



**DRAFT BASIC ASSESSMENT REPORT & ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT**

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

**PREPARED BY : JOAN CONSULTING (PTY) LTD**

**REFERENCE NO : NC30/5/1/1/2/12533 PR**

**DATE : OCTOBER 2020**

**Cell:** 073 912 0800

**Tel:** 011 791 5032

**Fax:** 086 235 5142

**Email:** [Lufuno@joanprojects.co.za](mailto:Lufuno@joanprojects.co.za)

**Address:** No 9 Lourie Road, Randparkriff, Randburg, Gauteng

**Postal Address:** P O Box 4147, Honeydew, 2040

**Company registration No:** 2011/142803/07





# 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)

**Name of Applicant** : Pan African Mineral Development Company (Pty) Ltd

**Telephone** : 011 201 4700

**Fax** : 011 201 4705

**Cell** : 073 092 4801

**Email Address** : [emmanuelm@pamdc-za.co.za](mailto:emmanuelm@pamdc-za.co.za)

**Physical address** : CEF House, Block C, Upper Greyston Office Park, 152 Ann Crescent, Strathavon, Sandton, Johannesburg

**Postal address** : P.O. Box 786141, Sandton, 2146

**File reference number SAMRAD: NC30/5/1/1/2/12533 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

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

## CONTENTS

IMPORTANT NOTICE .....	iii
OBJECTIVE OF THE BASIC ASSESSMENT PROCESS .....	iv
1. ACRONYMS .....	v
PART A:.....	1
SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT .....	1
1. Contact person and correspondence address .....	1
1.1. Details of the EAP.....	1
1.2. Expertise and qualifications of the EAP.....	1
1.3. Applicant of the Details .....	2
1.4. Location of the overall activity .....	2
2. Description of the scope of the proposed overall activity. ....	5
3. Listed and specified activities .....	7
4. Description of the activities to be undertaken .....	8
4.1. Phase 1 .....	8
4.2. Phase 2 - Construction, Operational And Deccomissioning Phase .....	9
4.3. Phase 3 .....	10
5. Policy and Legislative Context.....	11
6. Need and desirability of the proposed activities. ....	14
7. Motivation for the overall preferred site, activities and technology alternative. ....	14
8. Full description of the process followed to reach the proposed preferred alternatives within the site.....	15
8.1. Details of the development footprint alternatives considered.....	15
8.2. The property on which or location where it is proposed to undertake the activity; .....	15
8.3. The type of activity to be undertaken;.....	15
8.4. The design or layout of the activity;.....	15
8.5. The technology to be used in the activity; .....	15
8.6. The Operational Aspects of the Activity:.....	16
8.7. The option of not implementing the activity. ....	16
9. Details of the Public Participation Process Followed.....	16
9.1. Objectives of public participation Process .....	16
9.2. Tasks to be undertaken for the Public Participation Process.....	16
9.2.1.1. Identification of key Interested and Affected Parties: .....	17
9.2.1.2. Placement of site notices.....	17
9.2.1.3. Newspaper adverts .....	17
9.2.1.4. Availability Draft Basic Assessment Report .....	17
9.2.1.5. Public Meeting.....	17

9.3.	Summary of issues raised by I&Aps-	18
10.	The Environmental attributes associated with the alternatives.	19
10.1.	Baseline Environment	19
	Animal Species found in the Area	22
	Invertebrate found in the Area	22
10.2.	Demographic Profile	26
10.2.1.1.	Population Distribution and Demographics	26
11.	Description of the current land uses	30
10.3	Description of specific environmental features and infrastructure on the site	30
12.	Environmental and current land use map	30
13.	Impacts and risks identified including the nature, significance consequence, extent, duration and probability of the impacts, including the degree of these impacts.	32
14.	Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;	48
15.	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.	50
16.	The possible mitigation measures that could be applied and the level of risk.	51
17.	Motivation where no alternative sites were considered.	55
18.	Statement motivating the alternative development location within the overall site	55
19.	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.	55
20.	Assessment of each identified potentially significant impact and risk	56
21.	Summary of specialist reports.	58
22.	Environmental impact statement	58
22.1.	Summary of the key findings of the environmental impact assessment;	58
22.2.	Site Map	58
23.	Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	59
24.	Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr;	59
25.	Aspects for inclusion as conditions of Authorisation.	59
26.	Description of any assumptions, uncertainties and gaps in knowledge.	59
27.	Reasoned opinion as to whether the proposed activity should or should not be authorised	60
27.1.	Reasons why the activity should be authorized or not.	60
27.2.	Conditions that must be included in the authorisation	60
27.3.	Period for which the Environmental Authorisation is required.	60
28.	Undertaking	61

29.	Financial Provision.....	61
29.1.	Explain how the aforesaid amount was derived.....	61
29.2.	Confirm that this amount can be provided for from operating expenditure. ....	63
30.	Specific Information required by the competent Authority.....	63
30.1.	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: - .....	63
30.1.1.1.	Impact on the socio-economic conditions of any directly affected person. ....	63
31.	Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act.....	63
32.	Other matters required in terms of sections 24(4) (a) and (b) of the Act. ....	64
PART B.....		65
ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT.....		65
33.	DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME.....	65
34.	Details of the EAP.....	65
35.	Description of the Aspects of the Activity .....	65
36.	Composite Map.....	65
37.	Description of Impact management objectives including management statements .....	66
37.1.	Determination of closure objectives. ....	66
38.	Volumes and rate of water use required for the operation. ....	66
38.1.	Has a water use license has been applied for? .....	66
39.	Impacts to be mitigated in their respective phases.....	66
39.1.	Planning Phase .....	66
39.2.	Construction phase .....	68
39.3.	Operational Phase.....	68
39.4.	Decommissioning Phase .....	68
40.	Impact Management Outcomes .....	85
41.	Impact Management Actions.....	85
42.	Financial Provision.....	85
42.1.	Determination of the amount of Financial Provision.....	85
42.2.	Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation.....	85
42.3.	Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties. ....	86
42.4.	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.....	86
42.5.	Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.....	87
42.6.	Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline. ....	87



42.7.	Confirm that the financial provision will be provided as determined. ....	88
43.	Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including.....	88
43.1.	Monitoring of Impact Management Actions.....	88
43.2.	Monitoring and reporting frequency .....	88
43.3.	Responsible persons.....	88
43.4.	Time period for implementing impact management actions .....	89
43.5.	Mechanism for monitoring compliance .....	90
43.6.	Indicate the frequency of the submission of the performance assessment/ environmental audit report. ....	92
44.	Environmental Awareness Plan .....	92
44.1.	Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work.....	92
44.2.	Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.....	93
45.	Specific information required by the Competent Authority .....	93
46.	UNDERTAKING.....	93

## LIST OF TABLES

Table 1: EAP Details.....	1
Table 2: Details of the Applicant.....	2
Table 3: Property details .....	2
Table 4:21-digit Surveyor General Code for each farm portion.....	3
Table 5: NEMA triggered activities .....	7
Table 6: Applicable legislation to this Application .....	11
Table 7: Summary of issues raised by I&As .....	18
Table 8: Planning Phase Impact Assessment .....	32
Table 9: Impact Assessment for Construction, Operational and Decommissioning phase.....	33
Table 10: Criteria Used for Rating of Impacts.....	48
Table 11: Criteria for Rating of Classified Impacts.....	49
Table 12: Positive and Negative Impacts of the Project.....	50
Table 13: The possible mitigation measures that could be applied and the level of risk. ....	51
Table 14: Summary of potential impact risks .....	56
Table 15:Quantum Calculations .....	62
Table 16:Planning Phase Mitigation Measures.....	67
Table 17: Mitigation measures for Construction, Operational and Decommissioning phase of the project.....	69

Table 18: Rehabilitation measures .....	86
Table 19: Responsible Persons for the Project.....	89
Table 20: Mechanisms for monitoring compliance.....	90

## LIST OF FIGURES

Figure 1: Locality Map .....	4
Figure 2: Site Map.....	6
Figure 3: Topography Map .....	20
Figure 4: Vegetation Map .....	21
Figure 5: Geological Map .....	24
Figure 6: Surface water and wetland within the site .....	25
Figure 7: John Taolo Gaetsewe Municipal Area .....	26
Figure 8: Figure 3: Northern Cape Population per District .....	27
Figure 9: JTG Population Composition.....	27
Figure 10: Household size within JTG District Municipality.....	28
Figure 11: Age distribution within JTG District Municipality .....	28
Figure 12: Sex Ratio .....	29
Figure 13: Population group within JTGDM.....	29
Figure 14: Level of Education for population aged 20 years and older within JTGDM .....	30
Figure 15: Environmental and Land use Map of the exploration site Application .....	31

## 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
Report compiled by (EAP)	Mulalo Tshilimandila <a href="mailto:mulalo@joanprojects.co.za">mulalo@joanprojects.co.za</a>
Report reviewed and Approved by (Principal EAP)	Lufuno Mutshathama <a href="mailto:lufuno@Joanprojects.co.za">lufuno@Joanprojects.co.za</a> 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.

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.

###### (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.

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) is also a speciality service offering

### 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:	<a href="mailto:emmanuelm@pamdc-za.co.za">emmanuelm@pamdc-za.co.za</a>
Cell:	073 092 4801

### 1.4. Location of the overall activity

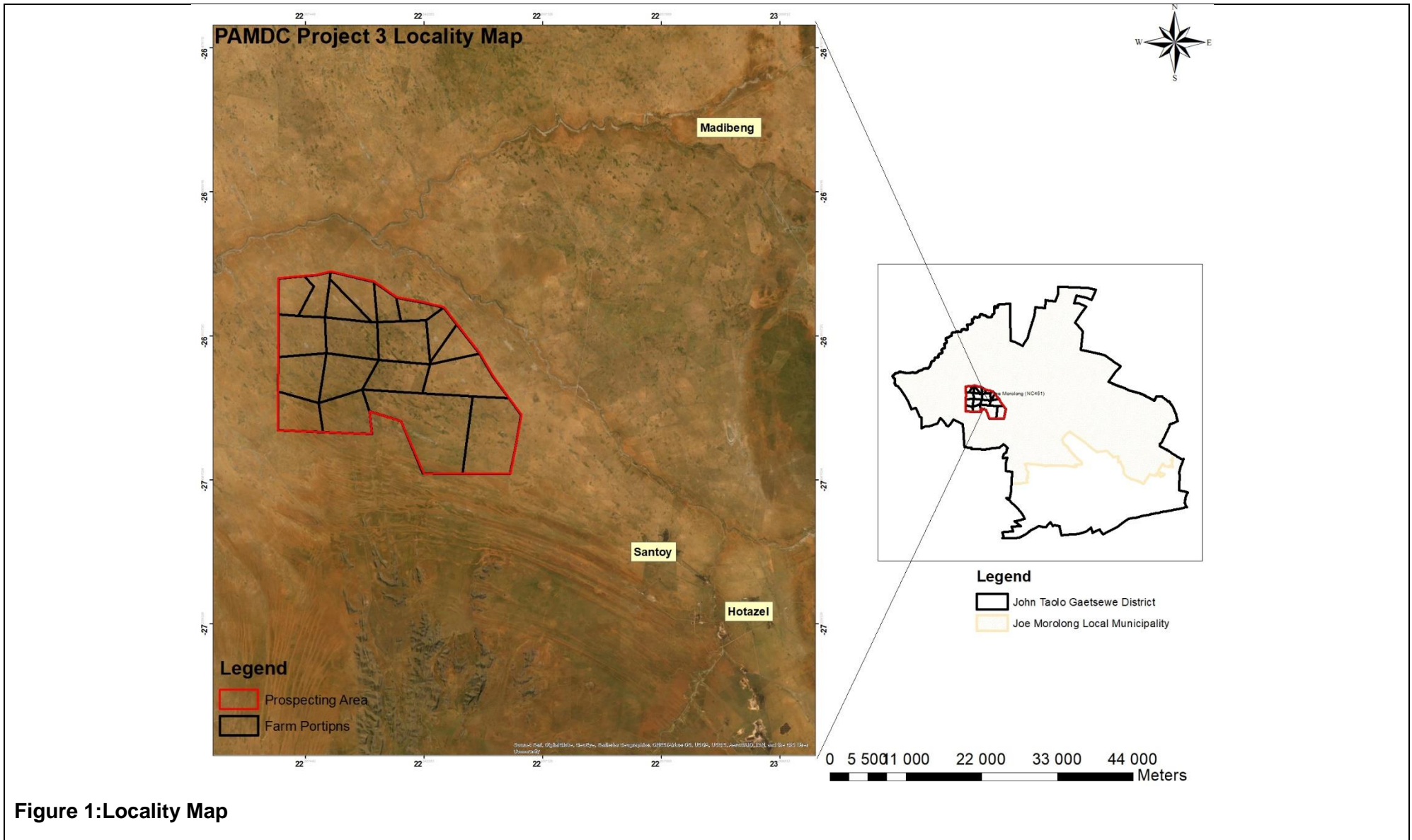
The project site is located in the Northern Cape Province in South Africa. It is situated at approximately 80 km South-West and 120KM south west of Kuruman town. This area falls within the Kuruman Magisterial District within Joe Morolong Local Municipality ward 4 under John Taolo district Municipality. The project site can be accessed through R31 and 380 provincial roads.

**Table 3: Property details**

Application area (Ha)	The area is approximately 62 926 hectares ha in extent
Magisterial district:	Kuruman Magisterial District
Distance and direction from nearest town	The project area lies North of the Northern Cape towns, thus 40km north of Hozatel Town, 100km north of Kuruman, 150km North of Kathu and 200km north east of Upington. The western side boarder of the farm is approximately 45km away from the boundary of Botswana and South Africa

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

<b>SG_CODE</b>	<b>FARM NAME</b>
C04100000000070400027	704/27
C04100000000070400018	Hiawatha 704/18
C04100000000070400019	Avoca 704/19
C04100000000070400026	704/26
C04100000000070400025	704/25
C04100000000070400017	Santa Rosa 704/17
C04100000000070400013	Almeria 704/13
C04100000000070400016	Beryl 704/16
C04100000000070400015	Sunstar 704/15
C04100000000070400014	Fellenberg 704/14
C04100000000070400024	704/24
C04100000000070400009	Victory 704/9
C04100000000070400010	Climax 704/10
C04100000000070400012	Wildwind 704/12
C04100000000070400011	Barbarossa 704/11
C04100000000070400007	Dieretuin 704/7
C04100000000070400030	704/30
C04100000000070400008	Kransduin 704/8
C04100000000070400031	704/31



## **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 30m<sup>3</sup> 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.

