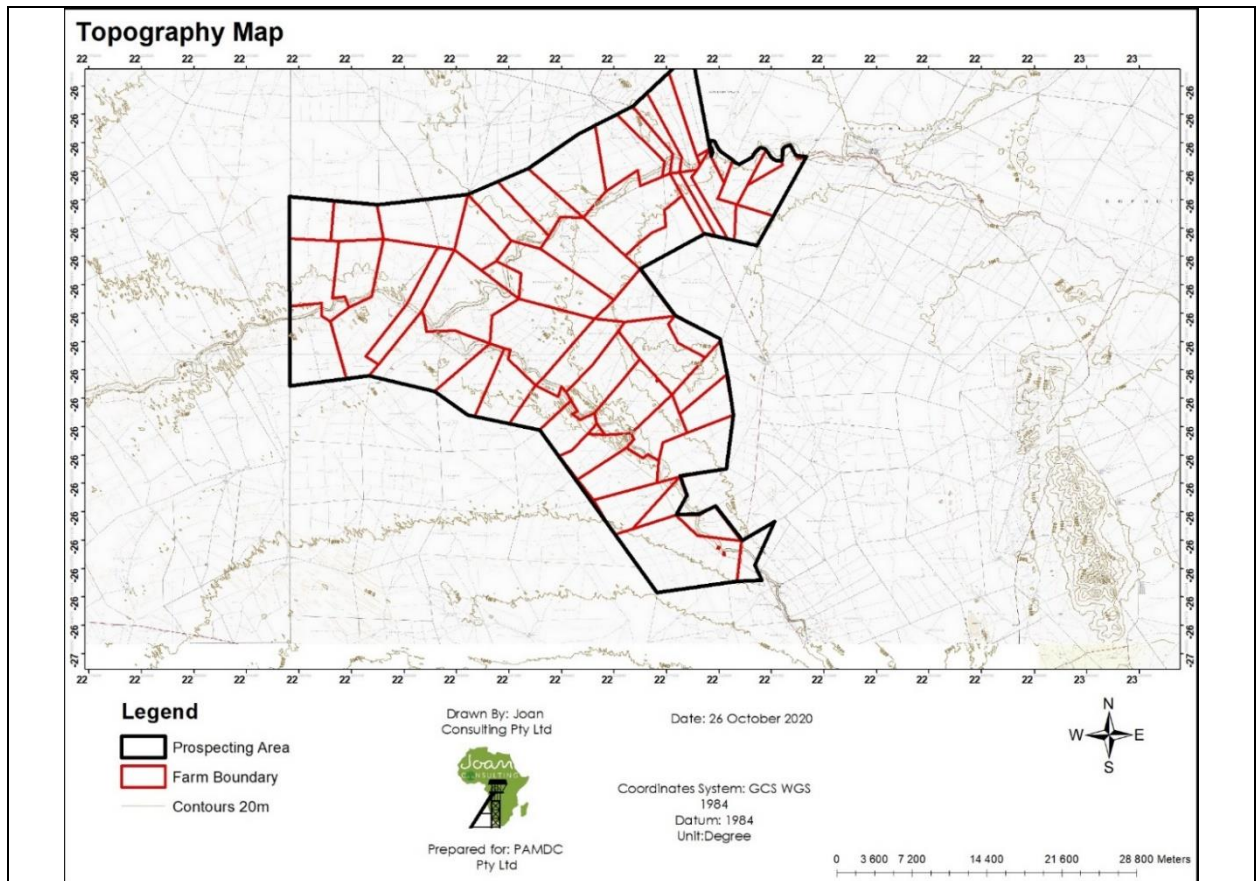


Figure 3: Topography Map

14. Heritage

Heritage sites and graves are considered to be highly significant. The proposed activities will not change/alter or result in significant impacts on the area's heritage resources.

No heritage resources have been identified to date. Unidentified heritage resources may be present on site. Provision has been made in this report that no drill site will be located within 50m of all graves/cemeteries and any identified heritage site (which may occur during the exploration programme). Should any artefacts or objects be found on surface or unearthed during the exploration process, the relevant procedure will be followed in addressing the finds.

15. Air Quality

Air quality is the degree to which the air in a particular place is pollution free. With regard to the prospecting area air pollution is caused by movement of vehicles going to and from Kuruman via the R380 road in which the cars emit the CO₂ gas from the exhausts which can cause haze which becomes a nuisance and can impact on the health of the people staying around the area. Dust emanating from cars utilising a gravel road that connect to R380 from Van Zylsrus town.

With relation to this project that is to take place, air pollution can be caused by the movement of heavy earthmoving equipment which can generate dust and cause nuisance and health implications to the workers and people living nearby. To minimise the generation of dust, a vehicle speed on gravel road will be limited to 20 km/h. All the equipment on site will be maintained and kept in a good working order, prospecting activities will be undertaken during the day on the normal working hours.

16. Noise

The only sources of noise in the proposed prospecting area comes from the vehicle movements of local residents and visitors or tourists and other people from around the area going in and out of the Kuruman town via the R380 route and a gravel road that connect to R380 from Van Zylsrus town.

17. Vegetation (Flora)

- **Overview of the Biome type**

Mucina and Rutherford (2006) described the project area as falling within 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. It is well developed over the lowveld and Kalahari region of South Africa and is also the dominant vegetation in neighbouring Botswana, Namibia and Zimbabwe. It is characterized by a grassy ground layer and a distinct upper layer of woody plants. Where this upper layer is near the ground vegetation may be referred to as Shrubveld, where it is dense as Woodland, and the intermediate stages are locally known as Bushveld.

The environmental factors delimiting the biome are complex: altitude ranges from sea level to 2000 m; rainfall varies from 235 to 1000 mm per year; frost may occur from 0 to 120 days per year; and almost every major geological and soil type occurs within the biome. A major factor delimiting the biome is the lack of sufficient rainfall which prevents the upper tree layer from dominating, coupled with fires and grazing, which keep the grass layer dominant. Summer rainfall is essential for grass dominance, which, with its fine material, fuels near-annual fires. In fact, almost all species are adapted to survive fires, usually with less than 10% of plants, both in the grass and tree layer, killed by fire. Even with severe burning, most species can re-sprout from the stem bases.

The grass layer is dominated by C 4-type grasses, which are at an advantage where the growing season is hot. But where rainfall has a stronger winter component, C 3-type grasses dominate. The shrub-tree layer may vary from 1 to 20 m in height, but in Bushveld typically varies from 3 to 7 m. The shrub-tree element may come to dominate the vegetation in areas which are being overgrazed.

Most of the Savanna vegetation types are used for grazing, mainly by cattle or game. In the southernmost Savanna types, goats are a major stock. In some areas crops and subtropical fruit are cultivated. These mainly include the Clay Thorn Bushveld, parts of Mixed Bushveld, and Sweet Lowveld Bushveld. Conservation status of Savanna is comparatively good, mainly due to the presence of the Kruger and Kalahari Gemsbok National Parks within the biome. However, the high area conserved in South Africa, belies the fact that half of Savanna vegetation types are inadequately conserved, in having less than 5% of their area in reserves and, much of the area is used for game-farming and can thus be considered effectively preserved, provided that sustainable stocking levels are maintained. The importance of tourism and big game hunting in the conservation of the area must not be underestimated (Mucina and Rutherford, 2006).

Prospecting of Manganese, iron, copper, zinc, lead, niklel, and cobalt on PORTIONS 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 23, 24, 25, 26, 27, 30, 46, 47, 48, 51, 52, 55, 57, 61, 62, 63, 64, 65, 66, 67, 68, 69, 71, 72, 77, 78, 79, 80, 81, 82, 83, 84,85, 86, 87, 101, 102 and 112 of FARM 703, situated in the Joe Morolong Local Municipality, under the John Taolo Gaetsewe District Municipality, in the Northern Cape Province

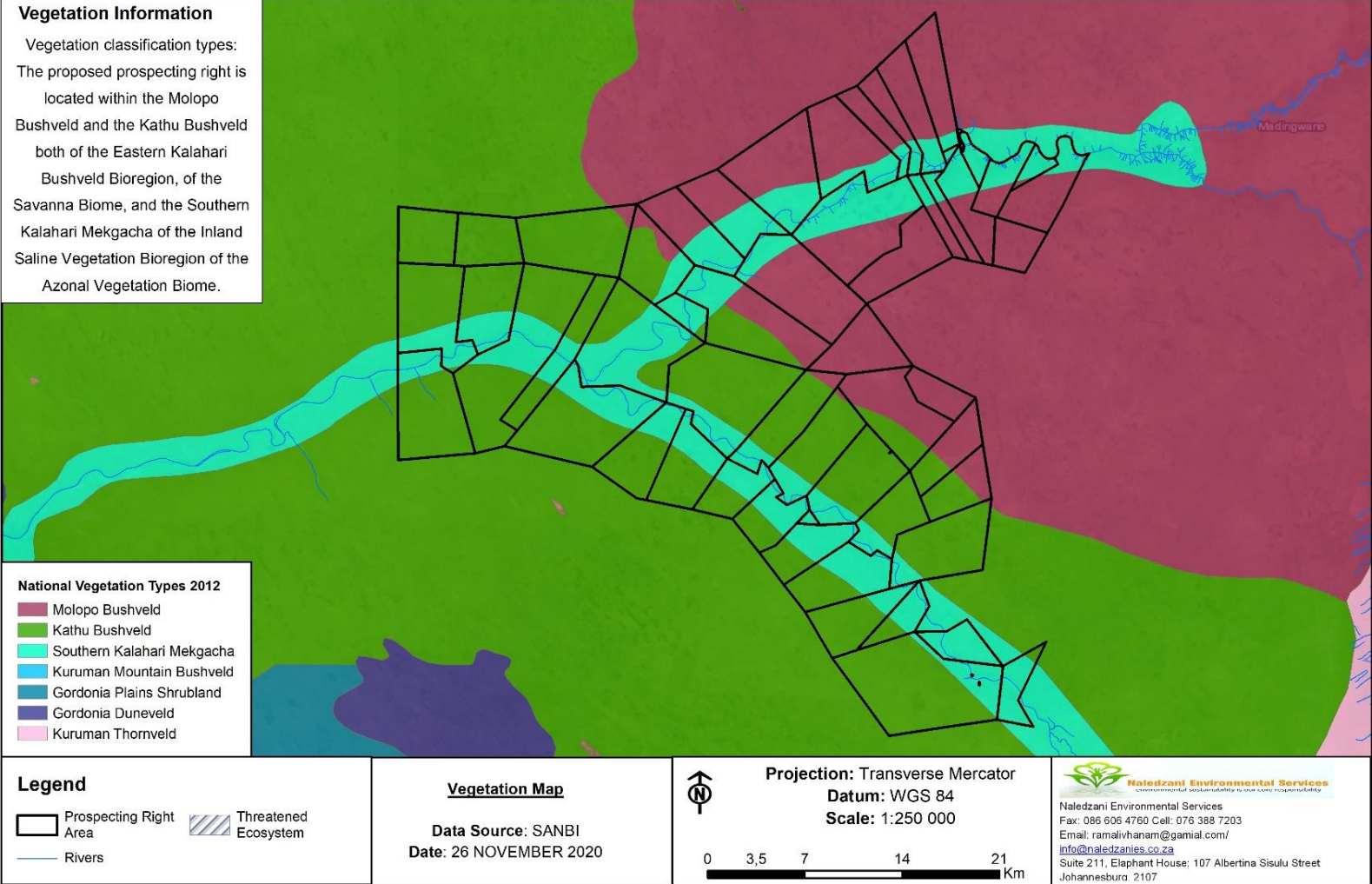


Figure 4: Broad vegetation map of the application area

18. Broad vegetation classification

According to Mucina and Rutherford (2006) the site is located within three vegetation units which are The Southern Kalahari Mekkacha (AZi 3) (occurring along the Kuruman river that transverses the site), Molopo Bushveld (SVk 11) and Kathu Bushveld (SVk 12).

19. Southern Kalahari Mekkacha

This vegetation unit occurs in the Northern Cape and North-West Provinces: Valleys (including beds and adjacent slopes) of the intermittent rivers draining the dry savanna south of the Bakalahari Schwelle (broad interfluvium at 1 000–1 100 m altitude) in the South African part of the Kalahari region. The major mekgacha of the region include the Nossob, Auob, Molopo and Kuruman Rivers. A more extensive (endorheic) system of mekgacha is found north of the Bakalahari Schwelle in central Botswana. Altitude ranging from 850 m to mainly 1 100 m, with a few occurrences as high as 1 500 m.

Vegetation & Landscape Features Sparse, patchy grasslands, sedgeland and low herblands dominated by C4 grasses on the bottom of (mostly) dry riverbeds. Low shrublands in places with patches of taller shrubland (with *Schotia afra*) on the banks of the rivers.

This vegetation unit is regarded as Least threatened. The target conservation rate is 24%. Already 18% statutorily conserved in the Kgalagadi Transfrontier Park and Molopo Nature Reserve. About 2% has been transformed by road building. The mekgacha are under strong utilisation pressure, both from wildlife (to graze and for salt licks) and domestic animals (grazing, browsing and animal penning). Alien woody *Prosopis* species occur as invasive plants in places.

20. Molopo Bushveld

The vegetation unit is distributed in the North-West and Northern Cape Provinces it occurs in the Molopo area from Bray and Werda in the north on the border with Botswana, southwards through Morokweng and Tosca in the east and Vorstershoop to McCarthysrus and Eldorado in the west to Bendell in the south. Altitude 1 000–1 300 m.

Vegetation & Landscape features Open woodland to a closed shrubland with the trees *Acacia erioloba* and *Boscia albitrunca* and shrubs *Lycium cinereum*, *L. hirsutum* and *Rhigozum trichotomum*. Grass layer is well developed in parts of the northeast, but usually fairly open.

The vegetation unit is regarded as Least threatened with the conservation target of 16%. Only 1% statutorily conserved in the Molopo Nature Reserve. More than 1% already transformed. In the Morokweng, Konke and Ewbank regions, intense utilisation has led to encroachment of *Geigeria ornativa*, *Tribulus terrestris* and *Acacia mellifera*, while much *A. erioloba* has been destroyed by fire-wood collection. Erosion is very low.

21. Kathu Bushveld

The vegetation unit is distributed in the Northern Cape Province, along the plains from Kathu and Dibeng in the south, through Hotazel, vicinity of Frylinckspan to the Botswana border roughly between Van Zylsrus and McCarthysrus. It forms medium-tall tree layer with *Acacia erioloba* in

places, but mostly open and including *Boscia albitrunca* as the prominent trees. Shrub layer generally most important with, for example, *A. mellifera*, *Diospyros lycioides* and *Lycium hirsutum*.

The vegetation unit is regarded as Least threatened with a conservation target of 16%. None conserved in statutory conservation areas. More than 1% already transformed, including the iron ore mining locality at Sishen, one of the biggest open-cast mines in the world.

22. Fauna

The prospecting area is located within the regional vegetation community Eastern Kalahari Bushveld Bioregion. This regional vegetation community is listed as Least threatened. The Eastern Kalahari Bushveld Bioregion is situated within the Savanna Biome of South Africa. Detailed regional and scientific data on all faunal groups are lacking notably for most of the invertebrate groups

Animals known to be present in and around the prospecting area are potential inhabitants of the area. All species known from the Northern Cape Province were included in the assessment except for birds which have been sampled extensively. The presence of 19 animal species was confirmed during a site investigation by means of visual sightings, tracks, scats and burrows.

23. Fauna survey

The majority of mammals and reptiles are either very secretive, nocturnal, hibernate (reptiles), migrate (birds) or prefer specific habitat so sampling and identification was limited.

24. Mammals

Records of all mammal species recorded in the four quarter degree grid squares were obtained from the Virtual Museum (VM) website of the Animal Demographic Unit of University of Cape Town prior to the site visits. The site assessment was conducted for mammal species diversity by direct and indirect methods using mammal sightings, burrows, holes and also verified by mammal book (Skinner and Chimimba, 2005). No trapping was conducted during the field survey.

25. Soils

Soils are shallow sandy soils, of the Hutton form. Red Aeolian sand of tertiary to recent age (Kalahari Group) with silcrete and calcrete and some andesitic and basaltic lava of the Griqualand West Supergroup are found within this vegetation type and Hutton soil forms, deeper than 1.2 m on the overwhelmingly dominant soil types and to a far lesser extent land type.

26. Geology

The area under application is underlain by the Ventersdorp, Olifantshoek, Molopo Complex and Karoo Supergroup. Details pertaining to the stratigraphy and lithology are provided below.

- **Ventersdorp Supergroup**

The Ventersdorp Supergroup consists of the Platberg Group, Kraaipan Group, Dominion Group, Vryburg Group and the Chaap Group.

Platberg group: The Platberg group occurs in the south eastern part of the prospecting area. Here it is represented by three formations including Kameeldoorns, Makwassie and Allenridge. Only a small portion of the Kameeldoorns Formation occurs in the south eastern part of the area. It consists of conglomerates, shale and breccia. The Makwassie formation is made of quartz porphyries, whereas the Allenridge Formation comprises volcanic rocks of basaltic and andesitic composition

Based on several evidences, Duane et al (2004) suggested that the Mississippi Valley Type (MVT) Bp-Zn deposits such as at Pering and Busy Park were formed from floods expelled from the Ventersdorp lavas, particularly the Makwassie Quartz Porphyry during the Kheis orogeny. This interpretation might have its relevant in conceptual exploration for Pb-Zn deposits in the region such as the spatial association of Ventersdorp lava with the Campbell Rand Subgroup.

Kraaipan group: The Kraaipan Group forms the oldest rocks in the concession area. It comprises under undifferentiated assemblage of banded chert and iron-formations, pelitic schists and mafic volcanic and granite gneisses that intruded the above mentioned volcanic and sedimentary assemblage. No gold mineralisation as those hosted by the iron formations in Kraaipan and Amelia has been reported in the present area, perhaps due to the lack of outcrop and – or isolated occurrences (as rafts) of the Kraaipan Group.

- **Olifantshoek Supergroup**

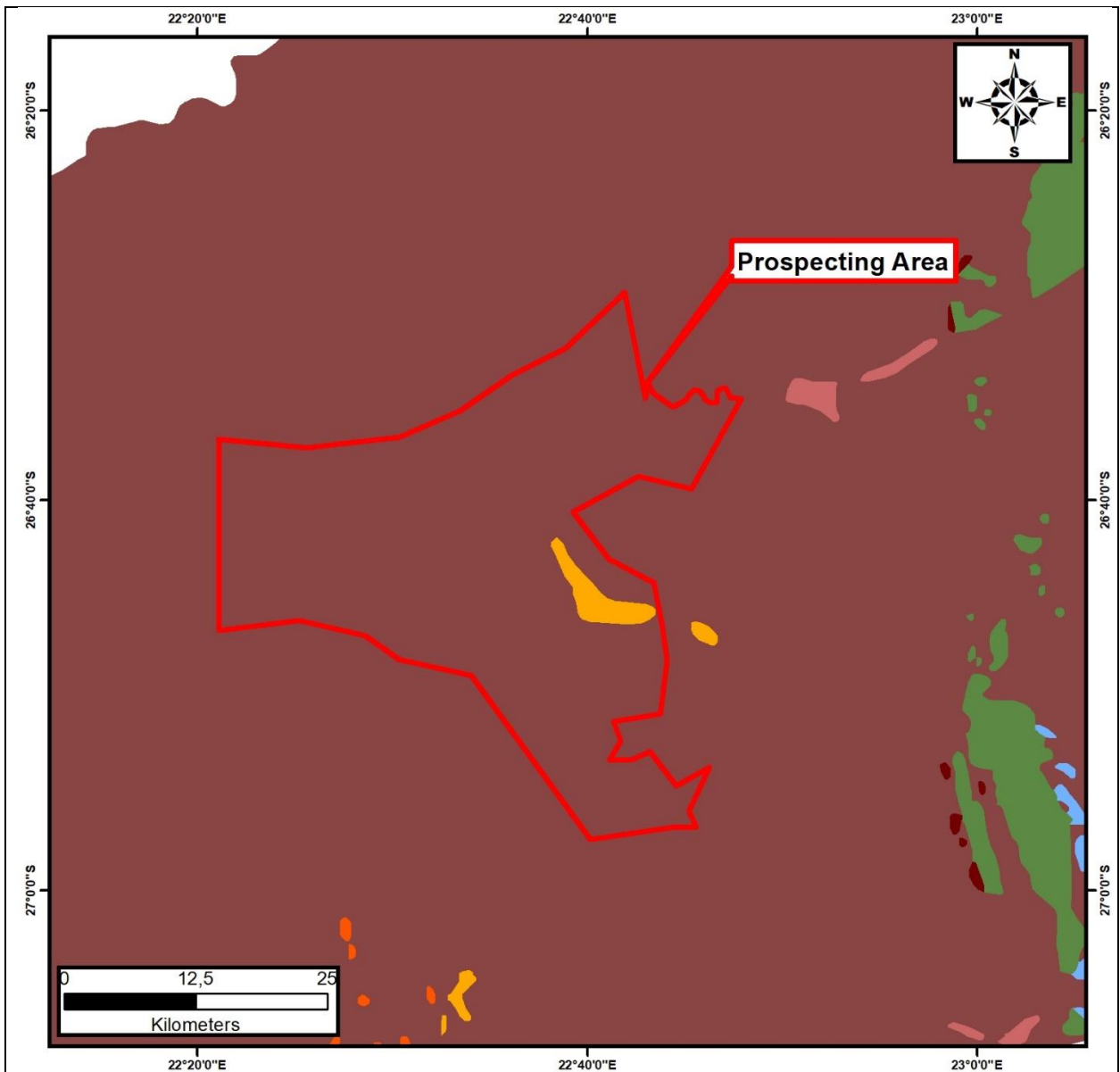
This Supergroup is represented by the Lucknow and Hartley Formations, Matsap Subgroup and Brushland Subgroup of the Volop Group.

