



mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

BASIC ASSESSMENT REPORT

AND

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

COMMENTING PERIOD: 10 NOVEMBER 2020-10 DECEMBER 2020

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 : NMM Holdings (Pty) Ltd

TEL NO :

CELL NO :

E-MAIL :

FAX

POSTAL ADDRESS : P.O Box 785788 | Bryanston | Johannesburg | 2146

FILE REFERENCE NUMBER SAMRAD: REF NO: NC 30/5/1/1/2/12548 PR

1. IMPORTANT NOTICE

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

Unless an Environmental 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 uninterpreted information and that it unambiguously represents the interpretation of the applicant.

2. OBJECTIVE OF THE BASIC ASSESSMENT PROCESS

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

- (a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- (b) identify the alternatives considered, including the activity, location, and technology alternatives;
- (c) describe the need and desirability of the proposed alternatives,
- (d)** through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage , and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on the 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.

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EXECUTIVE SUMMARY

NMM Holdings (Pty) Ltd has lodged an application to the Department of Mineral Resources (DMR) for a prospecting right, to prospect Feldspar, Quartz, Mica, Tantalum, Beryllium Ore, Bismuth Ore and Diamonds(excluding lithium ore) without bulk sampling in terms of Section 16 and 20 of the Mineral and Petroleum Resource Development Act, 28 of 2002 (MPRDA). The proposed prospecting application has been accepted by Department of Mineral Resources (DMR) Northern Cape Region and assigned **reference number: NC 30/5/1/1/2/12548 PR**. Lushika Services (Pty) Ltd was appointed as the Environmental Assessment Practitioners (EAP) to conduct the Environmental Impact Assessment (EIA) process. In terms of the NEMA (Act 107 of 1998). EIA regulations of 2014 (amended April 2017), the proposed prospecting activity triggers Activity 20 and Activity 22 of Listing Notice 1 GNR 327 and the applicant cannot proceed without an Environmental Authorisation.

The proposed prospecting activities will be undertaken over a period of five (5) years and the activities will be conducted in progressive phases which include Non-invasive and invasive methods. The Non-invasive method will include desktop studies and geological mapping, whereas Invasive methods will include drilling and sampling.

The potential risks and key issues identified were based on consultation with Interested and Affected Parties (IAPs), internal process based on similar projects and the current state of the environment of the site. A description of the biophysical and social environment is included in the report, to ensure that all potential risks and issues are taken into consideration in all phases of the proposed project.

This document Draft Basic Assessment Report (DBAR) and the Environmental Management Programme (EMPr), was compiled in terms of the EIA Regulations of 2014 (amended, April 2017) and will be distributed for review by interested and affected parties including the competent authority.

PART A: SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

1. CONTACT PERSON AND CORRESPONDENCE ADDRESS

1.1 Details of the EAP

i)

1.2 Expertise of the EAP

1.2.1 Qualifications of the EAP

1.2.2 Summary of the EAP's past experience

(In carrying out Environmental Impact Assessment Procedure)

1.3 Location of the Overall Activity

Table 1: Details of the Location

Farm Name:	<i>Refer to Table 2 below</i>
Application area (Ha)	1. Rok Optel 261 = 133,77 Ha 2. Geitjes Pan 59 = 195,06 Ha 3. Bastards Pan 259 = 138,13 Ha 4. Angeliers Pan 260 = 193,41 Ha 5. Jacomyns Pan 176 = 249,49 Ha 6. Kombaers Brand 177 = 193,55 Ha Total Extent = 1103.41 Hectares
Magisterial district:	Namaqua
Distance and direction from nearest town	The proposed are is located about 30km north-northwest of Kakamas
21 digit Surveyor General Code for each farm portion	<i>Refer to Table 2 below</i>

Table 2: Properties within the Application Area

NO	FARM NAME	FARM NUMBER	FARM PORTION	SG CODE	REGISTRATION DIVISION	ADMINISTRATION DISTRICT
1	ANGELIERS PAN	260	0	C036000000002600000	KENHARDT RD	!Kheis Local Municipality and Kenhardt Magisterial District
			1	C036000000002600001		
			2	C036000000002600002		
			3	C036000000002600003		
			4	C036000000002600004		
2	BASTARDS PAN	259	0	C036000000002590000	KENHARDT RD	!Kheis Local Municipality and Kenhardt Magisterial District
			1	C036000000002590001		
3	GEITJES PAN	59	0	C036000000000590000	KENHARDT RD	Siyathemba Local Municipality and Prieska Magisterial District
			1	C036000000000590001		
			2	C036000000000590002		
			3	C036000000000590003		
			4	C036000000000590004		
4	JACOMYNS	176	0	C036000000001760000	KENHARDT RD	!Kheis Local Municipality and Kenhardt Magisterial District
			1	C036000000001760001		
			2	C036000000001760002		
5	KOMBAERS BRAND	177	0	C036000000001770000	KENHARDT RD	!Kheis Local Municipality and Kenhardt Magisterial District
			1	C036000000001770001		
			2	C036000000001770002		
			3	C036000000001770003		
6	ROK OPTEL	261	0	C036000000002610000	KENHARDT RD	

			1	C0360000000026100001	!Kheis Local Municipality and Kenhardt Magisterial District
			2	C0360000000026100002	
			3	C0360000000026100003	

1.4 Locality map (Show nearest, town scale not smaller than 1: 250 000)

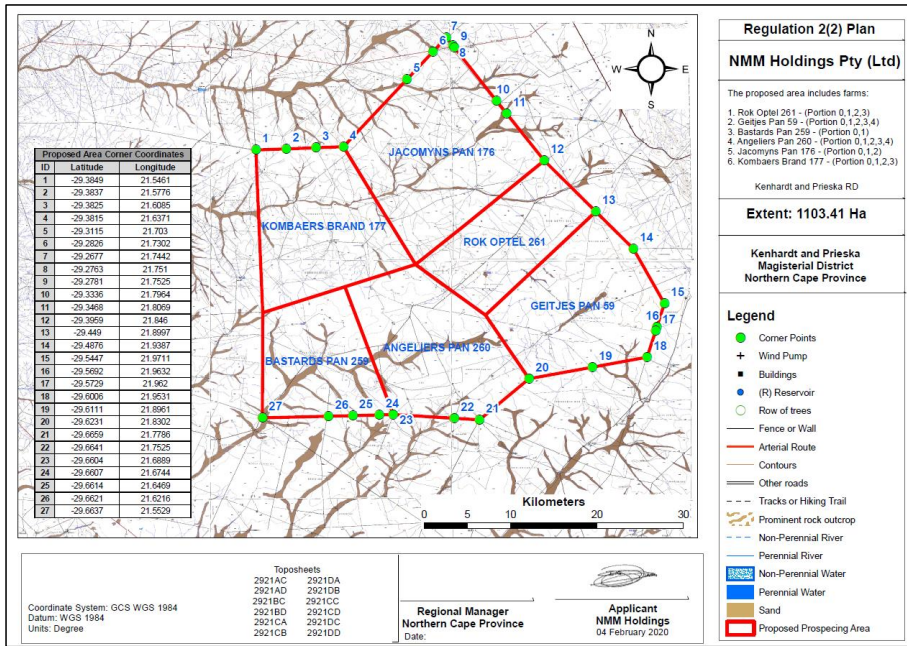


Figure 1: Locality Map

2. DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY

Both non-invasive and invasive prospecting activities will be undertaken as part of the proposed Prospecting Work Programme (PWP). The application will follow a phased approach, where the prospecting work program is divided into several sequential phases.

Figure 1 above depicts the proposed prospecting area, the proposed areas of interest within the application area will be defined within the course of prospecting activities. It is anticipated that the invasive program will consist of 63 boreholes with a footprint of approximately 300 m² each. Vegetation will be cleared at the borehole locations within the application area, the preferred drilling points will be where there is no vegetation. Minor access tracks will be created to access the proposed borehole sites where there are no existing roads. The total length of the access routes is anticipated to be 5 000 m and the approximate width is 3m.

2.1 Description of Planned Non-Invasive Activities

These activities do not disturb the land where prospecting will take place e.g. aerial photography, desktop studies, aeromagnetic surveys, etc.

A) Desktop Study

As the proposed area has been explored since the 1920s by the then Geological Survey of South Africa, literature review will entail comprehensive review of all available published and unpublished work such as books, journals, historical drilling data, memoirs, remote sensing mediums such as aerial photographs, ASTER images, Landsat images.

B) Remote Sensing

Remote sensing in the form of either aerial photographs, ASTER images, Landsat images, etc. will be conducted to identify and position the pegmatite bodies. It is important to note that the challenge with pegmatite bodies is that most are barren of economic minerals and those that do contain economic minerals may not all be economically viable.

C) Geological Mapping

Detailed mapping of the pegmatites will be conducted to assess their mineral content, zoned nature, as well as the grade and reserves of exploitable commodities. Mapping will also assist to communicate and confirm information gathered from literature review.

D) Sample Analysis and Metallurgical Recovery Tests

All samples from the drilling and trenching will be collected to complete first-pass, low-cost metallurgical recovery tests mainly for feldspars, mica, quartz, tantalite, beryl, spodumene and other accessory minerals.

E) Geological 3D Mapping

A 3D modelling software will be used to generate models for all the pegmatites within the proposed prospecting area. Modelling will include integration of varied types of observations into 3D geo-models using geological mapping data, borehole data and interpretations and any other available field data. Once

the models are finalised, a geostatistical review will be conducted and, a block model estimation will be done for all pegmatites to determine a mineral resource estimate.

2.2 Description of Planned Invasive Activities

(These activities result in land disturbances e.g. sampling, drilling, bulk sampling, etc)

A) Trenching

As some of the pegmatites are reported in literature to be covered by a layer of sand, trenching will be conducted to confirm existence of such pegmatites. In addition to locating the pegmatites, trenching will also assist in confirming the depths of the pegmatites. The number, locations and sizes of trenches to be dug will depend on the results of the desktop study, remote sensing and RC drilling.

B) Reverse Circulation (RC) Drilling

Before drilling can commence, borehole planning will be conducted involving finalisation of the drilling program design and implementation procedures to ensure that drilling is conducted as safe and economic as possible. This phase will include cooperation between the drilling contractor, services contractors, geologists and other technical specialists. The planning process will also ensure that the health and safety of all working on the drilling sites and the environment are protected.

The number and locations of RC boreholes that will be drilled will depend on the results of Phase 1 (Desktop Study, Remote Sensing, Geological Mapping). For budget purposes, 600 boreholes have been budgeted for. The depth and spacing of the boreholes will be designed to allow good resolution of the pegmatite geometry and mineral distribution. The borehole plan will be distributed to the DMR for approval before any drilling can commence.

2.3 Pre-Feasibility Study

(Activities in this section includes but are not limited to: initial, geological modeling, resource determination, possible future funding models, etc) Subsequent to the investigation of the pegmatites by RC drilling, the data will be put into a database and modelled using a 3D geological modelling software. Should the first-pass metallurgical recovery tests from RC drilling and trenching samples prove positive for the minerals sought, a detailed metallurgical test work program (bulk sampling) will be considered to

assist in making a final project decision. Should programme prove to be successful; a pre-feasibility study will be conducted to determine the viability of a mining operation prior to applying for a mining right application.

2.4 Listing and Specified Activities

This section present a list of activities that will be undertaken for the prospecting, the aerial covered by each activity and the listed activity triggered.

Table 3: Listing and specified activities

Name of Activity	Aerial extent of the activity	Listed Activity	Applicable Listing Notice
Activities directly related to prospecting of a mineral resource, including the operation of that activity which requires a prospecting right in terms of section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks.	1103.41 ha	X	GNR 327, Activity 20
Desktop Study: Literature Survey / Review / acquisition of data	N/A	N/A	N/A
Ground Geophysical Surveys and Geological Field Mapping	1103.41 ha	N/A	N/A
Target Exploration Boreholes: 10 drill sites, each site covering a total area of 300 m ²	1103.41 ha	X	GNR 327, Activity 20
Data Compilation	N/A	N/A	N/A
Detailed Ground Geophysical Surveys	1103.41 ha	N/A	N/A
Environmental Screening by ECO	1103.41 ha	N/A	N/A
Placement of site Ablutions - Chemical Toilets	5m ²	N/A	N/A
Access Route (Mostly existing roads to be utilised. Access tracks will be made where there are no existing routes.) Approximate total length : 2500 m	2500m	X	N/A

Approximate width: 3m)			
Temporary general waste storage (General/domestic waste - Wheelie bin)	1m ²	N/A	N/A
Temporary hazardous waste storage (Hazardous waste – Sealed Wheelie bin)	1m ²	N/A	N/A
Decommissioning of the prospecting site including rehabilitation of drill sites as per the rehabilitation plan (Drill sites + Access tracks)	2.5ha	X	GNR 327, Activity 22

2.5 The prospecting phases to be implemented

a) These intended prospecting activities will be conducted in phases using the aforementioned methods. The intended phases in sequence are indicated in the table below.

Table 4: Planned Prospecting Phases

PHASE	ACTIVITY (what are the activities planned to achieve optimal prospecting)	SKILL (S) REQUIRED (refers to the competent personnel that will be employed to achieve the required results)	TIMEFRAME (in months for the activity)	OUTCOME (What is the expected deliverable, e.g geological report, analytical results, feasibility study etc.)	TIMEFRAME FOR OUTCOME (deadline for the expected outcome to be delivered)	WHAT TECHNICAL EXPERT WILL SIGN OFF ON THE OUTCOME? (e.g geologist, mining engineer, surveyor, economist, etc)
1	Non-Invasive Prospecting Desktop Study	Geologist	Month 1 – Month 3 (4 Months)	Desktop Study Report	Month 4	Geologist
	Non-Invasive Prospecting Remote Sensing	Geologist	Month 5 – Month 8 (4 Months)	Remote Sensing Report	Month 8	Geologist
	Non-Invasive Prospecting Geological Mapping	Geologist	Month 9 – Moth 11 (3 Months)	Geological Map	Month 11	Geologist

2	Invasive Prospecting RC Drilling and Sampling	Geologist	Month 12 – Month 17 (6 Months)	Borehole Core Data	Month 17	Geologist
	Invasive Prospecting Trenching					
	Non-Invasive Prospecting Sample analysis and first-pass metallurgical recovery test	Metallurgist Laboratory analyst	Month 18 – Month 23 (6 Months)	Metallurgical recovery tests results Analytical results	Month 23	Metallurgist Laboratory analyst
3	Non-Invasive Prospecting Geological 3D Modelling	Geologist	Month 24 – Month 29 (6 Months)	Geological model and competent persons report	Month 29	Geologist
4	Invasive Prospecting Possible Bulk Sampling campaign	Geologist	Month 30 – Month 37 (8 Months)	Bulk sampling results	Month 37	Geologist
	Non-Invasive Prospecting Detailed Metallurgical Recovery Tests	Metallurgist	Month 38 – Month 40 (3 Months)	Metallurgical recovery tests results	Month 40	Metallurgist

5	Non-Invasive Prospecting Pre-feasibility Study	Mineral Economist/Geolo gist/Metallurgist	Month 41 – Month 52 (12 Months)	Pre-feasibility study Report	Month 52	Mineral Economist/Geolo gist/ coal metallurgist
6	Mining Right Application	Mineral Economist/Geolo gist/Metallurgist	Month 53 – Month 60 (8 Months)	Mining Works Programme	Month 60	Mineral Economist/Geolo gist/Metallurgist

3. POLICY AND LEGISLATIVE CONTEXT

Table 5: Policy and legislative context

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT?
<p>Constitution of the Republic of South Africa, 1996</p>	<p>During Operational and Decommissioning phase of the proposed development</p>	<p>Section 24 of the Constitution of the Republic of South Africa provides the overarching environmental legislative framework for environmental management. According to this section:</p> <p>“Everyone has the right: to an environment that is not harmful to their health or well-being; and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that-Prevent pollution and ecological degradation; Promote conservation; and Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.</p> <p>The proposed prospecting activity must ensure that that the environment is not disturbed, the health and well-being of the people must not be compromised.</p>

National Environmental Management Act, 1998 (Act No. 107 of 1998)	During Planning phase of the project, the proposed development is listed in GNR 327 Listing Notices 1. Activity Number 20 and 22 are triggered.	NMM Holdings has appointed Lushika Services to conduct Environmental Impact Assessment for the proposed project in line with Impact Assessment Regulations of the National Environmental Management Act 107 of 1998 as amended in 2017. Submission of Basic Assessment Report and Environmental Management Programme Report to the Competent Authority as required by NEMA
Mineral and Petroleum Resources Development Act	The prospecting right activities requires the prospecting right from the Department of Mineral Resources	A prospecting right application has been lodged with and accepted by the DMR as the competent Authority
National Heritage Resources Act (Act No 25 of 1999)	All cultural and heritage resources should be protected if or when encountered	A permit may be required if identified cultural/heritage sites on the proposed site will be disturbed or destroyed as a result of the prospecting activities.
National Environmental Management: Air Quality Act (Act No 39 of 2004)	Minimal Dust from moving vehicles and drilling can be generated.	This Act governs the standards associated with dust generation which are used in Impact Assessments to regulate the concentration of particulates that can be tolerated without the deterioration of environmental aspects.
Occupational Health and Safety Act (No 85 Of 1993)	During site establishment and operational phase, contractors and employees should adhere to the requirements of this legislation for a safe working environment.	The Act provides for the health and safety of persons at work and for the health and safety of persons in connection with the use of machinery; the protection of persons other than persons at work, against hazards to health and safety arising out of or in connection with the activities of persons at work.
National Environmental Management: Biodiversity Act (Act No 10 of 2004)	The prospecting activities may encounter critical endangered species	The Act provides for listing threatened or protected ecosystems, in one of four categories: critically

		endangered (CR), endangered (EN), and vulnerable (VU) or protected.
National Forests Act (Act No. 84 of 1998)	During the Site establishment, there may be a clearance of vegetation which includes trees.	In terms of S5(1) no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree.
National Road Traffic Act (Act No 93 of 1996)	<p>The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed.</p> <p>Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts.</p> <p>The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of</p>	An abnormal load/vehicle permit may be required for the drill rig to be taken to the site. These include route clearances and permits will be required for vehicles carrying abnormally heavy or abnormally dimensioned loads.

	the National Road Traffic Act and the relevant Regulations.	
Mine Health and Safety Act ,1996 (No. 29 of 1996	The mine Health and Safety Act, 1996 (No, 29 of 1996) provides for the protection of the health and safety of employees and other persons at mines and, for that purpose- promote culture of health and safety	The applicant will be required to meet the requirements of the Mine Health and Safety Act during invasive and non-invasive prospecting phases.
National Water Act (Act No. 36 of 1998)	The proposed activities requires minimum use of water, however it will not consume enough water to trigger a water use license application.	No water use license is required for this application. Any water required for drilling activities will be brought in via a mobile water tanker.
National Environmental Management: Waste Act, Act 59 of 2008	Management measures environmental awareness plan	The generation of potential waste will be minimised through ensuring employees of the drilling contractor are subjected to the appropriate environmental awareness campaign before commencement of drilling. All waste generated during drilling activities will be disposed of in a responsible legal manner.
Conservation of Agricultural Resources Act, 1983	The overall Prospecting Activities	The project should promote the conservation of soil, water and vegetation
Section 34 of the Local Government: Municipal Systems Act, 2000 (ACT 32 of 2000)	The overall prospecting activities	Municipal System Act compels municipalities to draw up the IDP's as a singular inclusive and strategic development plan. In terms of section 26 of the MSA, A municipality produces an IDP every five year.
National Development Plan 2030	The overall prospecting activities	The NDP aims to eliminate poverty and reduce inequality by 2030. According to the plan, South Africa can realise these goals by drawing on the energies of its people, growing an inclusive economy, building capabilities,

		enhancing the capacity of the state, and promoting leadership and partnership throughout society.
Environmental Management Framework and Strategic Environmental Management Plan 2011	The EMF define the zones of environmental sensitivity range from Zone "A" (Sensitive) to Zone "F" (not sensitive).	The proposed prospecting activities must adhere to the requirements of the EMF and SEMP to ensure that the biodiversity of the application area is not severely impacted.