Two different sites for site establishment were identified because the site is too big for one site to be established, however 0.1ha will be cleared for each site establishment (0.2ha for 2 sites). A site plan indicating all infrastructure to be constructed on site and drilling positions is attached in the overleaf page below.



## Site Plan for PAMDC Prospecting Right Application

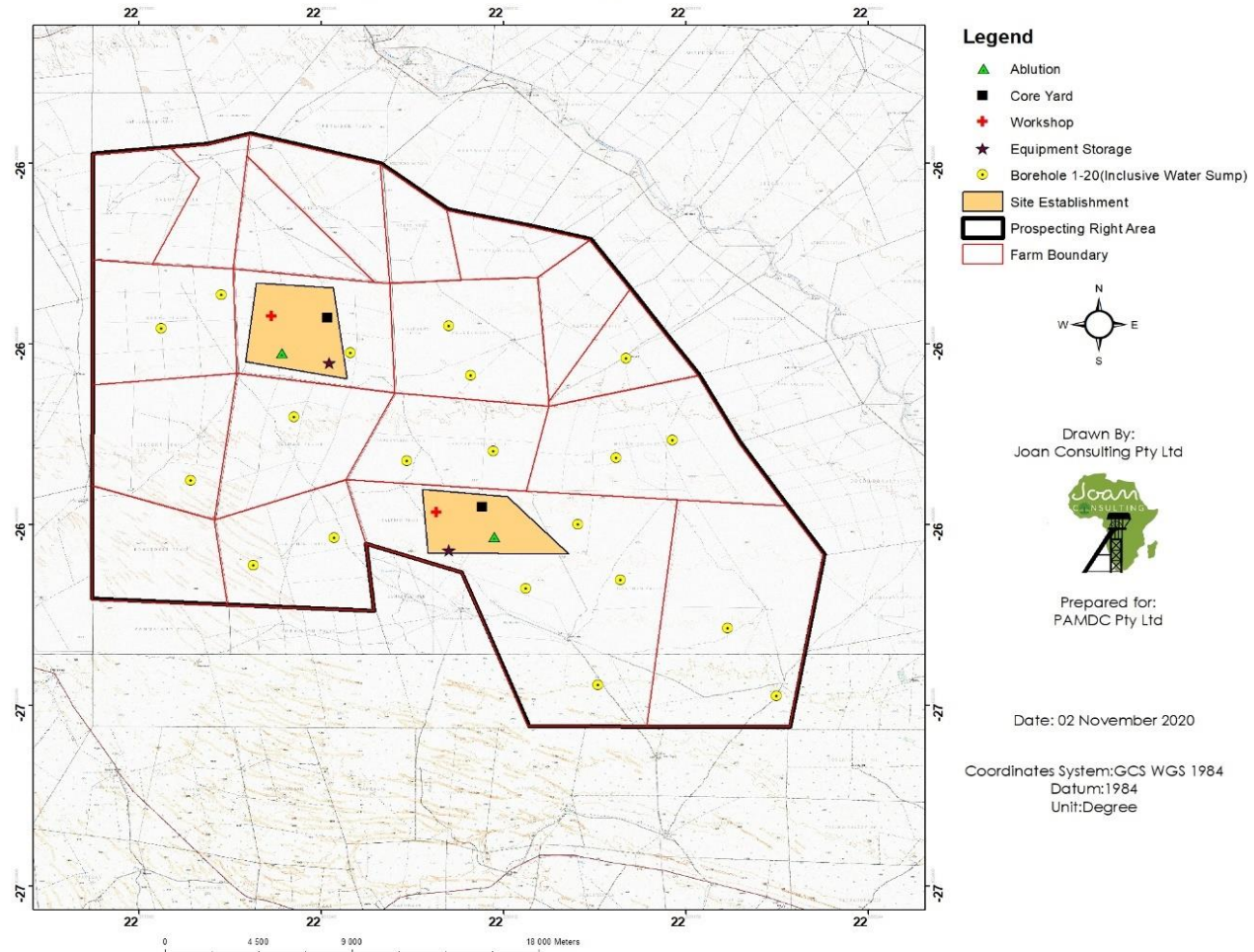


Figure 2: Site Map



### 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 325 and Listing Notice 3 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**

<b>NAME OF ACTIVITY</b> E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc.	<b>Aerial extent of the Activity Ha or m<sup>2</sup></b>		<b>LISTED ACTIVITY</b> Mark with an X where applicable or affected.	<b>APPLICABLE LISTING NOTICE</b> (GNR 544, GNR 545 or GNR 546)
Establishment of Drill site (Drilling)	2000 m <sup>2</sup>	0.2ha	X	Activity 20 - GNR R327 of 2017
Site Establishment <ul style="list-style-type: none"> <li>• Workshop Area</li> <li>• Storage Yard</li> <li>• Ablution facility</li> </ul>	2000 m <sup>2</sup>	0.2ha	X	Activity 20- GNR R327 of 2017
Access road (Existing)	-	-		N/A
Water Sump	80m <sup>2</sup> x 4m <sup>2</sup> x 20 holes	0.064ha		N/A
<b>Total Vegetation removed</b>	4000 m <sup>2</sup>	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 100m<sup>2</sup>. The drilled boreholes will be between 50 and 200m 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 Decommissioning 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 200m.

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 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**

<b>APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT</b>	<b>REFERENCE WHERE APPLIED</b>	<b>HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT?</b>
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.
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.

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 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"> <li>• To promote a culture of health and safety;</li> <li>• To provide for the enforcement of health and safety measurements;</li> <li>• 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;</li> <li>• To promote training and human resource of development;</li> <li>• To regulate employers' and employees' duties to identify hazards and eliminate, control and minimise the risk to health and safety;</li> <li>• To entrench the right to refuse to work in dangerous conditions</li> </ul>

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?
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"> <li>• An abnormal load/vehicle permit may be required for the drill rig to be taken to the site.</li> <li>• These include route clearances and permits will be required for vehicles carrying abnormally heavy or abnormally dimensioned loads.</li> </ul>

## **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 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 will be considered in the impact assessment;
- 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 to be 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 will be 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 include landowners, adjacent landowners, organ of states and any interested and affected parties. And any other interested and affected parties who were not part of the previous mining right application process will be awarded an opportunity to register as such to become part of the application process.

#### **9.2.1.2. Placement of site notices**

Site Notices will be 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 with coordinates will be attached on this draft report

#### **9.2.1.3. Newspaper adverts**

A Newspaper Advertisement will be published on a local paper which the Interested & Affected Parties will be able to access;

#### **9.2.1.4. Availability Draft Basic Assessment Report**

Draft Basic Assessment Report will be sent to all registered interested and affected parties upon request for a period of 30 days. In addition, the Draft Basic Assessment Report was also sent to identified departments.

#### **9.2.1.5. Public Meeting**

A public meeting will not be undertaken due to the COVID-19 pandemic circumstances. This is done to avoid risk of exposure to the virus. However telephonic call or visual meetings with I&APs who request such meetings will be held. with all the Interested and Affected Parties and a date, time and place in which the meeting will take place will be communicated with the I&APs 30 days prior to the meeting. A public participation plan will be sent to the DMRE in this regard.

**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	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.
List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.		Comments Received			
<b><u>AFFECTED PARTIES</u></b>					
<b>Landowner/s and Local municipality</b>					
	X	N/A		N/A	
<b>Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA e</b>					
	X				
<b>Communities</b>					
	X			N/A	
	X				

## **10. The Environmental attributes associated with the alternatives.**

*(The environmental attributes 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**

##### **➤ Temperature**

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

##### **➤ 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.

##### **➤ 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.

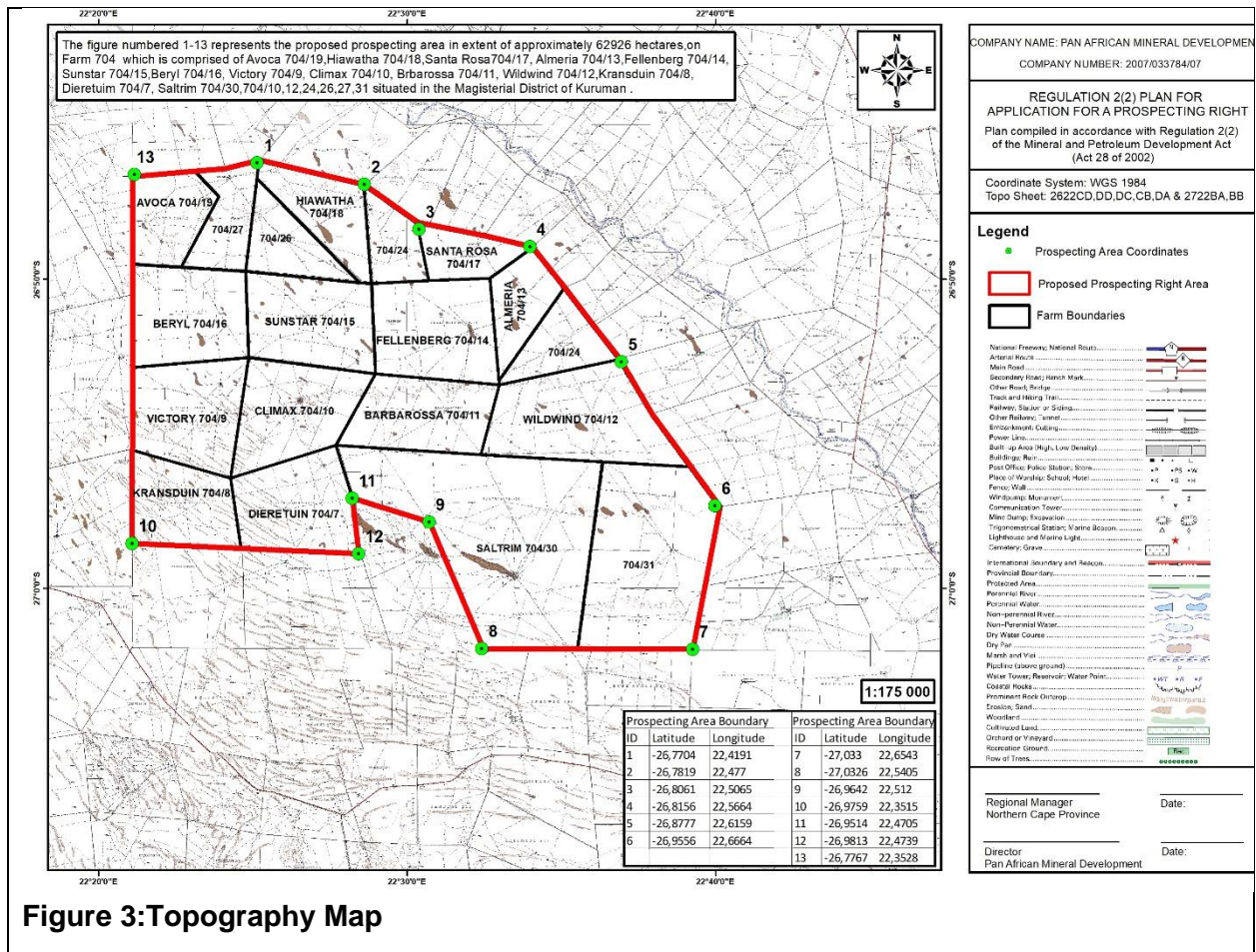


Figure 3: Topography Map

➤ 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.

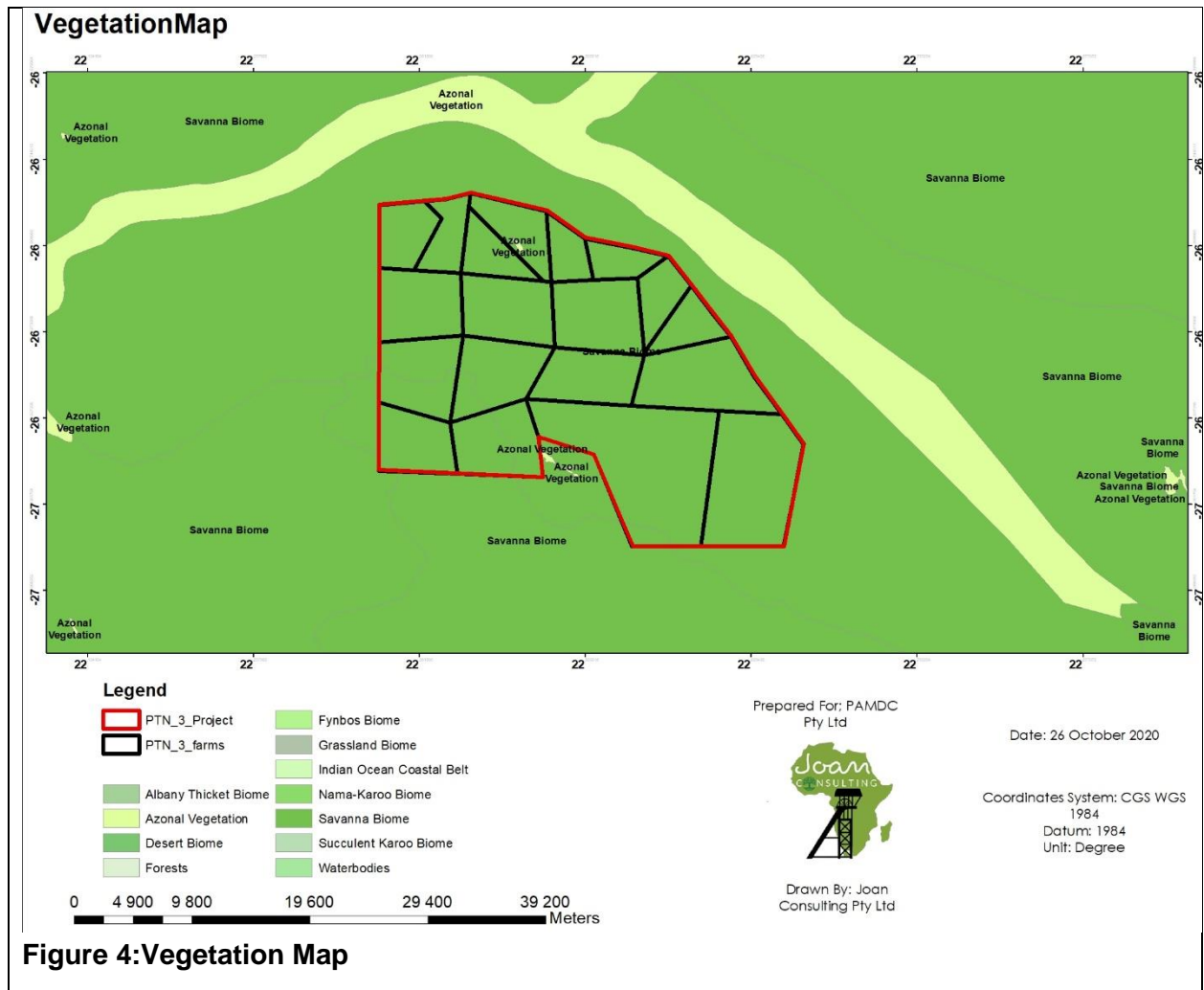
➤ Air Quality

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 R31 road in which the cars emit the CO<sub>2</sub> 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. 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.