- **Molopo Complex**


The Molopo Complex comprises layered mafic igneous rock assemblage of diorite, pyroxinite, harzburgite, norite and gabbro with the main body occurring in Botswana where it is known for its PGM and Ni mineralization.

- **Karoo Supergroup**







The Karoo Supergroup in this area comprises an assemblage of tillite, sandstone, mudstone and shale. These rocks occupy a significant portion of the western part of the area extending all the way from the south to the north. A small body of Karoo diabase has been mapped in the southern part of the area.



Legend

 Prospecting Area

Geology Types

-  Quarzite, limestone, shale, andesite **Olifantshoek Supergroup**
 -  Andesitic and basaltic lava with abundant pillows, minor jasper **Ongeluk Formation**
Postmasburg Group
 -  Banded iron-formation, jaspilite, riebeckite-amphibolite **Asbestos Hills Subgroup**
 -  Dolomite/limestone, subordinate chert, minor quartzite, shale and banded iron-formation **Asbestos Hills Subgroup**
 -  Superficial deposits comprising gravels, clays, sandstone, silcrete, calcrete and aeolian sand **Kalahari Group**
- 

Ghaap Group
Postmasburg Group
Transvaal Supergroup

Figure 5: Geological Map

27. Ground Water

The groundwater of Kuruman on the northern portion of the prospecting area is provided by karst aquifers, whereas the central portion of the prospecting area hosts a fractured aquifer. Although groundwater quality in the area is considered to be generally good with greatest recharge occurring in the mountainous areas, the potential for groundwater vulnerability is overall low except for a small portion that is considered high towards the north-east corner of the proposed prospecting area.

➤ Surface water and Wetland

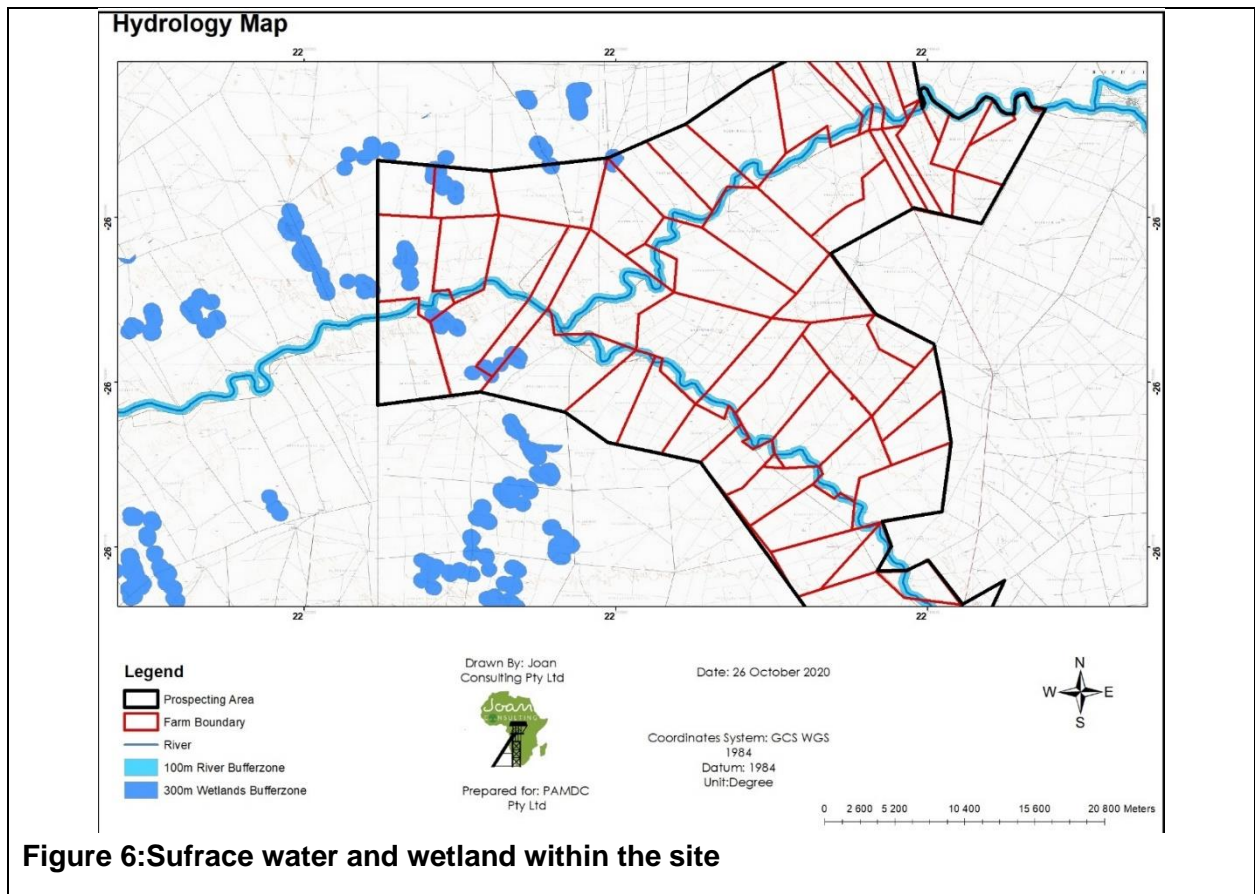


Figure 6: Surface water and wetland within the site

The JTGDM falls entirely within the Orange River Basin. Kuruman and Gamagara rivers are the main river systems within the district. The Kuruman hills also determine the drainage pattern of the Kuruman river system with the alignment of the ridge forcing the draining of water in the area northwards before turning sharply west. The Kuruman River is a tributary of the Molopo River which eventually converges with the Orange River (van Weele, 2011 and AGIS, 2015).

The proposed project falls within the D41H quaternary catchments and the Lower Vaal Catchment Management Area. The site is located in the Lower Vaal River Basin. Kuruman river and Mushaweng river that feeds directly in Kuruman River transverses though the site area. The ephemeral Kuruman River runs to the south of the site from east to west. A large catchment of approximately 13,780 km² feeds the Kuruman River, and consequently, when the river is in flood, flows can become considerable. The Kuruman River is, however, considered ephemeral as the river only produces surface flows during periods of heavy precipitation.

28. Water uses

Private boreholes are mostly found in farms of the proposed prospecting area. Due to the low rainfall figures and highly variable run-off, very little usable surface runoff is generated, which has resulted in an ever-increasing use of groundwater resources for human and agricultural needs. Most farms in the area depend on boreholes as a source of water.

Water will be purchase form the local municipality and will be brought to the drilling site using a mini truck and a tanker of 12 000 litres capacity.

29. Culture History Background of the Project Area

- **Stone Age Archaeology**

Stone Age archaeology is prevalent in the larger geographical area, especially to the south and east of the study area but generally, the Magojaneng area does not seem to have attracted much of habitation, save for the two Late Stone Age rock shelters that occur north and south of GaMohaana hills. Perhaps the lack of large rock-shelters, the domination of exposed environments and the lack of preferred stone raw materials for tools, dissuaded early man (ESA ~ 2.6 million to 250 000 years ago) from occupying this part of the area. Further to the southwest and southeast of this area, the ESA is very well represented at sites such as Kathu Pan 1, Kathu Townlands, Bestwood 1 (Wilkins and Chazan 2012; Chazan et al. 2012; Walker et al. 2014) and Wonderwerk Cave (Thackeray et al. 1981). All of the above sites produced well-made Acheulean hand axes and cleavers, as well as Fauresmith lithic materials that are transitional between the Acheulean (ESA) and the MSA.

It must be stressed that ESA sites are not only limited to areas that are south of the study area but also occur to the northwest, especially close to Black Rock and Gloria Mines near the town of Hotazel (Kusel et al. 2009; Pelsner and Van Vollenhoven 2011).

The ESA is generally associated with the earlier Oldowan industry (marked by crude choppers and other unifacial core tools), followed by the still large but better fashioned hand axes and cleavers of the Acheulean techno-complex (Deacon and Deacon 1999). The Fauresmith Industry is characterized by a prepared core technology that produced both blades and points, making it transitional between the ESA and the MSA (~ 250 000 to 40-25 000 years ago) (Porat et al. 2010; Wilkins and Chazan 2012; Walter et al. 2014). Until recently, the Fauresmith Industry was poorly defined, being mostly identified based on the co-occurrence of Levallois points and hand axes (Beaumont and Vogel 2006: 224), and prepared cores, blades, and 'side-scrapers on flakes' (Beaumont 1990:79).

The MSA is better understood as a flake-technological stage characterized by faceted platforms, produced from prepared cores, as distinct from the core tool-based ESA technology (Barham and Mitchell 2008). In the area under study, MSA material mostly occur on the same sites with ESA material, suggesting longer sequences of occupation that have allowed researchers to probe into the behavioural changes that influenced these technological developments (Porat et al. 2010; Walker et al. 2014). Thus, characteristic MSA have been reported at sites such as Kathu Pan 1 (Wilkins and Chazan 2012), Wonderwerk Cave (Beaumont and Vogel 2006), but they also have been reported in isolated clusters (van Vollenhoven and Pelsner 2012). At Wonderwerk Cave, the MSA component was associated with pieces of haematite and several incised stone slabs, most

with curved parallel lines that add to the behavioural shifts that went beyond stone tools and ushered in the appreciation of art (Beaumont and Vogel 2006).

Iron Age Archaeology

Agriculturalist communities entered southern Africa from West and East Africa around AD 200 and brought with them settled agriculture, metal working, animal husbandry, pottery making and social stratification (Huffman 2007). The view that all of these activities were introduced to southern Africa by these agriculturalist communities is still contested. The movement and spread of these EIA (~ AD200-1000) people within southern Africa seem to have been restricted to the summer rainfall (because of sorghum and millet farming) and they did not occupy much of the central interior Highveld area in South Africa. This perhaps explains the paucity of EIA sites in the study area. Ecologically, EIA preferred to settle on the alluvial soils near rivers for agricultural purposes and access to water. It was not until the mid-second millennium AD that serious Iron Age occupation began in the larger geographical area (excluding the study area) of this part of the Northern Cape.

More technological and behavioural changes than those witnessed in the MSA, occurred during the LSA (~ 40-25 000, to recently, 100 years ago), which is also associated with Homo Sapiens (Barham and Mitchell 2008). For the first time there is evidence of people's activities derived from material other than stone tools (ostrich eggshell beads, ground bone arrowheads, small, bored stones and wood fragments) (Deacon and Deacon 1999). The LSA people are also credited with the production of rock art (engravings and paintings), which is an expression of their complex social and spiritual beliefs (Parkington et al. 2008). In the area under study, the two LSA rock shelters to the south and the north of GaMohaana Hill are the only known archaeological remains that are closer to the study area (van der Walt 2013). Not much is known about these rock shelters, save for the fact that they have LSA material that include rock paintings (Morris 2010; van der Walt 2013: 18).

In terms of characterization, the lithic succession at Wonderwerk Cave serves as a benchmark for the Stone Age sequence of the Northern Cape (Beaumont and Vogel 2006; Kusel et al. 2009). The sequence comprises an uppermost LSA sequence that contains Ceramic LSA, Wilton and Oakhurst industries. Some researchers have named the earlier LSA industry of the region as the Oakhurst industry (some have labelled this local variant the Kuruman), characterized by rare retouched artefacts, most of which are large scrapers that are oblong with retouch on the side. However, it is not necessary to belabour the descriptions of these industries, especially because no LSA remains were recovered on the proposed development footprint. All the same, variants of the LSA industries were located at other sites such as Kathu Pan 1 (Porat et al. 2013) have been reported. At this site, ostrich eggshell fragments, beads and lithic artifacts attributed to Wilton and Albany industries were found. It is also important to note that, it is still possible to encounter isolated finds during construction and when this happens, the procedure (described in detail below) for reporting chance finds must be followed.

The study area falls known within the fringes of the distribution of LIA (~ AD1100-1840) people who made Olifantspoort facies (ancestral Sotho-Tswana speakers) dated between AD1500 and AD1700 (Huffman 2007: 191). Olifantspoort facies represents the second phase of the Moloko sequence and settlements with people that made this type of ceramics are distributed in the area to the northeast of the study area, between the Vaal River and Pretoria. The people, just like the

markers of Thabeng facies (third phase of the Moloko sequence AD1700-1840), settled in aggregated clusters where space was also demarcated by extensive stone walling. The extensive walled settlements around Kuruman are historically associated with the Tswana people such as the Rolong, Tlharo and Thlaping (De Jong 2010; Pelsler 2012; Fourie 2013). Typologically, this type of walling is called Type Z, which is prevalent in the Free State and mark the most southerly expansion of Sotho-Tswana speakers, up to the edge of a viable farming environment (Nkhasi 2008). Type Z settlement units have large compact central primary enclosures, 'usually from three to eight in number and often so close as to be touching' but they also have smaller primary enclosures which may be linked by secondary walling (Maggs, 1976: 40).

The nature of the interaction between the emigrant Tswana groups and Khoesan people who were already in this area is complex but there are indications of acculturation (Breutz 1981) and intensive trading (Goodwin 1956). Some of the activities that formed the locus for trade and interaction between the Tswanas and the Khoesan groups in this area are specularite mining and ivory hunting. For instance, at sites such Blinkklipkop (about 80km to the south of the study area), a Khoesan specularite mine sites dating to as early as AD800, there is evidence of either trade with or occupation of the mine by the Thlaping peoples around 1801 (Thackeray et al. 1983). Specularite was used for non-metallurgical purposes such as pottery decoration and bodily adornment (Hall 1985), and was a prized trade commodity, together with ivory and other items during the second millennium trade boom in this part of southern Africa. Thus, by the mid-19th century (and probably earlier), the Thlaping people were purchasing glass beads, iron, copper, tin and bronze wares from other northern Sotho-Tswana groups such as the Kwena and Hurutse, and exchanging these items with the Khoesan groups to the southwest (Goodwin, 1956: 256).

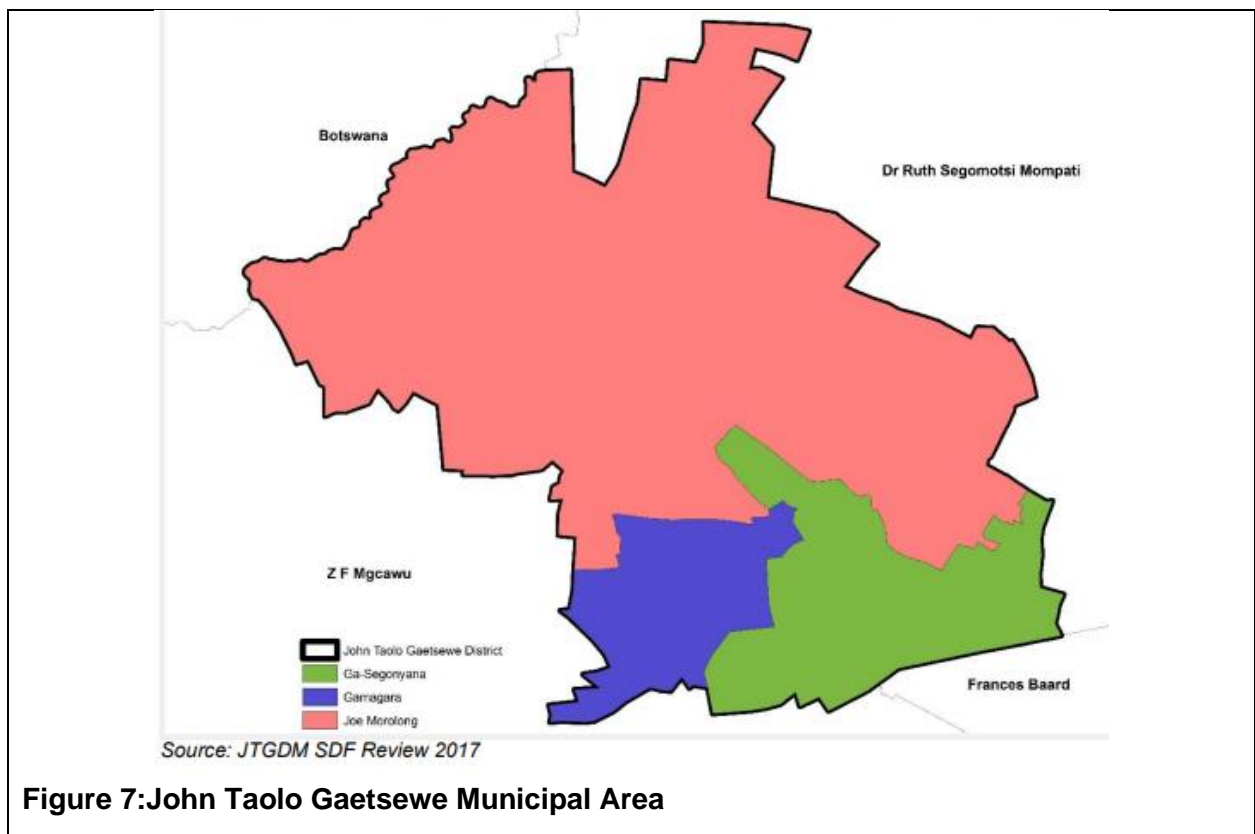
Of the Tswana groups around the present study area, the Thlaping might be of interest because of their connections with the site of Dithakong near Kuruman (De Jong 2010: 35-36; Pelsler 2012). This site, which at one point was a Thlaping capital, appears to be the only area in which there is direct archaeological evidence for settlement in the form of stone walling (Maggs 1972; Magoma 2013: 28). Socio-political tensions and permutations necessitated the shifting of most Tswana capital of which Dithakong was no exception. For instance, during the Batlhaping capital was first at Nokaneng around the year 1775, before it was moved to Dithakong on the Mashoweng River, and then at Kuruman in 1801. At around 1806 they returned to Dithakong but settled a short distance from the previous site. In 1812 people were contemplating returning to Nokaneng with an intermediate stop at Kuruman, where they re-established themselves in 1817. Thus in 1820 when Kuruman was the capital and comprised 25 wards, Dithakong was of similar size. Thus, the capital had moved three times in twenty years and suffered one major split which removed about half of its population. The reasons for these movements are not clear. This mobility presents a problem in the interpretation of the archaeological evidence and it helps to explain why many Iron Age sites have shallow accumulation of waste material (Maggs 1972).

Nonetheless, in the 1920s, the capital of the Batlhaping was permanently moved to Kuruman. All the same, none of these LIA sites were identified in the study area.

29.1. Demographic Profile

29.1.1.1. Population Distribution and Demographics

JTGDM is the second smallest district in the Northern Cape, occupying only 7% of the Province (27 498.9 km²) (StatsSA 2016). Administratively, the JTGDM comprises three Local Municipalities: (1) The Gamagara Local Municipality; (2) The Ga-Segonyana Local Municipality; and (3) The Joe Morolong Local Municipality, which encapsulates the geographical area covered by the former District Management Area and the former Moshaweng Local Municipality. The largest area within the District is the former District Management Area (DMA) with over 10 000 km². Joe Morolong Local Municipality is the District's largest local municipality in terms of area size; covering an extent of 20 215 km², with Ga-Segonyana LM and Gamagara LM covering for 16% and 10% respectively. The JT Gaetsewe District comprises of 186 towns and settlements of which the majority (80%) are villages in the Joe Morolong Municipality.



Population and Demographics

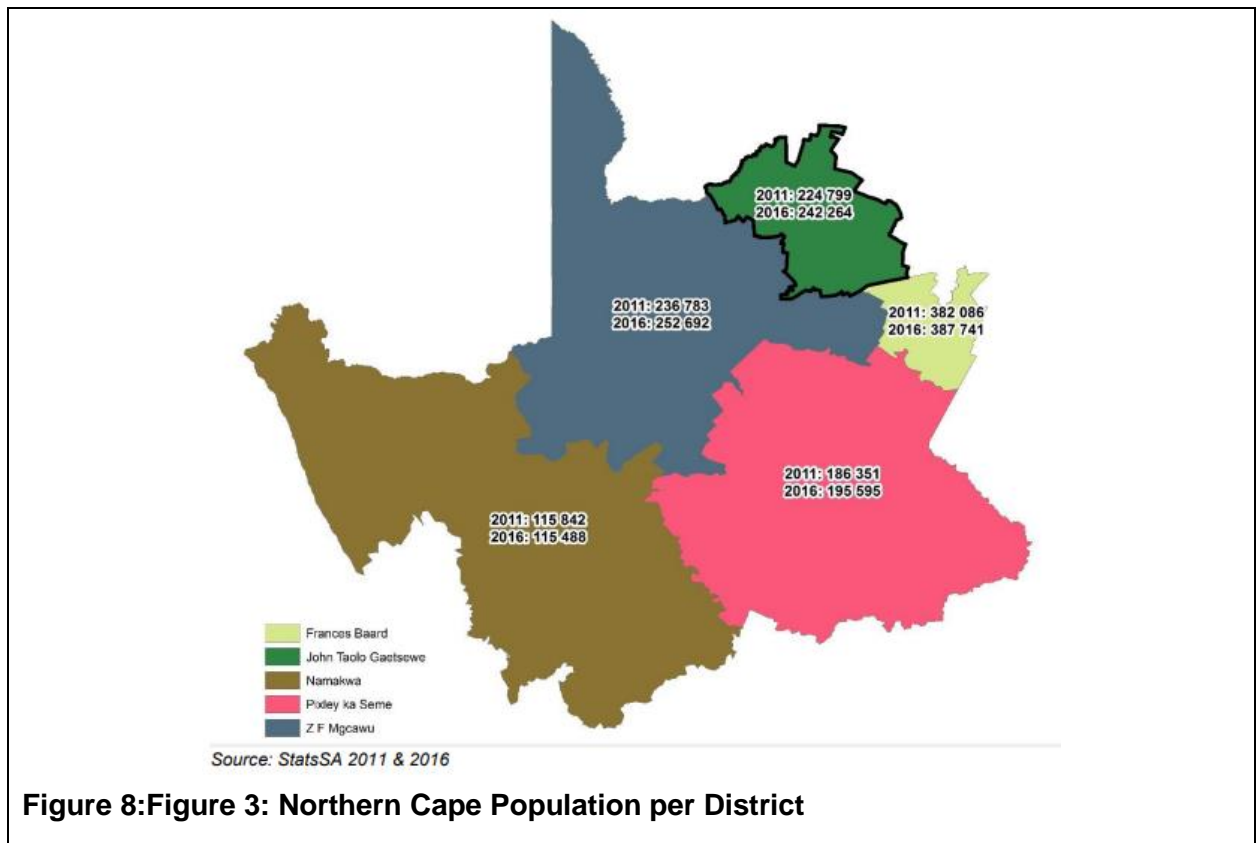


Figure 8: Figure 3: Northern Cape Population per District

The population of the John Taolo Gaetsewe District Municipality accounts for 20.3% of the total population in the Northern Cape Province. It is the third largest population size after the Frances Baard and ZF Mgcawu Districts. This position has been consistent throughout the period between 2011 and 2016.