4. NEED AND DESIRABILITY OF THE PROPOSED DEVELOPMENT

Assessment of the geological data available has determined that the area in question may have the proposed minerals. In order to ascertain the above and determine the nature, location and extent of the subject minerals within the proposed prospecting area, it will be necessary that prospecting be undertaken. The prospecting will also determine if there are any features that may have an impact on the economic extraction of the subject minerals. The minerals that will be prospected are, Feldspar, Quartz, Mica, Tantalum, Beryllium Ore, and Diamonds.

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

Currently South Africa is faced with an outbreak of illegal mining at a national scale which is associated with death of illegal miners as a result of conflict, thus mining prospecting activities reduces the probability of these incidents and on other hand promoting the sustainable and regulated exploration of natural resources in an environmental friendly manner.

Mining is not one of the key economic activities in both local municipalities where the proposed application area is situated, the proposed application presents an opportunity for the local municipalities to realize the potential mining activities within their jurisdiction. The majority of the proposed prospecting area is located within the other natural areas, with patches in the northwest and southeast that falls under the Critical Biodiversity Areas and Ecological Support Areas as determined by the Northern Cape Critical Biodiversity Areas Map (NC CBAs), the planned prospecting activities will have low to medium impacts.

5. MOTIVATION FOR THE OVERALL PREFERRED SITE, ACTIVITIES AND TECHNOLOGY ALTERNATIVE

The proposed site was selected based on extensive research and also following on information from previous prospecting activities in the area. In terms of the technologies proposed, the proposed prospecting methods and technologies have been chosen based on the known successful prospecting processes within the area.

The prospecting activities proposed in the Prospecting Works Programme (PWP) is dependent on the preceding phase as previously discussed, therefore no alternatives are indicated, but rather a phased approach of trusted prospecting techniques.

Some of the techniques employed in the non-invasive prospecting activities will include a literature survey, field reconnaissance/mapping, and geophysical survey of the geology, outcrops. Some of the invasive prospective activities include prospecting boreholes, boreholes to confirm continuity of mineralization & potential deposit size and resource definition drilling.

Consultation with affected landowners and adjacent landowners will be conducted in order to keep them informed about the proposed prospecting activities as well as to capture any comments and concerns they may have regarding the prospecting activity.

It should be noted that the exact locations of the boreholes have not been identified at this stage. The location of these boreholes will be dependent on the findings of the non-invasive prospecting activities. Once the proposed target areas for the boreholes have been identified during the phases as set out in Table 6 above, these areas will be investigated and will be subject to the conditions of this document.

6. FULL DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED PREFERRED ALTERNATIVES WITHIN THE SITE

This section describes the specific site area and the location of site features, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.

6.1 Details of the development footprint alternatives considered

6.1.1 Location Alternative

The known pegmatites within the proposed prospecting area include Angelierspan, Crieff, Jack No. 1 and Kombaers Brand (Jack No. 2 and No. 3) (*Refer to Figure 2 below*). These pegmatites form the easternmost extension of the known Northern Cape pegmatite belt, which stretches from the towns of Steinkopf and Vioolsdrif eastward along the Orange River, occurring in both South Africa and Namibia. The average width

of the pegmatite belt is 60km, turning south-eastward into the area of Riemvasmaak and reaching the Kenhardt district, over a total length along strike of approximately 400km.

It is based on this background that the proposed prospecting activities can only be undertaken on the application area, there is no alternative location assessed for this application.

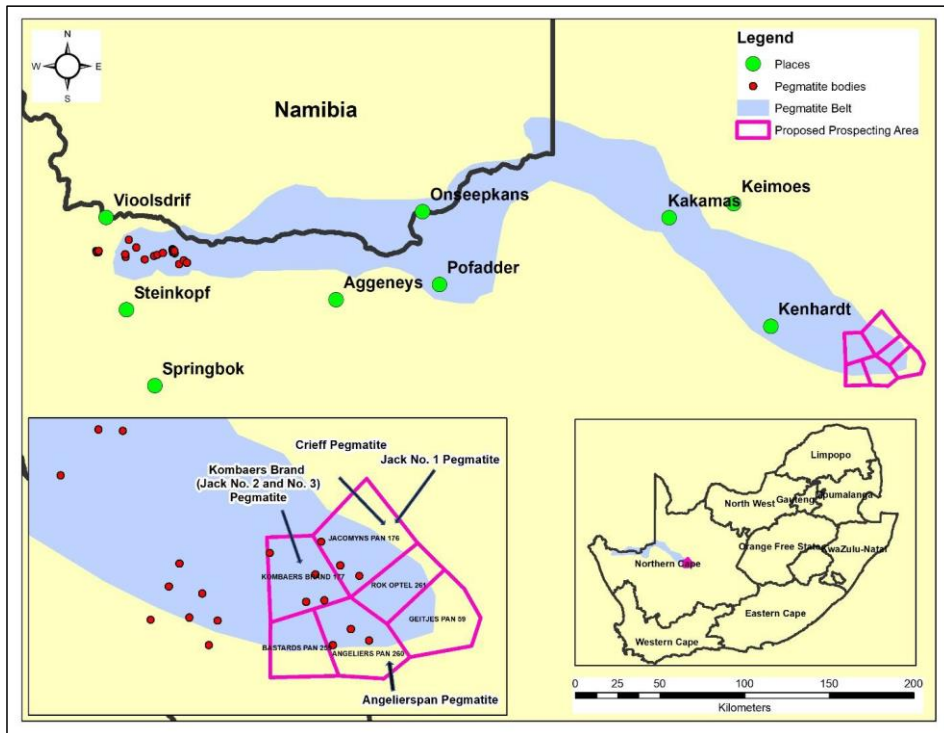


Figure 2: Pegmatite Belt and Pegmatite Bodies in Northern Cape

6.1.2 Design/Layout Alternative

Since exploration is temporary in nature, no permanent structures will be constructed. Negotiations and agreements will be made with the land owners to use any existing infrastructure like access roads for the

explorers, and any infrastructures that may exist on site. Temporary structures will be introduced to the proposed prospecting area in areas without infrastructures on site or near the prospecting area.

6.1.3 Technology Alternative

The technologies listed in the PWP have been selected as they are proven effective in the determination of resource viability within the proposed prospecting area. Some of the techniques employed in the non-invasive prospecting will include a literature survey, field reconnaissance/mapping, and geophysical survey of the geology, outcrops. Invasive technology alternatives have also been considered. It is hereby noted that the different phases and timeframes of the prospecting herein envisaged are, by their nature, dependent on the results obtained during the preceding phases of such prospecting. The proposals set out in the PWP are therefore made on the basis that results obtained during the preceding phases may necessitate reasonable changes and adaptations to such proposals, which will be reported as prescribed.

6.1.4 Activity Alternative

Due to the unavailability of extensive historical borehole datasets, invasive prospecting activities such as drilling as well as non-invasive activities will be conducted during prospecting. No bulk sampling work is to be carried out during this prospecting program.

6.1.5 Operational Alternative

Exploration Drilling Method

As some of the pegmatites are reported in literature to be covered by a layer of sand, trenching will be conducted to confirm existence of such pegmatites. In addition to locating the pegmatites, trenching will also assist in confirming the depths of the pegmatites. The number, locations and sizes of trenches to be dug will depend on the results of the desktop study, remote sensing and RC drilling.

Before drilling can commence, borehole planning will be conducted involving finalisation of the drilling program design and implementation procedures to ensure that drilling is conducted as safe and economic as possible. This phase will include cooperation between the drilling contractor, services contractors,

geologists and other technical specialists. The planning process will also ensure that the health and safety of all working on the drilling sites and the environment are protected.

There is no alternative operational approach to the proposed prospecting activities.

6.2 The option of not implementing the activity (no-go option)

The 'no-go' alternative is the option of not undertaking prospecting activities on the project site. The no-go option assumes the site remains in its current state. Drilling is required in order to investigate the potential and feasibility of the minerals on site. There is no potential for any future investment in a mine without the confirmation of the mineral resources availability which can only be obtained from drilling activities. Should the prospecting right not be granted, effectively the minerals being applied for will not benefit the local community. The socio-economic benefit and most notably the future employment and potential of mine development will be lost if the prospecting activities are not implemented in order to determine the feasibility of any deposits that may occur within the area.

- The mining sector forms part of the backbone of the South African economy. The Northern Province mining sector is one of the main contributors to the national GDP and as such the option of not carrying out the prospecting activities would prevent future prospects of mining thus reducing the contribution to the GDP.
- The jobs that were to be created during prospecting phase will also be missed; these employment opportunities would be reduced, causing an economic burden on the government as people dependant on social grants would not be reduced.
- The state of the natural environment will remain the same, amongst other things the following will be beneficial:
 - There will be no geological and soil disturbance which may lead to ground water contamination
 - No excessive generation of wastes from the proposed activities

- No compaction of path ways affecting the growth pattern of grasses and movement of micro animals
- No disturbance of wild life in the surrounding game farms will occur.
- The biodiversity will not be altered as there will be no removal of plants and induced noise from prospecting activities.

7. DETAILS OF PUBLIC PARTICIPATION FOLLOWED

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

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

7.1 Identification of key Stakeholders 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 is also its key role in this Environmental Impact Assessment (EIA) process.

Land owners (affected and adjacent) were identified through the site visit. Additional relevant organisations were also identified and notified of the application. This includes municipal and State departments with

jurisdiction in the project area. Interested and Affected parties (I&AP's) representing the following sectors of society were identified:

- Department of Water and Sanitation
- Department of Agriculture and Rural Development
- Northern Cape Regional Land Claims Commissioner
- South African Heritage Resources Agency
- Eskom
- TRANSNET
- ZF Mgqawu District Municipality
- Pixley ka Seme District Municipality
- !Kheis Local Municipality
- Siyathemba Local Municipality

7.2 Formal notification of the application to key Interested and Affected Parties

The project was announced as follows:

- **Newspaper Advert Notice:**

The project announcement advertisement was published in the local newspaper. The newspaper advert is used to notify all interested and IAPs of the proposed project and for them register as stakeholders for the project.

- **Site notice placement: -**

In order to inform surrounding communities and adjacent landowners of the proposed development, a notice was issued by the Northern Cape DMR Regional office to invite all interested and affected parties to register themselves for public participation process of the proposed prospecting activities application.

- **Written notification: -**

IAP's and other key stakeholders were sent notification letters, via e-mail. The notification letter presents a brief information about the application and further request all stakeholders to make inputs on the application

including reviewing the DBAR. The notification letters outlined the date on which DBAR will be available and how stakeholders can engage Lushika Services.

- **Public Meeting: -**

Due to requirements of Covid-19 Regulations a public meeting has not been scheduled.

- **Distribution of Draft BAR and EMPr**

All registered stakeholders and IAPs were be informed of the availability of the Draft Basic Assessment Report and Environmental Management Programme for public review. The stakeholders and IAPs were also invited to submit their comments regarding the proposed project.

8. SUMMARY OF ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

The table below presents issues raised by stakeholders, during the stakeholder engagement meeting.

NAME	DESIGNATION	COMMENT/INPUT	RESPONSE
No issue has been raised to-date			

9. BASELINE ENVIRONMENT

This chapter provides a description of the local and receiving environment; this information is provided in order to assist the reader in understanding the potential impacts of the proposed prospecting activities on the environment of the application area. Various aspects have been investigated including the biophysical, social and economic that may be directly or indirectly affected. This information was sourced from secondary and primary data, a literature review to collect secondary data was done and a site visit was undertaken to collect primary data and to do ground-truthing.

The proposed prospecting area falls within two District Municipalities namely; ZF Mgcawu and Pixley ka Seme District Municipality, portion 0, 1, 2, 3, and 4 of the Farm Geitjes Pan 59 falls under Siyathemba Local Municipality of Pixley ka Seme District Municipality and covers 195.06 hectares in extent of the total

prospecting area. The other farms from the prospecting area falls within the !Kheis Local Municipality of ZF Mgcawu District Municipality covering 908.35 hectares in extent of the prospecting area.

9.1 Climate

9.1.1 Regional Climate

The climate of the Northern Cape is semi-arid with a late summer-autumn rainfall regime. Average rainfall of the area varies from 50 mm to 400 mm per year. Evaporation levels within this province exceed the annual rainfall. Climate conditions are extreme (i.e. very cold in winter and extremely hot in summer).

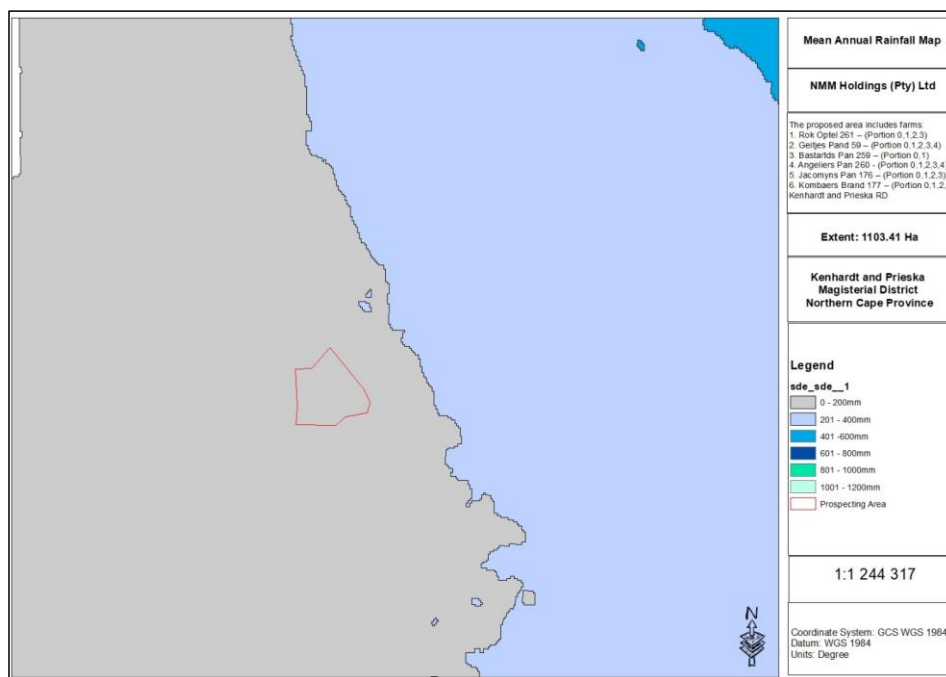


Figure 3: Mean Annual Rainfall Map

Climatic conditions of this region of the Northern Cape are typical of conditions characteristic of a semi-desert, the Northern Cape is generally accepted as the hottest Province in South Africa, with summer

temperatures varying between 30°C and 40°C (Accu weather, 2017) The region is characterised by fluctuating temperatures, low and unpredictable rainfall and high evaporation rates. The low annual rainfall (average of 170 – 240 mm in Upington or even lower in some surrounding areas) is significantly lower than the evaporation rate which creates the dry and arid environment. Rainfall usually occurs during the late spring and summer months with long and dry winters. As shown in figure below showing the annual rainfall per the Water Management Areas (WMA). The study area receives average rainfall of 0 – 200mm annual rainfall.

9.1.2 Local Climate

The prospecting area has a very low rainfall level, 183 mm per annum, with a standard deviation of 71 mm, according to the South African Rain Atlas (Water Research Commission, undated), Most rainfall in Kenhardt occurs mainly during autumn season. The figure below shows the average rainfall values for Kenhardt per month. The typically receives the lowest rainfall (0mm) in June and the highest (23mm) in March (GEOSS, 2015)

Table 6: Average Monthly Rainfall (mm) for the Kenhardt area

Month	Average Rainfall (mm)
January	25
February	33
March	38
April	24
May	11
June	5
July	3
August	4
September	5
October	8
November	11
December	16
Total Annual	183

9.2 Topography

The Northern Cape area is characterised by escarpments, hills and lowlands, with the series of koppies and ridges of the Ghaap Plateau. The general area is relatively flat, at an average elevation of between 1490m and 1530m, with a few koppies at 1590m above sea level.