➤ **Noise**

The only sources of noise in the 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 R31 route.

➤ **Vegetation (Flora)**



**Figure 4:Vegetation Map**

The prospecting zone is situated within the Savanna Biome as indicated in the above vegetation map. The Savanna Biome comprises of 46 percent of Southern Africa’s land mass; therefore, it is the largest Biome in Southern Africa. This Biome is characterized by C4-type grasses in plain areas, which is indicative of a summer rainfall zone. In addition, the distinct upper layer of woodland and bushveld are observable on a mountainous and intermediate areas respectively. The Kruger and Kalahari Gemsbok National Parks contain this vegetation type; therefore, the Savanna Biome vegetation is effectively conserved. However, only 5 percent of the total vegetation Biome is formally conserved.

However, the grass sward is typically dormant during the winter period. Physical adaptations to prevent severe predation of the grass sward during the winter period include the loss of nutritional value and becoming hard and unpalatable. Similarly, the shrub and woody component of savannas are largely dormant during the winter period; characterised by leafless trees and

shrubs. The loss of leaves during the winter period is an important adaptation to prevent loss of moisture; also preventing browsing that causes twig damages, scars, possible infections, etc.

Some evergreen species are present and these species are a significant food source for browsers during the winter period. Vegetative and specifically reproductive growth is however largely restricted to the summer period where pollinators are active and the reproductive ability and success is more certain. The depths to which tree and shrub roots penetrate provide an exclusive access to resources early and late in the growing season.

## ➤ **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.

### **Animal Species found in the Area**

- Grassland Beetle
- African Monarch
- Painted Lady
- Leopard Tortoise
- Namaqua Sand Lizard
- Helmeted Guineafowl
- Orange River Francolin
- Black-winged Kite
- Northern Black Korhaan
- Ring-necked Dove
- Laughing Dove
- Lilac-breasted Roller
- African Grey Hornbill
- Southern Yellow-billed
- Crimson-breasted Shrike
- Fork-tailed Drongo
- Cape Hare
- Cape Ground Squirrel

### **Invertebrate found in the Area**

- Golden Orb Web Spiders
- Ant-lions<sup>8</sup>
- Ground Beetles
- House Flies



### ➤ **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.

### ➤ **Geology of the site**

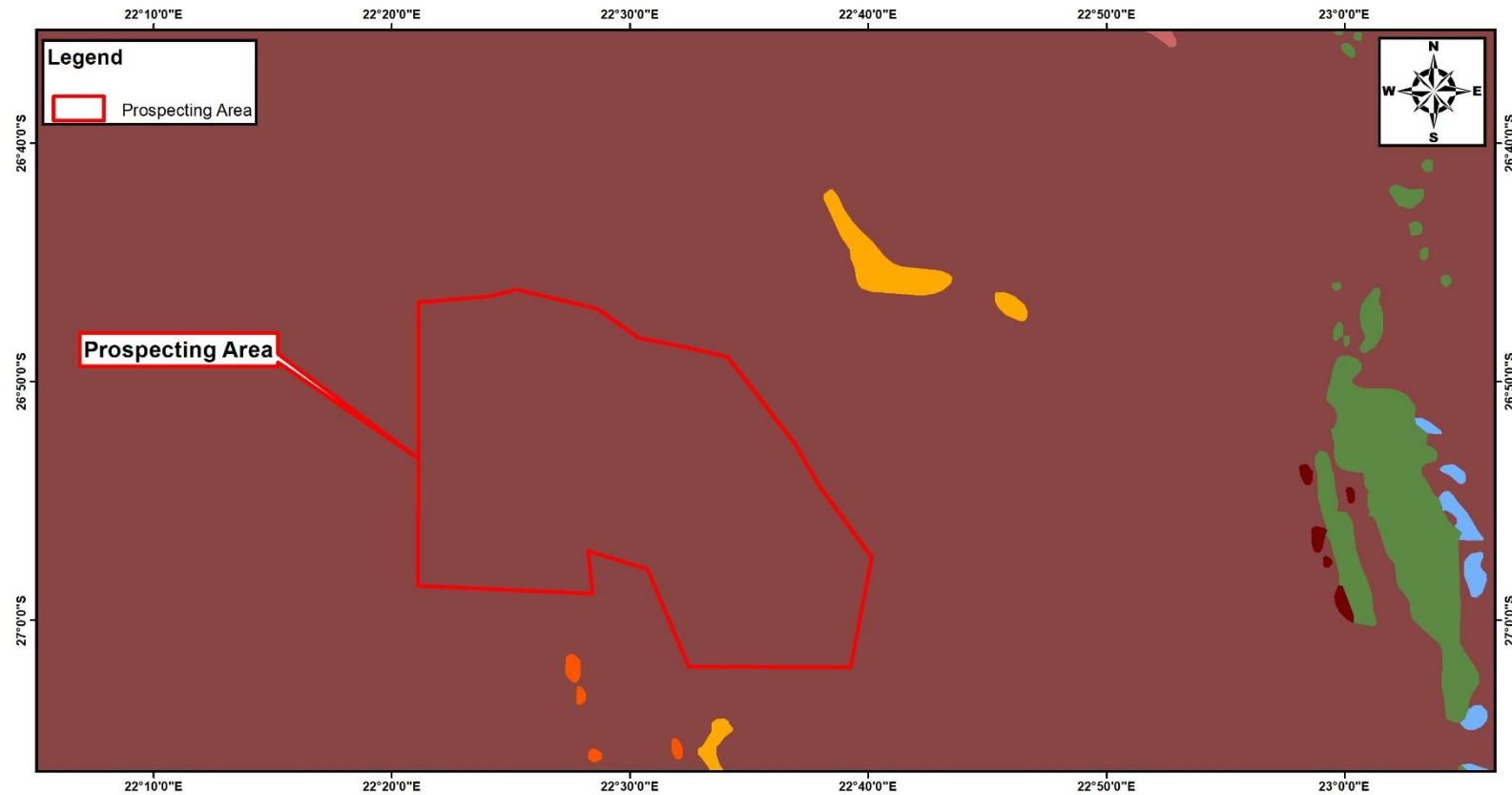
Most of the PAMDC concession area is covered by the Kalahari sediments and as a result, the outcrop is extremely scarce. Economic and sub-economic industrial minerals known to occur in the region include asbestos (long prohibited because of its dangerous health effect and is unlikely to be of use), building sand and aggregate, limestone, kieselgur (diatomite) and salt. Majority of these known deposits/occurrence are found outside the PAMDC concession areas, but this appears to be related to a lack of proper exploration and hence the PAMDC concession can be considered to have some potential of hosting these deposits. Similarities in geology of the PAMDC concession to the surrounding areas that contains these mineralization supports in contention

PAMDC Pb- Zn deposits are characterized by the Mississippi Valley Type. These deposits are widespread in the carbonate rocks of Ghaap and Chniespoort Group of the Transvaal Supergroup. Pb-Zn mineralization in the region of the present area of study is represented by Bushy Park and Pering deposits hosted by the carbonates of the Campbellrand

Subgroup are wide spread in the applied farms and the possibilities of Pb-Zn mineralization in these farms as exemplified by the pering deposits. Among the deposits described the nearest to the PAMDC area are the deposits/ occurrence at Bushy Park and Griquatown area. The deposits occur in the brecciated zones in isolated pockets of the Carbonates rocks of the Transvaal Supergroup. The nature of the mineralization, namely the occurrence as isolated pockets of mineralization is not encouraging for the Pb-Zn potential of these farms.

Several million tonnes of calcrete crust are abundantly developed over extensive portions in the Kuruman and the Vryburg District. Groves samples of calcite material collected by Martini (1987) between Kuruman and Vryburg returned disappointing results between 59 to 79% mainly due to high silica content. Ehlers and Wilson (2001) stated that better quality calcrete may exist in certain localized area but a systematic sampling programme will have to be conducted to delineate such material. Outside the PAMDC concession area Nel (1972) stated that a 2.5mt of limestone is available southwest of the settlement of Maropeng in the Lower Kuruman Reserve.

Large limestone deposits are mined from areas approximately 100km to the south of Kuruman in the vicinity of lime acres. These large deposits are situated close to the Kimberly- Postmasburg railway line. This area is the largest producer of limestone in the country. Most deposits are contained in the upper part of the Campbell Rand Subgroup that extends from the Griquatown in the south to North of Kuruman



**Geology Types**

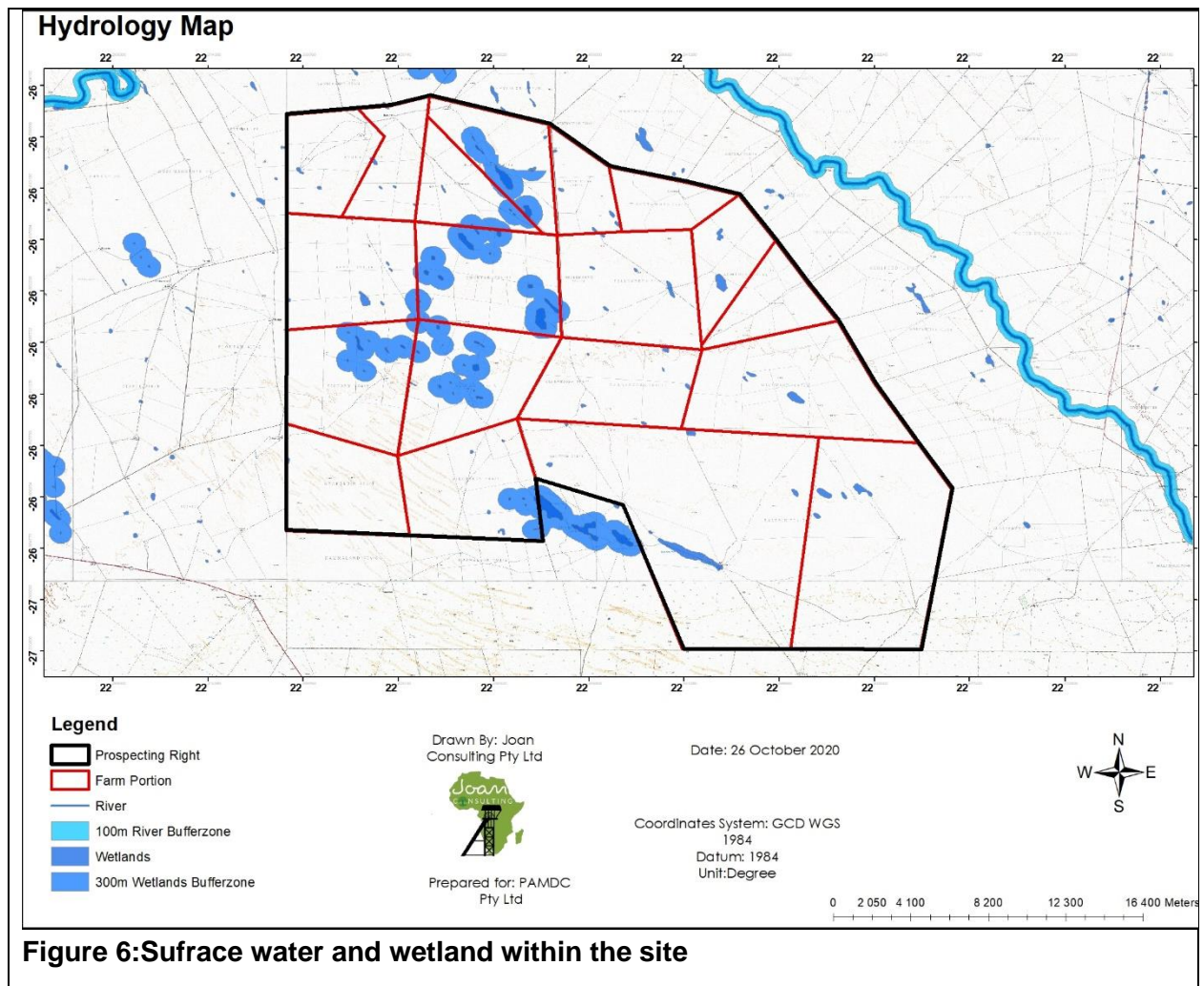
- Andesitic and basaltic lava with abundant pillows, minor jasper
- Banded iron-formation, jaspilite, riebeckite-amphibolite
- Brown and subordinate grey quartzites
- Diamicrite, subordinate sandstone, carbonate rock, jaspilite, mudrock, chert and conglomerate
- Dolomite/limestone, subordinate chert, minor quartzite, shale and banded iron-formation
- Quartzite, limestone, shale, andesite
- Superficial deposits comprising gravels, clays, sandstone, silcrete, calcrete and aeolian sand

**Figure 5: Geological Map**

## ➤ 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



**Figure 6: Surface water and wetland within the site**

The JTGDM falls entirely within the Orange River Basin. 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 km<sup>2</sup> 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.