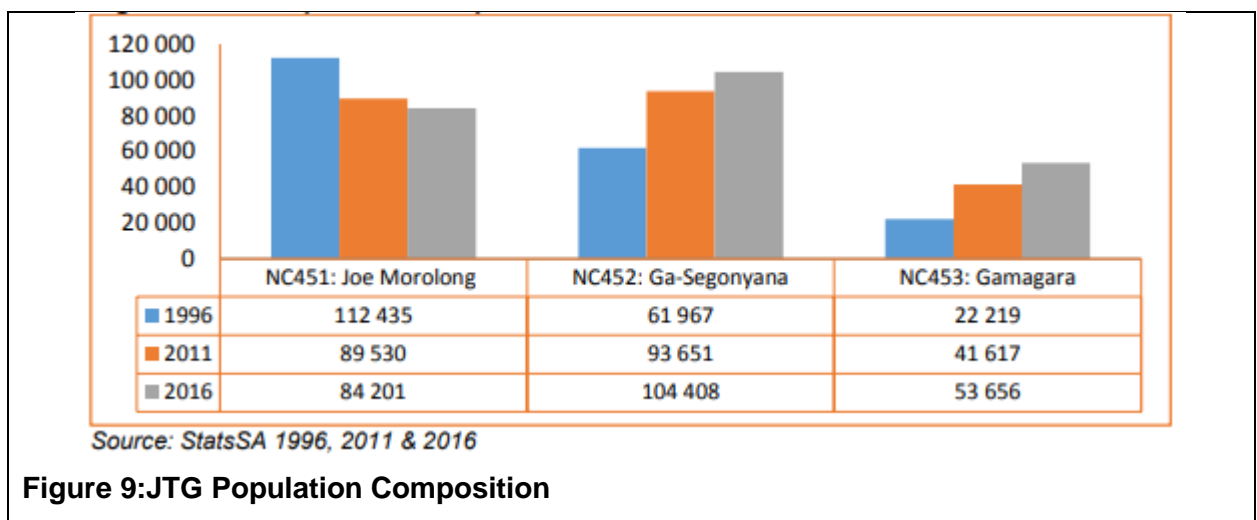
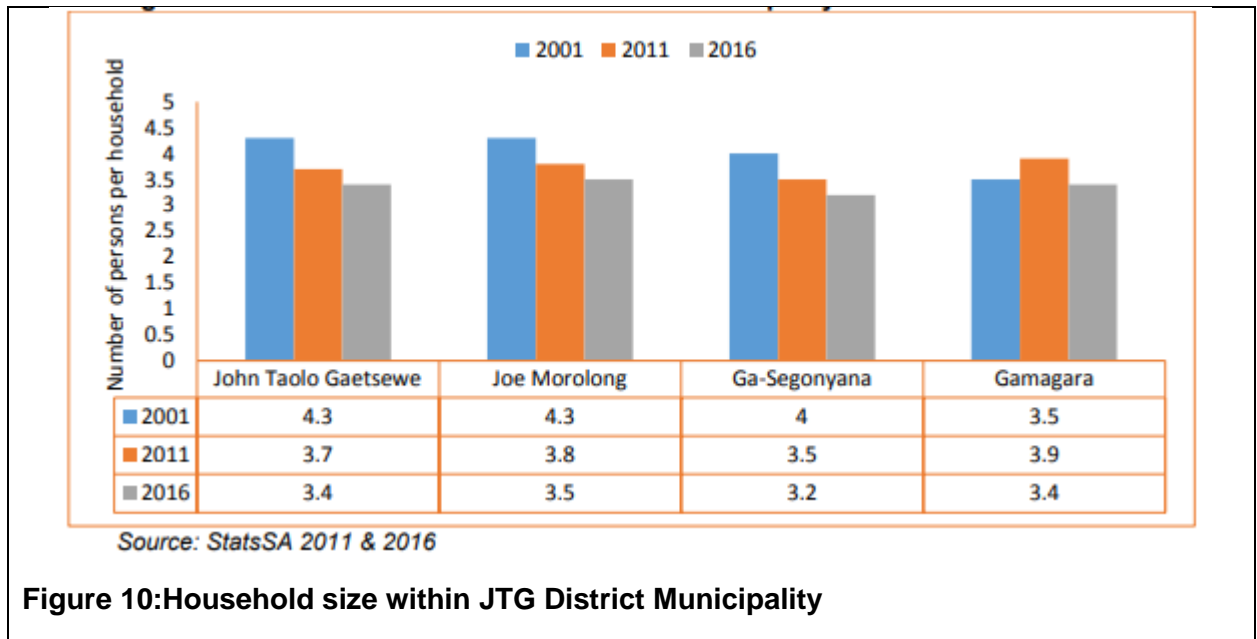


Figure 9: JTG Population Composition

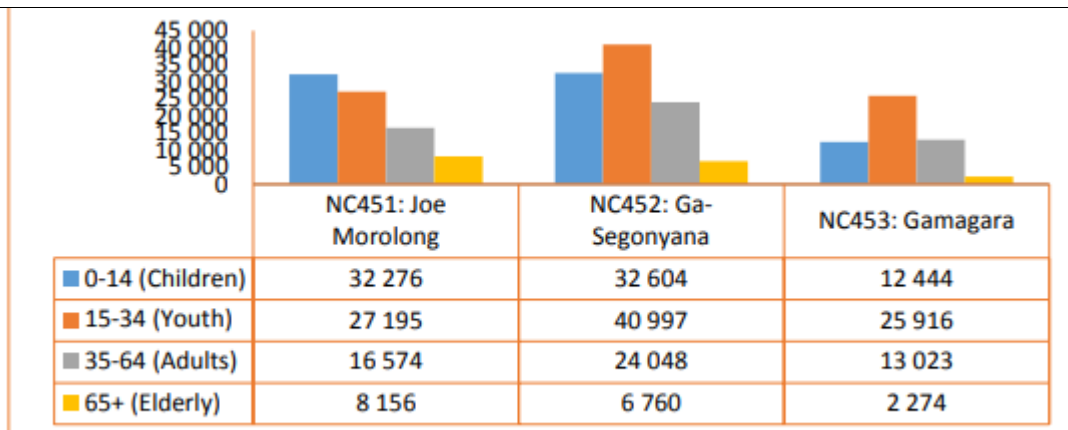
Household sizes

The household sizes decreased from 2011 to 2016 in all local municipalities within the district. A huge decrease is experienced in Gamagara LM from 3.9 in 2011 to 3.4 in 2016, this may be due to the high number of rental accommodation status which includes the in-migration (within the district) and out-migration (from outside the district) arising from work opportunities in Gamagara LM. The low decrease in Joe Morolong LM and Ga-Segonyana LM is as a result of the increase in the number of households and high dependency due to levels of poverty within the areas, especially in Joe Morolong LM where a high number of outmigration is experienced.



Age Profile

The age profile of the JTGD is as follows: 0 - 14 years: 31.92%; 15 - 64 years: 63.32%; and older than 65: 4.76%. It is not that different from the national profile on Census 2011 (i.e. 0 - 14 years: 31.03%; 15 - 64 years: 63.59%; and older than 65: 5.39%). The figure below shows a generally youthful population between the age segment 15 – 36 of 100 973 people i.e. 41.68%.



Source: StatsSA 2016

Figure 11: Age distribution within JTG District Municipality

Gender Profile

The gender split in the JTGD is 49.12% male and 50.88% female. There are generally more females than males in all municipalities with the exception of Gamagara LM; where there are more males than females, mainly because of the presence of job opportunities that attract men from other areas outside the district.

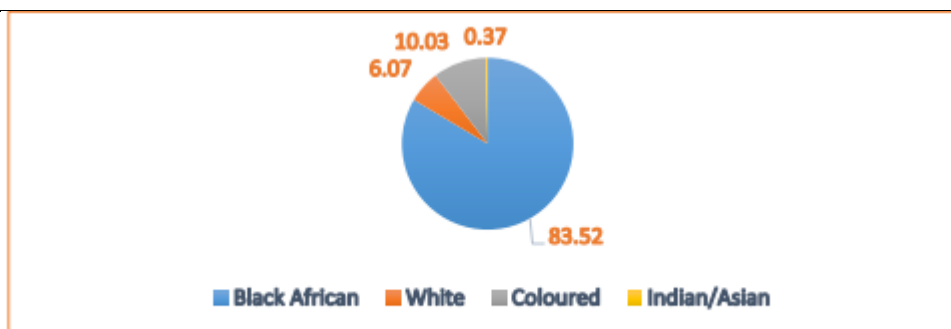
	John Taolo Gaetsewe	Joe Morolong	Ga-Segonyana	Gamagara
Male	118 988	38 206	50 483	30 299
Female	123 276	45 995	53 925	23 356

Source: StatsSA 2016

Figure 12: Sex Ratio

Racial Distribution

The racial profile of the JTGD is as follows: Black/African: 83.52%; Coloured: 10.03%; Asian and Indian: 0.37%; White: 6.07%



Source: StatsSA 2016

Figure 13: Population group within JTGD

Education

The majority of the population in JTGDM have not attended any form of schooling (17.6%). Only 15.10% have completed high school (Grade 12) and a very few have completed some form of post-matric qualification

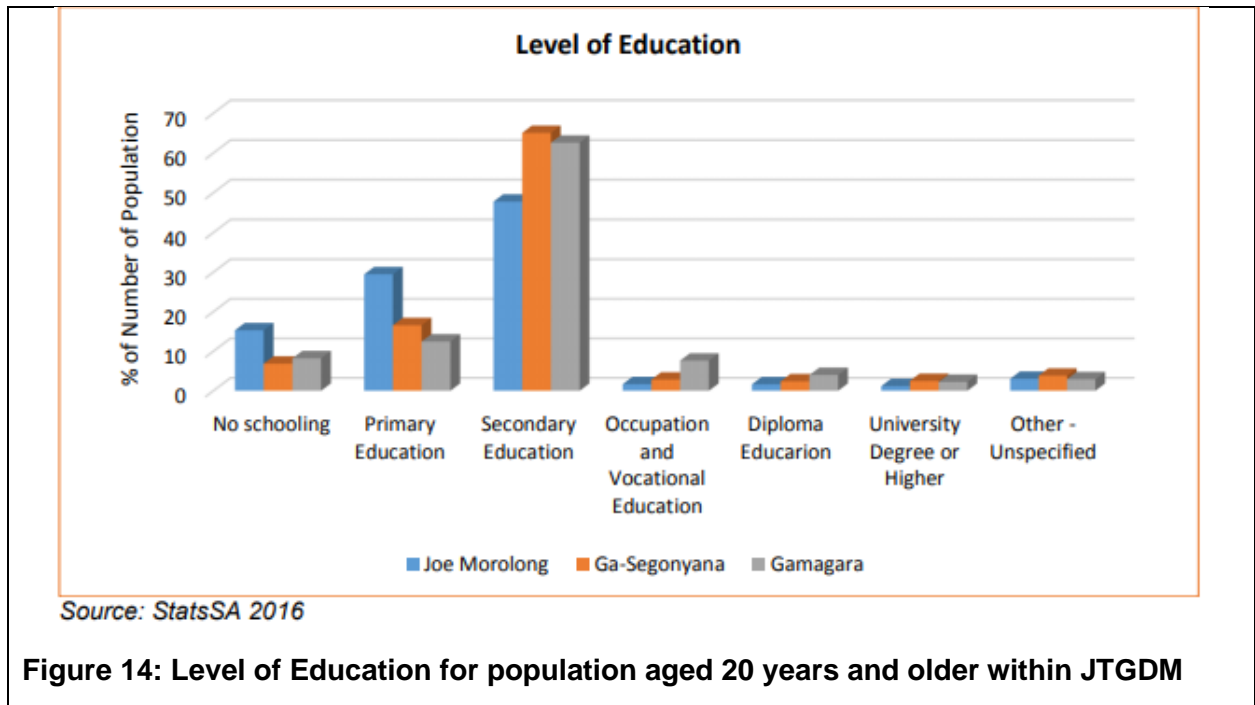


Figure 14: Level of Education for population aged 20 years and older within JTGDM

➤ Employment

In 2011, the District had an unemployment rate of 30%. However, this figure does include the discouraged work-seekers which will increase the unemployment rate to 47% if it were to be added. With an unemployment rate of 18%, the Gamagara Municipality is the only Municipality which has a lower unemployment rate than the District. The Joe Morolong Municipality has the highest unemployment rate in the District of 40%.

Unemployment rates

Nearly one in every three persons between 15 and 65 years of age in the JTGDM (30.1%) were unemployed in 2011. This was the second highest figure out of the five DMs, 2% higher than the Northern Cape Provincial figure. Within the local municipalities, Joe Morolong LM has the highest unemployment rate at 38.7% in 2011.

Income profile

Almost 41% District population receives no monthly income, and around 24% earn less than R400 a month. These figures indicate the poor economic condition of the District. Of all the LMs, Gamagara is in better position. In this municipality, approximately 32% people receives no income as compared to 42% in Joe Morolong and 44% in Ga-Segonyana.

30. Description of the current land uses

The average current land uses that were observed on site during the site survey from 23 to 20 November 2020 differs per farm as they are privately owned. The site has been characterised

by a mixture of land uses, of which agriculture are dominant. Various farms in the proposed project area consists of but not limited to the following land uses:

- Game Farming
- Livestock Farming
- Farm settlement
- Grazing land
- Quest House lodges
- Commercial farming of grapes.

The district holds potential as a viable tourist destination and has numerous growth opportunities in the industrial sector.

30.1. Description of specific environmental features and infrastructure on the site

The proposed site has the following environmental features and infrastructures on site or infrastructure occur on site or within close proximity.

- Patches of Critical Biodiversity area and Ecological Support area
- Mushaweng river that feeds directly in Kuruman River
- A gravel road from Van Zylsrus that transverses the site on the eastern part of the proposed site though various farms of the project area which connect to R380 Provincial road
- Eskom Power cables
- Farm buildings

31. Environmental and current land use map

Figure 15 below is an environmental and current land use map (composite map)

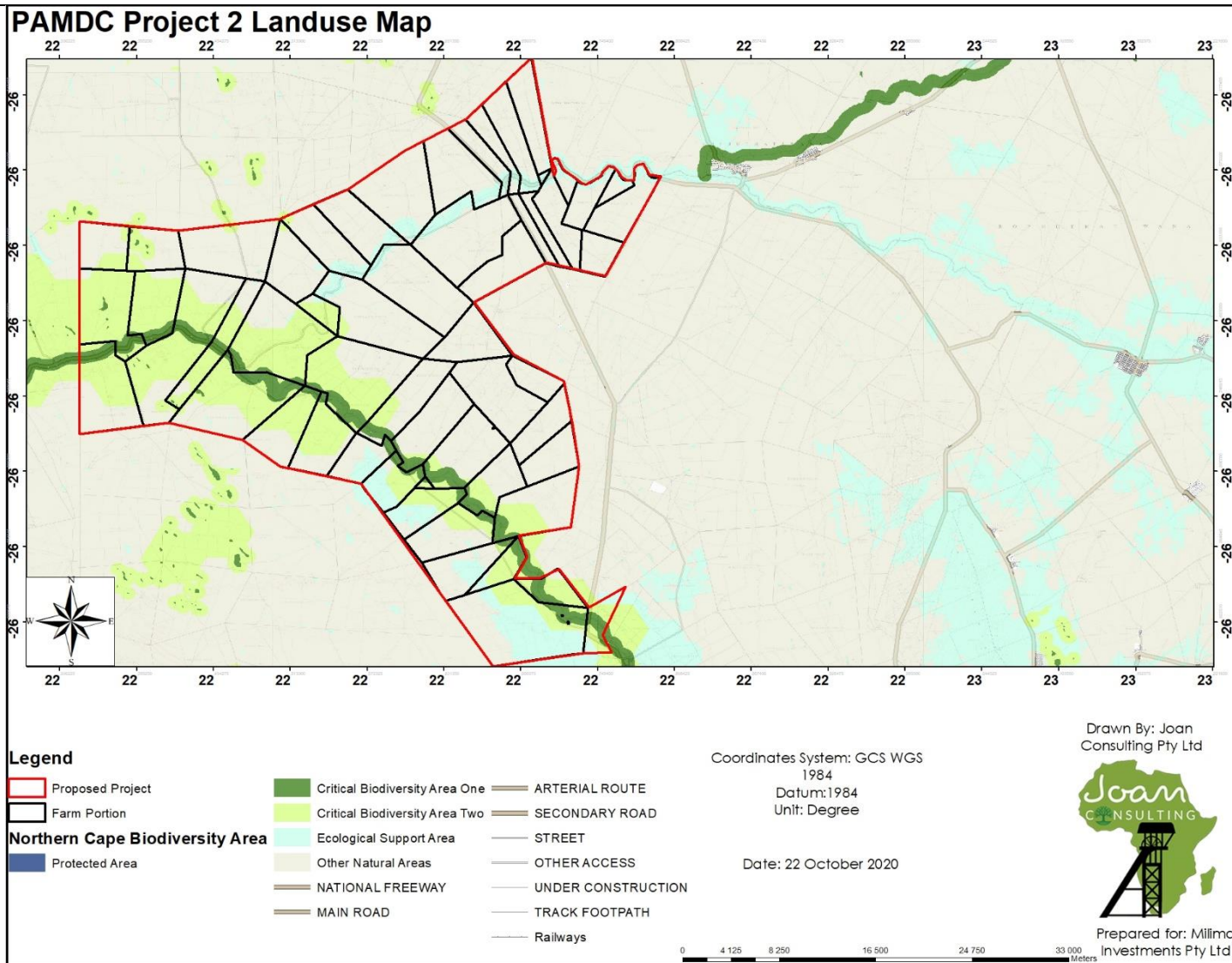


Figure 15: Environmental and Land use Map of the exploration site Application

32. Impacts and risks identified including the nature, significance consequence, extent, duration and probability of the impacts, including the degree of these impacts.