The study area is characterized by a sparsely vegetated landscape that is covered by pale red Aeolian sands of the Quaternary Gordonia formation that is Kalahari Group. The area is located within the broad valley that drains towards the orange river, the elevation ranges from 800 m – 900 m above sea mean sea level. The valley floor that surrounds the study area is incised by a number of shallow watercourses that drain towards the Orange River. The watercourses are predominately non-perennial and only run for a period where the area receives rainfall (summer – autumn).

The regional surface terrain is predominately sandy to gravelly and it traversed by a number of very shallow, intermittently-flowing drainage lines.

9.3 Geology

The Prieska Orebody is hosted by highly deformed metamorphic rocks of the Copperton Formation of the Areachap Group, which forms part of the Namaqualand Metamorphic Province. The Areachap Group represents a mid-Proterozoic fossil island arc environment consisting of amphibolite, hornblende gneiss, quartz-feldspathic gneiss, calc- silicates and pelitic schists. Chemical compositions of these highly deformed upper amphibolite/granulite grade metamorphosed rocks indicate protoliths ranging from rhyolite/rhyodacite, calc-alkaline basalt, tholeiite to ultramafic igneous rocks and sediments. The abovementioned assemblage is typical of an island arc environment. Island arc environments are ideal hosts for volcanic hosted massive sulphide (VHMS) type deposits and may successfully be explored by using the VHMS lithogeochemical alteration model. VHMS deposits not only yield strategic base metals such as zinc (Zn), copper (Cu) and lead (Pb), but significant grades of gold (Au) and silver (Ag) are associated with these deposits.

The known pegmatites within the proposed prospecting area include Angelierspan, Crieff, Jack and Kombaers Brand (figure 2). These pegmatites form the easternmost extension of the known Northern Cape pegmatite belt which stretches from the towns of Steinkopf and Vioolsdrf eastward along the Orange River,

occurring in both South Africa and Namibia. The average width of the pegmatite belt is 60km, turning south-eastward into the area of Riemvasmaak and reaching the Kenhardt district, over a total length along strike of approximately 400km.

Within the proposed prospecting area, the pegmatites are hosted by rocks of the of the Namaqualand Metamorphic Province granitoids (typically gneiss and granulite) of the Vyfbeker Metamorphic Suite (figure 4). The pegmatites generally strike northwest although some pegmatites show no preferred orientation, striking in every possible direction. The pegmatites range in size from a few centimetres to more than 3km in length and about 100 m wide. Generally, the pegmatites dip at high angles, but a few lie at low angles resulting in large surface exposures. The pegmatites also differ in shape as some occur as thin veins, some as dykes and some as irregular discordant masses. The depth of these pegmatites is difficult to determine due to the irregularities of the pegmatites in size and shape. The pegmatites generally strike northwest although some pegmatites show no preferred orientation, striking in every possible direction. The pegmatites range in size from a few centimetres to more than 3km in length and about 100 m wide. Generally, the pegmatites dip at high angles, but a few lie at low angles resulting in large surface exposures. The pegmatites also differ in shape as some occur as thin veins, some as dykes and some as irregular discordant masses. The depth of these pegmatites is difficult to determine due to the irregularities of the pegmatites in size and shape.

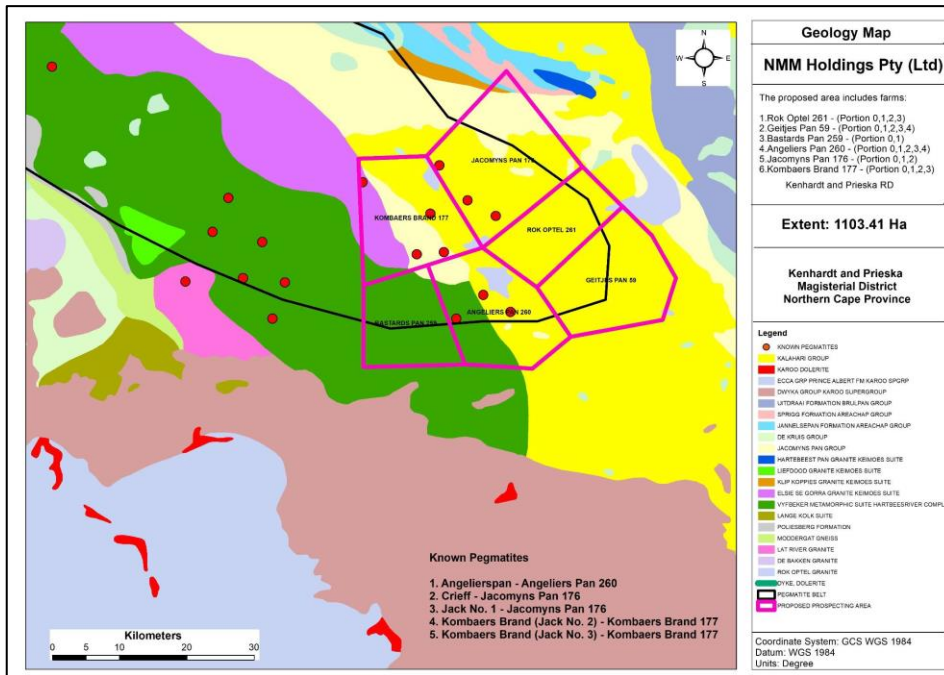


Figure 4: Geological Map

a) Classification of pegmatites within the proposed prospecting area

The pegmatites within the proposed prospecting area can be classified as heterogenous (zoned) pegmatites.

Homogeneous Pegmatites

All the pegmatites within the proposed prospecting area are inhomogeneous and display zones, from the margins inward, which are concentric shells or envelopes generally conformable to the shape of the pegmatite.

The zones are distinguished primarily on the grounds of mineral assemblages and texture. The zones are named from the margins inward as the border zone, wall zone, intermediate (there may be more than one

intermediate zone) zone and core. The zones are mainly crystallisation features which show increasing grain size and a decreasing number of rock-forming minerals, from the margin to the core.

Table 7: Angelienspan Pegmatitie

Location	About 88km southeast of kenhardt on the farm Angeliens Pan
Extent	- Only the hanging wall is still exposed but the pegmatite can be traced for over 70m. - Pegmatite mainly covered by superficial material such as soil, rubble and surface limestone
Dip	40° West
Zoning and Mineral Assemblage	- Three zones are clearly observable - Core Zone: between 1m to 2m thick and is rich in beryl. Other minerals occurring in the core zone include perthite plagioclase, quartz and muscovite - Yellowish-green beryl crystals up to half a metre in diameter occur, along with tourmaline, in the groundmass feldspar quartz, lepidolite and muscovite - Most of the beryl occurring near the surface was deemed unusable as it has been subjected to weathering and has been impregnated by surface limestones
Historical Prospecting	- The pegmatite is exposed in an excavation about 20m by 10m - Historical prospecting uncovered a single mass of beryl weighing about 63 tonnes
Historical Mining	Between 1950 and 1953, about 135 tonnes of beryl were produced

Table 8: Crieff Pegmatitie

Location	About 13km south of Crieff on portion of the farm Jacomyns Pan
Extent	Originally almost entirely covered by soil
Dip	30° northeast
Zoning and Mineral Assemblage	- Core zone: Consists of perthite and quartz on the foot-wall side of which there are the following three zones; - Inner intermediate zone: Thin, medium to coarse-grained and consists of mainly cleavelandite, sugary albite and muscovite, with beryl, columbite and apatite as accessories. The beryl, varies in colour from rose pink to light green and consistently occurs as anhedral lumps and masses sometimes

	<p>weighing as much as nine tonnes. A white variety of this mineral is commonly intergrown with nests of columbite</p> <ul style="list-style-type: none"> - Outer intermediate zone: consists of plagioclase, quartz and muscovite, which is also present the hanging-wall side. Except for small crystals of beryl which occur sporadically in this zone, no other mineral of economic importance is encountered - Wall zone: Fine to medium-grained and consists mainly of graphic granite, quartz, plagioclase and muscovite
Historical Prospecting	<ul style="list-style-type: none"> - Prospecting and mining operations which commenced in 1962 exposed the pegmatite over an area of 33m by 13m - about 45 tonnes of beryl were produced with average BeO content of the product being 12.1% - A few hundred kilograms of columbite ore with an average composition of 52% Cb₂-C₅ and 21% Ta₂O₅ were recovered as a by-product - The lithia mica recovered contained an average 2.5% LiO₂

Table 9: Jack No.1

Location	Jack No.1 is a group of parallel pegmatites located on the central portion of the farm Jacomyn's, about 9.5km south of Crieff
Extent	The largest pegmatite is 100m length
Zoning	<ul style="list-style-type: none"> - The pegmatite are well zoned, as observed in the 80m long trench dug across their strike - Large embedded crystals of beryl are observable on the contact between the core and intermediate zones (which consist of quartz, albite, muscovite , beryl, apatite and lithia mica)

Table 10: Kombaers Brand (Jack No.2)

Location	Near the eastern boundary of Kombaers Brand farm, about 1,5km south of the Mottles River
Extent	Forms a low hill almost wholly covered by soil and quartz-feldspar rubble on top. It is however well exposed over 120m along the northern slope of the hill
Zoning	Well exposed in two large excavations, which show the distinct zonal build, steep dip to the east and low plunge to the north of the pegmatite.
Historical Prospecting and Mining	- Along the core zone, beryl was well developed, and at least two masses of beryl over 20 tonnes each have been recovered

	- Several small replacement bodies of cleavelandite admixed with greisen and carrying columbite-tantalite, are present but did not lead to any production
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Table 11: Kombaers Brand (Jack No.3)

Location	About 5km south of Jack No.2, on the eastern boundary of the Kombaers Brand Farm
Extent	About 230m long, 16m to 66m wide
Dip	15° east
Zoning	<ul style="list-style-type: none"> - Core: consists of quartz-perthite. Directly against the core on the hanging-wall side, there occurs several anhedral masses of the beryl of which some weighed more than 20 tonnes. Some of these masses were observed to penetrate 2m to 3m into the core - Intermediate zone: thin (30cm to 120cm) and consists of cleavelandite, muscovite and quartz, with accessory beryl - Second intermediate zone: in some place, along the core there occurs a second intermediate zone of plagioclase, quartz and muscovite with accessory beryl, apatite and tourmaline
Historical Prospecting and Mining	<ul style="list-style-type: none"> - Only the northern portion of Jack No,3 has been mined for beryl - 50 tonnes of beryl with an average BeO content of 12% have been mined since production started in early 1934

9.4 Biodiversity

The study area stretches over the Nama-Karoo Biome. (Refer to the biome map on figure 5 below). According to (Mucina & Rutherford, 2006) Biomes can be divided into smaller units that are known as bioregions, each comprising of a number of vegetation types wherein the vegetation, soil and landscapes are similar. The proposed prospecting area is situated in the Bushmanland Bioregion of the Nama Karoo.

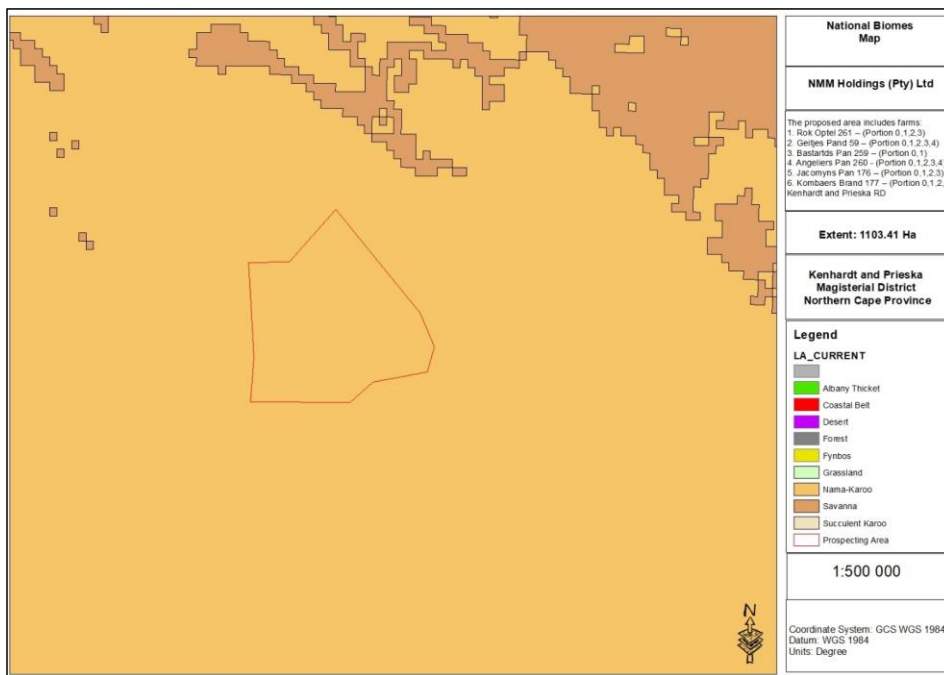


Figure 5: Biome Map

The Nam Karoo is characterised by Bushmanland Arid Grass land, within the Bushmanland Arid grassland there are various species that occur (refer to table 13 below)

Table 12: Vegetation types that will be traversed by the proposed prospecting area

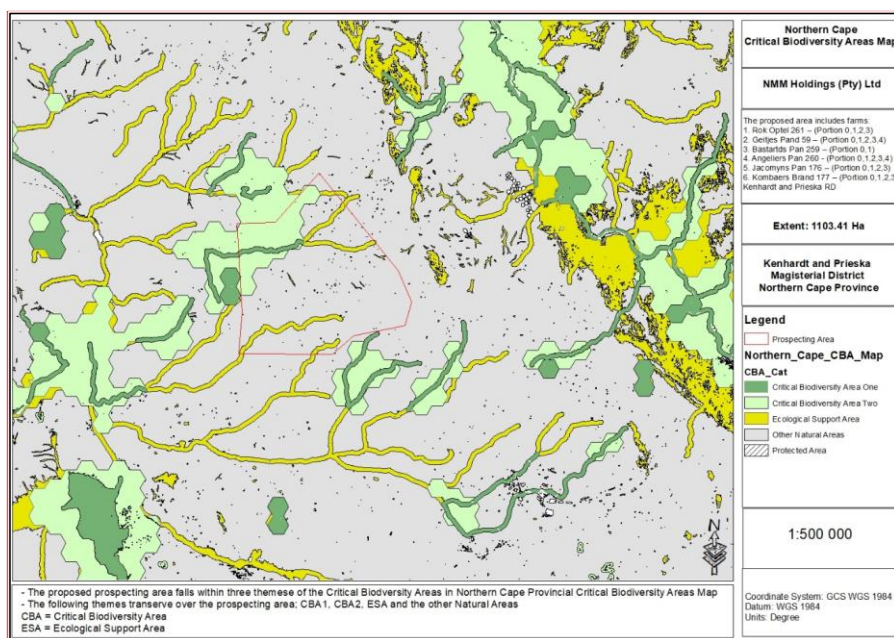
BIOME	BIOREGION (Vegetation organisation level between that of vegetation type and biome)	VEGETATION TYPE	CONSERVATION STATUS
Nama-Karoo	Bushmanland Bioregion	<u>Bushmanland Arid Grassland</u> The vegetation comprises sparse grassland, dominated by white grass (<i>stipagrostis</i> species) on plain on a slightly sloping plateau. In some areas, low shrubs of <i>Salsola</i> change the vegetation structure. Good rainfall years result in rich display of annual herbs.	Least Threatened. Small patches statutorily conserved in Augrabies falls National Park and Goegab Nature Reserve and the vegetation is mostly untransformed.
		<u>Bushmanland Sandy Grassland</u> Dense, sandy grassland plains dominated by white grasses (<i>Stipagrostis</i> and <i>Schimdтия</i> species) and abundant drought-resistant shrubs. After rainy winters rich displays of ephemeral spring flower can be seen.	Least Threatened. Although none conserved in statutory conservation areas. Very little of the area has been transformed but the invasive tree <i>Prosopis</i> species can be seen as a threat.

CRITICAL BIODIVERSITY AREA (CBAs)

The prospecting area is located outside the CBA1 (type 2) and Ecological Support Areas (ESA). CBAs are Terrestrial (T) and Aquatic (A) features in the landscape that are critical for retaining biodiversity and supporting continued ecosystem functioning and services (SANBI, 2007). Furthermore, CBAs are areas of the landscape that need to be maintained in a *natural or nearnatural state* in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. The CBAs are ranked as follows:

- CBA 1 (including PAs, T1 and A1) which are natural landscapes with no disturbances and which is irreplaceable in terms of reaching conservation targets within the district
- CBA 2 (including T2 and A2) which are near natural landscapes with limited disturbances which has intermediate irreplaceability with regards to reaching conservation targets.
- ESAs on the other hand, support key biodiversity resources (e.g. water) or ecological processes (e.g. movement corridors such as ridges) in the landscape. ESAs are functional landscapes that are moderately disturbed but maintain basic functionality that connect CBAs.

The CBAs Map below, produced from the Northern Cape CBAs map shows that the proposed prospecting area is within the CBA1, CBA2, ESA and the No Natural remaining. The ONT are areas deemed feasible for any development as they are less sensitive, however any activity within this layer must adhere to the environmental requirements to ensure the remaining natural biodiversity in the area is not lost. The dominant layer traversing the proposed prospecting area is No natural remaining.



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Figure 6: Northern Cape CBAs Map

TERRESTRIAL BIODIVERSITY SENSITIVITY

According to the web based, National Screening tool provided in the National Department Environmental Affairs, the proposed prospecting area falls in both high and low sensitivity (refer to figure 7 below). The North west and South east of the prospecting area. It is therefore recommended that the drilling holes in the North west and South East must be located carefully avoid locating the drill holes within sensitive areas of the biodiversity theme.