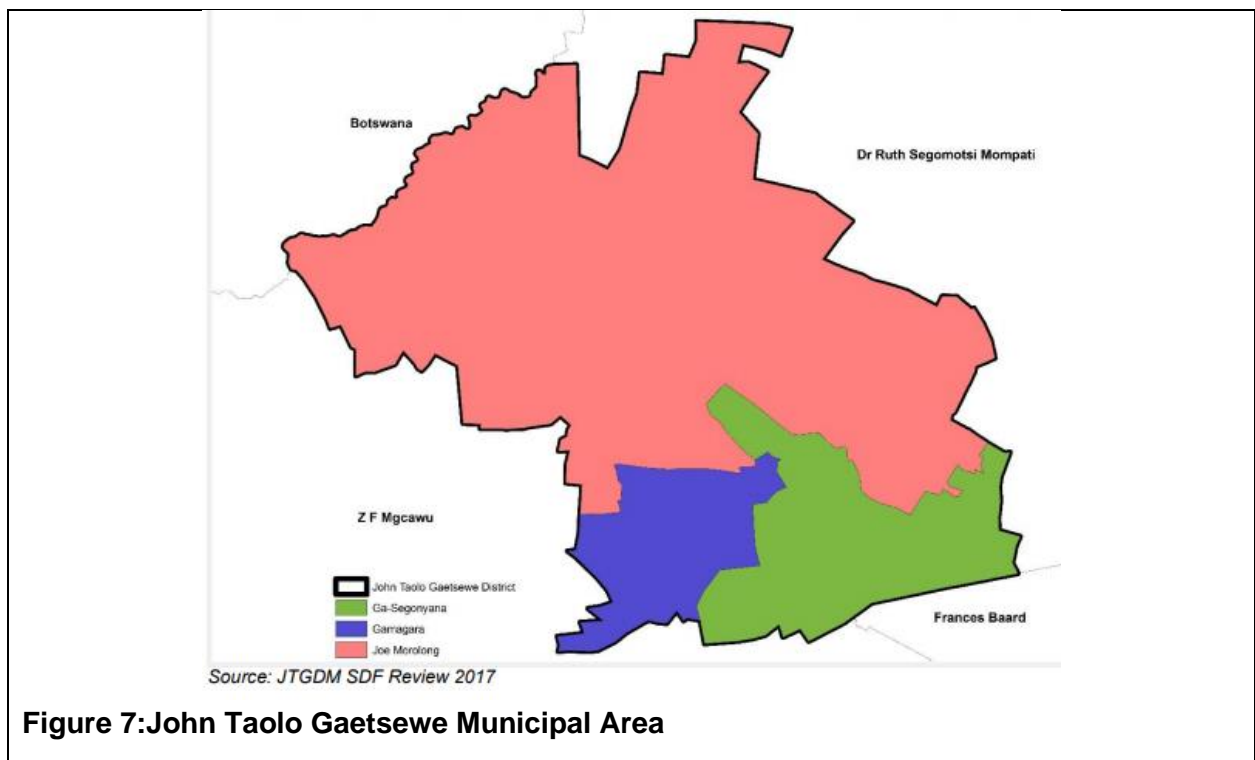
### Wetland and Pan

There are no wetlands areas within 1 000m of any proposed site therefore no wetlands will be impacted on by the proposed exploration activities. There are pans on site, namely Rim Salt pan situated at the centre affecting few portions of the farm Saltrim 704/30 and Rooi bok pan situated at the boundary of the farm Dieretuin 704.

## 10.2. Demographic Profile

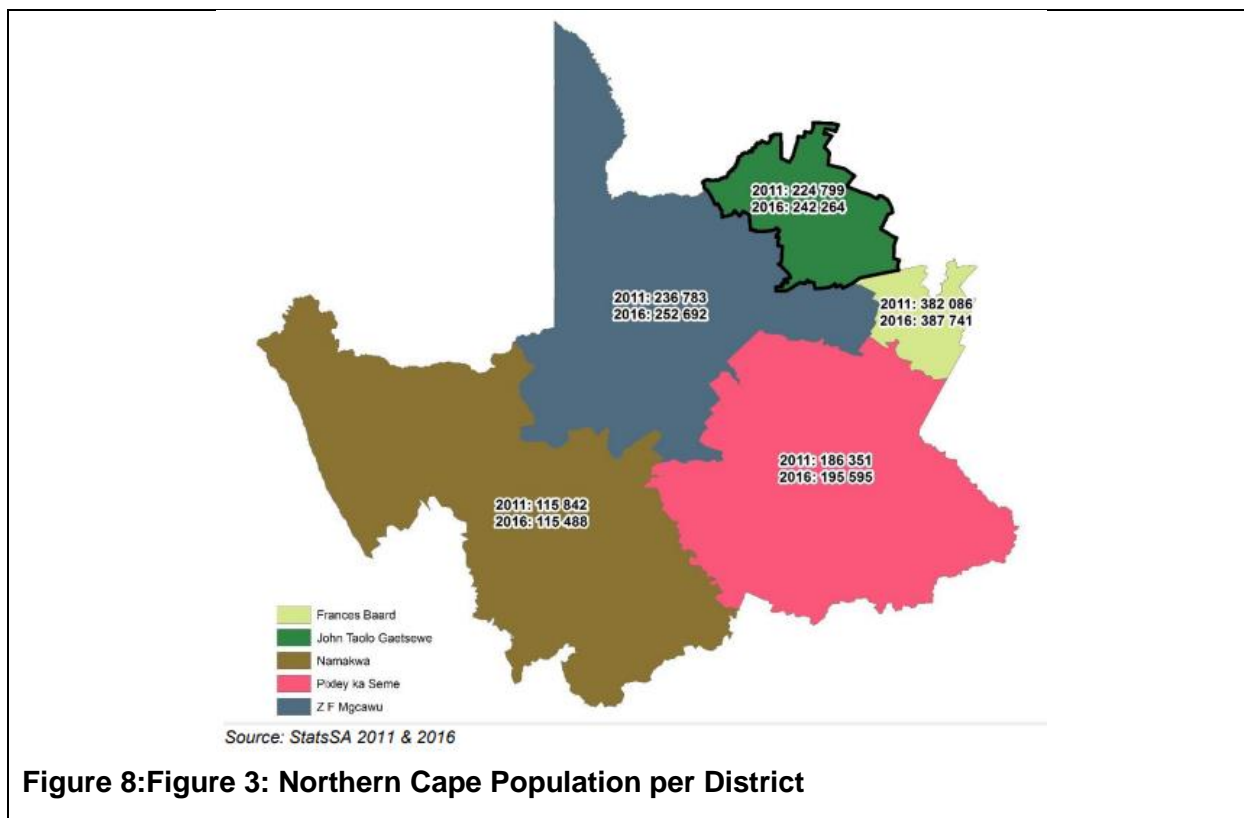
### 10.2.1.1. Population Distribution and Demographics

JTGDM is the second smallest district in the Northern Cape, occupying only 7% of the Province (27 498.9 km<sup>2</sup>) (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 km<sup>2</sup>. Joe Morolong Local Municipality is the District's largest local municipality in terms of area size; covering an extent of 20 215 km<sup>2</sup>, 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.



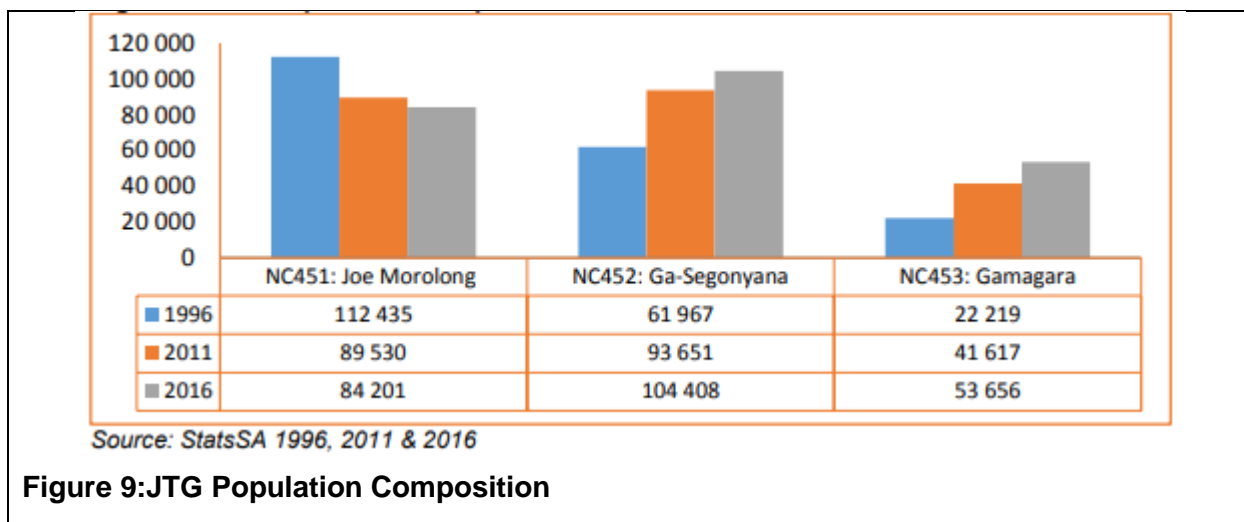
**Figure 7: John Taolo Gaetsewe Municipal Area**

## 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.

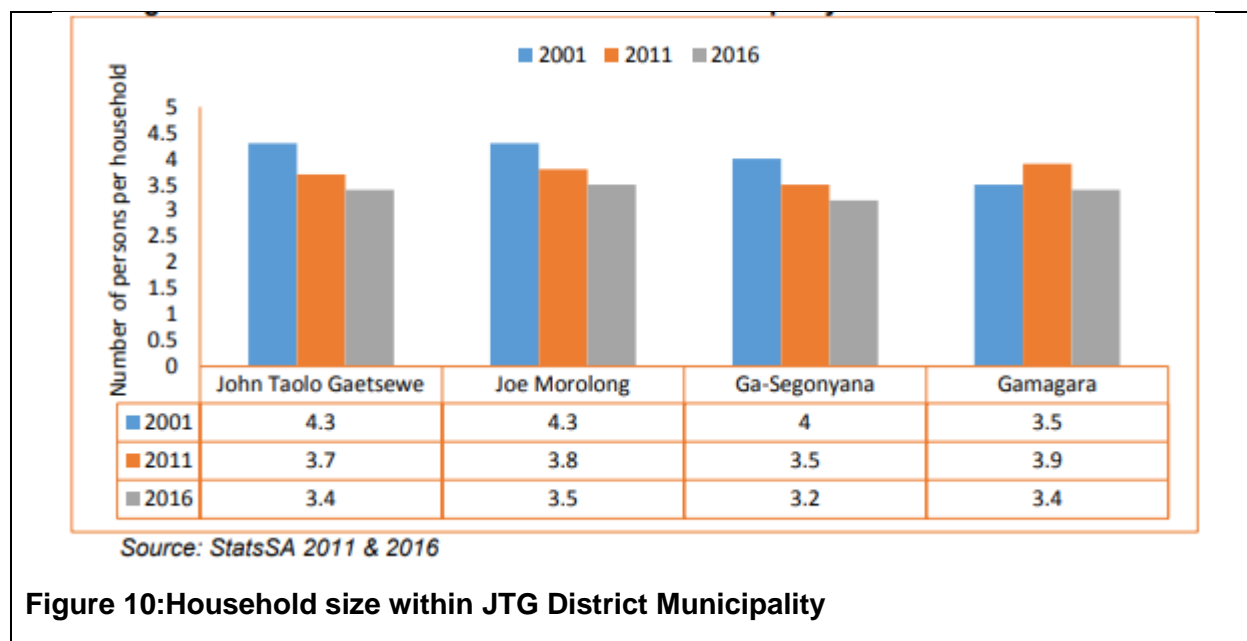


Figure 10: Household size within JTG District Municipality

## 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%.

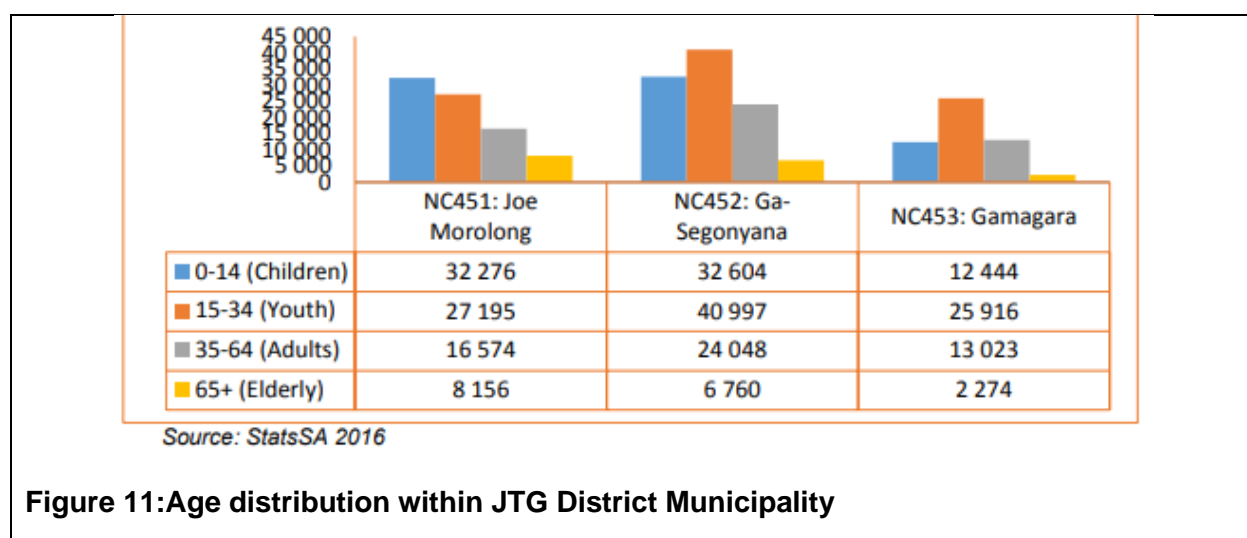


Figure 11: Age distribution within JTG District Municipality

## Gender Profile

The gender split in the JTGDM 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.