Table 8: Planning Phase Impact Assessment

Impacts and Mitigation measures relating to the proposed project during Planning Phase														
Activity	Impact	Aspect	Nature	Magnitude	Extent	Duration	Probability	Significance before mitigation	Mitigation measures	Magnitude	Extent	Duration	Probability	Significance after mitigation
Application process	Project Delays caused by Identification of legislative requirements	Planning	-	4	1	1	5	30	Obtain Environmental authorisation from the department of Mineral resources and Energy Prior Commencement of the project	4	1	1	2	12
Application process	Project Delays caused by Potential friction with I&APs and Landowners	Planning	-	4	1	1	5	30	<ul style="list-style-type: none"> Engage with affected Landowners Prior Commencement of the project Undertake effective Public participation Process 	4	1	1	2	12
Application process	Disputes and disagreements between land owners and the applicant	Planning and Social aspect	-	6	1	1	4	32	<ul style="list-style-type: none"> The applicant's legal team must draft a land user agreement which must be agreed upon by the landowners and the applicant, and it must include all site-specific condition such as; <ul style="list-style-type: none"> ✓ Operational hours ✓ Access to the farm ✓ And others added by the landowner 	6	1	1	2	16

Table 9: Impact Assessment for Construction, Operational and Decommissioning phase

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
CONSTRUCTION PHASE														
Vegetation	Clearing of vegetation and movement of vehicles for site establishment	Removal of Vegetation	- (ve)	6	2	4	5	60	<ul style="list-style-type: none"> • Areas to be cleared must be clearly marked and clearing of vegetation must only take place within these demarcated areas. (operation footprint) • No disturbance or removal of protected plant species in terms of the Nation Forest Act unless a license to do so is has been granted and removal is undertaken by a specialist • Prohibit the collection of plant material for medicinal purposes and fire wood • Where possible, place infrastructures in places that are already disturbed or degraded to avoid further removal of vegetation and increasing the footprint of the activity. 	2	1	2	5	25
Vegetation	Clearing of vegetation and movement of vehicles for site establishment	Destruction of protected plant species	- (ve)	4	1	4	5	45	<ul style="list-style-type: none"> • Supervision by an ecologist to ensure success of the rescue operation • Place drilling holes away from any red listed and/or protected plant species • Use already available farm roads to avoid trampling red listed plant species 	4	1	4	3	27

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
Vegetation	Clearing of vegetation and movement of vehicles for site establishment	Removal of the natural vegetation	- (ve)	4	1	4	5	45	<ul style="list-style-type: none"> Due to the sensitivity of the areas it is advised that areas designated for vegetation clearing should be identified and visibly marked off and also approved as part of final drilling map Avoid drilling on the Falls area as it provides habitat for Vultures as well as Blue Cranes. Use already available farm roads and avoid creating new ones Vegetation clearing areas should be kept to a minimum and restricted to the proposed drilling sites. Exposed areas should be rehabilitated with indigenous plants to the project area as soon as construction is finished 	4	1	4	3	27
Vegetation	Clearing of vegetation and movement of vehicles for site establishment	Disturbance to animals on site	- (ve)	6	2	3	4	44	<ul style="list-style-type: none"> Do not disturb nests, breeding sites or young ones. Do not attempt to kill or capture snakes unless directly threatening the safety of employees. Dogs or other pets are not allowed to the worksite as they are threats to the natural wild animal A low-speed limit of 30km/h must be enforced on site to reduce wild animal-vehicle collisions No animals should be intentionally killed or destroyed and poaching and hunting should not be permitted on the site. 	6	2	3	2	22

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
									<ul style="list-style-type: none"> Severe contractual fines must be imposed and immediate dismissal on any contract employee who is found attempting to snare or otherwise harms remaining faunal species. Hunting weapons are prohibited on site. Contract employees must be educated about the value of wild animals and the importance of their conservation. The ECO must conduct regular site inspections of removing any snares or traps that have been erected. Employees and contractors should be made aware of the presence of, and rules regarding, flora and fauna through suitable induction training and on-site signage. 					
Vegetation	Clearing of vegetation and movement of vehicles for site establishment	Increased soil erosion, increase in silt loads and sedimentation	- (ve)	4	2	4	5	50	<ul style="list-style-type: none"> Following prospecting, rehabilitation of disturbed areas is required Avoid areas with sensitive soils, steep slopes during rain or windy season. Ensure that roads are not paved but well maintained (as gravel) to reduce the speed of water by promoting infiltration 	2	4	4	3	30
Vegetation	Clearing of vegetation and	Establishment and spread	- (ve)	6	1	4	5	55	<ul style="list-style-type: none"> The best mitigation measure for alien and invasive species is the early detection and eradication of these species which will be 	6	1	4	3	33

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
	movement of vehicles for site establishment	of declared weeds							<p>ensured with the use of a monitoring programme.</p> <ul style="list-style-type: none"> An alien invasive management programme should be developed and implemented in order to control alien invasive species 					
Noise Air Quality	Clearing of vegetation and movement of vehicles for site establishment	Dust and Noise Generation on game Lodges and quest house:	- (ve)	8	3	2	4	52	<ul style="list-style-type: none"> Drill rig and Cars must be services regularly to reduce noise levels. Work during the day time only to minimise disruption of neighbours and animal life. Operational hours should be kept between 08H00- 17H00 in summer and 08H00- 16H00 in winter. Use equipment or machinery that complies with the manufacture's specifications for acceptable noise level Speed limit must be kept 30km/h and below. Best access route that will not generate dust and noise to Game Lodges, Lodges & Guest Houses should be discussed with the landowner prior any construction activities may commence on site. Due to the scarcity of water within the region, dust generation activities such as excessive clearing of vegetation, over 50km/h driving speed and etc should be limited; 	6	1	2	2	18

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
									<ul style="list-style-type: none"> No wild animal may under any circumstance be hunted, snared, captured, injured or killed 					
Socio-Economic	Clearing of vegetation and movement of vehicles for site establishment	Negatively impacting Settlement and residential on their livelihoods	- (ve)	8	2	2	5	60	<ul style="list-style-type: none"> The applicant must consult with the affected parties on which times are favourable for them before undertaking activities which could negatively impact on their livelihoods The applicant must ensure that there is an insurance policy in place readily available to compensate for any loss on the farm caused by the proposed activities; 	4	1	1	3	18
Soil	Clearing of vegetation and movement of vehicles for site establishment	Soil contamination by oil spills from vehicles and machinery	- (ve)	6	2	2	3	30	<ul style="list-style-type: none"> Any equipment that is leaking must be temporarily decommissioned and removed from the site, to a surface which is impermeable and has a waste water collection system. Spill kits will be provided for onsite spill cleaning. Clean any oil spillages on site within 24 hours Make all staff aware of the need to prevent spills, leaks and disposal of contaminated water onto the ground and ensure that they are adequately trained to take corrective action should an accidental spill occur Provide drip trays for all parked vehicles Dispose contaminated soils at a permitted site thus Holfontein hazardous waste disposal site or any other registered hazardous waste disposal site; 	2	1	2	2	10

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
Soil	Clearing of vegetation and movement of vehicles for site establishment	Habitat destruction by vegetation removal	- (ve)	6	2	4	5	60	<ul style="list-style-type: none"> • Areas to be cleared must be clearly marked in the field to eliminate unnecessary clearing. Vegetation clearing should be restricted within the demarcated areas (operation footprint) • A field survey must be undertaken before reclamation activities commence on site to demarcate the ecologically sensitive area near the stream, and ensure that disruption is caused in the sensitive area. • No listed and/or protected plant species are to be destroyed. The assistance of an ecologist is required to identify such species on site. • Use already available farm roads and trails to avoid trampling red listed plant species • Do not disturb nests, breeding sites of animals. • Do not attempt to kill or capture snakes unless directly threatening the safety of employees. • Employees and contractors should be made aware of the presence of, and rules regarding, flora and fauna through suitable induction training and on-site signage • Keep to the speed limit of 40 km/h on all roads running through and accessing the site to avoid driving over any fauna 	4	2	2	3	24
		Soil erosion as the results	- (ve)	6	3	4	3	39	<ul style="list-style-type: none"> • Sensitive landscapes must be marked as NO-GO areas 	4	2	2	2	16

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation	
		of exposed surface							<ul style="list-style-type: none"> Immediately rehabilitate areas that have of been stripped of vegetation by rehabilitating Restrict impacts to prospecting activities footprint Have temporal erosion control measures to protect the disturbed soils and topsoil until adequate vegetation has been established Topsoil should be retained and replaced where possible as topsoil contains a lot of the nutrients from decomposed organic matter and is therefore important for ecosystem functioning. Topsoil stockpiles should be covered/protected to prevent erosion by wind and/or water 						
Noise	Clearing of vegetation and movement of vehicles for site establishment	<ul style="list-style-type: none"> Disruption of the neighbouring landowners Noise will be generated from the operation of drilling Rig and vehicles 	- (ve)	2	2	1	5	25	<ul style="list-style-type: none"> Work during the day time only to minimise disruption of neighbours and animal life. Service equipment, machineries, and vehicles regularly to minimise noise. Where necessary if possible, install silencers on equipment/machinery. Provide ear plugs to the employees and ensure they wear them for the protection of their ears Use equipment or machinery that complies with the manufacture's specifications for acceptable noise level 	2	1	1	5	20	

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
Soil and Groundwater	Clearing of vegetation and movement of vehicles for site establishment	Ground & surface water contamination and soil contamination from hydrocarbon spillages from machinery or vehicles.	- (ve)	6	3	3	3	36	<ul style="list-style-type: none"> Vehicles must be restricted to travel on the designated roadways at the recommended times to avoid contamination Topsoil should be retained and replaced where possible, this will help reduce soil contamination as topsoil contains a lot of the nutrients from decomposed organic matter and is therefore important for ecosystem functioning. Topsoil stockpiles should be covered/protected to prevent erosion by wind and/or water Place drip trays under parked vehicles and machinery to avoid soil contamination by hydrocarbon leakage. Dispose contaminated soils at a permitted site thus Holfontein hazardous waste disposal site or any other registered hazardous waste disposal site; 	4	2	2	2	16
Vegetation (Weeds)	Clearing of vegetation and movement of vehicles for site establishment	The proposed activities may introduce or encourage establishment of alien vegetation in the area	- (ve)	6	2	2	3	30	<ul style="list-style-type: none"> Implement early detection and eradication of the alien invasive species through a monitoring programme. An alien invasive management programme must be implemented in order to control alien invasive species. All alien invasive tree & weed species growing in the areas disturbed by prospecting activities must be removed from the cleared area, and continuous monitoring must 	4	1	2	2	14

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
									be conducted for three consecutive years after closure of each site.					
Land Capability	Clearing of vegetation and movement of vehicles for site establishment	Land degradation and land use change due to potential topsoil/fertile soil loss	- (ve)	8	2	3	3	39	<ul style="list-style-type: none"> Place infrastructures in places that are already disturbed or degraded to avoid increasing the footprint of the activity Landowners must be consulted on where the different infrastructures can be placed. Avoid as far as possible areas of important farm land activities, by selecting areas with a low veld condition and diversity. Topsoil and sub soil must be kept separately throughout drilling activities and rehabilitation Carry out concurrent rehabilitation throughout the life of the project to encourage quick recovery of the project area Where soil nutrients and/or fertility has been lost, the soil must be fertilised to recover cultivation capacity 	4	1	2	3	21
Fauna	Clearing of vegetation and movement of vehicles for site establishment	<ul style="list-style-type: none"> Loss of faunal diversity may occur because of faunal dispersion 	- (ve)	6	2	2	4	32	<ul style="list-style-type: none"> Work during daytime to minimise the disruption animal life. Do not disturb nests, breeding sites of young animals unnecessarily. Do not attempt to kill or capture snakes unless directly threatening the safety of employees. 	4	1	2	2	14

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
		<ul style="list-style-type: none"> Disturbance of the area biodiversity ecosystem by operational vehicles 							<ul style="list-style-type: none"> Vehicles must be restricted to travel on the designated roadways to minimize the ecological footprint of the proposed development Keep to the speed limit of 40 km/h on all roads running through and accessing the site to avoid driving over any fauna 					
Safety and security	Clearing of vegetation and movement of vehicles for site establishment	<ul style="list-style-type: none"> Personnel injuries from safety hazards on site; Accidents resulted from moving vehicles; Exposure to snakes and other wild animals on site. 	- (ve)	6	2	2	4	40	<ul style="list-style-type: none"> Ensure that workers and any persons accessing the site wear the correct PPE at all times Compile a health and safety risk assessment of the site to identify all safety related hazards and risks Educate all employees working on site, in the form of inductions/training or toolbox talks of the health and safety risks on site 	2	1	1	2	08
Safety and Security	Clearing of vegetation and	Working on site can pose safety	- (ve)	6	2	2	3	30	<ul style="list-style-type: none"> Notify the local Kuruman Agri forum of the Prospecting team to before accessing the site. 	4	2	2	2	16

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
	movement of vehicles for site establishment	hazards to land owners and people living in the farms causing <ul style="list-style-type: none"> • Fear of lives • Increased Criminal activities. 							<ul style="list-style-type: none"> • People accessing the site must be known before accessing the site though sending the pictures of themselves. • Registration numbers of the vehicles (Make of the vehicles) on site must be known before accessing site. • All contractors appointed by the applicant must ensure that farm gates remain locked at times when entering and exiting the farms. 					
Traffic	Clearing of vegetation and movement of vehicles for site establishment	Increased in Traffic	- (ve)	2	1	2	4	16	<ul style="list-style-type: none"> • Traffic will not necessarily increase as the access route is not used by the public and there will be a maximum of 5 vehicles on a normal day – going in and out of the site 	2	1	2	3	13
Visual Impact	Clearing of vegetation and movement of vehicles for site	Limitation of visibility through dust caused by moving vehicles	- (ve)	6	1	1	4	32	<ul style="list-style-type: none"> • Due to the scarcity of water within the region, dust generation activities such as excessive clearing of vegetation, over 30km/h driving speed and etc should be limited; • Best access route that will not generate dust and noise to Game Lodges, Lodges & Guest Houses should be discussed with the landowner prior 	4	1	1	2	12

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
	establishment								<p>any construction activities may commence on site</p> <ul style="list-style-type: none"> A maximum number of 5 vehicles on a normal day – going in and out of the site 					
Socio-economic Impact	Site establishment: ablution and temporal admin facilities	Job Creation	+ (ve)	8	3	2	5	65	<ul style="list-style-type: none"> This is a positive impact; no mitigation measures are required. 					
Social	Clearing of vegetation and movement of vehicles for site establishment	Impacts on livelihoods and loss of income	- (ve)	8	2	2	5	60	<ul style="list-style-type: none"> The applicant must consult with the affected parties on which times are favourable for them before undertaking the activities which could negatively impact their livelihood The applicant must ensure that there is an insurance policy in place readily available to compensate for any loss on the farm caused by the proposed activities; 	4	1	1	3	18
Heritage Resources	Site establishment: ablution and temporal admin facilities	Impact on Heritage Resources	- (ve)	6	1	2	3	27	<ul style="list-style-type: none"> Should artefacts or archaeological items or sites be observed, activity on the area must cease immediately, area marked off and a specialist consulted prior to any further activity Keep a 50m distance from graves if encountered. 	4	1	1	1	6

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
Cultural heritage	Clearing of vegetation and movement of vehicles for site establishment	Impact on Heritage Resources	- (ve)	6	1	4	5	55	<ul style="list-style-type: none"> LIA site must be mapped and documented A management plan for the site must be drawn Section where scatters of potsherds were recorded must be avoided where possible An archaeologist must be appointed to monitor during prospecting Use chance find procedure to cater for accidental finds 	6	2	4	3	36
Cultural heritage	Clearing of vegetation and movement of vehicles for site establishment	Disturbance of graves	- (ve)	6	5	4	4	60	<ul style="list-style-type: none"> Maintain 25m buffer zones for all burial sites Burial sites must be mapped Consult Landowners and farm workers to identify burial sites before prospecting 	6	2	4	3	4
Cultural heritage	Clearing of vegetation and movement of vehicles for site establishment	Disturbance of buildings and structures older than 60 years old	- (ve)	4	1	2	2	14	<ul style="list-style-type: none"> None required 	4	1	2	2	14

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
Cultural heritage	Clearing of vegetation and movement of vehicles for site establishment	Destruction public monuments and plaques	- (ve)	2	1	1	1	4	<ul style="list-style-type: none"> Mitigation is not required because there are no public monuments within the prospecting right application site 	2	1	1	4	4
OPERATIONAL PHASE – DRILLING														
Vegetation	Borehole drilling, construction of water sump and movement of vehicles	Vegetation removal	- (ve)	6	1	2	5	45	<ul style="list-style-type: none"> Areas to be cleared must be clearly marked and clearing of vegetation must only take place within these demarcated areas. (operation footprint) Sensitive or endangered plant species must be marked avoided. Prohibit the collection of plant material for medicinal purposes and fire wood Where possible, place infrastructures in places that are already disturbed or degraded to avoid further removal of vegetation and increasing the footprint of the activity. 	4	1	1	5	30
Vegetation	Borehole drilling, construction	Removal of the natural vegetation	- (ve)	4	1	4	5	45	<ul style="list-style-type: none"> Due to the sensitivity of the area, it is advised that areas designated for vegetation clearing 	4	1	4	3	27

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
	of water sump and movement of vehicles								<p>should be identified and visibly marked off and also approved as part of final drilling map</p> <ul style="list-style-type: none"> • Avoid drilling on the falls area as it provides habitat for Vultures as well as Blue Cranes. • Use already available farm roads and avoid creating new ones • Vegetation clearing areas should be kept to a minimum and restricted to the proposed drilling sites. • Exposed areas should be rehabilitated with indigenous plants to the project area as soon as construction is finished 					
Vegetation	Borehole drilling, construction of water sump and movement of vehicles	Disturbance to animals on site	- (ve)	6	2	3	4	44	<ul style="list-style-type: none"> • Do not disturb nests, breeding sites or young ones. Do not attempt to kill or capture snakes unless directly threatening the safety of employees. • Dogs or other pets are not allowed to the worksite as they are threats to the natural wild animal • A low speed of 30km/h limit must be enforced on site to reduce wild animal-vehicle collisions • No animals must be intentionally killed or destroyed and poaching and hunting should not be permitted on the site. • Severe contractual fines must be imposed and immediate dismissal on any contract employee 	6	2	3	2	22

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
									<p>who is found attempting to snare or otherwise harms remaining faunal species.</p> <ul style="list-style-type: none"> Hunting weapons are prohibited on site. Contract employees must be educated about the value of wild animals and the importance of their conservation. The ECO must conduct regular site inspections of removing any snares or traps that have been erected. Employees and contractors should be made aware of the presence of, and rules regarding, flora and fauna through suitable induction training and on-site signage. 					
Vegetation	Borehole drilling, construction of water sump and movement of vehicles	Increased soil erosion, increase in silt loads and sedimentation	- (ve)	4	2	4	5	50	<ul style="list-style-type: none"> Following prospecting, rehabilitation of disturbed areas is required Avoid areas with sensitive soils, steep slopes during rain or windy season. Ensure that roads are not paved but well maintained (as gravel) to reduce the speed of water by promoting infiltration 	2	4	4	3	30
Vegetation	Borehole drilling, construction of water sump and	Establishment and spread of declared weeds	- (ve)	6	1	4	5	55	<ul style="list-style-type: none"> The best mitigation measure for alien and invasive species is the early detection and eradication of these species which will be ensured with the use of a monitoring programme. 	6	1	4	3	33

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
	movement of vehicles								<ul style="list-style-type: none"> An alien invasive management programme should be developed and implemented in order to control alien invasive species 					
Noise	Borehole drilling, construction of water sump and movement of vehicles	Noise will be generated due to the operation of drilling machinery and vehicle as well as people's movement around the site	- (ve)	6	2	1	5	45	<ul style="list-style-type: none"> All equipment to be adequately maintained and kept in good working order to reduce noise. Workers and personnel will wear hearing protection (ear plugs) when required. Use equipment or machinery that complies with the manufacture's specifications acceptable noise levels All vehicles and activities will only operate during daytime hours Employees loitering around the site is prohibited. 	2	1	1	5	20
Noise Air Quality	Borehole drilling, construction of water sump and movement of vehicles	Dust and Noise Generation on game Lodges and quest house:	- (ve)	8	3	2	4	52	<ul style="list-style-type: none"> Drill rig and Cars must be services regularly to reduce noise levels. Work during the day time only to minimise disruption of neighbours and animal life. Operational hours should be kept between 08H00- 17H00 in summer and 08H00- 16H00 in winter. Use equipment or machinery that complies with the manufacture's specifications for acceptable noise level. 	6	1	2	2	18

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
									<ul style="list-style-type: none"> Due to the scarcity of water within the region, dust generation activities such as excessive clearing of vegetation, over 30km/h driving speed and etc should be limited; Best access route that will not generate dust and noise to Game Lodges, Lodges & Guest Houses must be discussed with the landowner prior any construction activities may commence on site. 					
Soil	Removal of soil during drilling.	Exposure of soils stripped of vegetation during the construction phase and operational phase (drilling) may lead to soil erosion. This will result in loss of soil nutrients.	- (ve)	8	2	2	4	48	<ul style="list-style-type: none"> Have temporal erosion control measures to protect the disturbed soils and topsoil until adequate vegetation has established Undertake concurrent rehabilitation to restrict the exposure period of soils exposed and vulnerable to erosion Vehicles should be restricted to travel on the designated roadways at the recommended speed Topsoil must be stockpiled properly to retain fertility of the soil post closure Topsoil stockpiles must be covered/protected to prevent erosion by wind and/or water 	4	1	2	4	28
Health and safety	Borehole drilling, construction of water	Increased risk to public and worker safety.	- (ve)	8	1	2	4	44	<ul style="list-style-type: none"> Comply with all the relevant requirements of Mine Health and Safety Act (Act 29 of 1996) 	4	1	2	2	14

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
	sump and movement of vehicles													
Safety and Security	Borehole drilling, construction of water sump and movement of vehicles	Working on site can pose safety hazards to land owners and people living in the farms. <ul style="list-style-type: none"> • Fear of farm attacks due to strangers in their area • Increased Criminal activities. 	- (ve)	6	2	2	3	30	<ul style="list-style-type: none"> • Notify the local Kuruman Agri forum of the Prospecting team to before accessing the site. • People accessing the site must be known before accessing the site though sending the pictures of themselves. • Registration numbers of the vehicles (Make of the vehicles) on site must be known before accessing site. • All contractors appointed by the applicant must ensure that farm gates remain locked at times when entering and exiting the farms. 	4	2	2	2	16
Soil, Land Use and Land Capability	Borehole drilling, construction of water sump and movement of vehicles	Soil contamination from hydrocarbon spills	- (ve)	4	1	1	3	18	<ul style="list-style-type: none"> • Clean all hydrocarbon spills from machinery immediately, and • Dispose contaminated soils at a permitted site thus Holfontein hazardous waste disposal site or any other registered hazardous waste disposal site; 	4	1	1	2	12

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
									<ul style="list-style-type: none"> Drip trays are to be watertight, and must be emptied regularly and before rain events. The contents of drip trays are to be treated as hazardous waste. Only emergency and essential repairs of vehicles and equipment may take place on site at the discretion of the terms and conditions of the land use agreement in place, agreed upon the landowner and the applicant. No vehicles may be serviced of site. 					
Soil, Land Use and Land Capability	Borehole drilling, construction of water sump and movement of vehicles	Change in land capability due to topsoil loss,	- (ve)	8	2	3	4	52	<ul style="list-style-type: none"> Place infrastructures in places that are already disturbed or degraded to avoid increasing the footprint of the activity Landowners must be consulted on where the different infrastructures can be placed. Avoid as far as possible areas of important farm land activities, by selecting areas with a low veld condition and diversity Topsoil and sub soil must be kept separately throughout prospecting activities and rehabilitation Carry out concurrent rehabilitation throughout the life of the project to encourage quick recovery of the project area 	4	1	2	3	21

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
									<ul style="list-style-type: none"> Where soil nutrients and/or fertility has been lost, the soil should be fertilised to recover cultivation capacity 					
Soil, Land Use and Land Capability	Borehole drilling, construction of water sump and movement of vehicles	Soil Compaction	- (ve)	6	1	2	3	27	<ul style="list-style-type: none"> Avoid creating many access routes and truck tracks; Keep the speed limit to 30km/h or minimum to reduce the tire contractions on the soil 	4	1	2	2	14
Soil and Groundwater	Borehole drilling, construction of water sump and movement of vehicles	Contamination of soil and underground water by spills from mobile ablution facilities and oil from drill rig	- (ve)	6	2	2	4	40	<ul style="list-style-type: none"> Vehicles and drill equipment must be regularly serviced and maintained. Refuelling of vehicles and equipment must be done with care to minimise the chance of spillages; Dip trays will be placed under parked vehicles and machinery A spill kit will be available on each site where operation activities are in progress; and Any spillages must be cleaned up immediately to prevent further contamination. 	2	1	1	3	12
Groundwater	Borehole drilling, construction of water sump and	Material used for backfilling boreholes may leach pollutants	- (ve)	6	2	2	4	40	<ul style="list-style-type: none"> Ensure that the land owners' borehole yield is observed during the drilling operation. Should it be proven that the operation is indeed affecting the quantity and quality of groundwater available 	2	1	1	3	12