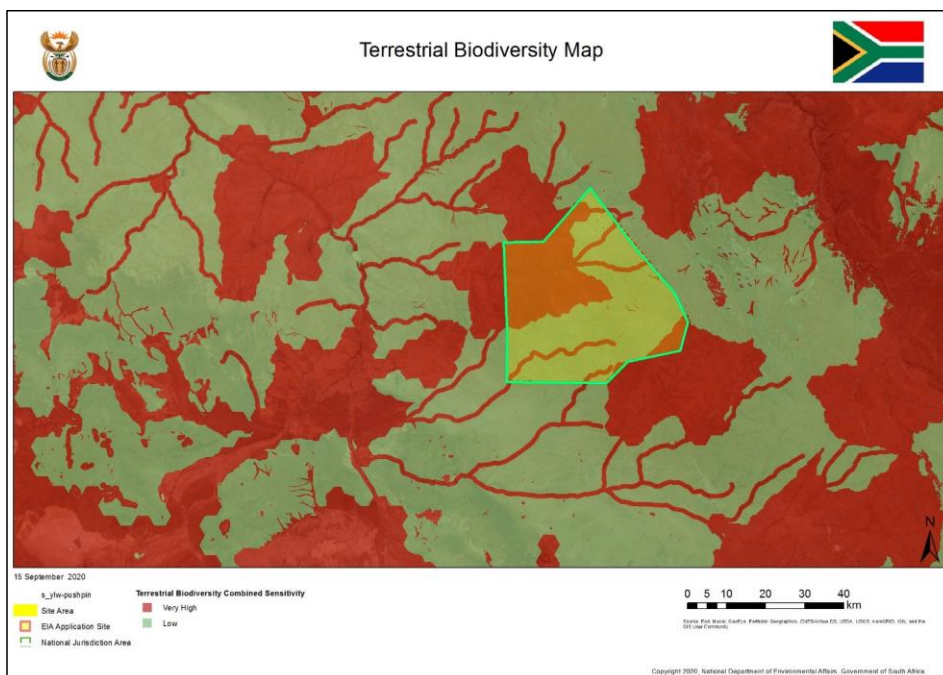


Figure 7: Terrestrial Biodiversity Sensitivity Map (Source, DEA web based screening tool)

9.5 Hydrology

A) Surface Water

The study area falls within the Lower Orange Water Management Area (WMA), specifically in the Orange Sub Water Management Area (Boegoeberg Sub Catchment), in the D82A quaternary catchment area. The Lower Orange WMA is the lowest WMA in the Orange River Basin and as such is affected by upstream activities. The area is arid with rainfall varying from 400 mm in the east to 50 mm on the west coast. The topography of the area is flat with large pans or (endoreic areas that do not contribute runoff to the Orange River system.

The Orange River, which forms a green strip in an otherwise arid landscape, also forms the border between South Africa and Namibia over about 550 km to the west of the 20-degree longitude. The Vaal River, the main tributary to the Orange River, has its confluence with the Orange River about 13 km west of Douglas. Other tributaries are the Ongers and Hartebeest Rivers from the south, and the Molopo River and Fish River (Namibia) from the north. There are a number of highly intermittent water courses along the coast which drain directly to the ocean.

Sheep and goat farming is practised over most of the area. Large parts of the WMA also include conservation areas. Cultivation is restricted to isolated patches where somewhat higher rainfall occurs, and extensive irrigation is practised in the narrow ribbon of fertile alluvial soils along the Orange River valley. This irrigation is supplied by releases from the Vanderkloof Dam. Large mining operations occur in various parts of the water management area. There are no large urban developments or power stations. Groundwater plays a major role in meeting the water requirements of the towns and rural settlements along the tributaries of the Orange.

Ninety percent of the runoff generated in the two Orange River WMAs is generated in the Upper Orange WMA. The bulk of the runoff generated in the Lower Orange comes from the Fish River in Namibia (approximately 60% of the Lower Orange runoff) but this only enters the main Orange River close to the river mouth. The bulk of the surface water in the Lower Orange Water Management Area is therefore found in the

main stem of the Orange River, with virtually all the surface water flowing into the Orange River from the Upper Orange and Lower Vaal WMAs.

The two major storage dams, Gariiep and Vanderkloof, which are both used to supply all the irrigation, urban, mining and environmental requirements along the Lower Orange River, are located in the Upper Orange WMA, but both are of vital importance to the Lower Orange. There are no large storage dams in the WMA, with only a few smaller dams on some of the main tributaries. These include:

- Smartt Syndicate Dam (101 million m³ gross storage) on the Ongers River.
- Van Wyksvlei (143 million m³ storage) on the Carnarvonleegte.

There are also several diversion weirs in the Orange River of which Boegoeberg (20 million m³ storage) is the largest. Reliable estimates of the surface water resources in the Upper Orange and Vaal River catchment are therefore of extreme importance for the Lower Orange. There is a fairly high confidence in the yield estimates of the surface water in the main system although some of the hydrology is relatively old. The hydrology for the Lower Orange is however not at an acceptable level for the planning or operation of any local water supply schemes outside the Orange River. For more detail the reader is also referred to the Upper Orange ISP (DWAF, 2004b) and Orange River Overarching ISP (DWAF, 2004a) documents. The total water available for use in the Lower Orange water management area at the year 2000 development levels (*refer to the table 14 below*).

Table 13: Available water in year 2000 (million m³/a)

Sub-Area	Natural resource		Usable return flow			Total local yield (1)	Transfers in	Grand Total
	Surface water	Ground-water	Irrigation	Urban	Mining and bulk			
Orange	1092	9	96	1	0	986	2083	1097
Orange Tributaries	9	13	0	0	0	22	0	22
Orange Coastal	0	3	0	0	0	3	6	9

Total	1083	25	96	1	0	961	2083	1122
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The negative yield for the Orange River within the Lower Orange water management area, as shown in Table 14, is as a result of evaporation losses and evapotranspiration by riparian vegetation along this reach of the river, which by far exceed the run-of-river yield contributed by local inflows. It also includes a component for losses associated with insufficient management of releases from Vanderkloof Dam.

Potential for a dam in the Lower Orange River has been identified for the re-regulation of releases from Vanderkloof Dam as well as the storage of flood flows mainly from the Upper Orange and Vaal Rivers and to a lesser extent also from the flows generated in the Lower Orange. This would contribute to the improved management of the Orange/Vaal River System, and facilitate more water being made available for use.

B) Groundwater

The proposed prospecting activities will not have any influence on the quality or quantity of ground water. A negative impact on groundwater usually occurs where subsurface water is pumped out of an excavation pit. This can lower the water table in the immediate surroundings of the excavation, which can negatively impact upon surrounding wetlands (specifically hill slope or seepage wetlands) and boreholes. The proposed method of mining permit will not entail deep excavations from which groundwater will need to be removed and there are no known wetlands within the study area.

Groundwater quality is one of the main factors affecting the development of available groundwater resources. Although there are numerous problems associated with water quality, some of which are easily corrected, total dissolved solids (TDS), nitrates (NO₃ as N) and flourides (F) are thought to represent the majority of serious water quality problems. The water quality was evaluated in terms of TDS and potability.

The information was obtained from DWAF Geohydrology. The potability evaluation done was based on the evaluation of chloride, fluoride, magnesium, nitrate, potassium, sodium, sulfate and calcium using the Quality of Domestic Water Supplies, Volume 1 (DWAF, 1998). The portion of the groundwater resources considered to be potable has been calculated as the portion classified as ideal, good and marginal (Class 0 -blue, 1-green and 2 - yellow). Water classified as poor and unacceptable (Class 3 - red and 4 - purple) is considered

not to be potable (See Point and diffusive pollution Agricultural activities are a source of diffuse water contamination.

The contribution of each farm on a local scale is often fairly small but the contribution on a catchment scale needs to be included in assessing any pollution situation. Most findings regarding this issue can only be assessed in a generic way due to the lack of data in the WMA. Nitrates are the contaminant of most concern, since they are very soluble and do not bind to soils, nitrates have a high potential to migrate to groundwater. Because they do not evaporate, nitrates/nitrites are likely to remain in water until consumed by plants or other organisms.

In general, the groundwater quality is rated as class 2 to class 4, marginal to completely unacceptable. The southern portion of the inland region, De Aar, Victoria West and Sutherland has a class 2 rating, together with the areas surrounding Prieska, Griekwastad, Upington and Springbok. The rest of the WMA, particularly north of Brandvlei and Carnarvon and the coastal strip are rated as class 3 and 4. The Sutherland, De Aar, Upington belt has a varying range of potable groundwater from a moderate 50% to approximately 90%. The balance of the WMA, has a predominant potable usage of less than 4 30%, with the occasional improvement to 50% (V3, 2002).

Agricultural activities are a source of diffuse water contamination. The contribution of each farm on a local scale is often fairly small but the contribution on a catchment scale needs to be included in assessing any pollution situation. Most findings regarding this issue can only be assessed in a generic way due to the lack of data in the WMA. Nitrates are the contaminant of most concern, since they are very soluble and do not bind to soils, nitrates have a high potential to migrate to groundwater. Because they do not evaporate, nitrates/nitrites are likely to remain in water until consumed by plants or other organisms.

9.6 Archaeology and cultural Heritage

The proposed prospecting area has been transformed by extensive cultivation from the 1960's onwards and more recently by clusters of construction activities. These activities would have impacted on surface indicators of archaeological sites. This was confirmed during the field assessment and in terms of the archaeological component of Section 35 of the NHRA Act 25 of 1999 no raw material suitable for stone tool

manufacture occurs in the prospecting area and no ceramics or stone walls attributed to the Iron Age were recorded. The proposed prospecting activities may encounter underlying items of ~~archaeological~~ archaeological importance during the drilling the process, if any item is uncovered the drilling process must cease and the South African Heritage Resources Agency (SAHRA) must be informed.

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The desktop heritage impact assessment identified various potential heritage resources within the study area, including burial grounds and graves, historical structures, palaeontological resources and archaeological resources that could be impacted during invasive prospecting activities.

According to the web based, National Screening tool provided in the National Department Environmental Affairs, the proposed prospecting area is not archaeological and cultural heritage sensitive. The map below shows the proposed prospecting area is under the low sensitive area of the archaeological theme.

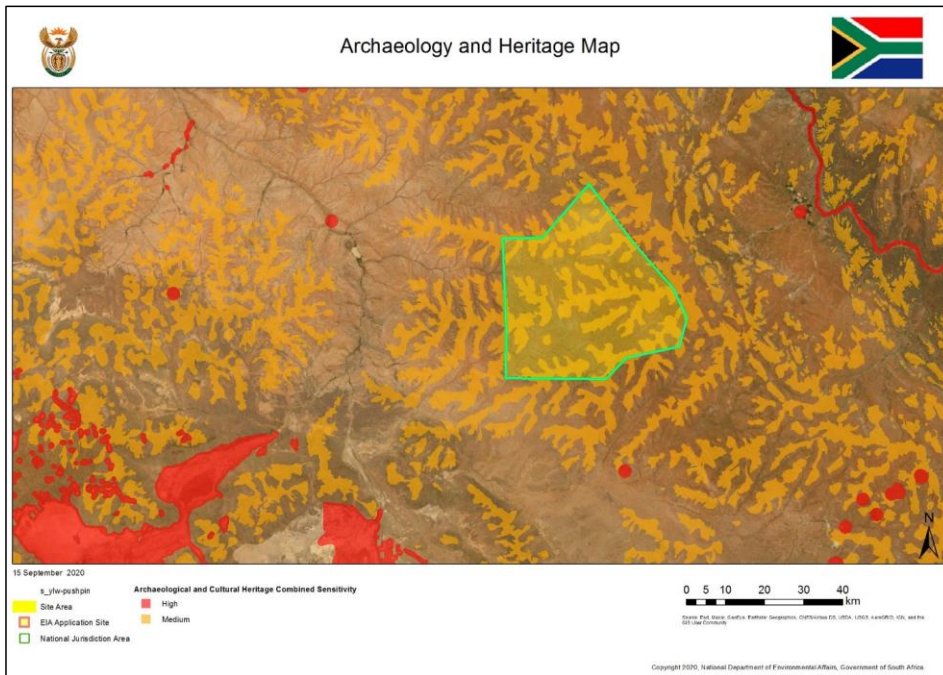


Figure 8: archaeological and Heritage Sensitivity Map (Source, DEA web based screening tool)

A) Burial Grounds and Graves

No burial grounds or graves are depicted on the historical topographic maps for the study area. However, it is possible that unknown burial grounds and graves are present. Burial grounds and graves have high heritage significance and are given a Grade IIIA significance rating. The impact of the proposed activities on burial grounds and graves is rated as LOW negative significance before mitigation, but with the implementation of the required mitigation measures the post-mitigation impact would be LOW negative.

B) Historical Structures

The impact of the proposed prospecting activities on potential historical structures is rated as MODERATE negative significance before mitigation and with the implementation of the mitigation measures the impact significance is reduced to LOW negative.

Any identified historical structures should be avoided with a buffer of 30m to avoid damage during the prospecting activities.

C) Archaeology

Previous studies conducted in the surroundings of the study area have identified a number of archaeological sites. These include Stone Age (ESA, MSA and LSA) sites including find spots, surface scatters and rock art sites. The impact of the proposed project on potential archaeological resources is rated as MODERATE negative significance before mitigation and with the implementation of the mitigation measures the impact significance is reduced to LOW negative.

When physical prospecting is planned an archaeologist must first visit and assess the areas of impact and make recommendations on any finds made. In the event that archaeological artefacts are discovered during any phase of the proposed prospecting activities, the Chance Find Protocol must be implemented by the Environmental Control Officer (ECO) in charge of these developments.

9.7 Soils and Land Capability

Soils with minimal development, usually shallow, on hard or weathering rock, with or without intermittent diverse soils. Lime generally present in part or most of the landscape. Freely drained, structure less soils quaternary sheet-wash alluvial deposits, sands, deep in places; in south, red yellow apendal, freely drained soils with a high base status. Land types includes Ag and Ae.

The soils of most of the area are red-yellow apendal soils, with a high base status and <300mm deep, typical of Ag and Ae land types. The soils are typically weakly structured with low organic content. These soils drain freely which results in a soil surface susceptible to erosion, especially wind erosion when the vegetation cover is sparse and gully erosion in areas where storm-water is allowed to concentrate. The soils in the area are

generally not suitable for dry land crop production therefore the pre-mining land capacity is categorized as Class III grazing land. The productivity of the area is very low at 8 – 10 Ha/SSU.

Soils can be identified to belong to the R and LP2 groups. Soils in the low plains consist out of soils with minimal development, usually shallow, on hard or weathering rock, with or without intermittent diverse soils. Lime generally present in part or most of the landscape. The landscape areas in the hills are ridges are rock with limited soils. The land type of this area is described as Ic, Ib, Ae and Ag. The soil in this area has a natural organic carbon content of less than 0.5mm. Soils has a pH of 7.5-8.4 towards the south-west, and towards the north-east, soil has a pH of more the 8.4. The leaching status of these soils is described as non-calcareous and eutrophic soils. These soils have 0.6-10.0 cobalt, 0.6-3.0 copper, low iodine, high in phosphorus, low in selenium, and 0.6 to 6.1 zinc contained within them.

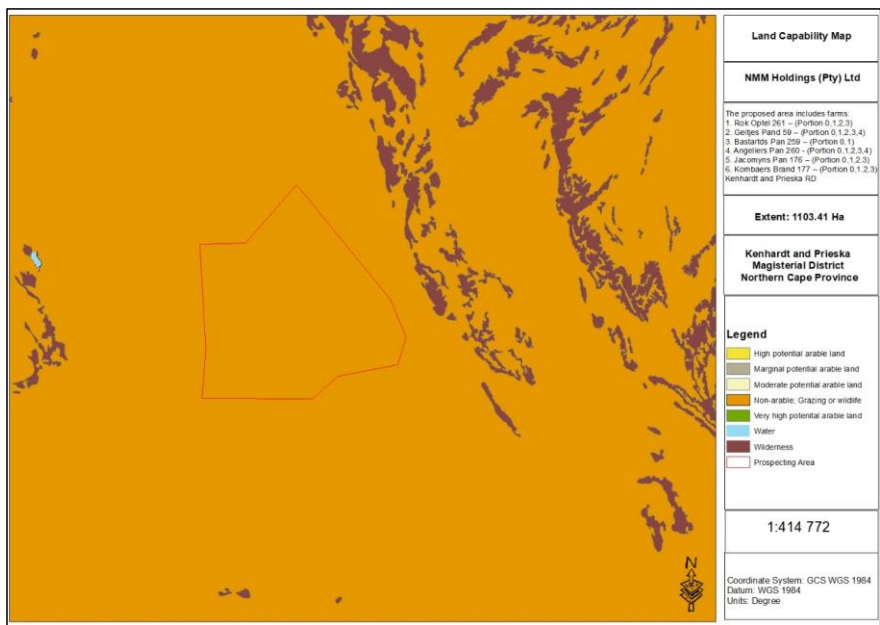


Figure 9: Land Capability Map

Soils in this area is highly susceptible to erosion caused by rainfall, even though the soil in the area is minimal, due to the rocky outcrops the soil loss in this area will be minimal. Sands in this area is susceptible to wind erosion.

Current land use conditions are those of farming with small livestock e.g. sheep and goats. More than 50% of the area is use mainly as agriculture and Hunting. The grazing capacity of the area can be classified as 81-11ha/LSU. In the north eastern corner of the farm Wortel, the grazing capacity is classified as 41-80% ha/LSU.

Current activities on the surround farms include livestock grazing at low densities, with sheep, goats and some cattle currently present to some of the surrounding farms. Surrounding farms are also used for the ranching of small stock, mostly sheep, goats, and some cattle. The land is arid and primarily used for grazing. Surrounding farms are either privately owned or owned by the municipality and used for communal purposes.