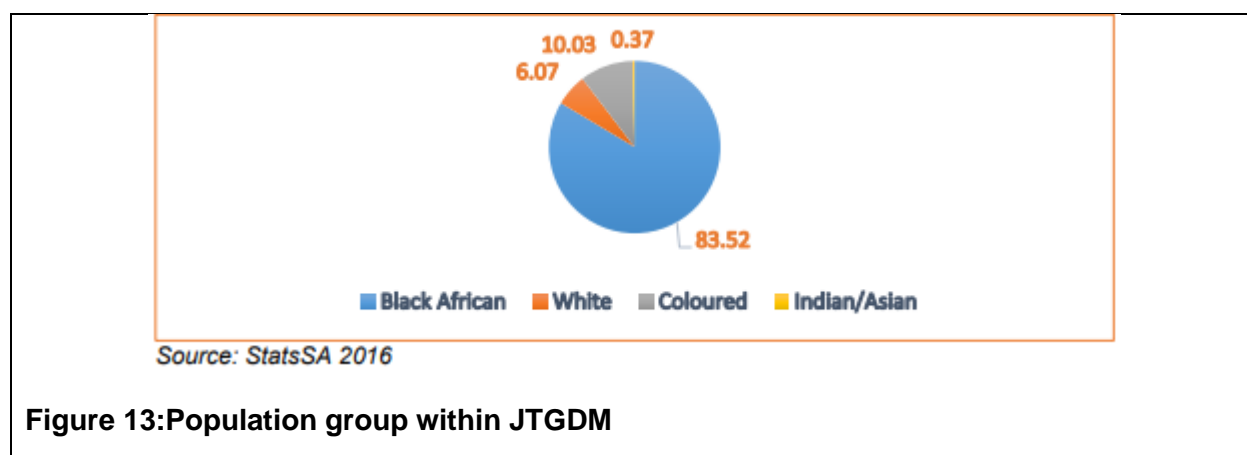
	John Taolo Gaetsewe	Joe Morolong	Ga-Segonyana	Gamagara
<b>Male</b>	118 988	38 206	50 483	30 299
<b>Female</b>	123 276	45 995	53 925	23 356

Source: StatsSA 2016

**Figure 12: Sex Ratio**

## Racial Distribution

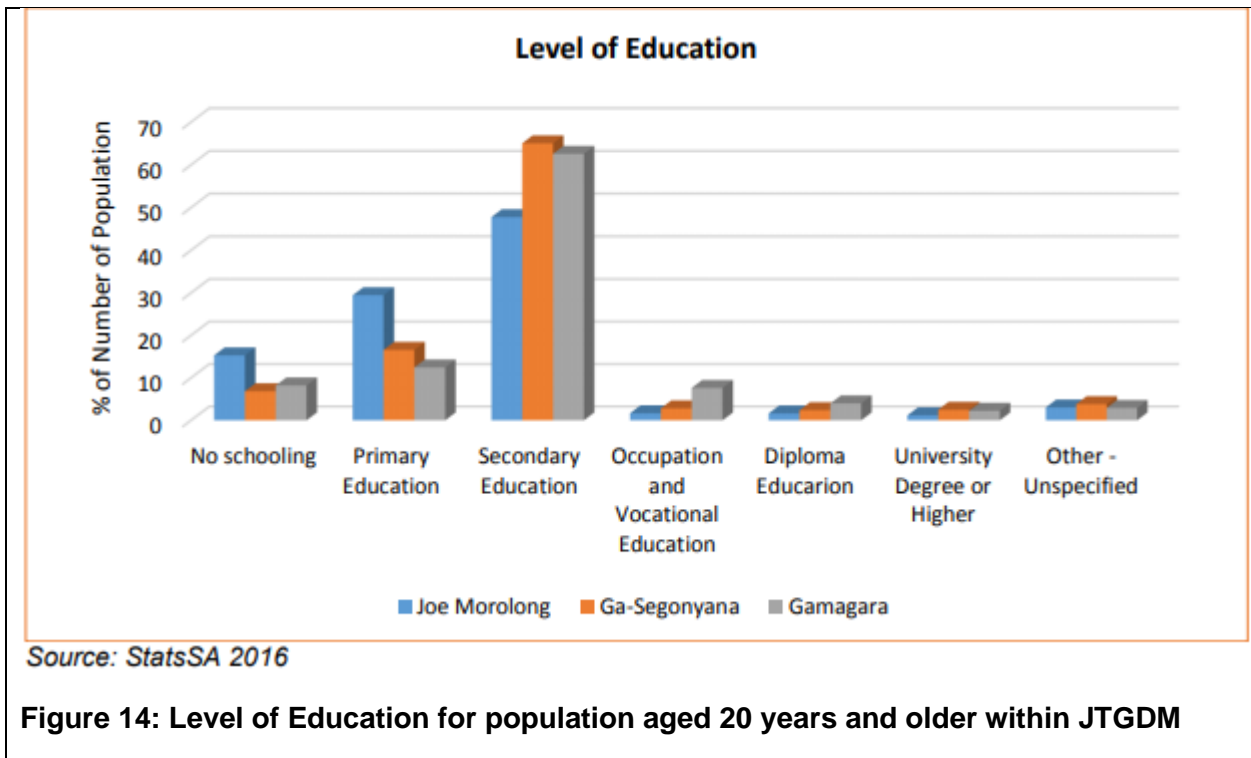
The racial profile of the JTGDM is as follows: Black/African: 83.52%; Coloured: 10.03%; Asian and Indian: 0.37%; White: 6.07%



## 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**

## 11. Description of the current land uses

The site has been characterised by a mixture of land uses, of which agriculture is dominant. The land use associated with the prospecting is agriculture, livestock farming, residences, recreational facilities and game lodges. The district holds potential as a viable tourist destination and has numerous growth opportunities in the industrial sector.

### 10.3 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.

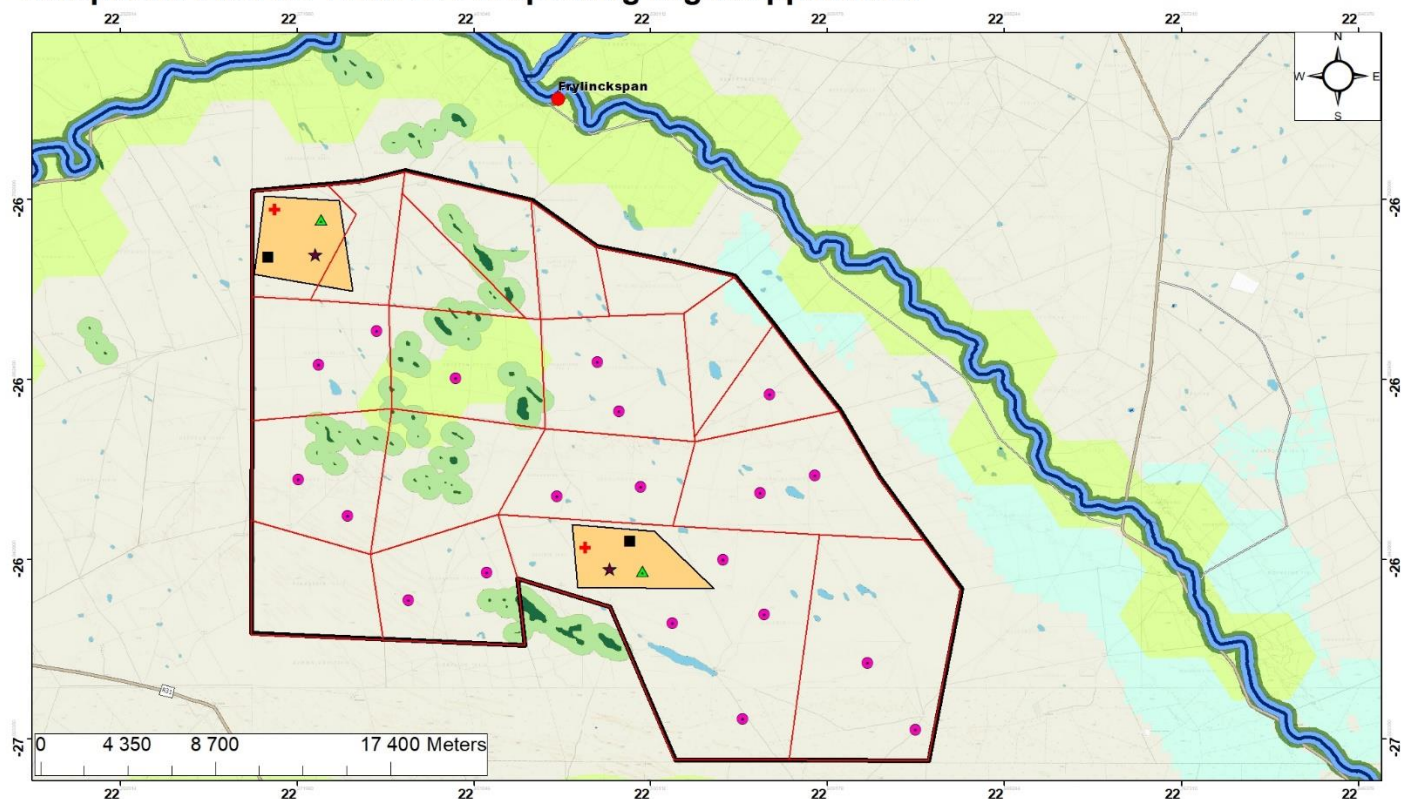
- Patches of Critical Biodiversity area and Ecological Support area
- Mushaweng river that feeds directly in Kuruman River is over 1000M North of the site.
- Rim Salt pan and Rooi bok pan situated in the farm Saltrim 704/30 and farm Dieretuin 704 respectively.
- Agricultural land
- Eskom Power cables
- Farm buildings
- Public gravel road
- Water boreholes
- Windmills

## 12. Environmental and current land use map

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



# Composite Plan for PAMDC Prospecting Right Application



## Legend

- |   |  |   |  |  |
|---|--|---|--|--|
| <span style="color: red;">●</span> Places   | <span style="background-color: black; color: black;">■</span> Core Yard    | <span style="border: 2px solid brown; padding: 2px;"> </span> Prospecting Right Area                      | <span style="border-bottom: 1px solid gray; width: 20px; display: inline-block;"></span> SECONDARY ROAD      | <span style="background-color: blue; width: 15px; height: 10px; display: inline-block;"></span> Protected Area                       |
| <span style="color: blue;">—</span> RiverLines  | <span style="color: red;">+</span> Workshop                                | <span style="border: 1px solid red; padding: 2px;"> </span> Farm Boundary                                 | <span style="border-bottom: 1px solid gray; width: 20px; display: inline-block;"></span> STREET              | <span style="background-color: green; width: 15px; height: 10px; display: inline-block;"></span> Critical Biodiversity Area One      |
| <span style="background-color: lightblue; width: 15px; height: 10px; display: inline-block;"></span> RiverLines_Buffer4 | <span style="color: black;">★</span> Equipment Storage                     | <b>Road Types</b>   | <span style="border-bottom: 1px dashed gray; width: 20px; display: inline-block;"></span> OTHER ACCESS       | <span style="background-color: lightgreen; width: 15px; height: 10px; display: inline-block;"></span> Critical Biodiversity Area Two |
| <span style="color: green;">▲</span> Ablution   | <span style="color: magenta;">●</span> Borehole 1-20(Inclusive Water Sump) | <span style="border-bottom: 1px solid gray; width: 20px; display: inline-block;"></span> NATIONAL FREEWAY | <span style="border-bottom: 1px dashed gray; width: 20px; display: inline-block;"></span> UNDER CONSTRUCTION | <span style="background-color: cyan; width: 15px; height: 10px; display: inline-block;"></span> Ecological Support Area              |
| <span style="background-color: orange; width: 15px; height: 10px; display: inline-block;"></span> Site Establishment    |  | <span style="border-bottom: 1px solid gray; width: 20px; display: inline-block;"></span> MAIN ROAD        | <span style="border-bottom: 1px dashed gray; width: 20px; display: inline-block;"></span> TRACK FOOTPATH     | <span style="background-color: lightgray; width: 15px; height: 10px; display: inline-block;"></span> Other Natural Areas             |
|   |  | <span style="border-bottom: 1px solid gray; width: 20px; display: inline-block;"></span> ARTERIAL ROUTE   |  | <span style="background-color: blue; width: 15px; height: 10px; display: inline-block;"></span> NWM_Wetlands                         |
|   |  |   |  | <span style="background-color: lightblue; width: 15px; height: 10px; display: inline-block;"></span> NWM_Wetcluster                  |

Drawn By:  
Joan Consulting Pty Ltd



Prepared for:  
PAMDC Pty Ltd  
Coordinates System:GCS WGS 1984  
Datum:1984  
Unit:Degree

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

13. 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"> <li>Engage with affected Landowners Prior Commencement of the project</li> <li>Undertake effective Public participation Process</li> </ul>	4	1	1	2	12

**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
<b>CONSTRUCTION PHASE</b>														
<b>Site Establishment (Air Quality)</b>	Site clearing, ablution facility placement	Dust generation by movement of large vehicles delivering mobile facilities	- (ve)	6	2	4	5	60	<ul style="list-style-type: none"> <li>• Areas to be cleared must be clearly marked and clearing of vegetation must only take place within these demarcated areas. (operation footprint)</li> <li>• 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</li> <li>• Prohibit the collection of plant material for medicinal purposes and fire wood</li> <li>• 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</li> <li>• Suppression of dust must be regularly done to limit high dust generation and maintain good air quality</li> </ul>	2	1	2	5	25
<b>Site Establishment</b>	Site clearing, ablution	Soil contamination by oil spills	- (ve)	6	2	2	3	30	<ul style="list-style-type: none"> <li>• Any equipment that is leaking must be temporarily decommissioned and removed from the site, to a surface</li> </ul>	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)	facility placement	from vehicles and machinery							<p>which is impermeable and has a waste water collection system.</p> <ul style="list-style-type: none"> <li>Spill kits must be provided for onsite spill cleaning. Clean any oil spillages on site within 24 hours</li> <li>Construct a concrete slab where any oil storage must be placed to avoid soil contamination by hydrocarbon leakage</li> <li>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</li> <li>Provide drip trays for all parked vehicles</li> </ul>					
	Site clearing, ablution facility placement	Habitat destruction by vegetation removal	- (ve)	6	2	4	5	60	<ul style="list-style-type: none"> <li>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)</li> <li>A field survey must be undertaken before reclamation activities commence on site to demarcate the ecologically sensitive area near the</li> </ul>	4	2	2	3	24