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
	movement of vehicles	that will result in the pollution of the surrounding groundwater							to users and surrounding water resources, the affected parties must be compensated.					
Ground water	Borehole drilling, construction of water sump and movement of vehicles	Borehole water level reduction	- (ve)	6	1	1	3	24	<ul style="list-style-type: none"> Water quality monitoring must be conducted quarterly during the operational phase of drilling activities; The applicant must monitor and keep records of water levels prior drilling activities commences, and water levels must be monitored monthly 	4	1	1	2	12
Ground water	Borehole drilling, construction of water sump and movement of vehicles	Destruction of buildings and infrastructure s other structures	- (ve)	6	1	1	4	32	<ul style="list-style-type: none"> Drilling activities should be located 150m away from any building structure. 	6	1	1	2	16
Waste Management	Waste generation and storage	Solid waste such as debris and litter may be generated and	- (ve)	8	2	3	5	65	<ul style="list-style-type: none"> Littering must be prohibited, and all waste generated from the site must be cleared. A 'no waste dumping' sign must also be placed on site. 	4	1	1	3	18

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
		deposited into the site. This could potentially attract nuisance and affect the natural scenery/aesthetic quality of the site.							<ul style="list-style-type: none"> Waste generated by workers must be collected and disposed of timeously at the nearest registered landfill. Store waste in labelled containers, indicating clearly whether the waste is hazardous or non-hazardous (general waste). Burning of waste material is not be permitted. Hazardous waste must be cleaned up using absorbent material provided in spill kits on site and must be disposed of accordingly at a hazardous waste landfill. 					
Fire control	Borehole drilling, construction of water sump and movement of vehicles	Increase veld fires potential	- (ve)	4	1	1	2	12	<ul style="list-style-type: none"> Vegetation around proposed site must be kept short to create a fire management zone. Open fire is prohibited on the site. No burning cigarettes or matches may be thrown down within exploration area. Rubbish or vegetation may under no circumstances be burnt Training of staff will include awareness regarding the rules of the site 	4	1	1	1	6
Surface water	Borehole drilling, construction of water sump and	Surface water Pollution though oil spills	- (ve)	6	1	2	3	27	<ul style="list-style-type: none"> Vehicles and equipment must be regularly serviced and maintained. Refuelling of vehicles and equipment will be done with care to minimise the chance of spillages; 	4	1	1	2	12

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
	movement of vehicles								<ul style="list-style-type: none"> Drip trays must be placed under parked vehicles and machinery 					
Surface water	Borehole drilling, construction of water sump and movement of vehicles	Increased sedimentation, surface runoff and Soil Erosion	- (ve)	4	1	2	2	14	<ul style="list-style-type: none"> Limit the development footprint to reduce high-sediment runoff; Avoid clearing the site during the rainy seasons Rehabilitate the area by re-using stockpiled soil within as short a period of time. 	4	1	1	2	12
Heritage Resources	Borehole drilling, construction of water sump and movement of vehicles	Discovery of graves and other heritage resources	- (ve)	6	1	2	3	27	<ul style="list-style-type: none"> Should artefacts or archaeological items be observed, activity on the specific site should cease immediately, the area marked off and a specialist consulted prior to any further activity Keep 50m distance from graves and demarcate them as no-go areas. 	4	1	1	1	6
Air Quality	Borehole drilling, construction of water sump and movement of vehicles	During operation, activities may result in dust generation and the release of particulates into the area. Potential dust	- (ve)	6	3	2	5	55	<ul style="list-style-type: none"> Due to the scarcity of water within the region, dust generation activities such as excessive clearing of vegetation, over 50km/h driving speed and etc should be limited; Best access route that will not generate dust and noise to Game Lodges, Lodges & Guest Houses should be discussed with the landowner prior any construction activities may commence on site 	2	2	2	2	12

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
		generation activities may include drilling, movement of vehicles and topsoil clearing							<ul style="list-style-type: none"> Limit the number of vehicles driving on and offsite Topsoil stockpiles or soil heaps must be watered to reduce dust emission or place protective nets over the stockpile Keep to the speed limit of 40 km/h on all roads running through and accessing the site Minimize the extent of cleared vegetation and exposed soil. Where possible, place protective nets over exposed soil. 					
Fauna	Borehole drilling, construction of water sump and movement of vehicles	<ul style="list-style-type: none"> Depletion of wild animals Hunting and Killing of wild Animals 	- (ve)	10	3	2	4	60	<ul style="list-style-type: none"> The rehabilitation of the disturbed areas must be conducted such that the rehabilitated areas will encourage the migration of animals back into the rehabilitated areas. Poaching of wild animals and livestock is prohibited. 	4	3	2	3	27
Fauna	Borehole drilling, construction of water sump and movement of vehicles	Migration of animal life due to disturbance	- (ve)	8	3	2	4	52	<ul style="list-style-type: none"> Sites will be operated according to the approved prospecting works programme As much as possible sites with degraded environment will be used for the drilling purposes. Poaching is prohibited at the prospecting site. 	6	3	2	4	45

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
Visual Impact	Borehole drilling, construction of water sump and movement of vehicles	Visual Impact on the farm	- (ve)	6	1	1	5	35	<ul style="list-style-type: none"> Ensure that the period used for the drill rigs is optimised to ensure that the drill rigs are moved from one site to another over short periods. 	6	1	1	3	21
Socio-Economic	Clearing of vegetation and movement of vehicles for site establishment	Settlement and residential area. Negatively impacting on their livelihoods	- (ve)	8	2	2	5	60	<ul style="list-style-type: none"> The applicant must consult with the affected parties on which times are favourable for them before undertaking activities which could negatively impact on their livelihoods The applicant must ensure that there is an insurance policy in place readily available to compensate for any loss on the farm caused by the proposed activities; 	4	1	1	3	18
Socio-Economic	Borehole drilling, construction of water sump and movement of vehicles	Fear of Farm attacks	- (ve)	6	3	2	4	44	<ul style="list-style-type: none"> Notify the local farmer's forum (Agri-Kuruman and affected forums); Comply with all the local safety requirements; All contractors appointed by the applicant must ensure that farm gates remain locked at times when entering and exiting the farms. 	2	1	1	1	04
Socio-Economic	Borehole drilling, construction of water	Safety and livelihood impact on the landowners	- (ve)	6	1	1	4	32	<ul style="list-style-type: none"> Land owners must be informed on the type of machinery and equipment to be used during drilling phase of the project. 	6	1	1	2	16

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
	sump and movement of vehicles	and occupiers.							<ul style="list-style-type: none"> Lighting must be conducted in manner that will reduce the impacts on visual aspects at night times 					
Socio-Economic	Borehole drilling, construction of water sump and movement of vehicles	Social, Health & Safety Aspect	- (ve)	6	1	1	4	32	<ul style="list-style-type: none"> Proper protective equipment must be allocated to all personnel working with high-risk equipment (drill rig) Tool box talk must be conducted to address the risk associated with the proposed project. The applicant must ensure that the insurance policy must also cover for any injuries on site. 	4	1	1	2	12
Socio-Economic	Borehole drilling, construction of water sump and movement of vehicles	Safety and Security.	+ Ve	6	1	1	5	35	<ul style="list-style-type: none"> Ensure that safety measures in the EMPR are implemented to prevent the impacts on the property owners. Negotiations on compensation and accessing the site to be undertaken before the drilling programme can commence. 	6	2	2	5	50
DECOMMISSIONING AND CLOSURE PHASE														
Rehabilitation	Rehabilitation of the disturbed and contaminated areas	<ul style="list-style-type: none"> Revegetation of areas where vegetation was disturbed to 	+ (ve)	6	1	2	3	27	<ul style="list-style-type: none"> All areas that have been damaged by prospecting activities and vehicles should be stabilized immediately after activities ceases to prevent and control erosion. Undertake concurrent rehabilitation throughout the operations. 	8	2	3	5	65

Aspect	Activity	Impact	(N) Nature of an Impact	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance Before Mitigation	Mitigation Measures	(M) Magnitude	(E) Extent	(D) Duration	(P) Probability	Significance After Mitigation
		<p>restore ecosystem function and integrity.</p> <ul style="list-style-type: none"> Removal of all infrastructures onsite. 							<ul style="list-style-type: none"> Remove all vehicles, equipment, waste and surplus materials from the site Clean up and remove any spills and contaminated soil on site. Ensure that all actions identified in the site closure checklist have been completed and that the ECO is satisfied with the state of the site Ensure that aftercare is provided, and the natural environment recovers and stabilizes after closure. 					
Soil, land use and land capabilities	Rehabilitation Activities	Soil and Land contamination from Hydrocarbons spillages	+(ve)	8	1	4	4	52	<ul style="list-style-type: none"> Protect vegetation and soil by avoiding hydrocarbon spillages; Vehicles must make use of existing roads to avoid destruction of vegetation; Car tracks created by movement of vehicles must be rehabilitated 	8	1	4	4	52
Rehabilitation	Decommissioning Monitoring of rehabilitation activities	Document control	+(ve)	8	1	4	4	52	<ul style="list-style-type: none"> After every two years the applicant must send a rehabilitation progress report which is inclusive of the financial provisions and the total spending's towards rehabilitation to the environmental officer of Agri Kuruman 	8	1	4	4	52

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

This section provides the detailed methodology used for the assessment of the significance of potential environmental impacts in the study. This methodology allows for the identified potential impacts to be analysed in a systematic manner, with significance rating (from insignificant to very high) assigned to each potential impact. The significance of an impact is defined as a combination of the consequence of the impact occurring and the probability that the impact will occur. The criteria used to determine impact consequence include extent, intensity and duration of the impact and are presented below.

Table 10: Criteria Used for Rating of Impacts

Nature of the impact (N)		
Positive	+	Impact will be beneficial to the environment (a benefit).
Negative	-	Impact will not be beneficial to the environment (a cost).
Neutral	0	Where a negative impact is offset by a positive impact, or mitigation measures, to have no overall effect.
Magnitude(M)		
Minor	2	Negligible effects on biophysical or social functions / processes. Includes areas / environmental aspects which have already been altered significantly, and have little to no conservation importance (negligible sensitivity*).
Low	4	Minimal effects on biophysical or social functions / processes. Includes areas / environmental aspects which have been largely modified, and / or have a low conservation importance (low sensitivity*).
Moderate	6	Notable effects on biophysical or social functions / processes. Includes areas / environmental aspects which have already been moderately modified, and have a medium conservation importance (medium sensitivity*).
High	8	Considerable effects on biophysical or social functions / processes. Includes areas / environmental aspects which have been slightly modified and have a high conservation importance (high sensitivity*).
Very high	10	Severe effects on biophysical or social functions / processes. Includes areas / environmental aspects which have not previously been impacted upon and are pristine, thus of very high conservation importance (very high sensitivity*).
Extent (E)		
Site only	1	Effect limited to the site and its immediate surroundings.
Local	2	Effect limited to within 3-5 km of the site.
Regional	3	Activity will have an impact on a regional scale.
National	4	Activity will have an impact on a national scale.
International	5	Activity will have an impact on an international scale.
Duration (D)		

Immediate	1	Effect occurs periodically throughout the life of the activity.
Short term	2	Effect lasts for a period 0 to 5 years.
Medium term	3	Effect continues for a period between 5 and 15 years.
Long term	4	Effect will cease after the operational life of the activity either because of natural process or by human intervention.
Permanent	5	Where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.
Probability of occurrence (P)		
Improbable	1	Less than 30% chance of occurrence.
Low	2	Between 30 and 50% chance of occurrence.
Medium	3	Between 50 and 70% chance of occurrence.
High	4	Greater than 70% chance of occurrence.
Definite	5	Will occur, or where applicable has occurred, regardless or in spite of any mitigation measures.

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

$$\text{Significance Points (SP)} = (\text{Magnitude} + \text{Duration} + \text{Extent}) \times \text{Probability}$$

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

Table 11: Criteria for Rating of Classified Impacts

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

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

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

Table 12: Positive and Negative Impacts of the Project

Positive Impacts from the proposed activity	Negative Impacts from the proposed activity
Discovery of new resources: This project will assist in expanding information of available resources within the area.	Noise: through the movement of vehicles and operation of machineries.
Local Market Boost: Contractors on site will rely on local market for materials, beverages and food	Removal of vegetation: for the purpose of the exploration activities
Good environmental management: All potential impacts that will be generated from the development of the project will be managed through the implementation of the EMP	Habitat destruction by removing the vegetation
	Change in land capability: exploration activities will not have so much impact on the land capability; however, this impact cannot be ruled out completely.
	Generation of Dust from drilling, trenching and use of the dusty access road
	Groundwater Contamination from industrial liquids leakage from the exploration equipment and vehicles.
	Waste generation -solid waste such as litter will be generated and may be deposited in and around the site if not properly managed.

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

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

Please refer table 13 below for a full description of the Impact Assessment including mitigation measures

Table 13: The possible mitigation measures that could be applied and the level of risk.

List of potential Impacts	Possible mitigation measures	Level of risk
Surface and ground water pollution	<ul style="list-style-type: none"> • Maintain the sumps to minimise seepage • Maintain and fix equipment to avoid leakage of oils and other industrial liquids. • Place drip trays under parked vehicles and machineries to contain any unnoticed leakage. • Service the portable toilet properly, regularly and by trained personnel. 	The level of risk is low before the implementation of the mitigation measures and the risk will be even lower after implementing the mitigation measures.
Noise	<ul style="list-style-type: none"> • Work during the day time only to minimise disruption of the neighbouring communities • Sound is louder during the night than during the day. • Service equipment, machineries, trucks and other vehicles regularly to minimise noise. • Provide ear plugs to the employees and ensure they wear them for the protection of their ears. 	The level of risk is medium before the implementation of the mitigation measures and the risk will be low or even lower after implementing the mitigation measures.
Dust	<ul style="list-style-type: none"> • Spray water to suppress dust however the volume of water used should not cause surface water runoff and removal of topsoil • Regulate speed to be 40 km/h on site to reduce dust emission. • Provide dust masks to employees to help them avoid inhaling the dust particles. 	The level of risk is high before the implementation of the mitigation measures and the can be reduced to medium or low after implementing the mitigation measures.
Removal of vegetation	<ul style="list-style-type: none"> • Use the mobile infrastructure where possible to avoid removal of vegetation • Rehabilitate and revegetate denuded areas as soon as possible 	The level of risk for removal of vegetation is high on

List of potential Impacts	Possible mitigation measures	Level of risk
		commencement of the mining activities
Loss of geology	<ul style="list-style-type: none"> Only take the sample quantity required and not more than required 	The level of risk for loss of geology is high on commencement of mining activities
Animal life disruption and poaching	<ul style="list-style-type: none"> Backfill the trenches as soon as possible to ensure safety of animals (and people) Barricade the trenches with the dugout soil to minimise the risk of animals falling into the trenches Enforce no poaching rule by imposing heavy fine to perpetrators employees/contractors. This will scare away the potential perpetrators. 	The level of risk is high during construction and can be reduced to medium after implementing mitigation measures
<ul style="list-style-type: none"> Soil erosion Soil contamination Habitat destruction 	<ul style="list-style-type: none"> Place infrastructures in places that are already disturbed or degraded to avoid removal of vegetation and exposing the soil and increasing the footprint of the activity. Usage of mobile equipment that will only require positioning and not construction Machinery and vehicles to be used on site should be properly maintained Ensure that they are drip trays for vehicles parked which operating on site to mitigate soil contamination by oil To minimise significant habitat destruction, ensure that vegetation clearance only occur where exploration activities will occur, 	The level of risk will be high and can be reduced to medium or low during implementation of mitigation measures
Increased wind and water erosion	<ul style="list-style-type: none"> Precautions should be taken to avoid excessive disturbance; Re-vegetation should take place as soon as possible after exploration to avoid wind erosion. Any completed sites that are no longer required for sampling must rehabilitate and re-seeded with locally-sourced seed of suitable species 	The level of risk is medium before the implementation of the mitigation measures and the risk will be reduced to low after implementing the mitigation measures.
Impacts on fauna	<p>Construction Phase Mitigations:</p> <ul style="list-style-type: none"> Any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person. 	Level of risk will be on medium to low after applying the mitigation measures.

List of potential Impacts	Possible mitigation measures	Level of risk
	<ul style="list-style-type: none"> • The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. The rocky outcrops are particularly sensitive in this regard and construction personnel should not be allowed off of the construction site and onto these areas. • All staff and contractors should undergo an environmental induction course by the ECO. • Fires should only be allowed within fire-safe demarcated areas. • No fire wood collection should be allowed on-site. • No hazardous materials should be stored onsite • Should the site need to be fenced, the fencing should be constructed in manner which allows for the passage of small and medium sized mammals, at least at strategic places, such as along drainage lines or other areas of dense vegetation. <p>Operational phase mitigations:</p> <ul style="list-style-type: none"> • No unauthorized persons should be allowed onto the site. • Staff present during the operational phase should receive environmental education so as to ensure that that no hunting, killing or harvesting of plants and animals occurs. 	
Increased alien plant invasion	<p>Construction Phase Mitigations:</p> <ul style="list-style-type: none"> • Soil disturbance and vegetation clearing should be kept to minimum. • Cleared areas that are not going to be used should be re-vegetated with locally-collected seed of indigenous species. • Regular monitoring to ensure that alien plants are not increasing as a result of the disturbance that has taken place. <p>Operational Phase mitigations:</p> <ul style="list-style-type: none"> • All alien plants present at the target site should be controlled at least annually using the best practice methods for the species present. • Bare soil should be kept to a minimum. 	Level of risk will be much lower after applying the mitigation measures.
Impact on heritage resources	<ul style="list-style-type: none"> • If a heritage feature is identified at any phase of the proposed activity, the heritage feature should be fenced and left undisturbed and a heritage specialist must be 	Level of risk will be much lower after applying the mitigation measures.

List of potential Impacts	Possible mitigation measures	Level of risk
	appointed immediately to conduct a Heritage Impact Assessment study in accordance to the SAHRA.	
Soil compaction	<ul style="list-style-type: none"> • Use the existing access route to access the site to avoid unnecessary soil compaction and extended. 	Level of risk will be much lower after applying the mitigation measures
Soil erosion	<ul style="list-style-type: none"> • Stripping of topsoil should not be conducted earlier than required (maintain grass cover for as long as possible) in order to prevent the erosion by wind and water • Stripped soils should be stockpiled on a flat or gentle slope area to prevent erosion. • Topsoil stockpiles must soon after backfilling and rehabilitation the disturbed surface site. • Erosion control measures such as intercept drains and toe berms must be constructed where necessary. 	Level of risk will be much lower after applying the mitigation measures.
Chemical soil pollution	<ul style="list-style-type: none"> • Keep a suitable bag to store chemically (oil & fuel) polluted soil for disposal once its full or at the end of the project (whichever comes first) 	Level of risk will be much lower after applying the mitigation measures.
Loss of current land capability	<ul style="list-style-type: none"> • Although the stockpiles will be backfilled, it is not anticipated that areas where grazing land capability was lost will be remediated to such an extent that the land capability will return. At most, the site will be rehabilitated to wilderness land capability. However, it is still recommended that the natural vegetation be re-established once the exploration activities have ceased and that the grazing capacity be restored as good as possible. 	Level of risk or the impact after mitigation is considered to be medium-low.

35. Motivation where no alternative sites were considered.

Please refer to section 8 above for all alternative related discussion.

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

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

The preferred site is based on the desktop analysis of the geology of the area, the physical survey undertaken. The site is potentially underlain by reserves of the target black reef, it is for this reason why exploration activities are to be carried out to verify the availability of minerals and the feasibility of mining them in future.

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

(Including (i) a description of all environmental issues and risks that identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.)

The following steps were undertaken to identify and assess the potential impacts the proposed activity will impose on the preferred site:

- **Desktop study**> Software's such as Google Maps, ArcGIS and SANBI GIS were used to gather information remotely of the receiving Environment. Existing literatures and previous mining activities as well as results from past prospecting works were used to understand the receiving environment.
- **Site visit**> a site visit was conducted to identify environmental features onsite and to undertake ground truthing of the desktop information as well as to inspect the land cover of the receiving environment. This aided in identifying potential impacts of the proposed activities on the environment and the current land uses.

The generic criteria and systematic approach used to identify, describe and assess impacts as outlined in this report is stated under section 14 of this report. The significance of each activity was determine based on the intensity, duration and extent within which its resultant impact will be felt either by the receiving environment or the surrounding communities/ Interested and Affected Parties.