9.8 Socio-Economic Profile

This section presents information on demonstrating the ZF Mngcwa District Municipality and Pixley ka Seme socio-economic development status, with special focus on !Kheis and Siyathemba Local Municipality which the study areas falls under. A total of 195.05 ha in extent of the proposed prospecting area falls within the Pixley ka Seme which is 17.68% of the total application area. 938.35 ha in extent of the prospecting area falls under the ZF Mgcawu District Municipality which is 82.32% of the total application area.

9.8.1 Demographics

a) Population

Average population density for the Northern Cape Province is 2.9 per square kilometre, whilst the average for South Africa is 40 persons per square kilometre.

i) Siyathemba Local Municipality

The population of SLM is approximately 22 000 people residing in the municipality which represents approximately 1.9% of the total population in the Northern Cape. The population of Siyathemba contracted

by 0.4% on average per annum between 2000 and 2010. The decline of the Siyathemba population was mainly driven by lower fertility rates. The death rate (the number of deaths per 1,000 people in a year) increased from 11.2 deaths per 1,000 people in 1995 to 11.6 during 2010.

This is significantly lower than the death rates recorded over the same period for the Northern Cape and South Africa. The reason for the lower death rate in the study area was mainly the result of lower HIV/AIDS prevalence rates when compared with South African averages.

The most dominant population group in the SLM are Coloured individuals, who represent more than 75% of the total population in the municipal area.

Black African and White population groups comprise around 12% and 8% of the population respectively. The dominant languages in the SLM are Xhosa and Afrikaans. Afrikaans is the most widely spoken language (78%).

Table 14: Population by age (SLM)

KEY STATISTICS	NUMBER/VALUE
Total Population	21 591
Young (0 – 14 Yrs)	30.8%
Youth and Working Age (15 – 64 Yrs)	63.2%
Elderly (65+ Years)	6%

ii) !Kheis Local Municipality

The majority population group within !Kheis Local Municipality is Coloured with 78%, followed by Black African with 12%, and White 7%. ‘Other’ and Indian or Asian are minorities in the !Kheis Local Municipality based on the 2011 census at approximately 1%.

The Municipality population per gender is slightly equal with males contributing 50.5% of the population and 49.5% females in the municipality.

9.8.2 Education Level

i) Siyathemba Local Municipality

According to the SLM (SLM IDP 2017-2018) there are 10 schools (3 combined, 6 primary and 1 secondary) in the Municipality. Within the 4.2% of the municipal population has not attended any type of a schooling system, while 48.5% have primary school education. A little over 1700 individuals (4%) have graduated from a University / Technikon. In Siyathemba, around 14% of adults have a matric certificate compared to 24.7% in the Northern Cape. The percentage of the population with a tertiary education in Siyathemba (5.1%) is also lower than that for the Northern Cape (7.3%).

Table 15: Education level

Level	Population (%)
Not attended school	4.2
Matric	48.5
University/Technikon Graduate	4

ii) !Kheis Local Municipality

There is a school in Groblershoop and several farm schools in the regional area. Education levels are relatively low - 13.5% of the municipal population above the age of 20 has no formal schooling. Only 4.5% of the population over the age of 20 received a high school education and only 14% of this group achieved Matric qualifications.

9.8.3 Employment Level

i) Siyathemba Local Municipality

Between 2001 and 2011, there has been a decrease in the number of people employed and a concomitant increase in the number of unemployed people across the Pixley Ka Seme District Municipality. For Siyathemba, 5 787 individuals remain as being economically inactive, while 5 370 are employed. The unemployment rate in SLM in 2011 was 24.3%. The average household income is approximately R9 000 – R19 500. Obtaining any form of income generating employment within the municipality has become increasingly difficult in recent years. This is attributed to the lack of education, resulting in the uneducated experiencing the highest incidences of poverty.

ii) !Kheis Local Municipality

The local Municipality unemployment rate is high at 28% in the 2011 Census indicating that there are limited formal job opportunities in the municipality. Youth, or persons 35 years or younger, comprise 34.3% of the municipal unemployment rate.

9.8.4 Provincial Economy

The graph below shows the contribution of various sectors to the provincial GDP within the Northern Cape in 2013. The electricity sector is by far the smallest, at 1.4%.

Table 16: Sector contribution to the Northern Cape GDP in 2013 (*Stats SA*)

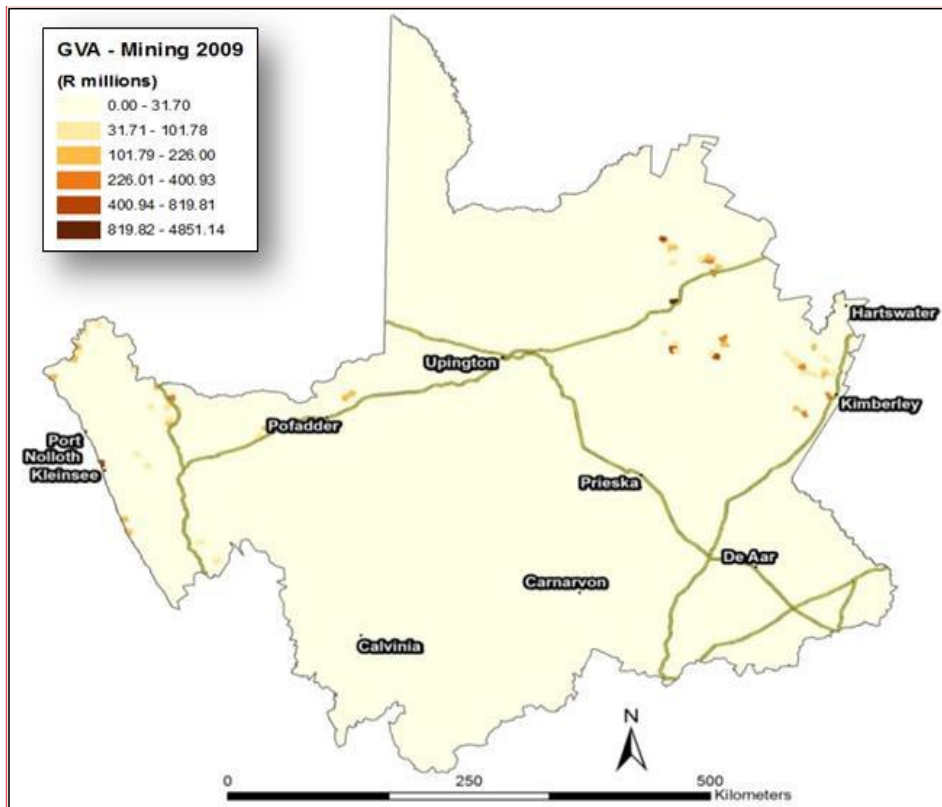
SECTOR	CONTRIBUTION (%)
Electricity	1.4
Agriculture	2.1
Construction	2.6
Manufacturing	4.4
Transport	6.1
Personal Services	7.0
Whole	9.3
Taxes	10.3
Finance	11.1
Government Service	12.1
Mining	33.6

i) **Mining**

The exceptional mineral wealth of the Northern Cape Province has ensured the importance, both nationally and internationally, of the province's mining industry. The minerals economy of the Northern Cape is a hundred and fifty (150) years old and continues to remain the mainstay of the provincial economy contributing 33.6 % to GDP in 2013.

In 1998, the Northern Cape produced around 37 % of South Africa's diamond output, 44 % of its zinc, 70 % of its silver, 84 % of its iron-ore, 93 % of its lead and 99 % of its manganese. Certain sub-sectors of the mining

industry in the Northern Cape are approaching maturity with downscaling already having commenced in the copper and diamond mining industries. This poses serious socio-economic challenges in the affected areas and there is an urgent need to identify and promote alternative economic activities to mitigate the negative impact of minerals downscaling. However, at the same time, there are still significant known reserves of a range of minerals as well as many unexploited deposits in other areas that will sustain the provincial mining industry for many years to come (Northern Cape Provincial Government, 2011).



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Figure 10: Spatial Distribution of Mining Activities in 2009

The figure 10 above shows the shows the contribution of mining to provincial gross value added (GVA) and its spatial distribution in the province. The concept of GVA has been used as an indicator for making estimates of regional economic activity (Naudé, Badenhorst, Zietsman, Van Huyssteen, & Maritz, 2007) and is broadly similar to what is more generally known as Gross Geographic Product (GGP). The Kimberly diamond fields, the Kuruman area and the West Coast emerge as the key mining areas of the Northern Cape.

ii) Agriculture

While contributing only around 3% to the provincial economy in 2013, agriculture remains an economic mainstay of the province due to its widespread practice and implementation. Despite the largely semi-arid and arid environment in the province, the fertile land that lies alongside the Orange and Vaal rivers supports the production of some of the country's finest quality agricultural products. The province has become a major exporter of table grapes produced along the Orange River and is world-renown for the quality of meat produced in the province (Northern Cape Provincial Government, 2011).

The Northern Cape is also well known for the production of wool, mohair and karakul pelts as well as dates, citrus products, wine and raisins. Two major factors currently constrain growth prospects in the agricultural sector in the Northern Cape. The first is the need to promote transformation so that new and emerging farmers can take their place as equal members of the commercial agricultural fraternity and in so doing satisfy the need for redistributive justice through increased access by the previously disadvantaged to land and agricultural resources. The second factor, is the need to achieve greater levels of diversification in irrigated agriculture in order to spread risk and promote the development of crops that have a high affinity for agro-processing.

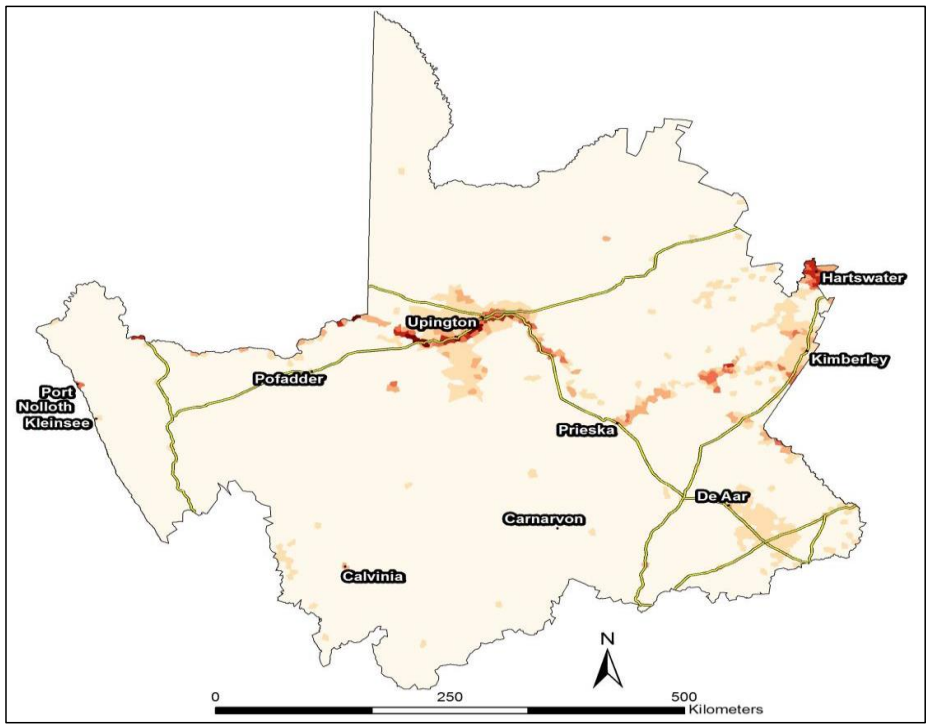


Figure 11: Spatial distribution of agriculture, forestry and fishing and contribution in GVA 2009

Figure 11 above highlights the critical role played by the Orange River and the areas adjacent to it in terms of contribution to provincial GVA by means of agriculture and forestry. Hartswater, Kimberly, Calvinia and De Aar are also key nodes for the generation of these aspects of GVA.

iii) Tourism

In many respects, tourism in the Northern Cape can be seen as a service industry with tremendous growth potential. Since the advent of democratic government in 1994, the Northern Cape tourism industry has blossomed largely as a result of the opening up of South Africa as a long-haul tourist destination for the world’s travellers but also because the province has gained exposure to growing numbers of domestic tourists too. The province caters ideally for nature-based eco-tourists looking for a new experience and at the same

time offers traditional tourists a great deal owing to its history in the development of the mining industry in South Africa. A number of major new conservation and eco-tourism developments are currently underway in the province in conjunction with the governments of Botswana and Namibia. At varying stages of execution, it is anticipated that these projects will have a major positive impact on the regional tourist economy, particularly if it is possible to use the conservation assets in each case to leverage private sector investment in new tourism plant and capacity (Northern Cape Provincial Government, 2011).

iv) Manufacturing

The Northern Cape manufacturing sector's contribution to provincial Gross Geographic Product (GGP) was comparatively low at 4.2 % in 2002, but increased to 4.4% in 2013 . Manufacturing enterprises make a significant contribution to the local economy in those localities where there is some concentration of manufacturing activity, mainly in the Kimberley, Upington, Hartswater and Kleinsee areas. Most manufacturing that takes place in the Northern Cape involves value-addition to the province's mineral and agricultural raw material output, or, the fabrication of intermediate products used in those industries. Despite the relative insignificance of the manufacturing sector in aggregate, there is significant scope for growth in certain economic sub-sectors, particularly if conditions conducive to increased investment in manufacturing can be created through institutional support and reform (Northern Cape Provincial Government, 2011).

v) Fishing and Mariculture

The cold but nutrient rich up-welling Benguela current that runs along the Namaqualand coast sustains an abundance of marine life that gives rise to enormous potential for the development of fishing and mariculture industries. The area already has a rich fishing and cray-fishing history and research shows that it should be possible under the recently amended legislative and regulatory framework to significantly rejuvenate the fishing industry. However, perhaps the greatest opportunity for economic development based on the exploitation of marine resources today is the development of the pump-ashore mari-culture industry. Mari-culture entails the cultivation of a range of high value marine species with tremendous potential for exports to lucrative overseas markets. Arguably, the Northern Cape has the best conditions for mari-culture out of any area along the South African coast and indications are that mari-culture offers sufficient growth potential to replace diamond mining over the long-term as coastal Namaqualand's principal industry. The provincial

government is currently working closely with pioneer private sector business persons involved in mari-culture to develop new mari-culture ventures in the area (Northern Cape Provincial Government, 2011).

9.8.5 Local Economy

The SLM Local Economic Development (LED) Vision is “Ensuring long term economic sustainability through local value addition and social upliftment, as well as integrated community development. We strive towards an economy owned by local people.”

The regional and local economy is poorly diversified with a reliance on, in the case of SLM, the government and agriculture sectors. The mining and manufacturing sectors provide very few (1% and 5% respectively) of the employment opportunities in the SLM.

The most significant contributors to the Gross Domestic Product (GDP) of the SLM are agriculture (28%), the finance and property sector (19%) and government (13%). At present, mining contributes approximately 3% to the GDP for the SLM. The mining sector is identified within the SLM IDP (2019/20) as a sector with development potential.

The Repli Trading No. 27 Social and Labour Plan 2018 notes the following with respect to the economy of the SLM and the potential economic influence of the proposed mine development:

- SLM is a small economy. Larger rural municipalities in South Africa have a Gross Geographic Product (GGP) of between R5bn and R10bn. By contrast, SLM has an estimated GGP of R1.3bn. A GGP is simply the sum of all salaries and wages, depreciation and operating profits in an economy. This means the new mine, with 450 employees, could add an annual GGP of R216 million per annum, or 16,6% of GGP to the local economy. This is significantly high. Another perspective is that the average salaries and wages in mining is R120 000 per annum and hence 450 new employees in the SLM has a purchasing power of R54 million per annum;
- The small economy in SML is a result of two factors, one the lack of rainfall that results in less than productive land (thus demand for land is low), and two, as a result, its low population. In addition, there is no innovation in the local economy;

- Furthermore, the average income per capita in SLM is half of that of the average income in South Africa, which furthermore reduces the economic quality of life of the SLM population because they have less disposable income, in a remote area where the prices of goods are more than the average South Africa prices due to high transport costs;
- The quality of social services is rated much higher by the SLM population than the average South African because the demand for services is much less locally; and
- The lack of adequate employment opportunities is the most significant concern for the SLM population. There are almost 14 000 people in the workforce in Siyathemba and just over 4 000 formal jobs. Thus two-thirds of the working population does not have formal jobs.

ii) !Kheis Local Municipality

The regional Gross Value Added (GVA) for 2010 is depicted in (table below). The GVA consists of mainly mining and quarrying (18%), Agriculture, forestry and fishing (15%) in ZF Mgcawu DM and Agriculture, forestry and fishing (33%) and Wholesale and retail trade, catering and accommodation (19%) in the !Kheis LM.

Table 17: Economic Activities

Industry	Provincial (%)	ZF Mgcawu DM (%)	!Kheis LM (%)
Agriculture, forestry and fishing	7	15	33
Mining and quarrying	24	18	0
Manufacturing	4	6	5
Electricity, gas and water	2	3	3
Construction	2	2	1
Wholesale and retail trade, catering and accommodation	11	13	19
Finance, insurance, real estate and business services	15	11	12
Transport, storage and communication	10	12	7
Community, social and personal services	10	8	10
General (government)	15	12	11

The proposed prospecting application is anticipated to aid in realisation of economic opportunity within the mining sector. The minerals to be prospected in the application have a potential to increase the local and regional economy including the two District Municipalities.