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>stream, and ensure that disruption is caused in the sensitive area.</p> <ul style="list-style-type: none"> <li>No listed and/or protected plant species are to be destroyed. The assistance of an ecologist is required to identify such species on site.</li> <li>Use already available farm roads and trails to avoid trampling red listed plant species</li> <li>Do not disturb nests, breeding sites of animals.</li> <li>Do not attempt to kill or capture snakes unless directly threatening the safety of employees.</li> <li>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</li> <li>Keep to the speed limit of 40 km/h on all roads running through and accessing the site to avoid driving over any fauna</li> </ul>					
		Soil erosion as the results of	- (ve)	6	3	4	3	39	<ul style="list-style-type: none"> <li>Sensitive landscapes must be marked as NO-GO areas</li> </ul>	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
		exposed surface							<ul style="list-style-type: none"> <li>Immediately rehabilitate areas that have of been stripped of vegetation.</li> <li>Restrict impacts to prospecting activities footprint</li> <li>Have temporal erosion control measures to protect the disturbed soils and topsoil until adequate vegetation has been established</li> <li>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</li> </ul>					
<b>Noise</b>	Noise will be generated from the operation of drilling vehicles and machinery.	Disruption of the neighbouring landowners.	- (ve)	2	2	1	5	25	<ul style="list-style-type: none"> <li>Work during the day time only to minimise disruption of neighbours and animal life.</li> <li>Service equipment, machineries, and vehicles regularly to minimise noise. Where necessary if possible, install silencers on equipment/machinery.</li> <li>Provide ear plugs to the employees and ensure they wear them for the protection of their ears</li> </ul>	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
									<ul style="list-style-type: none"> <li>Use equipment or machinery that complies with the manufacturer's specifications for acceptable noise level</li> </ul>					
<b>Soil and Groundwater</b>	Movement of Vehicles	Ground & surface water contamination and well and soil contamination from hydrocarbon spillages from machinery or vehicles.	- (ve)	6	3	3	3	36	<ul style="list-style-type: none"> <li>Vehicles must be restricted to travel on the designated roadways at the recommended times to avoid contamination</li> <li>Topsoil must 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 must be covered/protected to prevent erosion by wind and/or water</li> <li>Place drip trays under parked vehicles and machinery to avoid soil contamination by hydrocarbon leakage.</li> </ul>	4	2	2	2	16
<b>Vegetation (Weeds)</b>	Introduction and establishment of declared weeds	The proposed activities may introduce or encourage (through	- (ve)	6	2	2	3	30	<ul style="list-style-type: none"> <li>Implement early detection and eradication of the alien invasive species through a monitoring programme.</li> </ul>	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
		disturbance) the establishment of alien vegetation in the area							<ul style="list-style-type: none"> <li>An alien invasive management programme must be implemented in order to control alien invasive species. All alien invasive tree &amp; weed species growing in the areas disturbed by prospecting activities must be removed from the cleared area, and continuous monitoring must be conducted for three consecutive years after closure of each site.</li> </ul>					
<b>Land Capability</b>	Land Capability and Land Use	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"> <li>Place infrastructures in places that are already disturbed or degraded to avoid increasing the footprint of the activity</li> <li>Landowners must be consulted on where the different infrastructures can be placed.</li> <li>Avoid as far as possible areas of important farm land activities, by selecting areas with a low veld condition and diversity.</li> <li>Topsoil and sub soil must be kept separately throughout drilling activities and rehabilitation</li> <li>Carry out concurrent rehabilitation throughout the life of the project to</li> </ul>	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
									<p>encourage quick recovery of the project area</p> <ul style="list-style-type: none"> <li>Where soil nutrients and/or fertility has been lost, the soil should be fertilised to recover cultivation capacity</li> </ul>					
<b>Fauna</b>	Disturbance of the biodiversity ecosystem of the area by operational vehicles	Loss of faunal diversity may occur because of faunal dispersion	- (ve)	6	2	2	4	32	<ul style="list-style-type: none"> <li>Work during daytime to minimise the disruption animal life.</li> <li>Do not disturb nests, breeding sites of young animals unnecessarily.</li> <li>Do not attempt to kill or capture snakes unless directly threatening the safety of employees.</li> <li>Vehicles must be restricted to travel on the designated roadways to minimize the ecological footprint of the proposed development</li> <li>Keep to the speed limit of 40 km/h on all roads running through and accessing the site to avoid driving over any fauna</li> </ul>	4	1	2	2	14
<b>Safety</b>	Working on site can pose safety hazards	<ul style="list-style-type: none"> <li>Personnel injuries from safety hazards on site;</li> </ul>	- (ve)	6	2	2	4	40	<ul style="list-style-type: none"> <li>Ensure that workers and any persons accessing the site wear the correct PPE at all times</li> <li>Compile a health and safety risk assessment of the site to identify all safety related hazards and risks</li> </ul>	2	1	1	2	08

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"> <li>Accidents as a there will be moving vehicles;</li> <li>Exposure to snakes and other wild animals on site</li> </ul>							<ul style="list-style-type: none"> <li>Educate all employees working on site, in the form of inductions/training or toolbox talks of the health and safety risks on site</li> </ul>					
<b>Traffic</b>	Site establishment	Increased in Traffic	-	2	1	2	4	16	<ul style="list-style-type: none"> <li>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</li> </ul>	2	1	2	4	16
<b>Visual Impact</b>	Site establishment	<ul style="list-style-type: none"> <li>Visual Impact</li> </ul>	-	6	1	1	4	32	<ul style="list-style-type: none"> <li>Dust suppression methods must be applied when necessary to restrict the visual impact of dust emissions.</li> </ul>	4	1	1	2	12
<b>Socio-economic Impact</b>	Site establishment: ablution and temporal admin facilities	Job Creation	+	8	3	2	5	65	<ul style="list-style-type: none"> <li>This is a positive impact, no mitigation measures is required.</li> </ul>					

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
<b>Heritage Resources</b>	Site establishment: ablution and temporal admin facilities	Impact on Heritage Resources	-	6	1	2	3	27	<ul style="list-style-type: none"> <li>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</li> <li>Keep a 50m distance from graves if encountered.</li> </ul>	4	1	1	1	6
<b>OPERATIONAL PHASE – DRILLING</b>														
<b>Vegetation</b>	Establishment of each drilling site	Vegetation removal	- (ve)	6	1	2	5	45	<ul style="list-style-type: none"> <li>Areas to be cleared must be clearly marked and clearing of vegetation must only take place within these demarcated areas. (operation footprint)</li> <li>Sensitive or endangered plant species must be marked avoided.</li> <li>Prohibit the collection of plant material for medicinal purposes and fire wood</li> <li>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</li> </ul>	4	1	1	5	30
<b>Noise</b>	Drilling	Noise will be generated due to the operation of	- (ve)	6	2	1	5	45	<ul style="list-style-type: none"> <li>All equipment to be adequately maintained and kept in good working order to reduce noise.</li> </ul>	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
		drilling machinery and vehicle as well as people's movement around the site							<ul style="list-style-type: none"> <li>Workers and personnel must wear hearing protection (ear plugs) when required.</li> <li>Use equipment or machinery that complies with the manufacture's specifications acceptable noise levels</li> <li>All vehicles and activities must only operate during daytime hours</li> <li>Employees loitering around the site is prohibited.</li> </ul>					
<b>Soil</b>	Removal of soil during drilling	Exposure of soils stripped of vegetation during the construction phase and operational phase (drilling) may lead to erosion of such soils. This will result in loss of soil nutrients.	- (ve)	8	2	2	4	48	<ul style="list-style-type: none"> <li>Have temporal erosion control measures to protect the disturbed soils and topsoil until adequate vegetation has established</li> <li>Undertake concurrent rehabilitation to restrict the exposure period of soils exposed and vulnerable to erosion</li> <li>Vehicles should be restricted to travel on the designated roadways at the recommended speed</li> <li>Topsoil must be stockpiled properly to retain fertility of the soil post closure</li> <li>Topsoil stockpiles should be covered/protected to prevent erosion by wind and/or water</li> </ul>	4	1	2	4	28

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
Health and safety	Drilling	Increased risk to public and worker safety:	-	8	1	2	4	44	<ul style="list-style-type: none"> <li>Comply with all the relevant requirements of Mine Health and Safety Act (Act 29 of 1996)</li> <li>Access to excavations must be controlled;</li> <li>Excavated areas should be temporarily fenced off; and</li> <li>Excavations will be backfilled and landscaped as soon as possible</li> </ul>	4	1	2	2	14
Land	Drilling	Change in land capability due to topsoil loss,	- (ve)	8	2	3	4	52	<ul style="list-style-type: none"> <li>Place infrastructures in places that are already disturbed or degraded to avoid increasing the footprint of the activity</li> <li>Landowners should be consulted on where the different infrastructures can be placed.</li> <li>Avoid as far as possible areas of important farm land activities, by selecting areas with a low veld condition and diversity</li> <li>Topsoil and sub soil should be kept separately throughout prospecting activities and rehabilitation</li> <li>Carry out concurrent rehabilitation throughout the life of the project to</li> </ul>	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
									<p>encourage quick recovery of the project area</p> <ul style="list-style-type: none"> <li>Where soil nutrients and/or fertility has been lost, the soil should be fertilised to recover cultivation capacity</li> </ul>					
<b>Soil and Groundwater</b>	Drilling	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"> <li>Vehicles and drill equipment must be regularly serviced and maintained.</li> <li>Refuelling of vehicles and equipment will be done with care to minimise the chance of spillages;</li> <li>Dip trays will be placed under parked vehicles and machinery</li> <li>A spill kit will be available on each site where operation activities are in progress; and</li> <li>Any spillages must be cleaned up immediately to prevent further contamination.</li> </ul>	2	1	1	3	12
<b>Waste Management</b>	Waste generation and storage	Solid waste such as debris and litter may be generated and deposited in and around the site. This could	- (ve)	8	2	3	5	65	<ul style="list-style-type: none"> <li>Littering should be prohibited, and all waste generated from the site should be cleared.</li> <li>A 'no waste dumping' sign should also be placed on site.</li> <li>Waste generated by workers must be collected and disposed of timeously at the nearest registered landfill.</li> </ul>	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
		potentially attract nuisance and affect the natural scenery/aesthetic quality of the site.							<ul style="list-style-type: none"> <li>Store waste in labelled containers, indicating clearly whether the waste is hazardous or non-hazardous (general waste).</li> <li>Burning of waste material will not be permitted.</li> <li>Hazardous 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.</li> </ul>					
<b>Fire control</b>	Drilling	Increase veld fires potential	-	4	1	1	2	12	<ul style="list-style-type: none"> <li>Vegetation around proposed site will be kept short to create a fire management zone.</li> <li>Open fire will be prohibited to the e.</li> <li>No burning cigarettes or matches may be thrown down within exploration area.</li> <li>Rubbish or vegetation may under no circumstances be burnt</li> <li>Training of staff will include awareness regarding the rules of the site</li> </ul>	4	1	1	1	6
<b>Surface water</b>	Drilling	Surface water Pollution	-	6	1	2	3	27	<ul style="list-style-type: none"> <li>Vehicles and equipment must be regularly serviced and maintained.</li> </ul>	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
		though oil spills							<ul style="list-style-type: none"> <li>Refuelling of vehicles and equipment will be done with care to minimise the chance of spillages;</li> <li>Drip trays will be placed under parked vehicles and machinery</li> </ul>					
<b>Heritage Resources</b>	Drilling	Discovery of graves and other heritage resources	-	6	1	2	3	27	<ul style="list-style-type: none"> <li>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</li> <li>Keep 50m distance from graves and demarcate them as no-go areas.</li> </ul>	4	1	1	1	6
<b>Air Quality</b>	Removal of vegetation, topsoil stockpiling, vehicle movements and drilling	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	- (ve)	6	3	2	5	55	<ul style="list-style-type: none"> <li>Dust suppression measures such as spraying of water on site access route and around site must be implemented.</li> <li>Limit the number of vehicles driving on and offsite</li> <li>Topsoil stockpiles or soil heaps should be watered to reduce dust emission or place protective nets over the stockpile</li> <li>Keep to the speed limit of 40 km/h on all roads running through and accessing the site</li> </ul>	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
		vehicles and topsoil clearing							<ul style="list-style-type: none"> <li>Minimize the extent of cleared vegetation and exposed soil. Where possible, place protective nets over exposed soil.</li> </ul>					
<b>DECOMMISSIONING AND CLOSURE PHASE</b>														
<b>Rehabilitation</b>	Rehabilitating of the disturbed and contaminated areas	<ul style="list-style-type: none"> <li>Revegetation of areas where vegetation was disturbed to restore ecosystem function and integrity.</li> <li>Removal of all infrastructures onsite.</li> </ul>	+	6	1	2	3	27	<ul style="list-style-type: none"> <li>All areas that have been damaged by prospecting activities and vehicles should be stabilized immediately after activities cease to prevent and control erosion. Undertake concurrent rehabilitation throughout the operations.</li> <li>Remove all vehicles, equipment, waste and surplus materials from the site</li> <li>Clean up and remove any spills and contaminated soil on site.</li> <li>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</li> <li>Ensure that aftercare is provided, and the natural environment recovers and stabilizes after closure.</li> </ul>	8	2	3	5	65

**14. 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**

<b>Nature of the impact (N)</b>		
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.
<b>Magnitude(M)</b>		
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*).
<b>Extent (E)</b>		
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.

<b>Duration (D)</b>		
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.
<b>Probability of occurrence (P)</b>		
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**

<b>Significance of predicted NEGATIVE impacts</b>		
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.
<b>Significance of predicted POSITIVE impacts</b>		
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.

**15. 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
<b>Discovery of new resources:</b> This project will assist in expanding information of available resources within the area.	<b>Noise:</b> through the movement of vehicles and operation of machineries.
<b>Local Market Boost:</b> Contractors on site will rely on local market for materials, beverages and food	<b>Removal of vegetation:</b> for the purpose of the exploration activities
<b>Good environmental management:</b> All potential impacts that will be generated from the development of the project will be managed through the implementation of the EMP	<b>Habitat destruction</b> by removing the vegetation
	<b>Change in land capability:</b> exploration activities will not have so much impact on the land capability; however, this impact cannot be ruled out completely.
	<b>Generation of Dust</b> from drilling, trenching and use of the dusty access road
	<b>Groundwater Contamination</b> from industrial liquids leakage from the exploration equipment and vehicles.
	<b>Waste generation</b> -solid waste such as litter will be generated and may be deposited in and around the site if not properly managed.