38. Assessment of each identified potentially significant impact and risk

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

Table 14: Summary of potential impact risks

Activity Potential Impacts	Impact	Phase
Noise will be generated from the inception phase during mobilization or site establishment. This could disrupt the community members residing near the site (Boetrand community which is just over 1km away).	Noise generation (-ve)	All phases
The proposed activities may introduce or encourage (through disturbance) the establishment of alien vegetation in the area	Introduction or an establishment of declared weeds and alien invasive species(-ve)	All phases
Loss of faunal diversity may occur because of faunal collisions with operational vehicles and the disturbance of the biodiversity/ ecosystem of the area.	Loss of Faunal Life (-ve)	Construction & operational phase
Habitat loss due to inappropriate vegetation clearing practices and inefficient rehabilitation of disturbed areas.	Habitat disruption and destruction (-ve)	All phases
Exposure of soils stripped of vegetation during the construction phase (drilling) will lead to erosion of such soils. This will result in loss of soil nutrients.	Soil erosion (-ve)	Construction Phase
<ul style="list-style-type: none"> • Personnel injuries from safety hazards on site; • Accidents as a there will be moving vehicles; • Exposure to snakes and other wild animals on site 	Personal safety and hazard exposure (actual and perceived) (-ve)	All phases
Should topsoil /fertile soil be lost, these activities may further reduce land capability of the area	Change in land use and land capacity (-ve)	Construction and operational phase
Noise will be generated due to the operation of drilling machinery, excavator and trucks movement around the site and people on site	Noise generation(-ve)	All phases

Activity Potential Impacts	Impact	Phase
The site is predominantly natural, and the proposed activities will impact upon the aesthetic value of the natural scenery.	Visual pollution (-ve)	Operational phase
Solid waste such as debris and litter can be potentially generated and deposited in and around the site. This could potentially attract nuisance and affect the natural scenery / aesthetic quality of the site.	Waste generation and storage(-ve)	All phases
Dust generation from the exploration activities may affect the natural and social environment.	Visual impact	Operational Phase
Hydrocarbon spillages from the operations (machinery or vehicles) may seep into groundwater and contaminate the groundwater reserves in and around the area.	Soil and Groundwater contamination (-ve)	Operational Phase
During operation, activities may result in dust generation and the release of particulates into the area. Potential dust generation activities may include drilling, movement of vehicles, and topsoil clearing	Dust generation (-ve)	Operational Phase
<ul style="list-style-type: none"> • Revegetation of areas where vegetation was disturbed to restore ecosystem function and integrity. • Removal of all infrastructures onsite. 	Restoration of disturbed areas (+ve)	Decommissioning Phase

39. Summary of specialist reports.

This proposed project will entail drilling of 20 boreholes and the placement of drilling activities will be more than 100m from sensitive environment such as rivers, wetlands and other critical biodiversity.

specialist undertaken	recommendations of the specialist report	specialist recommendations that have been included in the basic assessment report	reference to a section of report where specialist recommendations have been included.
Biodiversity Assessment Report	<p>From the desktop assessment it seems the plant communities on the site were in a good condition, representing natural, close to pristine vegetation. The proposed area for the prospecting is regarded as having a conservation value of Medium to High. This is due to the abundance and richness of the protected plant species (<i>Vachellia erioloba</i> and <i>Boscia albitrunca</i>) as well as part of the area being within a CBA and ESA and also according to the mining guideline map.</p> <p>It is proposed that drilling holes be placed 50 meters away from the watercourses as the area along the stream is regarded as highest to mining and also being part of the CBA. The opportunity exists however, for the proposed prospecting to contribute significantly to conservation of biodiversity within the region, as not the whole area will be removed of vegetation but rather only the drilling sites. Rather than creating new roads use already available farm roads to the drilling sites. If efforts are made to initiate conservation of this habitat, and conservation is maintained after the closure of the prospecting, the net impacts on biodiversity will be positive. Avoid drilling close to watercourses.</p>	X	Section 10 of this report

specialist undertaken	recommendations of the specialist report	specialist recommendations that have been included in the basic assessment report	reference to a section of report where specialist recommendations have been included.
	<p>It is then advised that drilling prospecting may continue provided that the mitigation measures as suggested can be implemented, then the overall impact of the development components would be of low overall significance and it is unlikely that the development would result in an overall net loss of biodiversity or long-term degradation of the receiving environment as the area to be drilled is smaller in terms of vegetation removal.</p>		
Phase 1 Archaeological and Heritage Impact Assessment Report	<p>The study did not find any permanent barriers to the proposed prospecting right application. It is the considered opinion of the author that the proposed prospecting may proceed from a heritage resources management perspective, provided that mitigation measures are implemented if and when required. The following recommendations are based on the results of the AIA/HIA research, cultural heritage background review, site inspection and assessment of significance.</p> <ul style="list-style-type: none"> • Should it become necessary to prospect on the mapped site (see Figure 1) then an archaeologist must be appointed to monitor during prospecting. • A walk down survey may be required if drilling will be concentrated on the mapped site. • The proposed prospecting may be approved to proceed as planned under observation that project work does not extend beyond the surveyed site. • Should any unmarked burials be exposed during prospecting, potential custodians must be trekked, consulted and relevant rescue/ relocation permits must be obtained from SAHRA and or Department of Health 	X	Section 10 and 31 of this report

specialist undertaken	recommendations of the specialist report	specialist recommendations that have been included in the basic assessment report	reference to a section of report where specialist recommendations have been included.
	<p>before any grave relocation can take place. Furthermore, a professional archaeologist must be retained to oversee the relocation process in accordance with the National Heritage Resources Act 25 of 1999.</p> <ul style="list-style-type: none"> • Should chance archaeological materials or human burial remains be exposed during subsurface construction work on any section of the proposed development laydown sites, work should cease on the affected area and the discovery must be reported to the heritage authorities immediately so that an investigation and evaluation of the finds can be made. The overriding objective, where remedial action is warranted, is to minimize disruption in construction scheduling while recovering archaeological and any affected cultural heritage data as stipulated by the NHRA regulations. • Subject to the recommendations herein made and the implementation of the mitigation measures and adoption of the project EMP, there are no other significant cultural heritage resources barriers to the proposed prospecting. The Heritage authority may approve the proposed prospecting right application to proceed as planned with special commendations to implement the recommendations here in made. • If during prospecting, operational or closure phases of this project, any person employed by the applicant, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance, work must cease at the site of the find and this person must report this find to their immediate supervisor, and through their supervisor to the site manager. 		

specialist undertaken	recommendations of the specialist report	specialist recommendations that have been included in the basic assessment report	reference to a section of report where specialist recommendations have been included.
	<ul style="list-style-type: none"> • The Site Manager must then make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area before informing ISS • In the event that archaeological materials are unearthed, all prospecting activities within a radius of at least 20m of such indicator should cease and the area be demarcated by a danger tape. Accordingly, a professional archaeologist should be contacted immediately • It is the responsibility of the applicant to protect the site from publicity (i.e., media) until a mutual agreement is reached. • Noteworthy that any measures to cover up the suspected archaeological material or to collect any resources is illegal and punishable by law. In the same manner, no person may exhume or collect such remains, whether of recent origin or not, without the endorsement by SAHRA • The applicant is reminded that unavailability of archaeological materials (e.g., stone tools and graves, etc) and fossils does not mean they do not occur, archaeological material might be hidden underground, and as such the client is reminded to take precautions during prospecting. • The footprint impact of the proposed prospecting activities should be kept to minimal to limit the possibility of encountering chance finds within the proposed development site. 		

specialist undertaken	recommendations of the specialist report	specialist recommendations that have been included in the basic assessment report	reference to a section of report where specialist recommendations have been included.
	<ul style="list-style-type: none"> • Overall, impacts to heritage resources are not considered to be significant for the project receiving environment. It is thus concluded that the project may be cleared to proceed as planned subject to the Heritage Authority ensuring that detailed heritage monitoring procedures are included in the project EMP for the construction phase, include chance archaeological finds mitigation procedure in the project EMP (See Appendix 1). • The chance finds process will be implemented when necessary especially when archaeological materials and burials are encountered during subsurface construction activities. • The findings of this report, with approval of the SAHRA, may be classified as accessible to any interested and affected parties within the limits of the laws. 		

39.1. Environmental impact statement

39.2. Summary of the key findings of the environmental impact assessment;

Environmental impacts associated with the exploration activities are expected to be localised and of low to medium significance. Mitigation measures have been recommended by the EAP in order to eliminate and/or reduce environmental impacts. These mitigation measures and monitoring programmes have been included as commitment in the Environmental Management Programme. The Environmental Management Programme aims to present management measures that will eliminate, offset or reduce adverse environmental impacts, as well as to provide the framework for environmental monitoring. The purpose of the Environmental Management Programme is to ensure that negative environmental impacts of the proposed project are effectively managed within acceptable limits and that the positive impacts are enhanced.

39.3. Site Map

Please refer to section 2 of this report. The site plan has been attached on section 2 and appended as **appendix C** project maps of this report.

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

Please refer to section 16 for the positive and negative impacts and risks.

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

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

The objective of the identified mitigation measures is to ensure that the impacts are minimised or avoided, where impacts cannot be avoided, rehabilitation measures are to be implemented upon closure, and as part of the closure objectives of the project. All the potential (negative) impacts identified have been assessed and found to be of low and low to medium significance and after applying the mitigation measures, the impacts get even lower.

The EMPr addresses the environmental impacts associated with the project during construction, operation, decommissioning and post closure phases of the proposed project.

42. Aspects for inclusion as conditions of Authorisation.

(Any aspects which must be made conditions of the Environmental Authorisation).

- Existing access routes must be used to access the point of interest. The access routes should be maintained to ensure that other users are not affected by the use of routes for the development.
- Ensure that the access roads are well maintained and sprayed with water when necessary to suppress dust emissions.
- Disturbed areas must be rehabilitated to a quality that matches or replicates the surrounding area,
- All wastes generated must be disposed of at an appropriate registered landfill and disposal certificate be kept on site;

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

(Which relate to the assessment and mitigation measures proposed)

The EAP hereby made the following assumptions

- It is assumed that the description of the proposed project, provided by the applicant is sufficient for providing the authorities with the right information for understanding the proposed project
- All information provided by the EAP was correct at the time it was provided
- The data from unpublished researches is valid and accurate
- The scope of this investigation is limited to accessing the potential environmental impacts associated with the proposed project

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

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

It is the opinion of the EAP that the proposed exploration activities should be authorised based on the following findings:

- The environmental impacts associated with the drilling activities are minimal provided that the proposed mitigation is implemented.
- With appropriate care and consideration, the impacts resulting from drilling can be suitably avoided, minimised or mitigated. According to the impact assessment undertaken for the proposed project, the resultant impacts 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.
- With implementing the appropriate rehabilitation activities, the impacts associated with the exploration activities can be reversed.
- Without undertaking exploration activities, the knowledge concerning the potential mineral resource within the mining right area will not be confirmed.
- The project will yield positive impacts in that it will create jobs should the exploration studies indicate a positive mining potential.

44.2. Conditions that must be included in the authorisation

The following conditions must be included in the Environmental Authorisation

- Undertake Environmental Performance Assessments against the EMP to ensure the correct implementation of all EMP measures;
- Record must be kept of the implementation of the EMP measures and monitoring of the efficiency of the implemented measures;
- Provide financial provision for the rehabilitation of the disturbed areas;
- The right holder should be held liable for reimbursing any losses incurred by landowners as a result of the proposed exploration activities.
- The rehabilitation plan should be considered as the first draft and a living document. All measures on the report should be implemented through the life of the operation; and
- All recommendations made in the report should be implemented and considered in the finalisation of the site layout plan and operational design of the proposed exploration activity.

44.3. Period for which the Environmental Authorisation is required.

Based on the prospecting works programme, the authorisation is required for the duration of 5 years.

45. Undertaking

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

The EAP herewith confirms

- The correctness of the information provided in the reports
- The inclusion of comments and inputs from stakeholders and I&APs;
- The inclusion of inputs and recommendations from the specialist reports where relevant; and
- 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.

46. Financial Provision

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

The financial provision estimated is **R84 968.47 (Eighty-Four Thousand Nine Hundred and sixty-eight rand and forty-seven cents)** and will be provided upon request by the DMRE.

46.1. Explain how the aforesaid amount was derived.

The amount was derived from using the 2020 DMRE provided master rates on the quantum of financial provision table.

Table 15: Quantum Calculations

		CALCULATION OF THE QUANTUM						
Applicant:	PAMDC (Pty) Ltd				Ref No.:			
Evaluator:	-				Date:		26-Oct-20	
No.	Description	Unit	A	B	C	D	E=A*B*C*D	
			Quantity	Master Rate	Multiplication factor	Weighting factor 1	Amount (Rands)	
1	Dismantling of processing plant and related structures	m3	0	17,3	1	1	0	
2 (A)	Demolition of steel buildings and structures	m2	0	241,3	1	1	0	
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	355,7	1	1	0	
3	Rehabilitation of access roads	m2	0	43,2	1	1	0	
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	419,2	1	1	0	
4 (B)	Demolition and rehabilitation of non-electrified railway lines	m	0	228,6	1	1	0	
5	Demolition of housing and/or administration facilities	m2	0	482,7	1	1	0	
6	Opencast rehabilitation including final voids and ramps	ha	0	245652,0	1	1	0	
7	Sealing of shafts adits and inclines	m3	0	129,6	1	1	0	
8 (A)	Rehabilitation of overburden and spoils	ha	0	168679,4	1	1	0	
8 (B)	Processing waste deposits and evaporation ponds (salt)	ha	0	210087,1	1	1	0	
8 (C)	Processing waste deposits and evaporation ponds (acid, metal)	ha	0	610192,5	1	1	0	
9	Rehabilitation of subsided areas	ha	0	141243,5	1	1	0	
10	General surface rehabilitation	ha	0,4	133622,5	1	1	53449	
11	River diversions	ha	0	133622,5	1	1	0	
12	Fencing	m	0	152,4	1	1	0	
13	Water management	ha	0	50807,0	1	1	0	
14	2 to 3 years of maintenance and aftercare	ha	0,4	17782,5	1	1	7112,988	
15 (A)	Specialist study	Sum				1	0	
15 (B)	Specialist study	Sum				1	0	
						Sub Total 1		60561,988
1	Preliminary and General		7267,43856		Weighting Factor 2		7267,43856	
						1		
2	Contingencies		6056,1988				6056,1988	
						Subtotal 2		73885,63
						VAT (15%)		11082,84
						Grand Total		ZAR 84 968,47

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

(Confirm that the amount, is anticipated to be an operating cost and is provided for as such in the Mining work programme, Financial and Technical Competence Report).

The amount is provided for in the operational expenditure.

47. Specific Information required by the competent Authority

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

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

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

Drilling operation is normally a short to medium term in duration, creating short term job opportunity and potential to improve local economy. The proposed activity will have very minimal socio-economic impact to the surface users using the area for cattle pastures as only 20 boreholes will be drilled. Groundwater resources pollution potential and extent is low.

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

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

The field survey recorded one burial site with two graves marked by tombstones and inscribed headstones. The graves secured by fence and they are located closed to a farmstead. The burial site is located at GPS Coordinates 26° 42' 552"S and 22° 24' 224"E. The possibility of encountering previously unidentified burial sites at other farms ranges from low to medium. Should such sites be identified during prospecting, they are still protected by applicable legislations and they should be protected (also see Appendixes for more details). Burial sites older than 60 years are protected by the NHRA and those younger than 60 years are protected by the Human Tissue Act. Exhumation of graves must confirm to the standards set out in the ordinance on excavation (Ordinance no.12 of 1980 which replaced the old Transvaal Ordinance no.7 of 1925.

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

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

This BAR and EMPr has been compiled in accordance with the NEMA (1998), EIA Regulations (2014, amended April 2017) and MPRDA (2002). The EAP managing the application confirms that this BAR and EMPr is being submitted for Environmental Authorisation in terms of the National Environmental Management Act, 1998 in respect of listed activities that have been triggered by application in terms of the Mineral and Petroleum Resources Development Act, 2002 (MPRDA) (as amended). Should the DMRE require any additional information, this will be provided upon request.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

50. DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME.

51. Details of the EAP

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

It is confirmed that the requirements for the provision of the details and expertise of the EAP are already included in PART A, section (3.1) (i).

52. Description of the Aspects of the Activity

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

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

53. Composite Map

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

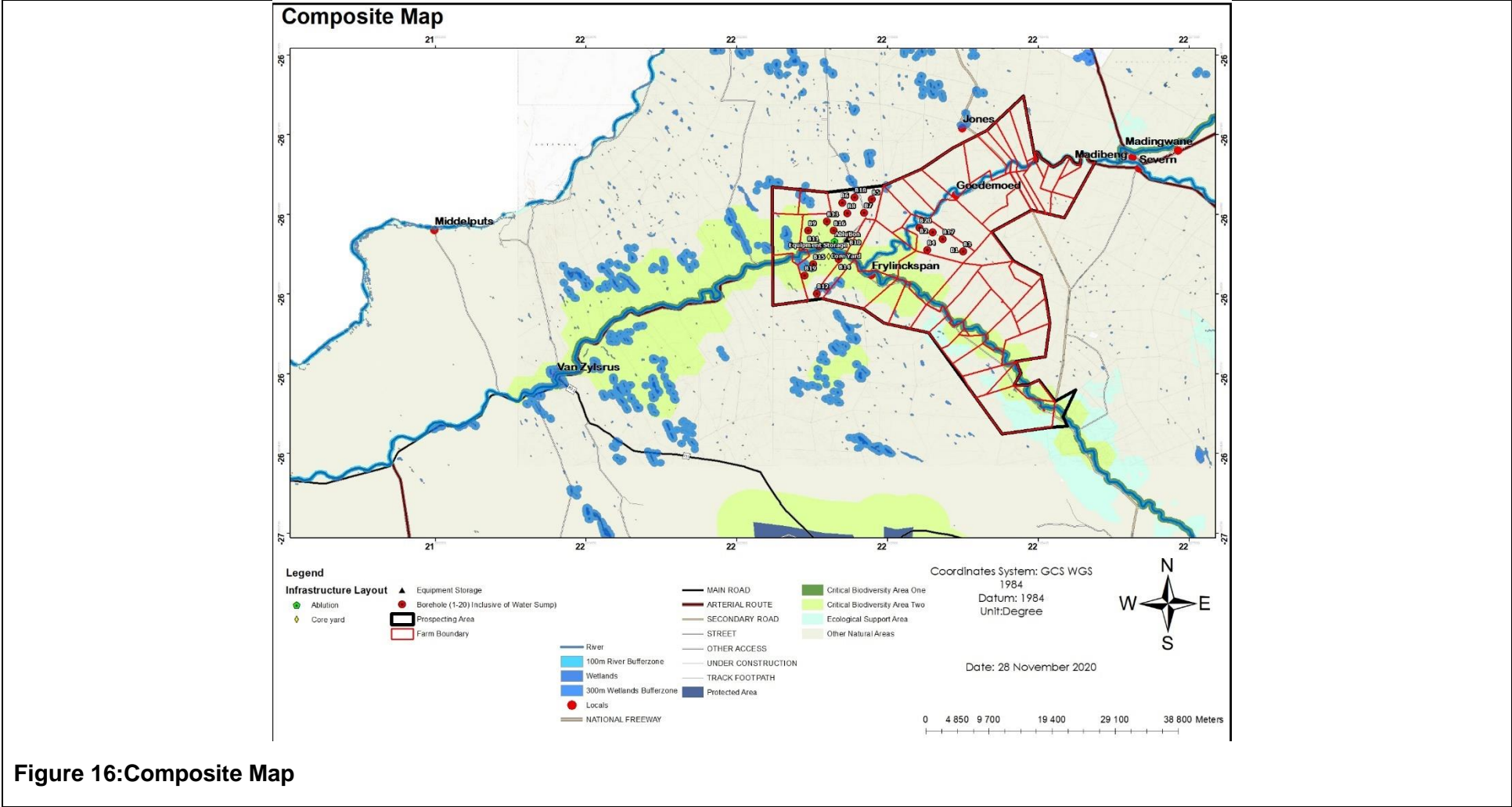


Figure 16: Composite Map

54. Description of Impact management objectives including management statements

54.1. Determination of closure objectives.

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

Closure of each exploration site will entail rehabilitation of the disturbed areas to as close to their pre- exploration condition as possible. The closure-related objectives are as follows:

- To rehabilitate the disturbed area back to its natural state as practically as possible.
- To leave no residual impacts on the neighbouring farmers
- To encourage revegetation
- To leave no open borehole on site (close the drill holes with concrete caps)
- To remove all the mobile infrastructure and all other items brought in for the operation
- To remove all waste types and disposed of properly.
- To ensure the safety and health of humans and animals post closure.
- To complete rehabilitation of the site within a specified period as guided by the Regional Manager

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

The operation requires approximately 250 litres of water per day. However, water will be purchased from the local municipality and trucked in with a mini truck with a tanker 10 000 capacity. This quantity is for dust suppression and cooling down the rig.

55.1. Has a water use license has been applied for?

A Water Use Licence has not been applied for, given that the proposed exploration does not trigger any water uses as per Section 21 of the National Water Act. Water required for dust suppression will be trucked in.

56. Impacts to be mitigated in their respective phases

The EMPr is the over-arching administrative and institutional document from which other documents take their authority. It is intended to be an overview document that specifies the on-site environmental management philosophy of the entire landfill site and the organisational structure necessary to achieve that vision. In addition, it specifies common environmental management and monitoring principles that will be applied to all aspects of the project. The EMPr provides mitigation and management measures for the following phases of the project:

- Planning
- Construction
- Operational
- Decommissioning Phase

56.1. Planning Phase

This section of the EMPr incorporates pro-active environmental management measures with the goal of attaining sustainable development which can be achieved during this phase. Pro-active environmental measures help minimize the chance of negative impacts occurring. Necessary corrective actions are proposed to further limit potential impacts.

Table 16: Planning Phase Mitigation Measures

Activity	Potential Impacts	Aspect Affected	Size and scale	Mitigation Measures	Time period for Implementation	Compliance with standards	Responsibility	Monitoring frequency
Application process	Project Delays caused by Identification of legislative requirements	Planning	N/A	Obtain Environmental application guidance from the Department of Mineral Resources and Energy Prior Commencement of the project	Planning Phase of the Project	Environmental Authorisation and other associated permits	Project Manager	Once-off
Application process	Project Delays caused by Potential friction with I&APs and Landowners	Planning	N/A	<ul style="list-style-type: none"> Engage with affected Landowners Prior Commencement of the project Undertake effective Public participation Process 	Planning Phase of the Project	Correct Environmental Authorisation and other associated permits	Project Manager	Once-off

56.2. Construction phase

This section of the EMPr provides management principles for the construction phase of the project. Environmental actions, procedures and responsibilities as required within the construction phase are specified. These specifications will form part of the contract documentation and, therefore, the Contractor will be required to comply with the specifications to the satisfaction of the Project Manager in terms of the contract.