10. IMPACTS AND RISKS IDENTIFIED INCLUDING THE NATURE, SIGNIFICANCE, CONSEQUENCE, EXTENT, DURATION AND PROBABILITY OF THE IMPACTS, INCLUDING THE DEGREE TO WHICH THESE IMPACTS

Table 18: Impacts Identified, phases and description

IMPACTS	PHASE	DESCRIPTION
Policy requirements	Planning	Identification of legislative requirements
Flora	Site establishment and	Destruction / loss of indigenous natural vegetation due to site preparation activities.
Fauna	Site establishment and Operational	Disturbance of species habitats (i.e. snake holes, spiders, reptiles, etc.)
Ground and Surface water	Site establishment and Operational	Spillage of fuels, lubricants and other chemicals
Geology	Operational	Removal of rocks and debris for analysis, disturbance of local geological formation.
Soils	Site establishment and operational	Disturbance of soils during site clearance and during drilling operations
Air Quality	Site establishment and Operational	Dust stemming from drilling and vehicles going to site
Traffic	Site establishment and decommissioning	Increase of traffic in the area as vehicles access and exit the site
Noise nuisance	Site establishment and Operational	Noise caused by moving vehicles and drill rigs
Economic	Operational	Project expenditure (incl. direct capital investment)
Socio-economic	Planning Phase	Potential friction with I&APs and Landowners, part time employment opportunities
Visual	Site establishment, Operational and Decommissioning	Visual disturbances with all the vehicles, signs and drilling rigs.
Cultural/Heritage - historical	Site establishment and Operational	Disturbance of artefacts of cultural and heritage importance (i.e. unidentified grave sites).

Waste	Site establishment and Operational Phase	Generation of solid waste on site.
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10.1 Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;

The potential environmental impacts associated with the project will be evaluated according to its nature, extent, duration, intensity, probability and significance of the impacts, whereby:

- **Nature:** A brief written statement of the environmental aspect being impacted upon by particular action or activity.
- **Extent:** The area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment phase of a project in terms of further defining the determined significance or intensity of an impact. For example, high at a local scale, but low at a regional scale;
- **Duration:** Indicates what the lifetime of the impact will be;
- **Intensity:** Describes whether an impact is destructive or benign;
- **Probability:** Describes the likelihood of an impact actually occurring; and
- **Cumulative:** In relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area

Table 19: Criteria for evaluating potential environmental impacts

CRITERIA	DESCRIPTION			
Extent	National (4) The whole of South Africa	Regional (3) Provincial and parts of neighbouring provinces	Local (2) Within a radius of 2 km of the site	Site (1) Within the site

Duration	Permanent (4) Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient	Long-term (3) The impact will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter. The only class of impact which will be non-transitory	Medium-term (2) The impact will last for the period of the site establishment phase, where after it will be entirely negated	Short-term (1) The impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than the site establishment phase
Intensity	Very High (4) Natural, cultural and social functions and processes are altered to extent that they permanently cease	High (3) Natural, cultural and social functions and processes are altered to extent that they temporarily cease	Moderate (2) Affected environment is altered, but natural, cultural and social functions and processes continue albeit in a modified way	Low (1) Impact affects the environment in such a way that natural, cultural and social functions and processes are not affected
Probability of Occurrence	Definite (4) Impact will certainly occur	Highly Probable (3) Most likely that the impact will occur	Possible (2) The impact may occur	Improbable (1) Likelihood of the impact materialising is very low
Impact Reversal	Highly Impossible (4) Impact reversal will certainly be impossible	Moderate (3) Impact can be reversed to some extent with loss of natural resources	Possible (2) High possibility of impact reversal	Definite (1) Impact can be totally reversed
Loss of irreplaceable resources	Definite (4) Resources definitely be lost	Highly Probable (3) Most likely that resources will be lost	Possible (2) Resources may be lost	Improbable (1) Loss of resources is highly unlikely

Significance is determined through a synthesis of impact characteristics. Significance is also an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

Significance=Extent+ Duration +Intensity x Probability

Table 20: Criteria for classifying impacts

Ranks/Level	Description
Low impact/ Minor (3 -10 points)	A low impact has no permanent impact of significance. Mitigation measures are feasible and are readily instituted as part of a standing design, construction or operating procedure.
Medium impact/ Moderate (11 -20 points)	Mitigation is possible with additional design and construction inputs.
High impact (21 -30 points)	The design of the site may be affected. Mitigation and possible remediation are needed during the construction and/or operational phases. The effects of the impact may affect the broader environment.
Very high impact/ Major (31 - 48 points)	Permanent and important impacts. The design of the site may be affected. Intensive remediation is needed during construction and/or operational phases. Any activity which results in a “very high impact” is likely to be a fatal flaw.
Status	Denotes the perceived effect of the impact on the affected area.
Positive (+)	Beneficial impact.
Negative (-)	Deleterious or adverse impact.
Neutral (/)	Impact is neither beneficial nor adverse.
It is important to note that the status of an impact is assigned based on the status quo – i.e. should the project not proceed. Therefore not all negative impacts are equally significant.	

The suitability and feasibility of all proposed mitigation measures is included in the assessment of significant impacts. This was achieved through the comparison of the significance of the impact before and after the proposed mitigation measure is implemented.

10.2 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

At this moment there is no alternative layout, should the comments from IAPs and other relevant stakeholders warrants that we change the layout or have alternative, those comments will be addressed accordingly. The project will have minimal impacts on the environment, about 63 exploration holes will be drilled, this should be viewed in the context that the drilling sites are approximately 1.89 ha in comparison to the 1103.42 Ha that is being applied; the impacts will be very minimal. The impacts associated with drilling can be mitigated and after drilling has been completed; the drill pads will be rehabilitated to predrilling status.

Table 21: Positive and negative impacts

Impacted Environment	Impact	Status of impact
SITE ESTABLISHMENT AND OPERATIONAL PHASE		
Fauna and Flora	Destruction / loss of indigenous natural vegetation and plant species during site preparation	Negative
	Impact on animal species	Negative
	Establishment and spread of declared weeds and alien invader plants	Negative
Water resource	Damage to surface water and groundwater resulting in hydrological impacts	Negative
Air Quality	Dust emissions	Negative
Soils	Physical disturbance of soils during land clearing	Negative
Socio Economic	Direct employment and skills development	Positive
Visual aspect	Visual Disturbance (vegetation clearance and temporary infrastructures including equipment on site)	Negative
Cultural/Heritage-historical resources	Potential impact on heritage and archaeological resources	Undetermined at this stage
Waste generation	Generation of solid waste (e.g. littering)	Negative
DECOMMISSIONING PHASE		
Air quality	Dust emissions	Negative

Impacted Environment	Impact	Status of impact
Soil	Soil degradation	Negative

10.3 Motivation where no alternative sites were considered

The nature of the proposed activity dictates the proposed site location. The applicant has done preliminary studies that indicated that the minerals applied for prospecting can only be found within the proposed area.

10.4 Statement motivating the alternative development location within the overall site

Since exploration is temporary in nature no permanent structures will be constructed, negotiations and agreements will be made with the farm owners to use any existing infrastructure like accommodation for the explorers, access roads and other things. In addition to the information provided, each of the phases is dependent on the results and success of the preceding phase. The location and extent of soil sampling and possible drilling will be determined based on information derived from the geophysics surveys. Sampling and drill sites will be selected to avoid water courses where practicable.

11. ENVIRONMENTAL IMPACT ASSESSMENT

Table 22: Environmental Impact Assessment

Impact pathway	Nature of potential impact/risk	Phase impact occurs	Before Mitigation				Significance of impact	Reversibility of impact	Potential mitigation measures	After Mitigation				Ranking of impact/risk
			E	D	I	P				E	D	I	P	
Compliance with legislative requirements	Non commencement/delayed commencement of proposed project	Planning	3	4	3	2	(20 -ve)	Yes	Comply with all legislative requirements as stipulated in the EIA 2017 regulations	1	1	1	2	(6 -ve)
Geological Field Mapping and Environmental Screening	Interference with existing land uses and Deterioration and damage to existing access roads and tracks	Planning	2	3	3	3	(18-)	Yes	Site access control, heritage impact assessment; consultation with Landowners and Site access control; Demarcation of access tracks to be used	1	2	2	2	(10 -ve)
Destruction of indigenous	Habitat and loss of species	Site establishment and Operational	2	2	3	3	(21-ve)	Yes	Appoint an Environmental Control Officer (ECO) prior to commencement of site establishment phase.	1	1	2	2	(8 -ve)

Impact pathway	Nature of potential impact/risk	Phase impact occurs	Before Mitigation				Significance of impact	Reversibility of impact	Potential mitigation measures	After Mitigation				Ranking of impact/risk
			E	D	I	P				E	D	I	P	
natural vegetation	Alien plant invasions in disturbed areas	Site establishment and Operational	1	1	2	2	(8 -ve)	Yes	Responsibilities should include, but not necessarily be limited to, ensuring adherence to EMPr guidelines, guidance of activities, planning, reporting to authorities.	1	1	1	2	(6 -ve)
Disturbance of soils	Exposed soils susceptible to erosion	Site establishment and Operational	1	1	2	2	(8 -ve)	Yes	Conduct a search and rescue operation for all conservation important plants on the site. This operation should be conducted during the austral summer period when vegetative and reproductive	1	1	1	2	(6 -ve)
Impacts on indigenous plant species	Plant species are especially vulnerable to infrastructure development due to the fact that they cannot move out of the path of the operational activities, but are also affected by overall loss of habitat.	Site establishment and Operational	1	2	2	2	(10 -ve)	Yes		1	2	1	1	(4 -ve)

Impact pathway	Nature of potential impact/risk	Phase impact occurs	Before Mitigation				Significance of impact	Reversibility of impact	Potential mitigation measures	After Mitigation				Ranking of impact/risk
			E	D	I	P				E	D	I	P	
Fauna	Faunal mortality and displacement on site.	Site establishment and Operational	1	2	3	3	(18 -ve)	Yes		2	1	1	2	(8 -ve)
Geology	Permanent removal of rocks and geological formations	Operational	1	4	3	4	(32 -ve)	No	Cap off and cement drill hole	1	3	1	3	(15 -ve)
Groundwater quality	The prospecting operations will require the drilling of boreholes. The boreholes may result in the drawdown, which may affect the yield to the surrounding groundwater users. Material used for backfilling may leach pollutants that will result in the pollution of the	Operational	2	3	3	4	(32 -ve)	Yes	Groundwater monitoring network (both quality and quantity) should be established. Any spillage should be cleaned using spillage kit Ensure that the land owners' borehole yield is observed during the drilling operation. Should it be	2	1	2	3	(21 -ve)

Impact pathway	Nature of potential impact/risk	Phase impact occurs	Before Mitigation				Significance of impact	Reversibility of impact	Potential mitigation measures	After Mitigation				Ranking of impact/risk
			E	D	I	P				E	D	I	P	
	surrounding groundwater regime.								proven that the operation is indeed affecting the quantity and quality of groundwater available to users and surrounding water resources, the affected parties must be compensated					
Air quality	Increase in traffic on unpaved roads and drilling activities will increase levels of dust generated on site. Greenhouse gases emitted from drilling machinery and vehicles used on site, could contribute to reduced levels of air quality.	Site establishment, Operational and Decommissioning	2	1	2	3	(15 -ve)	No	Use of water for dust spraying and wetting, proper grading of roads and keeping traffic to a reasonable level All equipment and vehicles must be serviced and be in good condition to reduce emissions.	2	1	2	2	(10 -ve)

Impact pathway	Nature of potential impact/risk	Phase impact occurs	Before Mitigation				Significance of impact	Reversibility of impact	Potential mitigation measures	After Mitigation				Ranking of impact/risk
			E	D	I	P				E	D	I	P	
Project expenditure (incl. direct capital investment)	Investment and growth in local economy	Operational Phase and decommissioning	2	1	2	4	(20)	No	None	2	1	2	4	(20)
Noise disturbance	Noise generated from prospecting operations activities may add to the current noise levels. This may have impacts on surrounding property owners and wildlife.	Operational	2	3	2	2	(14 -ve)	No	Engine silencers must be installed on all equipment and vehicles used on site Working must be restricted to 8 hours during daytime, to minimise the ecological and social disturbance.	1	2	2	2	(10 -ve)

Impact pathway	Nature of potential impact/risk	Phase impact occurs	Before Mitigation				Significance of impact	Reversibility of impact	Potential mitigation measures	After Mitigation				Ranking of impact/risk
			E	D	I	P				E	D	I	P	
Visual Disturbance	The activities undertaken during the site establishment or associated infrastructure will be visible from the nearby roads and properties. However, due to the undulating topography, visibility for the most part will most probably be restricted to short distances.	Site establishment, Operational and Decommissioning	1	2	2	2	(10 -ve)	Yes	Inform the land owner on the type of machinery and equipment to be used at the prospecting site. Ensure that lighting is conducted in manner that will reduce the impacts on visual aspects at night times.	1	1	2	2	(8 -ve)

Impact pathway	Nature of potential impact/risk	Phase impact occurs	Before Mitigation				Significance of impact	Reversibility of impact	Potential mitigation measures	After Mitigation				Ranking of impact/risk
			E	D	I	P				E	D	I	P	
Socio-economic	Potential friction with local business individuals who are running tourist attractions and breeding game life.	Planning, Site establishment, Operational, decommissioning	3	3	2	3	(24 -ve)	Yes	Extensive public consultations which will increase public awareness record and address comments, concerns and questions.	1	2	1	2	(8 -ve)
	Temporary employment opportunities	Operational and Decommissioning	2	1	2	3	(15 +ve)	Yes	None	2	1	2	3	(15 +ve)

Impact pathway	Nature of potential impact/risk	Phase impact occurs	Before Mitigation				Significance of impact	Reversibility of impact	Potential mitigation measures	After Mitigation				Ranking of impact/risk
			E	D	I	P				E	D	I	P	
	Potential decline in local business due to prospecting activities.	Site establishment, Operational and Decommissioning	3	2	3	2	(16 -ve)	Yes	Prospecting should be conducted following best practices is to minimise negative economic impacts on local business	3	2	2	1	(7 -ve)
Cultural/ Heritage historical impacts	Discovery of gravesites and historical artefacts in the proposed area	Site establishment and Operational	1	2	2	3	(15 -ve)	Yes	Should any paleontological or cultural artefacts be discovered work at the point of discovery must stop, the location be clearly demarcated and SAHRA contacted immediately. Work at the discovery site may only be recommenced on instruction from SAHRA.	1	1	1	2	(6 -ve)

Impact pathway	Nature of potential impact/risk	Phase impact occurs	Before Mitigation				Significance of impact	Reversibility of impact	Potential mitigation measures	After Mitigation				Ranking of impact/risk
			E	D	I	P				E	D	I	P	
Traffic	Increase of traffic in the area as vehicles access the sites	Site establishment and Decommissioning	2	3	2	3	(28 -ve)	No	Abnormal Vehicles must move in and out of the site during off peak hours, to avoid congestion that may occur on the main road.	2	2	1	2	(10 -ve)

12. 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 23: Potential Impacts and Risk

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
Desktop Study	None Identified	N/A	Planning Phase	N/A	No mitigation proposed	N/A
Identification of legislative requirements	Commencement of activities without all the required licenses and permits	Policy and legal Requirements	Planning Phase	High	The applicant must ensure that all relevant legislations and regulations have been adhered to before commencement of the project.	Low
Set-up of drilling Equipment	Clearing of Vegetation	Flora and Fauna	Operational Phase	Low	Already cleared areas should be preferred over heavily dense areas	Low
Set-up of drilling Equipment	Theft	Socio-Economic	Operational Phase	Low	The site camp must be secured and entrance into the site must be controlled	Low
Preparation of drilling sites and access roads	Loss of Vegetation	Flora and Fauna	Operational Phase	Medium	Where possible existing access roads must be used	Low
Drilling Activities	Ground & Surface Water contamination	Hydrology	Operational Phase	Medium	The drill bits must be maintained in good condition to prevent leakages of oil when in the underground.	Low

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
				Medium	Aquifer detection methods should be applied before drilling can be undertaken.	Low
					Streams must be diverted where alluvial activities are taking place.	Low
	Mortality and displacement of fauna	Fauna	Operational Phase	Medium	Search and rescue mission should be undertaken for species on drilling site	Low
	Waste Generation	Waste Management	Operational Phase	High	The mud generated from the drilling activities must be contained, and contaminated mud must be handled separately, treated or disposed of at an appropriate landfill. Skips and marked bins must be provided at the site for waste separation.	Medium
Drilling Activities	Spillages of hazardous chemicals	Soil & geology; Hydrology	Operational Phase	Medium	All substances required for vehicle maintenance and repair must be stored in sealed containers until they can be disposed of / removed from the	Low

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
					site. All drill holes must be capped off and closed off with cement.	
				Medium	Hazardous substances / materials are to be transported in sealed containers or bags.	Low
				Medium	Spillages must be attended to as soon as they occur. Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site.	Low
	Destruction of Heritage Resources	Cultural and Heritage Social	Operational Phase	Medium	Should any paleontological or cultural artefacts be discovered work at the point of discovery must stop, the location be clearly demarcated and SAHRA contacted immediately. Work at the discovery site may only be recommenced on instruction from SAHRA.	Low

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
Decommissioning of Site Camp	Waste generation	Waste management	Decommissioning Phase	Medium	The uncontaminated stockpiled materials must be used for backfilling	Low
Decommissioning of Site Camp	Contamination of the Soil and Water	Soil and Hydrology	Decommissioning Phase	Medium	The hazardous substances onsite must be stored in marked containers. All the equipment must be shipped out of the site The compacted soils must be loosened and the topsoil must be spread above it. The seed spreading of indigenous species must take place to ensure regrowth.	Low

13. SUMMARY OF SPECIALIST

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

Site investigations have indicated that no specialist studies will be required for the proposed prospecting application.

14. ENVIRONMENTAL IMPACT STATEMENT

14.1 Summary of key findings of environmental assessment:

In nature impacts associated with prospecting have very low impacts on the environment or socially. Usually the impacts caused during the prospecting activity can be reversed or rehabilitated. The invasive impacts that can be envisaged is the drilling of the 63 exploration holes which collectively amounts to 2.5 Ha which makes up to less than 1% of area that is being applied for which is 1103.41 Ha.

The proposed prospecting operation may affect existing alternative land uses on adjacent property or non-adjacent properties as the area predominantly breeds wildlife and is saturated with game lodge. The following actions are subject to the proposed mitigation measures and require monitoring:

- The clearing of vegetation
- The storage of hydrocarbon-based materials on site
- On-site waste management
- The creation of roads/tracks
- The removal of storage and soil
- The traversing of vehicles through populated areas within the prospecting area
- Groundwater: Monitor the water quality of the boreholes
- Noise generation

Monitoring of the required mitigation measures is to take place on site daily by the site geologist. Annual monitoring audits are to take place by an appointed independent environmental assessment practitioner.