## 16. 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).*

**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"> <li>• Maintain the sumps to minimise seepage</li> <li>• Maintain and fix equipment to avoid leakage of oils and other industrial liquids.</li> <li>• Place drip trays under parked vehicles and machineries to contain any unnoticed leakage.</li> <li>• Service the portable toilet properly, regularly and by trained personnel.</li> </ul>	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"> <li>• Work during the day time only to minimise disruption of the neighbouring communities</li> <li>• Sound is louder during the night than during the day.</li> <li>• Service equipment, machineries, trucks and other vehicles regularly to minimise noise.</li> <li>• Provide ear plugs to the employees and ensure they wear them for the protection of their ears.</li> </ul>	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"> <li>• Spray water to suppress dust however the volume of water used should not cause surface water runoff and removal of topsoil</li> <li>• Regulate speed to be 40 km/h on site to reduce dust emission.</li> <li>• Provide dust masks to employees to help them avoid inhaling the dust particles.</li> </ul>	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"> <li>• Use the mobile infrastructure where possible to avoid removal of vegetation</li> <li>• Rehabilitate and revegetate denuded areas as soon as possible</li> </ul>	The level of risk for removal of vegetation is high on commencement of the mining activities

List of potential Impacts	Possible mitigation measures	Level of risk
Loss of geology	<ul style="list-style-type: none"> <li>Only take the sample quantity required and not more than required</li> </ul>	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"> <li>Backfill the trenches as soon as possible to ensure safety of animals (and people)</li> <li>Barricade the trenches with the dugout soil to minimise the risk of animals falling into the trenches</li> <li>Enforce no poaching rule by imposing heavy fine to perpetrators employees/contractors. This will scare away the potential perpetrators.</li> </ul>	The level of risk is high during construction and can be reduced to medium after implementing mitigation measures
<ul style="list-style-type: none"> <li>Soil erosion</li> <li>Soil contamination</li> <li>Habitat destruction</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>Usage of mobile equipment that will only require positioning and not construction</li> <li>Machinery and vehicles to be used on site should be properly maintained</li> <li>Ensure that they are drip trays for vehicles parked which operating on site to mitigate soil contamination by oil</li> <li>To minimise significant habitat destruction, ensure that vegetation clearance only occur where exploration activities will occur,</li> </ul>	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"> <li>Precautions should be taken to avoid excessive disturbance;</li> <li>Re-vegetation should take place as soon as possible after exploration to avoid wind erosion.</li> <li>Any completed sites that are no longer required for sampling must rehabilitate and re-seed with locally-sourced seed of suitable species</li> </ul>	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><b>Construction Phase Mitigations:</b></p> <ul style="list-style-type: none"> <li>Any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person.</li> <li>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.</li> <li>All staff and contractors should undergo an environmental induction course by the ECO.</li> </ul>	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"> <li>• Fires should only be allowed within fire-safe demarcated areas.</li> <li>• No fire wood collection should be allowed on-site.</li> <li>• No hazardous materials should be stored onsite</li> <li>• 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.</li> </ul> <p><b>Operational phase mitigations:</b></p> <ul style="list-style-type: none"> <li>• No unauthorized persons should be allowed onto the site.</li> <li>• 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.</li> </ul>	
Increased alien plant invasion	<p><b>Construction Phase Mitigations:</b></p> <ul style="list-style-type: none"> <li>• Soil disturbance and vegetation clearing should be kept to minimum.</li> <li>• Cleared areas that are not going to be used should be re-vegetated with locally-collected seed of indigenous species.</li> <li>• Regular monitoring to ensure that alien plants are not increasing as a result of the disturbance that has taken place.</li> </ul> <p><b>Operational Phase mitigations:</b></p> <ul style="list-style-type: none"> <li>• All alien plants present at the target site should be controlled at least annually using the best practice methods for the species present.</li> <li>• Bare soil should be kept to a minimum.</li> </ul>	Level of risk will be much lower after applying the mitigation measures.
Impact on heritage resources	<ul style="list-style-type: none"> <li>• 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 appointed immediately to conduct a Heritage Impact Assessment study in accordance to the SAHRA.</li> </ul>	Level of risk will be much lower after applying the mitigation measures.
Soil compaction	<ul style="list-style-type: none"> <li>• Use the existing access route to access the site to avoid unnecessary soil compaction and extended.</li> </ul>	Level of risk will be much lower after applying the mitigation measures

List of potential Impacts	Possible mitigation measures	Level of risk
Soil erosion	<ul style="list-style-type: none"> <li>• 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</li> <li>• Stripped soils should be stockpiled on a flat or gentle slope area to prevent erosion.</li> <li>• Topsoil stockpiles must soon after backfilling and rehabilitation the disturbed surface site.</li> <li>• Erosion control measures such as intercept drains and toe berms must be constructed where necessary.</li> </ul>	Level of risk will be much lower after applying the mitigation measures.
Chemical soil pollution	<ul style="list-style-type: none"> <li>• Keep a suitable bag to store chemically (oil &amp; fuel) polluted soil for disposal once its full or at the end of the project (whichever comes first)</li> </ul>	Level of risk will be much lower after applying the mitigation measures.
Loss of current land capability	<ul style="list-style-type: none"> <li>• 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.</li> </ul>	Level of risk or the impact after mitigation is considered to be medium-low.



## **17. Motivation where no alternative sites were considered.**

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

## **18. 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.

## **19. 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 where used to gather information remotely of the receiving Environment. Existing literatures and previous mining activities as well as results from past prospecting works where 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.

## 20. 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	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"> <li>• Personnel injuries from safety hazards on site;</li> <li>• Accidents as a there will be moving vehicles;</li> <li>• Exposure to snakes and other wild animals on site</li> </ul>	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

Activity Potential Impacts	Impact	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
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"> <li>• Revegetation of areas where vegetation was disturbed to restore ecosystem function and integrity.</li> <li>• Removal of all infrastructures onsite.</li> </ul>	Restoration of disturbed areas (+ve)	Decommissioning Phase

## **21. 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. All possible impacts will be mitigated as per the EMP and as such no specialist studies were deemed necessary.

## **22. Environmental impact statement**

### **22.1. 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.

### **22.2. Site Map**

Please refer to section 2 of this report. The site plan has been attached on section 2 of this report.

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

Please refer to section 15 for the positive and negative impacts and risks.

### **24. 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.

### **25. 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;

### **26. 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.

## **27. Reasoned opinion as to whether the proposed activity should or should not be authorised**

### **27.1. 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.

### **27.2. 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.

### **27.3. Period for which the Environmental Authorisation is required.**

The authorisation is required for the duration of 5 years.

## 28. 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.

## 29. 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.

### 29.1. 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 Quantity	B Master Rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)	
1	Dismantling of processing plant and related structures	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	



**29.2. 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.

**30. Specific Information required by the competent Authority**

**30.1. 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: -**

**30.1.1.1. 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.

**31. 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).*

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.

The relevant heritage authority (SAHRA) must be consulted and notified should anything of archaeological or cultural value be identified, the relevant department (SARHA) will be contacted immediately.

### **32. 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

#### 33. DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME.

#### 34. 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).

#### 35. 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).

#### 36. 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)*

Kindly refer to the composite map attached as figure 15 of this report.

## **37. Description of Impact management objectives including management statements**

### **37.1. 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

## **38. Volumes and rate of water use required for the operation.**

The operation requires approximately 500 litres of water per day. This quantity is for dust suppression and cooling down the rig.

### **38.1. 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.

## **39. 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

### **39.1. 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"> <li>Engage with affected Landowners Prior Commencement of the project</li> <li>Undertake effective Public participation Process</li> </ul>	Planning Phase of the Project	Correct Environmental Authorisation and other associated permits	Project Manager	Once-off

### **39.2. 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.

### **39.3. 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.

### **39.4. 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 be implemented during the decommissioning phase of the project.

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

Aspect/Activity	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
<b>CONSTRUCTION PHASE</b>								
<b>Site Establishment</b>	Site clearing, ablution facility placement	Vegetation will be removed for site establishment purposes destroying environmental-natural habitat	0.4ha	<ul style="list-style-type: none"> <li>• Areas to be cleared must be clearly marked and clearing of vegetation must only take place within these demarcated areas. (operation footprint)</li> <li>• 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</li> <li>• Prohibit collection of plant material for medicinal purposes and fire wood</li> <li>• 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.</li> </ul>	12 - 24 Months	Good Environmental Practice	Contractor	Monthly
<b>Site Establishment</b>	Site clearing, ablution facility placement	Soil erosion as the results of exposed surface	0.4ha	<ul style="list-style-type: none"> <li>• Sensitive landscapes should be marked as NO-GO areas</li> <li>• Immediately rehabilitate areas that have of been stripped of vegetation by rehabilitating.</li> <li>• Restrict impacts to prospecting activities footprint</li> </ul>	12 - 24 Months	Good Environmental Practice	Contractor	Monthly

Aspect/Activity	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
				<ul style="list-style-type: none"> <li>• Have temporal erosion control measures to protect the disturbed soils and topsoil until adequate vegetation has been established.</li> <li>• 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</li> </ul>				
<b>Site Establishment</b>	Site clearing, ablution facility placement	Soil contamination by oil spills from vehicles and machinery	0.4ha	<ul style="list-style-type: none"> <li>• Any equipment that is leaking should be temporarily decommissioned and removed from the site, to a surface with an impermeable surface and waste water collection system.</li> <li>• Spill kits will be provided for onsite spill cleaning. Clean any oil spillages on site within 24 hours</li> <li>• Construct a concrete slab were any oil storage will be placed to avoid soil contamination by hydrocarbon leakage</li> <li>• 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</li> </ul>	12 - 24 Months	Good Environmental Practice	Contractor	Monthly



Aspect/Activity	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
				<p>trained to take corrective action should an accidental spill occur</p> <ul style="list-style-type: none"> <li>• Provide drip trays for all parked vehicles</li> </ul>				
<b>Site Establishment</b>	Site clearing, ablution facility placement	Dust generation by movement of large vehicles delivering mobile facilities	0.4ha	<ul style="list-style-type: none"> <li>• Areas to be cleared must be clearly marked and clearing of vegetation must only take place within these demarcated areas. (operation footprint)</li> <li>• 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</li> <li>• Prohibit the collection of plant material for medicinal purposes and fire wood</li> <li>• 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</li> </ul>	Throughout Operational Phase	Minimal or no gaseous emissions to neighbouring farms and atmosphere	Contractor	Daily
<b>Noise</b>	Noise will be generated from the operation of construction vehicles and machinery.	This could disrupt the community members residing near the site.	0.4ha	<ul style="list-style-type: none"> <li>• Working during the day time only to minimise disruption of neighbours and animal life.</li> <li>• Service equipment, machineries, trucks and other vehicles regularly to minimise noise and where possibly place silencers on equipment / machinery</li> </ul>	Throughout Construction Phase	SANS 10103 Acceptable Ambient Levels and SANS 10210 of 2004, Noise Control Regulations	Contractor	Monthly

Aspect/Activity	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
				<ul style="list-style-type: none"> <li>Provide ear plugs to the employee and ensure they wear them for the protection of their ears</li> <li>Use equipment or machinery that complies with the manufacturer's specifications acceptable noise level</li> </ul>		- General Notice R154 of 10 January 1992		
<b>Soil and Groundwater</b>	Movement of Vehicles	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"> <li>Vehicles should be restricted to travel on the designated roadways at the recommended times</li> <li>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</li> <li>Provide drip trays for all parked vehicles</li> <li>Place drip trays under parked vehicle to avoid soil contamination by hydrocarbon leakage by equipment/machinery</li> </ul>	Throughout construction phase	Prevention of groundwater pollution in line with National Water Act (36 of 1998)	Contractor	Daily
<b>Weeds</b>	Introduction and establishment of declared weeds	The proposed activities may introduce or encourage (through disturbance) the	0.4ha	<ul style="list-style-type: none"> <li>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.</li> </ul>	Throughout Construction Phase	Biodiversity and Mining Guideline 2013	Contractor	Monthly

Aspect/Activity	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
		establishment of alien vegetation in the area		<ul style="list-style-type: none"> <li>An alien invasive management programme should be developed and implemented in order to control alien invasive species. All alien invasive tree &amp; weed species growing in the areas disturbed by prospecting activities will be removed from the cleared area, and continuous monitoring should be conducted for three consecutive years after closure of each site.</li> <li>Monitor the establishment of any foreign/alien invasive species on site and remove.</li> </ul>				
<b>Land</b>	Land Capability and Land Use	Should topsoil/fertile soil be lost, these activities may further reduce land capability of the area	0.4ha	<ul style="list-style-type: none"> <li>Place infrastructures in places that are already disturbed or degraded to avoid increasing the footprint of the activity</li> <li>Landowners should be consulted on where the different infrastructures can be placed.</li> <li>Avoid as far as possible areas of important farm land activities, by selecting areas with a low veld condition and diversity.</li> <li>Topsoil and sub soil should be kept separately throughout drilling activities and rehabilitation</li> </ul>	Throughout Construction Phase	Soil Conservation	Contractor	Monthly

Aspect/Activity	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
				<ul style="list-style-type: none"> <li>Carry out concurrent rehabilitation throughout the life of the project to encourage quick recovery of the project area</li> <li>Where soil nutrients and/or fertility has been lost, the soil should be fertilised to recover cultivation capacity</li> <li>Avoid as far as possible areas of important farm land activities, by selecting areas with a low veld condition and diversity.</li> </ul>				
<b>Fauna</b>	Disturbance of the biodiversity ecosystem of the area by operational vehicles	Loss of faunal diversity may occur because of faunal collisions	0.4ha	<ul style="list-style-type: none"> <li>Work during daytime to minimise the disruption animal life. Do not disturb nests, breeding sites or young animals.</li> <li>Do not attempt to kill or capture snakes unless directly threatening the safety of employees.</li> <li>Vehicles must be restricted to travel on the designated roadways to minimize the ecological footprint of the proposed development</li> <li>Keep to the speed limit of 40 km/h on all roads running through and accessing the site to avoid driving over any fauna</li> </ul>	Throughout Construction Phase	Biodiversity and Mining Guideline 2013	Contractor	Monthly
<b>Safety</b>	Working on site can pose safety hazards	<ul style="list-style-type: none"> <li>Personnel injuries from safety</li> </ul>	0.4ha	<ul style="list-style-type: none"> <li>Ensure that workers and any persons accessing the site wear the correct PPE at all times</li> </ul>	Throughout Construction Phase	Occupational Health and Safety Standards	Contractor	Daily