Operational Phase

The operational phase of the proposed project will continue to generate impacts that require attention. If proper management strategies are not implemented the impacts would accumulate and create environmental risks. This section will outline the measures to be implemented during the operational phase of the project.

Decommissioning Phase

The decommissioning phase of the exploration activities will see the decrease in negative impacts as the site will be under rehabilitation. Once rehabilitation is completed, the post operation impacts will be very minimal. It is to be noted that the decommission and rehabilitation process also have negative impacts, however such impacts are not of the magnitude of the operational phase. This section outlines mitigation measures that must implemented during the decommissioning phase of the project.

Table 17: Mitigation measures for Construction, Operational and Decommissioning phase of the project

Aspect	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
CONSTRUCTION PHASE								
Vegetation	Clearing of vegetation and movement of vehicles for site establishment	Vegetation will be removed for site establishment purposes destroying environmental-natural habitat	0.4ha	<ul style="list-style-type: none"> • Areas to be cleared must be clearly marked and clearing of vegetation must only take place within these demarcated areas. (operation footprint) • No disturbance or removal of protected plant species in terms of the Nation Forest Act unless a Prospecting to do so is has been granted and removal is undertaken by a specialist • Prohibit the collection of plant material for medicinal purposes and fire wood • Where possible, place infrastructures in places that are already disturbed or degraded to avoid further removal of vegetation and increasing the footprint of the activity. 	12 - 24 Months	Good Environmental Practice	Contractor	Monthly
Vegetation	Clearing of vegetation and movement of vehicles for site establishment	Removal of the natural vegetation	0.4ha	<ul style="list-style-type: none"> • Due to the sensitivity of the area, it is advised that areas designated for vegetation clearing must be identified and visibly marked off and also approved as part of final drilling map • Avoid drilling on the Falls area as it provides habitat for Vultures as well as Blue Cranes. • Use already available farm roads and avoid creating new ones 	During Operational Phase	Biodiversity Act	Contractor	Weekly

Aspect	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
				<ul style="list-style-type: none"> Vegetation clearing areas must be kept to a minimum and restricted to the proposed drilling sites. Exposed areas should be rehabilitated with indigenous plants to the project area as soon as construction is finished 				
Vegetation	Clearing of vegetation and movement of vehicles for site establishment	Disturbance to animals on site	0.4ha	<ul style="list-style-type: none"> Do not disturb nests, breeding sites or young ones. Do not attempt to kill or capture snakes unless directly threatening the safety of employees. Dogs or other pets are not allowed to the worksite as they are threats to the natural wild animal A low speed of 30km/h limit must be enforced on site to reduce wild animal-vehicle collisions No animals must be intentionally killed or destroyed and poaching and hunting should not be permitted on the site. Severe contractual fines must be imposed and immediate dismissal on any contract employee who is found attempting to snare or otherwise harms remaining faunal species. Hunting weapons are prohibited on site. Contract employees must be educated about the value of wild animals and the importance of their conservation. 	During Prospecting Activities	Biodiversity Act	Contractor	Weekly

Aspect	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
				<ul style="list-style-type: none"> The ECO must conduct regular site inspections of removing any snares or traps that have been erected. Employees and contractors should be made aware of the presence of, and rules regarding, flora and fauna through suitable induction training and on-site signage. 				
Vegetation	Clearing of vegetation and movement of vehicles for site establishment	Increased soil erosion, increase in silt loads and sedimentation	0.4ha	<ul style="list-style-type: none"> Following prospecting, rehabilitation of disturbed areas is required Avoid areas with sensitive soils, steep slopes during rain or windy season. Ensure that roads are not paved but well maintained (as gravel) to reduce the speed of water by promoting infiltration 	During Prospecting Activities	Biodiversity Act	Contractor	Weekly
Vegetation	Clearing of vegetation and movement of vehicles for site establishment	Establishment and spread of declared weeds	0.4ha	<ul style="list-style-type: none"> The best mitigation measure for alien and invasive species is the early detection and eradication of these species which will be ensured with the use of a monitoring programme. An alien invasive management programme should be developed and implemented in order to control alien invasive species 	During Prospecting Activities	Biodiversity Act	Contractor	Weekly
Soil	Clearing of vegetation and movement of vehicles for site establishment	Soil erosion as the results of exposed surface	0.4ha	<ul style="list-style-type: none"> Sensitive landscapes must be marked as NO-GO areas Immediately rehabilitate areas that have been stripped of vegetation by rehabilitating. 	12 - 24 Months	Good Environmental Practice	Contractor	Monthly

Aspect	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
				<ul style="list-style-type: none"> Restrict impacts to prospecting activities footprint Have temporal erosion control measures to protect the disturbed soils and topsoil until adequate vegetation has been established. Topsoil must be retained and replaced where possible as topsoil contains a lot of the nutrients from decomposed organic matter and is therefore important for ecosystem functioning. Topsoil stockpiles should be covered/protected to prevent erosion by wind and/or water 				
Soil	Clearing of vegetation and movement of vehicles for site establishment	Soil contamination by oil spills from vehicles and machinery	0.4ha	<ul style="list-style-type: none"> Any equipment that is leaking must be temporarily decommissioned and removed from the site, to a surface with an impermeable surface and waste water collection system. Spill kits must be provided for onsite spill cleaning. Clean any oil spillages on site within 24 hours Make all staff aware of the need to prevent spills, leaks and disposal of contaminated water onto the ground and ensure that they are adequately trained to take corrective action should an accidental spill occur Provide drip trays for all parked vehicles 	12 - 24 Months	Good Environmental Practice	Contractor	Monthly

Aspect	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
Air Quality	Clearing of vegetation and movement of vehicles for site establishment	Dust generation by movement of large vehicles delivering mobile facilities	0.4ha	<ul style="list-style-type: none"> • Areas to be cleared must be clearly marked and clearing of vegetation must only take place within these demarcated areas. (operation footprint) • No disturbance or removal of protected plant species in terms of the Nation Forest Act unless a license to do so is has been granted and removal is undertaken by a specialist • Prohibit the collection of plant material for medicinal purposes and fire wood • Where possible, place infrastructures in places that are already disturbed or degraded to avoid further removal of vegetation and increasing the footprint of the activity 	Throughout Operational Phase	Minimal or no gaseous emissions to neighbouring farms and atmosphere	Contractor	Daily
Noise	Clearing of vegetation and movement of vehicles for site establishment	Noise will be generated from the operation of construction vehicles and machinery.	0.4ha	<ul style="list-style-type: none"> • Working during the day time only minimise disruption of neighbours and animal life. Operational hours should be kept between 08H00- 17H00 in summer and 08H00-16H00 in winter. • Service equipment, machineries, trucks and other vehicles regularly to minimise noise and where possibly place silencers on equipment / machinery • Provide ear plugs to the employee and ensure they wear them for the protection of their ears 	Throughout Construction Phase	SANS 10103 Acceptable Ambient Levels and SANS 10210 of 2004, Noise Control Regulations - General Notice	Contractor	Monthly

Aspect	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
				<ul style="list-style-type: none"> Use equipment or machinery that complies with the manufacture's specifications acceptable noise level 		R154 of 10 January 1992		
Soil and Groundwater	Clearing of vegetation and movement of vehicles for site establishment	Hydrocarbon spillages from the operations (machinery or vehicles) may seep into groundwater and contaminate the groundwater reserves in and around the area.	0.4ha	<ul style="list-style-type: none"> Vehicles must be restricted to travel on the designated roadways at the recommended times Topsoil must be retained and replaced where possible as topsoil contains a lot of the nutrients from decomposed organic matter and is therefore important for ecosystem functioning. Topsoil stockpiles should be covered/protected to prevent erosion by wind and/or water Provide and place drip trays under parked vehicle to avoid soil contamination by hydrocarbon leakage by equipment/machinery 	Throughout construction phase	Prevention of groundwater pollution in line with National Water Act (36 of 1998)	Contractor	Daily
Vegetation (Weeds)	Clearing of vegetation and movement of vehicles for site establishment of declared weeds	The proposed activities may introduce or encourage (through disturbance) the establishment of alien vegetation in the area	0.4ha	<ul style="list-style-type: none"> The best mitigation measure for alien and invasive species is the early detection and eradication of these species which will be ensured with the use of a monitoring programme. An alien invasive management programme must be implemented in order to control alien invasive species. All alien invasive tree & weed species growing in the areas disturbed by prospecting activities must be removed 	Throughout Construction Phase	Biodiversity and Mining Guideline 2013	Contractor	Monthly

Aspect	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
				<p>from the cleared area, and continuous monitoring should be conducted for three consecutive years after closure of each site.</p> <ul style="list-style-type: none"> Monitor the establishment of any foreign/alien invasive species on site and remove. 				
Land Capability	Clearing of vegetation and movement of vehicles for site establishment	Should topsoil/fertile soil be lost, these activities may further reduce land capability of the area	0.4ha	<ul style="list-style-type: none"> Place infrastructures in places that are already disturbed or degraded to avoid increasing the footprint of the activity Landowners must be consulted on where the different infrastructures can be placed. Avoid as far as possible areas of important farm land activities, by selecting areas with a low veld condition and diversity. Topsoil and sub soil must be kept separately throughout drilling activities and rehabilitation Carry out concurrent rehabilitation throughout the life of the project to encourage quick recovery of the project area Where soil nutrients and/or fertility has been lost, the soil should be fertilised to recover cultivation capacity Avoid as far as possible areas of important farm land activities, by selecting areas with a low veld condition and diversity. 	Throughout Construction Phase	Soil Conservation	Contractor	Monthly
Fauna	Clearing of vegetation and movement of	Loss of faunal diversity may occur because	0.4ha	<ul style="list-style-type: none"> Work during daytime to minimise the disruption animal life. Operational hours must 	Throughout	Biodiversity and Mining	Contractor	Monthly

Aspect	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
	vehicles for site establishment	of faunal collisions		<p>be kept between 08H00- 17H00 in summer and 08H00- 16H00 in winter.</p> <ul style="list-style-type: none"> Do not disturb nests, breeding sites or young animals. Do not attempt to kill or capture snakes unless directly threatening the safety of employees. Vehicles must be restricted to travel on the designated roadways to minimize the ecological footprint of the proposed development Keep to the speed limit of 30 km/h on all roads running through and accessing the site to avoid driving over any fauna 	Construction Phase	Guideline 2013		
Safety	Clearing of vegetation and movement of vehicles for site establishment	<ul style="list-style-type: none"> Personnel injuries from safety hazards on site; Accidents because of moving vehicles; Exposure to snakes and other wild animals on site 	0.4ha	<ul style="list-style-type: none"> Ensure that workers and any persons accessing the site wear the correct PPE at all times Compile a health and safety risk assessment of the site to identify all safety related hazards and risks Educate all employees working on site, in the form of inductions/training or toolbox talks of the health and safety risks on site 	Throughout Construction Phase	Occupational Health and Safety Standards	Contractor	Daily

Aspect	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
Heritage Resources	Clearing of vegetation and movement of vehicles for site establishment	<ul style="list-style-type: none"> Impact on Heritage Resources 	0.4ha	<ul style="list-style-type: none"> Should artefacts or archaeological items be observed, then all activity should cease immediately, the area marked off and a specialist consulted prior to any further activity Should graves be observed on site during activity progress then all activity should cease and the area demarcated as a no-go zone 	Throughout Construction Phase	Protection of archaeological materials	Client Contractor	Once-off
Cultural heritage	Clearing and prospecting	Destruction of archaeological remains	0.4ha	<ul style="list-style-type: none"> LIA site must be mapped and documented A management plan for the site must be drawn Section where scatters of potsherds were recorded must be avoided where possible An archaeologist must be appointed to monitor during prospecting Use chance find procedure to cater for accidental finds 	Throughout Operational Phase	Protection of archaeological materials	Client	Once off
Cultural heritage	Clearing and prospecting	Destruction of archaeological remains	0.4ha	<ul style="list-style-type: none"> Maintain 25m buffer zones for all burial sites Burial sites must be mapped Consult Landowners and farm workers to identify burial sites before prospecting 	Throughout Operational Phase	Protection of archaeological materials	Client	Once off
Cultural heritage	Clearing and prospecting	Destruction of archaeological remains	0.4ha	<ul style="list-style-type: none"> None required 	Throughout Operational Phase	Protection of archaeological materials	Client	Once off

Aspect	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
Cultural heritage	Clearing and prospecting	Destruction of archaeological remains	0.4ha	<ul style="list-style-type: none"> Mitigation is not required because there are no public monuments within the prospecting right application site 	Throughout Operational Phase	Protection of archaeological materials	Client	Once off
Traffic	Clearing of vegetation and movement of vehicles for site establishment	Increased traffic	0.4ha	<ul style="list-style-type: none"> Speed limits must be established and limited to 30KM/h on site to minimise accidents Traffic signs to be put around the site to notify motorists and drivers about the activities 	Throughout Construction Phase	Smooth traffic flow	Contractor	Weekly Daily
Waste Management	Clearing of vegetation and movement of vehicles for site establishment	Generated Solid waste	0.4ha	<ul style="list-style-type: none"> Solid waste must be stored in a designated area for collection and disposal. These materials maybe sold to appropriate recycling traders or taken to recycling plant. Ensure that there are suitable storage and collection facilities in place for general waste, recyclable and special wastes. 	Throughout Construction Phase	Good House Keeping	Contractor	Daily
Air Quality and Noise	Clearing of vegetation and movement of vehicles for site establishment	On Game Lodges, Lodges & Guest Houses: <ul style="list-style-type: none"> Dust Generation Noise Generation 	0.4ha	<ul style="list-style-type: none"> Due to the scarcity of water within the region, dust generation activities such as excessive clearing of vegetation, over 30km/h driving speed and etc should be limited; Best access route that will not generate dust and noise to Game Lodges, Lodges & Guest Houses should be discussed with the landowner prior any construction activities may commence on site Footprint earmarked 	Throughout Construction Phase	Compliance with Ambient air and noise quality Standards	Contractor	Throughout the life cycle of the prospecting work

Aspect	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
				<p>for vegetation removal must be clearly marked</p> <ul style="list-style-type: none"> Trucks, machinery, and equipment must be regularly serviced to reduce noise levels Work should be conducted during day time only to minimise disruption of neighbours and animal life. 				
Fauna	Clearing of vegetation and movement of vehicles for site establishment	<p>Impacts on Game Lodge</p> <ul style="list-style-type: none"> Dispersing and disruption of animals 	0.4ha	<ul style="list-style-type: none"> No wild animal may under any circumstance be handled, removed or be interfered with No wild animal may be fed on site No wild animal may under any circumstance be hunted, snared, captured, injured or killed No wild animal may under any circumstance be hunted, snared, captured, injured or killed Remove and dispose of any snares or traps found on or adjacent to the site 	Throughout Construction Phase	Compliance with conservation of wild life Standards	Contractor	Throughout the life cycle of the prospecting work
Social	Clearing of vegetation and movement of vehicles for site establishment	<ul style="list-style-type: none"> Impact on Settlement and Residential Negatively impacting on residents' livelihoods 	0.4ha	<ul style="list-style-type: none"> The applicant must consult with the affected parties on which times are favourable for them before undertaking the activities which could negatively impact their livelihood. The applicant must ensure that there is an insurance policy in place readily available to compensate for any loss on the farm caused by the proposed activities; 	Throughout Construction Phase	Compliance with standards within the IDP	Contractor	Throughout the life cycle of the prospecting work
Safety and Security	Clearing of vegetation and movement of	Fear of farm attacks by farmers due to	0.4ha	<ul style="list-style-type: none"> Notify the local Kuruman Agri forum of the Prospecting team to before accessing the site. 	Throughout	Compliance with health and	Contractor and Applicant	Throughout the life cycle

Aspect	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
	vehicles for site establishment	strangers in the area		<ul style="list-style-type: none"> • People accessing the site must be known before accessing the site though sending the pictures of themselves. • Registration numbers of the vehicles (Make of the vehicles) on site must be known before accessing site. • All contractors appointed by the applicant must ensure that farm gates remain locked at times when entering and exiting the farms. 	Construction Phase	safety standards		of the prospecting work
OPERATIONAL PHASE - DRILLING								
Clearing of Vegetation	Borehole drilling, construction of water sump and movement of vehicles	Creating site offices, parking lots, ablution block which causes the clearing of vegetation.	0.4ha	<ul style="list-style-type: none"> • Areas to be cleared must be clearly marked and clearing of vegetation must only take place within these demarcated areas. (operation footprint) • Any sensitive or endangered tree species that is cleared should be kept for re-planting after operational phase • Prohibit the collection of plant material for medicinal purposes and fire wood • Where possible, place infrastructures in places that are already disturbed or degraded to avoid further removal of vegetation and increasing the footprint of the activity 	6 - 12 Months During Operational Phase	Good Environmental Practice	Contractor	Weekly
Vegetation	Borehole drilling, construction of water sump	Removal of the natural vegetation	0.4ha	<ul style="list-style-type: none"> • Due to the sensitivity of the area, it is advised that areas designated for vegetation clearing should be identified and visibly marked off and also approved as part of final drilling map 	During Operational Phase	Biodiversity Act	Contractor	Weekly

Aspect	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
	and movement of vehicles			<ul style="list-style-type: none"> • Avoid drilling on the Falls area as it provides habitat for Vultures as well as Blue Cranes. • Use already available farm roads and avoid creating new ones • Vegetation clearing areas should be kept to a minimum and restricted to the proposed drilling sites. • Exposed areas must be rehabilitated with indigenous plants to the project area as soon as construction is finished 				
Vegetation	Borehole drilling, construction of water sump and movement of vehicles	Disturbance to animals on site	0.4ha	<ul style="list-style-type: none"> • Do not disturb nests, breeding sites or young ones. Do not attempt to kill or capture snakes unless directly threatening the safety of employees. • Dogs or other pets are not allowed to the worksite as they are threats to the natural wild animal • A low of 30km/h speed limit must be enforced on site to reduce wild animal-vehicle collisions • No animals must be intentionally killed or destroyed and poaching and hunting should not be permitted on the site. • Severe contractual fines must be imposed and immediate dismissal on any contract employee who is found attempting to snare or otherwise harms remaining faunal species. • Hunting weapons are prohibited on site. 	During Prospecting Activities	Biodiversity Act	Contractor	Weekly

Aspect	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
				<ul style="list-style-type: none"> Contract employees must be educated about the value of wild animals and the importance of their conservation. The ECO must conduct regular site inspections of removing any snares or traps that have been erected. Employees and contractors must be made aware of the presence of, and rules regarding, flora and fauna through suitable induction training and on-site signage. 				
Vegetation	Borehole drilling, construction of water sump and movement of vehicles	Increased soil erosion, increase in silt loads and sedimentation	0.4ha	<ul style="list-style-type: none"> Following prospecting, rehabilitation of disturbed areas is required Avoid areas with sensitive soils, steep slopes during rain or windy season. Ensure that roads are not paved but well maintained (as gravel) to reduce the speed of water by promoting infiltration 	During Prospecting Activities	Biodiversity Act	Contractor	Weekly
Vegetation	Borehole drilling, construction of water sump and movement of vehicles	Establishment and spread of declared weeds	0.4ha	<ul style="list-style-type: none"> The best mitigation measure for alien and invasive species is the early detection and eradication of these species which will be ensured with the use of a monitoring programme. An alien invasive management programme should be developed and implemented in order to control alien invasive species 	During Prospecting Activities	Biodiversity Act	Contractor	Weekly
Fire	Borehole drilling, construction of	There is a potential for fire to occur on the	0.4ha	<ul style="list-style-type: none"> Vegetation around proposed site must be kept short to create a fire management zone. 	During Prospecting Activities	National Forest Act (Act No.	Contractor	Monthly

Aspect	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
	water sump and movement of vehicles	site. Veld fires can occur across the vegetated areas of the property		<ul style="list-style-type: none"> Open fire is prohibited to people involved in prospecting. No burning cigarettes or matches may be thrown down within prospecting area. Collection of fire wood is not allowed. Rubbish or vegetation may under no circumstances be burnt Training of staff will include awareness regarded the rules of the site. 		84 of 1998)		
Noise	Borehole drilling, construction of water sump and movement of vehicles	Noise will be generated due to the operation of drilling machinery, trucks movement around the site and people on site	0.4ha	<ul style="list-style-type: none"> All equipment to be adequately maintained and kept in good working order to reduce noise. Operational hours should be kept between 08H00- 17H00 in summer and 08H00- 16H00 in winter. Workers and personnel will wear hearing protection (ear plugs) when required. Use equipment or machinery that complies with the manufacture's specifications acceptable noise levels All vehicles and activities will only operate during daytime hours. 	During Prospecting Activities	SANS 10103 Acceptable Ambient Levels and SANS 10210 of 2004, Noise Control Regulations - General Notice R154 of 10 January 1992	Contractor	Daily

Aspect	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
Soil	Borehole drilling, construction of water sump and movement of vehicles	Exposure of soils stripped of vegetation during the construction phase (drilling) will lead to erosion of such soils. This will result in loss of soil nutrients.	0.4ha	<ul style="list-style-type: none"> • Have temporal erosion control measures to protect the disturbed soils and topsoil until adequate vegetation has established. • Undertake concurrent rehabilitation to restrict the exposure period of soils exposed and vulnerable to erosion • Vehicles must be restricted to travel on the designated roadways at the recommended • Topsoil must be retained and replaced where possible as topsoil contains a lot of the nutrients from decomposed organic matter and is therefore important for ecosystem functioning. Topsoil stockpiles must be covered /protected to prevent erosion by wind and/or water 	During Prospecting Activities	Prevention of groundwater pollution in line with National Water Act (Act No. 36 of 1998)	Contractor	Monthly
Land Capability	Borehole drilling, construction of water sump and movement of vehicles	Should topsoil/fertile soil be lost, these activities may further reduce land capability of the area	0.4ha	<ul style="list-style-type: none"> • Place infrastructures in places that are already disturbed or degraded to avoid increasing the footprint of the activity • Landowners must be consulted on where the different infrastructures can be placed. • Avoid as far as possible areas of important farm land activities, by selecting areas with a low veld condition and diversity • Topsoil and sub soil must be kept separately throughout prospecting activities and rehabilitation 	During Prospecting Activities	Soil Conservation	Contractor	Monthly