14.2 Final Site Map

The exact locations of the drilling holes are indicated within the map provided although the map will be subjected to changes depending on the results of the preliminary drilling and assaying. The prospecting activities are conducted in phases, and each phase depends on the success of the previous phase.

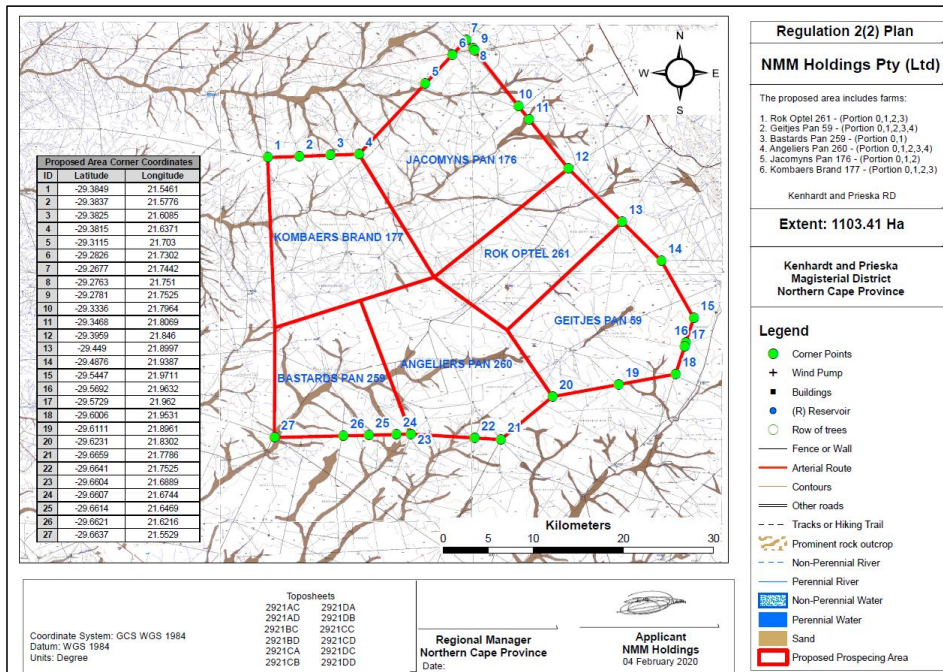


Figure 12: Map showing all drilling points

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

a) Positive and negative impacts associated with the proposed prospecting activities include:

- Destruction / loss of indigenous natural vegetation during site preparation

- Impacts on plant species of concern during site preparation
- Impacts on fauna
- Establishment and spread of declared weeds and alien invader plants
- Physical disturbance of soils during land clearing
- Dust emissions
- Disturbance of the geological formation due to removal of rock material.
- Direct employment and skills development
- Impact on groundwater system during invasive phase of the proposed development.
- Impact on surface water
- Visual Disturbance
- Physical disturbance of soils during land clearing
- Disturbance of surrounding landowners activities and/or livelihoods
- Direct employment and skills development
- Potential impacts on heritage resources and archaeological resources

The proposed activities have low significance since these are short term activities, however socio-economic impacts such as employment has a medium significance. The probability of occurrence of an impact was determined and most of these activities can be controlled and impacts can be reduced or avoided. Generally prospecting activities have low impact on the environment. The planned activities negative impacts can be controlled and avoided or minimised therefore the layout does not require revision. Mitigation measures will be utilised to control, avoid and/or minimise all identified potential impacts.

15. PROPOSED IMPACT MANAGEMENT OBJECTIVES AND THE IMPACT MANAGEMENT OUTCOMES FOR INCLUSION IN THE EMPR;

The EMPr will seek to achieve a required end state and describe how activities could have an adverse impact on the environment will be mitigated, controlled and monitored. The EMPr will address the environmental impacts during the Site establishment, Operational, and Decommissioning Phases of the proposed project. Due regard will be given to environmental protection during the entire project. A number of environmental recommendations will therefore be made to achieve environmental protection. The environmental and social objectives will be set to allow prospecting in an environmental and socially responsible manner while ensuring that sustainable closure can be achieved. To achieve closure, the correct decisions need to be taken during the planning phase of the project.

The overall goal for environmental management for the proposed is to construct and operate the project in a manner that:

- Minimises the ecological footprint of the project on the local environment;
- Facilitates harmonious co-existence between the project and other land uses in the area;
- Contributes to the environmental baseline and understanding of environmental impacts of Prospecting activities in a South African context.

The following environmental management objectives are recommended for the proposed mineral prospecting development and associated infrastructure:

- Monitor soils so as to avoid unnecessary erosion, and implement erosion control measures to preserve the quality of the soil for rehabilitation.
- Development planning must restrict the area of impact to minimum and designated areas only.
- Monitor and prevent contamination, and undertake appropriate remedial actions.
- Limit the visual and noise impact on receptors.

- Avoid impact on possible heritage and archaeological resources.
- Promote health and safety of workers.
- Limit dust and other emissions to within allowable limits

16. ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION

NMM Holdings (Pty) Ltd must comply with all Environmental legislations. Specific environmental legislation to be adhered to include; National Environmental Management Act, Act 107 of 1998 (NEMA) and Minerals and Petroleum Resources Development Act, Act 28 of 2002 (MPRDA);

- Notice must be given to landowners and surrounding landowners 1 month prior to any prospecting activities.
- Maintain a minimum 500m buffer from any infrastructure or dwelling (schools, churches, homes);
- Landowners and land occupiers should be engaged (re-consulted) at least 1 month prior to any site activities being undertaken once drill sites are known;
- A map detailing the drilling locations should be provided to the landowners as well as the DMR prior to commencement of prospecting activities.
- Record must be kept of the implementation of the EMPr measures and monitoring of the efficiency of the implemented measures; and
- A buffer of 50m from wetlands and water courses should be established during the site establishment and operational phase.

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

The following assumptions, uncertainties, and gaps in knowledge are applicable to this BAR:

- The baseline environment was compiled through desktop studies only. The possibility exists that the desktop data is outdated or incomplete. A limited duration site visit was undertaken in order to verify the desktop data utilised. Furthermore, the description of the baseline environment will be further informed by the results of the public participation process.

- The potential impacts of any drilling activity on the groundwater regime will vary from site to site, even over short distances due to changes in geology and receptors. As no recent hydrocensus across the entire exploration area has been conducted, the EAP did not have access to, for example, positions of existing boreholes, dependency on groundwater, specific water quality, depth to groundwater levels and borehole depths. The sensitivity map and groundwater management plan, as presented in this report, must be seen as working documents that must be improved as more information becomes available.
- This report only provides a high-level desktop / strategic screening of potential heritage risk areas. The recommendations and conclusions regarding the assessment of the potential impacts will require confirmation by a detailed field-based survey before physical prospecting is to commence. Specifically, it should be noted that some of the heritage sites that are depicted on the historical topographic maps may no longer exist due to past disturbance and that there may be grave and burial ground sites that are not depicted on the historic maps which will be identified only by the subsequent field study.

18. REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED

Based on the site investigations and analysis of the EAP it is suggested that the proposed activity should be authorised due to the following:

- Monitoring of the required mitigation measures is to take place on site daily by the site Geologist, Annual monitoring audits are to take place by an appointed independent Environmental Assessment Practitioner (EAP) to compile the required annual environmental compliance report required by the DMR
- The environmental impacts associated with the limited drilling activities are minimal provided that the proposed mitigation measures are implemented
- The desktop studies have proven that the site is located on a mineralized zone, prospecting activities must be undertaken to confirm the ore reserves

- The option of not approving the activities will result in a significant loss to valuable information regarding the status of the ore bodies present on these properties.
- In addition to this, should economical reserves be present and the applicant does not have the opportunity to prospect, the opportunity to utilize these reserves for future phases will be lost as well.
- The spatial extent of the physical impact is 1.89 ha over a prospecting right license area of 63 drill sites and 100m² of an access road which will be established in total throughout the duration of the drilling programme, Therefore the actual footprint to be permanently disturbed is minimal in comparison to the total site area of the total farm area will be impacted.
- With appropriate care and consideration the impacts resulting from drilling can be suitably avoided, minimised or mitigated
- It has also been noted that mining sector is the pillar of South African economy and also provides employment opportunities for many.
- A buffer of 50 m from wetlands and water courses should be established during the operational phase

18.1 Conditions that must be included in the authorisation

- Maintain a minimum 500m buffer from any infrastructure or dwelling (schools, churches, homes);
- Landowners and land occupiers should be engaged (re-consulted) at least 1 month prior to any site activities being undertaken once drill sites are known;
- A map detailing the drilling locations should be provided to the landowners as well as the DMR prior to commencement of prospecting activities.
- Record must be kept of the implementation of the EMPr measures and monitoring of the efficiency of the implemented measures; and
- A buffer of 50m from wetlands and water courses should be established during the operational phase.

- A suitable closure plan must be submitted to show sufficiently providence for the avoidance, management and mitigation of environmental impacts associated with the decommissioning of the proposed activities.

19. PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

The Prospecting Right has been applied for a period of five (5) years. The Environmental Authorisation should therefore allow for the five years of prospecting and one year for decommissioning and rehabilitation

20. 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 undertaking provided at the end of the EMPr is applicable to both, this Basic Assessment Report and the EMPr in Part B, below

21. FINANCIAL PROVISION

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

A total of **R 54 506.00** is required to both manage and rehabilitate the environment in respect of rehabilitation.

21.1 Explain how the aforesaid amount was derived

The aforesaid amount was derived using the Department of Mineral Resource guideline document for the evaluation of the quantum of closure-related financial provision provided by the applicant.

21.2 Confirm that this amount can be provided for from operating expenditure

Should a Prospecting Right be granted to the **NMM Holdings (Pty) Ltd** will make provision for the estimated closure cost by means of a Bank Guarantee or any other means available and accepted by the Competent Authority.

22. SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

22.1 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:-

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

Current land uses on the prospecting area, such as grazing, may be temporarily impacted through the presence of closed off areas that drill rigs will operate within. These are however, small areas. These areas will be rehabilitated post drilling activities and the areas will once again become available for grazing and other agricultural activities.

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

Mitigation measures proposed in this report include that no drill site will be located within 100 m of any identified heritage site (which may occur during the prospecting programme) based on the desktop work undertaken. Should any paleontological or cultural artefacts be discovered work at the point of discovery must stop, the location be clearly demarcated and SAHRA contacted immediately. Work at the discovery site may only be recommenced on instruction from SAHRA.

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

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 DMR require any additional information, this will be provided upon request. No reasonable or feasible alternatives exist for this Prospecting Right Application and as such, motivation for no alternatives has been provided in the relevant sections above.

PART B ENVIRONMENTAL MANAGEMENT PROGRAMME

1. DETAILS OF EAP

The details of the EAP are provided in section 1.1 of part A of this document

2. DESCRIPTION OF ASPECTS OF THE ACTIVITY

The requirement to describe the aspects of the activity that are covered by the final environmental management programme is already included in PART A.

3. COMPOSITE MAP

No composite map can be presented at this stage

4. DESCRIPTION OF IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENTS

4.1 Determination of closure objectives.

- Rehabilitation of areas disturbed as a consequence of prospecting to a land capability that will support and sustain a predetermined post-closure land uses;
- Removal of all infrastructure/equipment that cannot be beneficially re-used, as per agreements established, and returning the associated disturbed land to the planned final land use;
- Removal of existing contaminated material from affected areas;
- Establishment of final landforms that are stable and safe in the long run;
- Establishment and implementation of measures that meet specific closure related performance objectives;

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

4.1.1 Volumes and rate of water use required for the operation

The proposed prospecting activities will require water supply for the drilling activities, the water will be sourced from water service providers and will be carted onto the site in a tanker. A 2000 ℓ water cart will be adequate for the size of this operation. The water will be used for dust suppression of access roads. Dust suppression will be conducted as and when necessary.

4.1.2 Has a water use licence has been applied for?

No water use license application has been lodged as there are no water resources that will be affected by the proposed prospecting activities. No groundwater will be used or abstracted during the prospecting operations. Moreover, a buffer of 50m from wetlands and water courses shall be established during the prospecting activities.

4.1.3 Impacts to be mitigated in their respective phases, Impact Management Outcomes and Impact Management Actions

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

Table 24: Impacts to be mitigated

POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION	MITIGATION TYPE	STANDARD TO BE ACHIEVED
SITE ESTABLISHMENT PHASE						
Site Establishment- access roads, to prospecting sites, establishment of the campsite, physical surveying of the site and pegging of drilling boreholes						
Loss of top soils and soil erosion	Soils, Land Use and Land Capability	Topsoil must be stockpiled immediately after clearing vegetation to prevent erosion of soil through surface runoff and wind. No topsoil or fertile soil (dark soil) may be stored within 32 m of a drainage line, watercourse or wetland Where applicable, construct berms in order to prevent rill erosion and donga formation. All cleared areas and sumps are to be monitored for erosion daily, any erosion forming	Rehabilitation in terms of MPRDA and NEMA principles. Applicable guidelines from NEM:BA and Department of Agriculture, Forestry and Fisheries (DAFF) and Conservation of Agricultural Resources Act (CARA) regarding removal of species General implementation of activities	During Site establishment	Control	Return as close as possible to pre-prospecting environment

		is to be remediated with immediate effect.	taking Mining and Biodiversity Guidelines into account			
Loss of natural vegetation in the affected areas.	Flora.	Site clearance will be limited to only areas where invasive prospecting activities will be undertaken. Ensure minimal disturbance of vegetation when conducting geophysical surveys and geological mapping. No vegetation clearance or tree removal should take place prior to a suitable qualified specialist have identified the species and the necessary permits and licenses have been obtained for removal of protected or endangered species.	Rehabilitation in terms of MPRDA and NEMA principles. Permits to (DAFF) and CARA for removal of species in terms of NEM:BA General implementation of activities taking Mining and Biodiversity Guidelines into account	During Site establishment	Control through visual monitoring and inspection	Adhere to rehabilitation standards and Biodiversity Guidelines

		No crops may be harvested from the farms where work is being undertaken by any member of NMM Holdings or contractors of NMM Holdings.				
Migration of animal life due to disturbance caused proposed project	Fauna	Use sites with most degraded environment for the site development. Trapping and killing of fauna will be prohibited at the prospecting site.	General implementation of activities taking Biodiversity Act and its guidelines into account.	During Site establishment	Control through visual monitoring and inspection	Minimise impact on fauna
Deterioration of water quality in the nearby Water courses and within the groundwater regime.	Surface and Ground Water.	Site establishment should not be undertaken within sensitive landscapes, these areas will be avoided. A distance of 32 meters should be kept between stockpiles and water courses Avoid stripping of areas within the operational site.	Water management measures in compliance with NWA, 1998 and DWS guidelines	During Site establishment	Avoid	Minimise the impacts on sensitive areas such as wetlands and streams.

		Rehabilitate areas that may have been mistakenly stripped. Storm water upslope of the campsite and drill sites should be diverted around these areas.				
Air pollution through emissions from the vehicles and equipment used on the operational site.	Air quality.	Dust suppression will be conducted in areas with excessive dust emissions. Traffic will be restricted to demarcated areas. Traffic volumes and speeds within the operational site will be controlled. The prospecting will be undertaken such that the ambient air quality does not exceed the National Air Quality Standards	National Environmental Management Air Quality Act.	Throughout Site establishment	Minimise impact	The dust emissions are not to exceed the ambient air quality standards for rural areas
Increased noise levels.	Noise aspects	Limit the maximum speed to 30 km/h or less, subject to risk assessment.	National Noise Control Regulations, SANS10103:2008 guidelines.	Throughout the Site establishment	Minimise impacts	The noise levels from the operational sites will be managed

		Less noisy equipment will be used, the equipment will be kept in good working order and the equipment will be fitted with correct and appropriate noise abatement measures.				and levels will be within the regulated noise levels as set by the regulations
Visual impacts on the surrounding communities and road users from the site establishment.	Visual aspects. Neighbouring occupants	Temporary stockpiling of excavated material shall take place in demarcated areas. Stockpiles shall be positioned and sloped to create the least visual impact The prospecting area shall be enclosed to minimise visual disruption from machinery and equipment to be used Lighting will be conducted in a way that will decrease the impacts on visual aspects at night times.	Measures will be undertaken to ensure that the visual aspects from the site comply with the relevant visual standards and objectives including Municipal By Laws.	Throughout the duration of the Site establishment	Minimise impact	Ensure that all operations during the site establishment phase do not result in detrimental visual impacts on surrounding properties, communities and road

Impact from the influx of job seekers and employment of farm labourers.	Socio-Economic Aspect	Recruitment will not be undertaken on site. Farm labourers will not be employed unless agreed to with the farm owners. Ensure that all labourers are trained and adhere to all health and safety standards	Measures taken will be in line with the company's recruitment policies. Occupational Health and Safety Act	Throughout Site establishment	Control	Comply with all national health and safety standards as well as adhere to the company's recruitment policies.
Excessive Waste generation	Soil and Visual impacts	Minimise littering on site and ensure that all labourers are trained in environmental awareness. Bins (sufficient number and capacity) to store general and hazardous produced on a daily basis shall be provided at each drilling site. The waste bins must be sealed to avoid, leakage of leachate material and must be waterproof so that rain water cannot enter into them.	Waste Management Act	Throughout the Site establishment	Avoid	Avoid the excessive generation of general waste during this phase