Aspect/Activity	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
		<p>hazards on site;</p> <ul style="list-style-type: none"> <li>• Accidents as there will be moving vehicles;</li> <li>• Exposure to snakes and other wild animals on site</li> </ul>		<ul style="list-style-type: none"> <li>• Compile a health and safety risk assessment of the site to identify all safety related hazards and risks</li> <li>• Educate all employees working on site, in the form of inductions/training or toolbox talks of the health and safety risks on site</li> </ul>				
<b>Heritage Resources</b>	Site establishment: Clearing Site vegetation	<ul style="list-style-type: none"> <li>• Impact on Heritage Resources</li> </ul>	0.4ha	<ul style="list-style-type: none"> <li>• 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</li> <li>• Should graves be observed on site during activity progress then all activity should cease and the area demarcated as a no-go zone.</li> </ul>	Throughout Construction Phase	Protection of archaeological materials	Client Contractor	Once-off
<b>Traffic</b>	Site establishment	<ul style="list-style-type: none"> <li>• Increased traffic</li> </ul>	0.4ha	<ul style="list-style-type: none"> <li>• Speed limits must be established and limited to 40KM/h on site to minimise accidents</li> <li>• Traffic signs to be put around the site to notify motorists and drivers about the activities</li> </ul>	Throughout Construction Phase	Smooth traffic flow	Contractor	<ul style="list-style-type: none"> <li>• Weekly</li> <li>• Daily</li> </ul>

Aspect/Activity	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
<b>Waste Management</b>	Site Establishment	Generated Solid waste	0.4ha	<ul style="list-style-type: none"> <li>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.</li> <li>Ensure that there are suitable storage and collection facilities in place for general waste, recyclable and special wastes.</li> </ul>	Throughout Construction Phase	Good House Keeping	Contractor	Daily
<b>OPERATIONAL PHASE - DRILLING</b>								
<b>Clearing of Vegetation</b>	Establishment of the project area	Creating site offices, parking lots, ablution block which causes the clearing of vegetation.	0.4ha	<ul style="list-style-type: none"> <li>Areas to be cleared must be clearly marked and clearing of vegetation must only take place within these demarcated areas. (operation footprint)</li> <li>Any sensitive or endangered tree species that is cleared should be kept for re-planting after operational phase</li> <li>Prohibit the collection of plant material for medicinal purposes and fire wood</li> <li>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</li> </ul>	6 - 12 Months During Operational Phase	Good Environmental Practice	Contractor	Weekly
<b>Fire</b>	Clearing of vegetation to	There is a potential for fire to occur on the	0.4ha	<ul style="list-style-type: none"> <li>Vegetation around proposed site will be kept short to create a fire management zone.</li> </ul>	During Prospecting Activities	National Forest Act	Contractor	Monthly

Aspect/Activity	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
	create fire breaks	site. Veld fires can occur across the vegetated areas of the property		<ul style="list-style-type: none"> <li>Open fire will be prohibited to people involved in prospecting.</li> <li>No burning cigarettes or matches may be thrown down within prospecting area.</li> <li>Collection of fire wood will not be allowed.</li> <li>Rubbish or vegetation may under no circumstances be burnt</li> <li>Training of staff will include awareness regarded the rules of the site.</li> </ul>		(Act No. 84 of 1998)		
<b>Noise</b>	Noise Generation	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"> <li>All equipment to be adequately maintained and kept in good working order to reduce noise.</li> <li>Workers and personnel will wear hearing protection (ear plugs) when required.</li> <li>Use equipment or machinery that complies with the manufacture's specifications acceptable noise levels</li> <li>All vehicles and activities will only operate during daytime hours</li> </ul>	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
<b>Soil</b>	Soil erosion from exposed surface	Exposure of soils stripped of vegetation	0.4ha	<ul style="list-style-type: none"> <li>Have temporal erosion control measures to protect the disturbed soils</li> </ul>	During Prospecting Activities	Prevention of groundwater	Contractor	Monthly

Aspect/Activity	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
		during the construction phase (drilling) will lead to erosion of such soils. This will result in loss of soil nutrients.		<p>and topsoil until adequate vegetation has established</p> <ul style="list-style-type: none"> <li>• Undertake concurrent rehabilitation to restrict the exposure period of soils exposed and vulnerable to erosion</li> <li>• Vehicles should be restricted to travel on the designated roadways at the recommended</li> <li>• 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</li> </ul>		pollution in line with National Water Act (Act No. 36 of 1998)		
<b>Land</b>	Change in land use and land capability	Should topsoil/fertile soil be lost, these activities may further reduce land capability of the area	0.4ha	<ul style="list-style-type: none"> <li>• Place infrastructures in places that are already disturbed or degraded to avoid increasing the footprint of the activity</li> <li>• Landowners should be consulted on where the different infrastructures can be placed.</li> <li>• Avoid as far as possible areas of important farm land activities, by selecting areas with a low veld condition and diversity</li> <li>• Topsoil and sub soil should be kept separately throughout prospecting activities and rehabilitation</li> </ul>	During Prospecting Activities	Soil Conservation	Contractor	Monthly



Aspect/Activity	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
				<ul style="list-style-type: none"> <li>Carry out concurrent rehabilitation throughout the life of the project to encourage quick recovery of the project area</li> <li>Where soil nutrients and/or fertility has been lost, the soil should be fertilised to recover cultivation capacity</li> </ul>				
<b>Top Soil</b>	Top soil Stockpiling	Dust generation from stockpiles	0.4ha	<ul style="list-style-type: none"> <li>Prior prospecting, all topsoil must be stockpiled for use during the Rehabilitation Phase.</li> <li>Stockpiled topsoil should be used as the final cover for all disturbed areas where re-vegetation is required.</li> <li>Stockpiled soil should be protected by erosion-control berms if exposed for a period of greater than 14 days during the wet season.</li> <li>Soil stockpiles should be located away from drainage lines and areas of temporary inundation during the wet season.</li> <li>If possible, seeding of the stockpiles with suitable local vegetation is recommended.</li> </ul>	During Prospecting Activities	Soil Conservation	Contractor	Daily
<b>Soil and Groundwater</b>	Soil and Groundwater contamination by oil spills from vehicles	Hydrocarbon spillages from the operations (machinery or vehicles) may	0.4ha	<ul style="list-style-type: none"> <li>Vehicles and equipment must be regularly serviced and maintained.</li> <li>Refuelling of vehicles and equipment will be done with care to minimise the chance of spillages;</li> </ul>	During Prospecting Activities	Prevention of Groundwater Pollution in line with	Contractor ECO	Monthly

Aspect/Activity	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
		seep into groundwater and contaminate the groundwater reserves in the area.		<ul style="list-style-type: none"> <li>Dip trays will be placed under parked vehicles and machinery</li> <li>A spill kit will be available on each site where operation activities are in progress; and</li> <li>Any spillages must be cleaned up immediately to prevent further contamination.</li> </ul>		National Water Act (Act No. 36 of 1998)		
<b>Waste Management</b>	Waste generation and storage	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"> <li>Littering should be prohibited, and all waste generated from the site should be cleared. A 'no waste dumping' sign should also be placed on site.</li> <li>Waste generated by workers must be collected and disposed of weekly at the nearest registered landfill.</li> <li>Store waste in labelled containers, indicating clearly whether the waste is hazardous or non-hazardous (general waste).</li> <li>Burning of waste material will not be permitted.</li> <li>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.</li> </ul>	During Prospecting Activities	Waste Management Regulation standards	ECO	Daily

Aspect/Activity	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
				<ul style="list-style-type: none"> <li>Absorbent materials used to clean up spillages should be disposed of in a separate hazardous waste bin.</li> </ul>				
<b>Heritage Resources</b>	Discovery of graves and other heritage resources	Destruction of heritage resources	0.4ha	<ul style="list-style-type: none"> <li>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</li> <li>Should graves be observed on site during activity progress then all activity must cease and the area demarcated as a no-go zone</li> </ul>	Throughout Operational Phase	Protection of archaeological materials	Client	Once off
<b>Dust</b>	Dust Generation	<ul style="list-style-type: none"> <li>During operation, activities may result in dust generation and the release of particulates into the area.</li> <li>Potential dust generation activities may include drilling,</li> </ul>	0.4ha	<ul style="list-style-type: none"> <li>Dust suppression measures such as spraying of water on site access route and around site must be implemented.</li> <li>Limiting the number of vehicles driving on and offsite</li> <li>Topsoil stockpiles or soil heaps should be watered to reduce dust emission</li> <li>Keep to the speed limit of 40 km/h on all roads running through and accessing the site</li> <li>Minimize the extent of cleared vegetation and exposed soil. Where possible, place protective nets over exposed soil.</li> </ul>	Throughout Operational Phase	NEMA: Air Quality Act, 2004 (Act No. 39 of 2004)	ECO Contractor	Daily

Aspect/Activity	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
		movement of vehicles and topsoil clearing						
<b>Soil</b>	Drilling	Soil Erosion	0.4ha	<ul style="list-style-type: none"> <li>• Have temporal erosion control measures to protect the disturbed soils and topsoil until adequate vegetation has established</li> <li>• Undertake concurrent rehabilitation to restrict the exposure period of soils exposed and vulnerable to erosion</li> <li>• Vehicles should be restricted to travel on the designated roadways at the recommended</li> <li>• 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.</li> </ul>	Throughout Operational Phase	Soil Conservation	Contractor	Monthly
<b>Soil</b>	Drilling	Soil Contamination	0.4ha	<ul style="list-style-type: none"> <li>• Areas to be cleared must be clearly marked and clearing of vegetation must only take place within these demarcated areas</li> <li>• Vehicles should be restricted to travel on the designated roadways Provide drip trays for all parked vehicles</li> </ul>	Throughout Operational Phase	Soil Conservation	Contractor	Monthly

Aspect/Activity	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
<b>Emergency Procedures</b>	Drilling	Hydrocarbon spills	0.4ha	<ul style="list-style-type: none"> <li>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.</li> <li>The area must be cordoned off and secured.</li> <li>The Client and ECO must ensure that there is always a supply of absorbent material readily available to absorb/breakdown the spill.</li> <li>The ECO shall notify the relevant authorities of any spills that occurs.</li> <li>The ECO shall assemble and clearly list the relevant emergency telephone contact numbers for staff and brief staff on the required procedures.</li> </ul>	Throughout Operational Phase	Good House Keeping	Client ECO	Daily
<b>Traffic</b>	Drilling	Increased Traffic	in 0.4ha	<ul style="list-style-type: none"> <li>Speed limits must be established and limited to 40KM/h on site to minimise accidents</li> <li>Traffic signs to be put around the site to notify motorists and drivers about the activities</li> </ul>	Throughout operational Phase	Smooth Traffic Flow	Contractor	T Weekly Daily
<b>DECOMMISSIONING AND CLOSURE PHASE</b>								
<b>Rehabilitation</b>	Rehabilitating of the disturbed and	<ul style="list-style-type: none"> <li>Revegetation of areas where</li> </ul>	0.4ha	<ul style="list-style-type: none"> <li>All areas that have been damaged by Prospecting activities and vehicles should be stabilized immediately after</li> </ul>	After Decommission of	Good house keeping	ECO Contractor	Weekly

Aspect/Activity	Activity	Impact	Size and scale	Mitigation Measures	Implementation Period	Compliance with Standards	Responsibility	Monitoring frequency
	contaminated areas	<p>vegetation was disturbed to restore ecosystem function and integrity.</p> <ul style="list-style-type: none"> <li>Removal of all infrastructures onsite.</li> </ul>		<p>activities ceases to prevent and control erosion. Undertake concurrent rehabilitation throughout the operations.</p> <ul style="list-style-type: none"> <li>Remove all vehicles, equipment, waste and surplus materials from the site</li> <li>Clean up and remove any spills and contaminated soil on site.</li> <li>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</li> <li>Ensure that aftercare is provided, and the natural environment recovers and stabilizes after closure.</li> </ul>	Prospecting Activities			

## 40. 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.

## 41. 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.

## 42. Financial Provision

### 42.1. 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.

### 42.2. 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

**42.3. 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 will be sent to the land owners.

**42.4. 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 m <sup>2</sup>
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 <sup>2</sup>
Fence	0m
<b>Total Area to be cleared</b>	<b>0.4ha</b>

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.

**42.5. 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

**42.6. 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.

#### **42.7. Confirm that the financial provision will be provided as determined.**

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

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

#### **43.1. 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.

#### **43.2. 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

#### **43.3. 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"> <li>• Review the annual reports compiled by the Environmental Control Officer (ECO);</li> <li>• Identify the need for remedial measures with regard to proposed works;</li> <li>• Communicate directly with the Contractors; and</li> <li>• Issue non-conformance notifications to Contractors that do not comply with the requirements as set out in the EMP.</li> </ul>
Environmental Control Officer	<ul style="list-style-type: none"> <li>• Objectively monitor, implement applicable environmental legislation, conditions of Environmental Authorisations (EA's) and the EMP.</li> <li>• 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).</li> <li>• 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</li> <li>• Develop environmental awareness training for all new site personnel (e.g. posters, tool box talks, signage);</li> <li>• Undertake visual inspections of the activities of employees with regard to implementation of the requirements outlined in the EMP;</li> <li>• Immediately notify the Project Manager of any non-compliance with the EMP, or any other complaints or issues of environmental concern;</li> <li>• Ensure that all environmental monitoring programmes (sampling, measuring, recording etc.) are carried out according to protocols and schedules</li> </ul>
Lead 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.

**43.4. Time period for implementing impact management actions**

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

**43.5. 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"> <li>• Maintain a complaint register that is made accessible to the locals</li> <li>• Safety inspection to ensure all workers are wearing protective ear plugs during blasting operations</li> </ul>	ECO and Project/Site Manager	<ul style="list-style-type: none"> <li>• Monitor Monthly</li> <li>• Weekly reporting on any complaints</li> </ul>
Construction and operation	Soil contamination by oil spills from vehicles (-ve)	<ul style="list-style-type: none"> <li>• Daily inspection of operational equipment</li> <li>• Service vehicles timeously</li> </ul>	ECO& Project Manager	<ul style="list-style-type: none"> <li>• Daily inspection</li> <li>• Weekly reporting</li> <li>• Services vehicles within prescribed services periods</li> <li>• Immediate implementation of management actions</li> </ul>
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"> <li>• 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.</li> </ul>	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"> <li>• Weekly monitoring</li> <li>• Monthly reporting</li> <li>• Immediate implementation of management actions</li> </ul>

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

**43.6. 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.

**44. 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.

**44.1. 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.

**44.2. 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.

**45. 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.

**46. 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:

**October 2020**

---

Date

**-END-**