Aspect	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
				<ul style="list-style-type: none"> Carry out concurrent rehabilitation throughout the life of the project to encourage quick recovery of the project area 				
Top Soil	Top soil Stockpiling during drilling	Dust generation from stockpiles	0.4ha	<ul style="list-style-type: none"> Prior prospecting, all topsoil must be stockpiled for use during the Rehabilitation Phase. Stockpiled topsoil must be used as the final cover for all disturbed areas where re-vegetation is required. Stockpiled soil must be protected by erosion-control berms if exposed for a period of greater than 14 days during the wet season. Soil stockpiles must be located away from drainage lines and areas of temporary inundation during the wet season. If possible, seeding of the stockpiles with suitable local vegetation is recommended. 	During Prospecting Activities	Soil Conservation	Contractor	Daily
Soil and Groundwater	Borehole drilling, construction of water sump and movement of vehicles	Hydrocarbon spillages from the operations (machinery or vehicles) may seep into groundwater and contaminate the groundwater reserves in the area.	0.4ha	<ul style="list-style-type: none"> Vehicles and equipment must be regularly serviced and maintained. Refuelling of vehicles and equipment will be done with care to minimise the chance of spillages; Dip trays must be placed under parked vehicles and machinery A spill kit must be available on each site where operation activities are in progress; and 	During Prospecting Activities	Prevention of Groundwater Pollution in line with National Water Act (Act No. 36 of 1998)	Contractor ECO	Monthly

Aspect	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
				<ul style="list-style-type: none"> Any spillages must be cleaned up immediately to prevent further contamination. 				
Waste Management	Waste generation and storage during drilling	Solid waste such as debris and litter can be potentially generated and deposited in and around the site. This could potentially attract nuisance and affect the natural scenery/aesthetic quality of the site.	0.4ha	<ul style="list-style-type: none"> Littering must be prohibited, and all waste generated from the site should be cleared. A 'no waste dumping' sign must be placed on site. Waste generated by workers must be collected and disposed of weekly at the nearest registered landfill. Store waste in labelled containers, indicating clearly whether the waste is hazardous or non-hazardous (general waste). Burning of waste material is not permitted. Hazardous materials will be generated if there are spillages during operation and maintenance periods. This waste should be cleaned up using absorbent material provided in spill kits on site and must be disposed of accordingly at a hazardous waste landfill. Absorbent materials used to clean up spillages must be disposed of in a separate hazardous waste bin. 	During Prospecting Activities	Waste Management Regulation standards	ECO	Daily
Heritage Resources	Discovery of graves and other heritage resources during drilling	Destruction of heritage resources	0.4ha	<ul style="list-style-type: none"> Should artefacts or archaeological items be observed, then all activity ought to cease immediately, the area marked off and a specialist consulted prior to any further activity 	Throughout Operational Phase	Protection of archaeological materials	Client	Once off

Aspect	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
				<ul style="list-style-type: none"> Should graves be observed on site during activity progress then all activity must cease and the area demarcated as a no-go zone 				
Cultural heritage	Clearing and prospecting	Destruction of archaeological remains	0.4ha	<ul style="list-style-type: none"> LIA site must be mapped and documented A management plan for the site must be drawn Section where scatters of potsherds were recorded must be avoided where possible An archaeologist must be appointed to monitor during prospecting Use chance find procedure to cater for accidental finds 	Throughout Operational Phase	Protection of archaeological materials	Client	Once off
Cultural heritage	Clearing and prospecting	Destruction of archaeological remains	0.4ha	<ul style="list-style-type: none"> Maintain 25m buffer zones for all burial sites Burial sites must be mapped Consult Landowners and farm workers to identify burial sites before prospecting 	Throughout Operational Phase	Protection of archaeological materials	Client	Once off
Cultural heritage	Clearing and prospecting	Destruction of archaeological remains	0.4ha	<ul style="list-style-type: none"> None required 	Throughout Operational Phase	Protection of archaeological materials	Client	Once off
Cultural heritage	Clearing and prospecting	Destruction of archaeological remains	0.4ha	<ul style="list-style-type: none"> Mitigation is not required because there are no public monuments within the prospecting right application site 	Throughout Operational Phase	Protection of archaeological materials	Client	Once off

Aspect	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
Air Quality	Borehole drilling, construction of water sump and movement of vehicles	<ul style="list-style-type: none"> During operation, activities may result in dust generation and the release of particulates into the area. Potential dust generation activities may include drilling, movement of vehicles and topsoil clearing 	0.4ha	<ul style="list-style-type: none"> Due to the scarcity of water within the region, dust generation activities such as excessive clearing of vegetation, over 50km/h driving speed and etc should be limited; Best access route that will not generate dust and noise to Game Lodges, Lodges & Guest Houses should be discussed with the landowner prior any construction activities may commence on site Limiting the number of vehicles driving on and offsite Topsoil stockpiles or soil heaps must be watered to reduce dust emission Keep to the speed limit of 30 km/h on all roads running through and accessing the site Minimize the extent of cleared vegetation and exposed soil. Where possible, place protective nets over exposed soil. 	Throughout Operational Phase	NEMA: Air Quality Act, 2004 (Act No. 39 of 2004)	ECO Contractor	Daily
Soil	Borehole drilling, construction of water sump and movement of vehicles	Soil Erosion	0.4ha	<ul style="list-style-type: none"> Have temporal erosion control measures to protect the disturbed soils and topsoil until adequate vegetation has established Undertake concurrent rehabilitation to restrict the exposure period of soils exposed and vulnerable to erosion Vehicles are restricted to travel on the designated roadways at the recommended 	Throughout Operational Phase	Soil Conservation	Contractor	Monthly

Aspect	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
				<ul style="list-style-type: none"> Topsoil should be retained and replaced where possible as topsoil contains a lot of the nutrients from decomposed organic matter and is therefore important for ecosystem functioning. 				
Soil	Borehole drilling, construction of water sump and movement of vehicles	Soil Contamination	0.4ha	<ul style="list-style-type: none"> Areas to be cleared must be clearly marked and clearing of vegetation must only take place within these demarcated areas Vehicles must be restricted to travel on the designated roadways Provide drip trays for all parked vehicles 	Throughout Operational Phase	Soil Conservation	Contractor	Monthly
Emergency Procedures	Borehole drilling, construction of water sump and movement of vehicles	Hydrocarbon spills	0.4ha	<ul style="list-style-type: none"> 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 Site Agent. The area must be cordoned off and secured. The Client and ECO must ensure that there is always a supply of absorbent material readily available to absorb/breakdown the spill. The ECO must notify the relevant authorities of any spills that occurs. The ECO shall assemble and clearly list the relevant emergency telephone contact numbers for staff and brief staff on the required procedures. 	Throughout Operational Phase	Good House Keeping	Client ECO	Daily

Aspect	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
Traffic	Borehole drilling, construction of water sump and movement of vehicles	Increased Traffic	0.4ha	<ul style="list-style-type: none"> Speed limits must be established and limited to 30KM/h on site to minimise accidents. Traffic signs to be put around the site to notify motorists and drivers about the activities. 	Throughout operational Phase	Smooth Traffic Flow	Contractor	Weekly Daily
DECOMMISSIONING AND CLOSURE PHASE								
Rehabilitation	Rehabilitating of the disturbed and contaminated areas	<ul style="list-style-type: none"> Revegetation of areas where vegetation was disturbed to restore ecosystem function and integrity. Removal of all infrastructures onsite. 	0.4ha	<ul style="list-style-type: none"> All areas that have been damaged by Prospecting activities and vehicles should be stabilized immediately after activities ceases to prevent and control erosion. Undertake concurrent rehabilitation throughout the operations. Remove all vehicles, equipment, waste and surplus materials from the site Clean up and remove any spills and contaminated soil on site. Ensure that all actions identified in the site closure checklist have been completed and that the ECO is satisfied with the state of the site Ensure that aftercare is provided, and the natural environment recovers and stabilizes after closure. 	After Decommissioning of Prospecting Activities	Good house keeping	ECO Contractor	Weekly

Aspect	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
Soil, land use and land capabilities	Rehabilitation Activities	Soil and Land contamination from Hydrocarbon's spillages	0.4ha	<ul style="list-style-type: none"> Protect vegetation and soil by avoiding hydrocarbon spillages; Vehicles must make use of existing roads to avoid destruction of vegetation; Car tracks created by movement of vehicles must be rehabilitated 	After Decommission of Prospecting Activities	Good house keeping	ECO Contractor	Weekly
Monitoring of rehabilitation activities	Rehabilitation Activities	Document control	0.4ha	<ul style="list-style-type: none"> After every two years the applicant must send a rehabilitation progress report which is inclusive of the financial provisions and the total spending's towards rehabilitation to the environmental officer of Agri Kuruman 	After Decommission of Prospecting Activities	Good house keeping	ECO Contractor	Weekly

57. Impact Management Outcomes

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

All the above requirements related to Planning, construction, operational and decommissioning phase are addressed in tables 16 and 17 above.

58. Impact Management Actions

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

All the above requirements related to Planning, construction, operational and decommissioning phase are addressed in tables 16 and 17 above.

59. Financial Provision

59.1. Determination of the amount of Financial Provision.

A total of **R84 968.47 (Eighty-Four Thousand Nine Hundred and sixty-eight rand and forty-seven cents)** is required to both manage and rehabilitate the environment in respect of rehabilitation. PAMDC (Pty) Ltd will annually update and review the quantum of the financial provision as required by law.

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

Closure and rehabilitation will be done with reference to the closure objectives. The closure objectives include:

- To rehabilitate the disturbed area back to its natural state as close as possible.
- To leave no remnant impacts on the neighbouring farmers and rehabilitate to allow re-vegetation
- To leave no open borehole or trench on site. Close the drill holes with caps
- To remove all the mobile infrastructure and all other items used during operation
- To remove all waste types and disposed properly.
- To complete final rehabilitation within specified period as guided by the Regional Manager
- To safeguard the safety and health of humans and animals on the site.
- To limit and manage the visual impact of the exploration activities.
- To manage and limit the impact to the surface and groundwater resources
- To ensure minimal disturbance whenever possible so that normal land use can continue after closure

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

A draft report with closure objectives was sent to the land owner.

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

A total of 0.4 ha of land will be affected by the process of the proposed project. The table below outlines all activities involved in the application and their aerial extent relative to impact on land.

Table 18: Rehabilitation measures

ACTIVITY	Aerial extent of the Activity Ha or m²
Drill Site (borehole, sump, water cart, core tray & toilet)	0.2ha
Removal of vegetation	0.2ha
• Parking Bay	
• Site Office	
• Mobile Ablution	
• Equipment Storage	
Access road	0 m ²
Fence	0m
Total Area	0.4ha

The following rehabilitation plan will be implemented for the above -mentioned activities;

- All mobile ablution/toilets will be taken away from site and the area disturbed will be revegetated.
- Drill holes shall be capped by placing a steel casing to a suitable depth and concrete cap on top of the borehole.
- The equipment storage area will be decommissioned and removed from site. The disturbed area will be cleaned and ripped to aid revegetation
- All infrastructure and machinery on the site camp shall be removed and area shall be ripped to promote revegetation.
- The temporary access road, single track or formal shall be ripped or ploughed, and where necessary fertilizer (based on soil analysis) applied to ensure the regrowth of vegetation;
- The areas shall be cleared of any contaminated soil.
- Once the excavated void has been backfilled, 300mm thick topsoil or soft overburden in place of soil will be spread on rehabilitated areas
- The site will be mulched using locally obtained grass; this is to stimulate the long-term establishment of indigenous vegetation and to reduce erosion during early plant growth
- Rehabilitation of the new topographical landscape will be conducted in such a way that it would blend in with the surrounding landscape and allow normal (controlled) surface drainage to continue.

- All illegal invader plants and weeds shall be eradicated as required in terms of Regulation 15 & 16 of the Act on Conservation of Agricultural Resources, 1983 (Act no. 43 of 1983) which list the plants.

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

The closure objectives are aligned with the site and the rehabilitation that must be done. The closure objectives are aimed at leaving the project site as far as possible, in the state which is safe and which will allow natural succession. The rehabilitation plan responds to these closure objectives and aims to carry out tasks that will ensure that the closure objectives are met

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

Financial provision required to rehabilitate the environmental has been calculated in table 15 above of this report.

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

The financial provision will be provided as determined upon request by the competent authority.

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

60.1. Monitoring of Impact Management Actions

Monitoring of the impact management actions will be done by the Environmental Control Officer and the project manager. The ECO will be based on site to ensure that all management actions are implemented where required. Should, under any circumstance, the contractor's activities pose any damage on the environment and not comply with measures and impact management actions as stipulated in the EMP, the contractor will be held responsible for any such non-compliance. It is therefore the responsibility of the contractor to ensure that all relevant measures are taken to rectify such damage, at the contractor's expense. It is the duty of the ECO to monitor compliance with the EMP, and report and notify the contractor of any non-compliance, highlighting the following:

- Details of the nature of the non-conformance;
- The actions to be taken to correct the situation; and
- The date by which each corrective action should be executed.

The contractor will also be liable to produce a Corrective Action Plan, within which he/she will detail how the required corrective actions will be implemented. This plan will be submitted to the ECO and Project Manager for approval prior to implementation and the corrective measures have been carried out, the ECO will then be required to sanction the success or failure of the corrective action.

60.2. Monitoring and reporting frequency

Monitoring will be done monthly and the reporting to the competent authority will be done annually. Any non-compliances will be recorded and plans of actions documented

60.3. Responsible persons

For this EMP to be implemented effectively, all role players involved in this project need to comply with the directives set out. A concise description of impacts and their mitigation/management measures will be provided and understood by all role players responsible for the implementation and monitoring of the mitigation measures

This project will comprise of the following responsible role players:

- Lead Authority (DMRE- Northern Cape Regional Office)
- The Environmental Control Officer;
- The Contractor;
- The project manager and
- The Developer (Permit holder).

These parties will ensure that all conditions stated on the right are adhered to and that all environmental management requirements are met. Each person's responsibility is detailed in the Table below

Table 19: Responsible Persons for the Project

Functions	Responsibility
Authorisation holder	Ensuring compliance to the EMP and conditions contained in the Environmental Authorisation (EA). Contracting the Environmental Control Officer as an independent appointment to objectively monitor and implement the applicable environmental legislation.
Project Manager	<p>Complete responsibility of the whole project and any contracted parties and ensuring that all environmental management facets are adhered to. The Project Manager will be supported by the ECO, with the following roles and responsibilities during the operations;</p> <ul style="list-style-type: none"> • Review the annual reports compiled by the Environmental Control Officer (ECO); • Identify the need for remedial measures with regard to proposed works; • Communicate directly with the Contractors; and • Issue non-conformance notifications to Contractors that do not comply with the requirements as set out in the EMP.
Environmental Control Officer	<ul style="list-style-type: none"> • Objectively monitor, implement applicable environmental legislation, conditions of Environmental Authorisations (EA's) and the EMP. • Conduct audits on compliance to applicable environmental legislation, conditions of EA's and the EMP. Including size and sensitivity of the development (on grounds of the EIA). • Liaison between the relevant authorities and project team. Any changes in environmental conditions, registration and updating of all EMP documentation should be communicated and carried out by the ECO • Develop environmental awareness training for all new site personnel (e.g. posters, tool box talks, signage);

Functions	Responsibility
	<ul style="list-style-type: none"> • Undertake visual inspections of the activities of employees with regard to implementation of the requirements outlined in the EMP; • Immediately notify the Project Manager of any non-compliance with the EMP, or any other complaints or issues of environmental concern; • Ensure that all environmental monitoring programmes (sampling, measuring, recording etc.) are carried out according to protocols and schedules
Lead competent Authority (DMRE)	The department responsible for approving the Environmental Authorisation application. Ensuring that the monitoring and adherence to EMPs is carried out, by going through/reviewing audit reports submitted by the ECO and conducting regular site visits.
Contractor	A Contractor will be employed by the developer for different components of the project. The Contractor's primary responsibilities are to construct the works and ensure compliance with the EMP whilst carrying out the work.

60.4. Time period for implementing impact management actions

The impact management actions must be implemented immediately or within a day of being approved

60.5. Mechanism for monitoring compliance

Table 20: Mechanisms for monitoring compliance

Activity	Associated Potential Impacts	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementing Impact Management Actions
Construction and operation	Noise generation (-ve)	<ul style="list-style-type: none"> • Maintain a complaint register that is made accessible to the locals • Safety inspection to ensure all workers are wearing protective ear plugs during blasting operations 	ECO and Project/Site Manager	<ul style="list-style-type: none"> • Monitor Monthly • Weekly reporting on any complaints
Construction and operation	Soil contamination by oil spills from vehicles (-ve)	<ul style="list-style-type: none"> • Daily inspection of operational equipment • Service vehicles timeously 	ECO& Project Manager	<ul style="list-style-type: none"> • Daily inspection • Weekly reporting • Services vehicles within prescribed services periods • Immediate implementation of management actions
Construction and operation	Noise generation (-ve)	Maintain a complaint register that is made accessible to the locals	ECO& Project manager	Weekly reporting on any complaints
Construction and operation	<ul style="list-style-type: none"> • Solid waste such as debris and litter can be potentially generated and deposited in and around the site. This could potentially attract nuisance and affect the natural scenery / aesthetic quality of the site. 	Inspection of waste storage and ablution facilities and the general site inspection for any oil spillages	ECO & Project Manager	<ul style="list-style-type: none"> • Weekly monitoring • Monthly reporting • Immediate implementation of management actions

Activity	Associated Potential Impacts	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementing Impact Management Actions
	<ul style="list-style-type: none"> Contamination of soil and underground water by spills from mobile ablution facilities 			
Construction and operation	Dust	<ul style="list-style-type: none"> Safety inspections to ensure all workers are wearing protective gears during operation Inspection to ensure access roads and site are sprayed. Maintain a complaint register that is made accessible to the locals 	ECO & Occupational Hygienist Project Manager	<ul style="list-style-type: none"> Monthly monitoring and reporting Immediate implementation of management actions Monthly reporting on any non-compliances Daily monitoring
Construction and operation	Soil erosion and change in land capability	Ensure concurrent rehabilitation (backfilling and fertilisation/re-vegetation) is implemented throughout the life of the mine	<ul style="list-style-type: none"> ECO & project Manager 	Monthly reporting
Construction and operation	Safety and hazards	Maintain an incidence register for any accidents or safety incidences	<ul style="list-style-type: none"> ECO & Project Manager 	Monthly reporting
<ul style="list-style-type: none"> Rehabilitating the camp site, rehabilitation of the disturbed and contaminated areas Re-vegetation Removal of all mobile infrastructure on site 	<ul style="list-style-type: none"> Recovery/ restoration of natural habitat Dust dispersal 	Inspection of rehabilitation on site and comparison of rehabilitation progress against rehabilitation plan	<ul style="list-style-type: none"> ECO & Competent Authority Safety officer /Occupational hygienist 	<ul style="list-style-type: none"> Annual inspection and reporting Monthly

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

Environmental Performance Assessment (EPA) audits or reviews are a requirement of all authorisation holders, as stipulated in the MPRDA Regulations 54 and 55 (MPRDA Regulations, Government Notice (GN) 527, 2004, as amended. In compliance with these Regulations, the audit process is to be conducted on an annual basis.

61. Environmental Awareness Plan

An environmental control officer will undertake awareness of different environmental aspect and will train the employees on how to deal with emergency situations and how to remediate such emergencies.

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

There will be detailed in environmental awareness training that all employees will undergo.

- An Environmental Control Officer will conduct environmental awareness training and environmental awareness programs throughout the operation. The environmental awareness plan will be aimed at making contractors and/or workers aware of the potential environmental risks associated with the project and the necessity to prevent accidental spillages by the implementation of good housekeeping practices.
- All personnel will as a minimum requirement, undergo a general SHE induction and awareness training. The induction and training will sensitize all employees to safety and environmental issues including but not limited to:
 - ✓ environmental protection
 - ✓ waste management,
 - ✓ veld fires,
 - ✓ poaching/ faunal protection,
 - ✓ safety precautions,
 - ✓ Water protection.
- Awareness training will be conducted to educate personnel on the potential consequences of non-compliances with specified operating procedures and management measures as well as significant environmental impacts, actual or potential, of their work activities. Training is appropriate to the activity of individual employees
- An environmental calendar will be drawn. The calendar will detail monthly environmental awareness topics for all personnel to engage in and get continuous environmental awareness.
- Signage and posters of environmental awareness topics will be placed in and around operational areas.

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

All employees must be provided with environmental awareness training to inform them of any environmental risks which may result from their work and the manner in which the risks must be dealt with in order to avoid pollution or the degradation of the environment. This should be in conjunction with the implementation of the EMPr.

62. Specific information required by the Competent Authority

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

PAMDC (Pty) Ltd will update and review the quantum of the financial provision on an annual basis. In addition, formal monitoring and performance assessment reviews of compliance will be undertaken annually.

63. UNDERTAKING

The EAP herewith confirms

- the correctness of the information provided in the reports
- the inclusion of comments and inputs from stakeholders and I&APs;
- the inclusion of inputs and recommendations from the specialist reports where relevant; and
- that the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected. Parties are correctly reflected herein.



Signature of the environmental assessment practitioner:

Joan Consulting (Pty) Ltd

Name of company:

November 2020

Date

-END-