		<p>Bins shall be emptied on a weekly basis or if there is a nauseous smell coming from them or vectors are breeding within them.</p> <p>An integrated waste management approach shall be used, based on the principles of waste minimisation, reduction, re-use and recycling of materials.</p>				
OPERATION PHASE						
Exploration :Core drilling of the exploration boreholes, stockpiling, Drilling, use of campsite and rehabilitation of the drilling sites						
Soils contamination, disruption of the Soil profile	Soils, Land Use, Land Capability and	Ensure that drilling machinery construction vehicles should be are well maintain to avoid	Rehabilitation in terms of MPRDA and NEMA principles.	Throughout operational phase	Control	Return as close as possible to pre-prospecting environment

<p>Disturbance of ecological systems through destruction of natural vegetation. Loss of Land use</p>	<p>natural vegetation</p>	<p>spillage of hydrocarbons, to avoid soil and ground water contamination All oil spills will be remedied using approved methodologies Sumps and boreholes should be returned to pre-drilling conditions. All waste generated during drilling ties should be collected and disposed of at a suitable registered waste facility Retain all vegetation cover around drilling sites; the grass is to be mowed as part of site establishment. No waste material or litter shall be burnt or buried on site. Post operational phase, the land will be returned to its previous state in as much as possible.</p>	<p>Operational control procedures (e.g. spill / leak handling). Incident Reporting System; Environmental Inspections; Planned Maintenance System; water quantity (abstraction) monitoring; continued communication with surrounding landowners.</p>			
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Establishment of campsite and drilling operation may result in contamination of surface water run-off by hydrocarbon fluids and sedimentation	Surface and water	A buffer of 50m from watercourse and wetlands should be maintained during the all prospecting activities Excess water and mud from drilling sites should be stored in sumps that are sizeable enough to contain them Storm water generated around drilling sites should be diverted away from natural water courses Ensure that prospecting activities d not impact negatively on the quality and quantity of groundwater used by surrounding occupants	Water management measures in compliance with NWA,(National Water Act) 1998 and GN 704, 1999.	Throughout operational phase	Minimise	Maintain groundwater quality
Air pollution caused by vehicle emissions and dust	Air Quality	Dust suppression should be practiced during the operational phase Construction vehicles should be regularly	National Environmental Management Air Quality Act	Throughout the operational phase	Control and minimise	Maintain air quality

		maintained in order to minimize greenhouse gas emission				
Wetland-- destruction and loss of aquatic habitat	Aquatic and terrestrial components	A buffer of 50m from wetlands and watercourses should be established during the operational phase. Remove or eradicate all alien invasive vegetation growing on stockpiles or in any area of the drilling site footprint.	National Environmental Management Act National Environmental Management Waste Act National Water Act (NWA) National Environmental Management: Biodiversity Act (NEMBA)	Throughout the operational phase	Avoid	Protect aquatic and terrestrial ecosystems in as far as possible.
Noise impacts	Fauna and Adjacent landowners/ occupants	Provide employees with ear plugs Use equipment that produces minimal noise as far as possible Avoid working outside normal working hours (i.e. 08:00 to 17:00) and during weekends	National Noise Control Regulations SANS 10103:2008	Throughout the operational phase	Minimise	Minimal noise

		<p>All machinery and equipment must be maintained in good working order, and fitted with approved and specified muffler systems.</p> <p>Compliance with local by-laws and regulations regarding the noise and hours of operation</p>				
Visual impacts	Neighbouring occupants	<p>Visual screening methods could be used on site to reduce visual impacts.</p> <p>Lighting will be conducted in a manner that will reduce the visual impact at night times.</p>	National Road Traffic Act	Throughout the operational phase	Control	Minimise visual impacts
Impacts on heritage features	Heritage features on-site	<p>No heritage features must be destroyed or removed without a permit in terms of SAHRA.</p> <p>Should any heritage features or remains be discovered, work is to</p>	South African Heritage Resources Agency	Throughout the operational phase	Stop and avoid	Protect heritage features

		stop, the area is to be demarcated and a qualified Archaeologist is to be contacted and contracted to evaluate the site and apply for the appropriate permit if needed. Once the permit has been obtained from SAHRA the archaeologist is then to supervise the removal or destruction of the item. Once it has been moved or destroyed works can continue.				
Health and safety impacts	Socio economic Employees and land occupants	Neighbouring occupants should be warned about any disruptions prior the commencement of the activity Ensure that health and safety measures are put in place to protect employees and neighbouring occupants	Occupational Health and Safety Act	Throughout the operational phase	Avoid	Avoid health risks and injury incidents

		Provide employees with personal protective Equipment (PPE)				
Traffic impacts	Traffic movement	Vehicles that are moving to the site should only move during the day when there is less traffic in the road	National Traffic Act	Throughout the operational phase	Avoid	Avoid traffic congestion
Introduction of weeds and alien invasive plants	Flora	All sites disturbed by site establishment activities must be monitored for exotic or invasive plant species and weeds. Site clearance will encourage the introduction of alien invasive plant species; The NMM Holdings Contractor should train the labourers on the removal and disposal of alien vegetation (Mechanical and Chemical).	NEM:BA CARA	Throughout the operational phase	Control and avoid	Control in order to avoid alien plants invasion

		<p>Chemical (herbicides) or mechanical removal may be used. If chemical methods are used the method of use is to be undertaken in accordance with manufacturer's specification for the weeds and this method and management is to be approved by the ECO</p> <p>Any eradicated exotic/invasive plant or weed vegetation must be removed from site and disposed of at an approved waste disposal facility or an alternative eradication method approved by the competent authority</p>				
Soil erosion	Soil	Erosion protection measures are to be undertaken. Daily	Rehabilitation in terms of MPRDA and NEMA principles.	Throughout the operational phase	Control and Remedy	Ensure that soil erosion is minimised

		<p>erosion protection monitoring is to take place at each drilling site prior to commencement of the daily works. If any erosion is identified it is to be remediated prior to the commencement of works.</p> <p>Daily erosion checks are to be undertaken on the sump area. If cracks or erosion is identified the side walls are to be battered back to ensure a safe environment for all. Drainage channels must be kept free draining at all times.</p> <p>No pooling of water will be allowed, drainage diversions must be provided to prevent scour of the site, and this is also to direct water away from</p>	<p>General implementation of activities taking Biodiversity Act and its guidelines into account</p>			
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		the impacted area to prevent erosion.				
Waste generation	Soil and Visual impacts	<p>Minimise littering on site and ensure that all labourers are trained in environmental awareness.</p> <p>Bins (sufficient number and capacity) to store general and hazardous produced on a daily basis shall be provided at each drilling site.</p> <p>The bins are to be vandal proof; sealed bins that cannot leak leachate material and waterproof that rain water cannot enter into them.</p> <p>Bins shall be emptied on a weekly basis or if there is a nauseous smell coming from them or vectors are breeding within them.</p>	National Environmental Management: Waste Management Act	Throughout the operational phase	Avoid	Avoid the excessive generation of general waste during this phase

		An integrated waste management approach shall be used, based on the principles of waste minimisation, reduction, re-use and recycling of materials.				
DECOMMISSIONING PHASE						
Removal of temporary infrastructure and final rehabilitation of disturbed areas						
Compaction and contamination of soils within the rehabilitation site.	Soil	All vehicles and machinery used at the rehabilitation site must be kept in good working order. No repairs of vehicles or machinery will be conducted at the rehabilitation site unless it is emergency repairs, which will be conducted on protected ground. Movement of vehicles and machinery should be limited to demarcated routes, which	Rehabilitation in terms of MPRDA and NEMA principles. General implementation of activities taking Biodiversity Act and its guidelines into account.	Throughout the Decommissioning Phase	Avoid	Rehabilitation of drilling sites shall be undertaken in line with closure objectives and in consultation with landowners.

		will be rehabilitated when no longer in use				
Re-instatement of soil productivity, land capability, land use and topographical patterns.	Soil	<p>Ensure that the soil in the vicinity of the rehabilitation site is not detrimentally impacted.</p> <p>All the waste from demolition must be collected from site for disposal. Once the area is shaped correctly the compacted areas are to be ripped at 300mm and topsoil is to be replaced.</p> <p>Areas that have not had topsoil stripped are to be monitored for alien plant growth and vegetation recovery. If after a year the vegetation has not recovered the area is to be hand seeded with a Highveld indigenous grass</p>	<p>Rehabilitation in terms of MPRDA and NEMA principles</p> <p>General implementation of activities taking Biodiversity Act and its guidelines into account.</p>	Throughout the Decommissioning Phase	Avoid	<p>Rehabilitation of drilling sites shall be undertaken in line with closure objectives and in consultation with landowners.</p>

Pollution of surface water environment	Surface water	Ensure that the rehabilitation of the site does not have detrimental impacts on the surface water environment.	The surface water leaving the rehabilitation site will comply with the Department of Water and Sanitation target of water quality parameters.	Throughout the Decommissioning Phase	Avoid	Rehabilitation of drilling sites shall be undertaken in line with closure objectives and in consultation with landowners.
Potential injuries to fauna and residents due to Geological instability.	Geology and social	Ensure that all drill holes have been refilled with rocks and or cement to avoid potential injuries to fauna and residents.	Rehabilitation in terms of MPRDA and NEMA principles Health and safety Act	Decommissioning Phase	Avoid	Rehabilitation of drilling sites shall be undertaken in line with closure objective
Air pollution from rehabilitation site.	Air Quality	Where necessary, wet suppression will be conducted at areas with excessive dust emissions. Vehicles and machinery will be well maintained. The traffic volumes and speed within the rehabilitation site will be controlled	National Environmental Management Air Quality Act	Throughout the Decommissioning Phase	Avoid	Rehabilitation of drilling sites shall be undertaken in line with closure objectives and in consultation with landowners.

Migration of animal life due to disturbance caused proposed project	Fauna	Use sites with most degraded environment for the site development. Trapping and killing of fauna will be prohibited at the prospecting site.	General implementation of activities taking Biodiversity Act and its guidelines into account.	During Site establishment	Control through visual monitoring and inspection	Minimise impact on fauna
Generated noise from the rehabilitation site	Noise	Smaller or less disruptive equipment should, where possible, be used when working near receptors. Equipment will be well maintained and fitted with the correct and appropriate noise abatement measures.	National Noise Control Regulations, SANS10103:2008 guidelines.	Throughout the Decommissioning Phase	Avoid	Rehabilitation of drilling sites shall be undertaken in line with closure objectives and in consultation with landowners. Ensure that the rehabilitation activities do not have detrimental impacts on people.

5. FINANCIAL PROVISION

5.1 Determination of the amount of Financial Provision

A total of **R 406 194.00** is required to both manage and rehabilitate the environment in respect of rehabilitation. NMM Holdings must update and review the quantum of the financial provision annually.

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

For a prospecting operation such as this, the primary closure and environmental objectives are to:

- Minimise the area to be disturbed and to ensure that the areas disturbed during the prospecting activities are rehabilitated and stable, as per the commitments made in this EMP.
- Sustain the pre-prospecting land use.
- To record and communicate the results of the monitoring programme during decommissioning to the participating stakeholders.

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

The environmental objectives in relation to closure will be consulted with the farmers and affected parties. It will be explained that should the prospecting yield negative results, then the end use for area will revert to its pre-prospecting land use (minutes to be incorporated on the final report). The end-use of the area will therefore not be changed by the prospecting operations.

5.4 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.

Table 25: Rehabilitation Plan

ASPECT/ IMPACT	REHABILITATION MEASURE	MONITORING FREQUENCY & RESPONSIBILITY
Removal of site structures	Clear and completely remove from site all site plant equipment, storage containers, signage, temporary services, fixtures and any other temporary works; and Ensure that all access roads utilised during site establishment (which are not earmarked for closure and rehabilitation) are returned (as far as possible) to their state prior to site establishment.	Once-off; NMM Holdings.
Vegetation clearing/Replanting	Remove any emerging alien and invasive vegetation to prevent further establishment; All planting work is to be undertaken by suitably qualified personnel making use of the appropriate equipment; Transplant during the winter (between April and September); and Plant indigenous plants to minimise the spread of alien and invasive vegetation.	When re-vegetation is done and in blooming season; NMM Holdings. or sub-contractor appointed
Topsoil replacement	Replace and redistribute stockpiled topsoil together with herbaceous vegetation, overlying grass and other fine organic matter in all disturbed areas of the prospecting site, including temporary access routes and roads. Replace topsoil to the original depth (i.e. as much as was removed prior to site establishment). Prohibiting the use of topsoil suspected to be contaminated with the seed of alien vegetation. Alternatively, the soil is to be sprayed with specified herbicides. Where local soil has poor drainage, broken rock (Approx. 75 mm in diameter) must be placed to a depth of 150mm at the bottom of the planting hole prior to planting and backfilling with approved plant medium mixture.	Once-off; NMM Holdings.
Waste and Rubble Removal	Remove from site all domestic waste and dispose of in the approved manner at a registered waste disposal site.	Once-Off; NMM Holdings.
Solid and Hazardous Waste	Dispose of all hazardous waste not earmarked for reuse, recycling or resale at a registered hazardous waste disposal site.	Once-off; NMM Holdings.

	<p>Remove from site all temporary fuel stores, hazardous substance stores, hazardous waste stores and pollution control sumps. Dispose of hazardous waste in the approved manner.</p> <p>Do not hose oil or fuel spills into a storm water drain or sewer, or into the surrounding natural environment.</p> <p>Dispose of all visible remains of excess cement and concrete after the completion of tasks. Dispose of in the approved manner (solid waste concrete may be treated as inert rubble, but wet cement and liquid slurry, as well as cement powder must be treated as hazardous waste).</p>	
Erosion protection	<p>Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the operational site.</p> <p>Retain shrubbery and grass species wherever possible.</p> <p>Perform regular monitoring and maintenance of erosion control measures.</p>	<p>After rainfall events; NMM Holdings or sub-contractor appointed</p>

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

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

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

The quantum of financial provision for the rehabilitation of negative environmental impact was determined in accordance with the National Environmental Management Act, 1998 (Act No.107 of 1998): Regulation (GNR 940) pertaining to the financial provision for the rehabilitation, closure and post closure of prospecting exploration, mining or production operations (DEA,2014).

A total amount of **R 406 194.00** will be set aside for rehabilitation purposes as estimated in line with the prospecting work programme.

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

NMM Holdings (Pty) Ltd undertakes to provide financial provision for the implementation of the rehabilitation plan.

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

- a) Monitoring of Impact Management Actions
- b) Monitoring and reporting frequency
- c) Responsible persons
- d) Time period for implementing impact management actions

Table 26: Mechanism for monitoring compliance

SOURCE ACTIVITY MONITORING AND REPORTING	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS

Site Establishment.	<ul style="list-style-type: none"> • Dust • Noise • removal of vegetation • disruption of animal life • habitat destruction • loss of geology • change in topography 	<ul style="list-style-type: none"> • Daily dust suppression • Monthly dust bucket monitoring 	Geologist and Project Manager	Daily and monthly
Traffic management	<ul style="list-style-type: none"> • Dust • noise • animal life disruption • Traffic Congestion 	<ul style="list-style-type: none"> • Monitor dust fallout levels monthly and • Noise level • Monitor the time frames in which heavy vehicles travel on main roads and national roads. 	Geologist and Project Manager	Monthly and when necessary
Ablution Facility	<ul style="list-style-type: none"> • Land contamination • Water contamination • health hazard 	<ul style="list-style-type: none"> • service the toilet facility • monitor water quality 	Geologist and Project Manager	When necessary and monthly
Existing/Access Routes	<ul style="list-style-type: none"> • dust • animal life disruption • Monitor dust. 	<ul style="list-style-type: none"> • Monitor dust fall out levels • Monitor speed on the road 	Geologist and Project Manager	Monthly and when necessary

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

Regular monitoring of all the environmental management procedures and mitigation measures shall be carried out by NMM Holdings in order to ensure that the provisions of this EMP are adhered to. Formal monitoring and performance assessment of the EMP will be undertaken on a monthly basis.

7. ENVIRONMENTAL AWARENESS

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

The following Environmental Awareness Training will be implemented by NMM Holdings in order to inform employees and contractors of the environmental risk that may result from their work, or the risk of their interaction with the sensitive environment. The training will be conducted as part of the induction process for all new employees (including contractors) that will perform work in terms of the proposed activities. Proof of all training provided must be kept on-site. The Environmental Awareness Training will, as a minimum cover the following topics.

Table 27: Environmental Awareness Plan

Surface and groundwater	<ul style="list-style-type: none">• Risks to surface and groundwater, e.g. fuel and chemical handling and further risks of erosion or damage to riparian vegetation.• How incidents should be reported, and emergency requirements.• The importance to reuse water and to prevent spillages.
Cultural Heritage	<ul style="list-style-type: none">• To respect all cultures and believes.• How to report any sightings of heritage importance as identified during operation activities (e.g. fossils)
Fauna	<ul style="list-style-type: none">• Overview of the fauna found on/around site and the uniqueness thereof.• Mitigation measures that all contractors and employees need to abide by.

	<ul style="list-style-type: none"> No contractor or personnel allowed to catch or kill any species, and how any sightings should be reported if further actions are required (e.g. to catch and release).
Flora	<ul style="list-style-type: none"> Overview of the flora diversity on site, and the rare and endangered nature thereof. Measures taken by the company to protect species. No contractor or personnel allowed to remove, harvest or destroy any flora species unless clearly instructed based on the operational plans.
Waste management	<ul style="list-style-type: none"> Measures to avoid waste generation and to participate in waste minimisation/reduction.
Traffic strategies.	<ul style="list-style-type: none"> To stay on designated roads and not create new roads on areas that will not be used for prospecting purposes. To be aware of the fauna species and to be on the lookout and avoid collisions.
Emergency Preparedness and Response	<ul style="list-style-type: none"> How to report any emergency or incident. Incident and emergency reporting requirements
General rules and conduct	<ul style="list-style-type: none"> Respect for the sensitive environment. Do not litter. Respect for each other and for different cultures. Safety and health requirements

7.2 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. Employees should be provided with environmental awareness training before prospecting operations start. All new employees should be provided with environmental awareness training. Induction courses will be provided to all employees by a reputable trainer.

8. SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

No risks have been identified other than those that have been identified within this document, these are to be communicated to all contractors and all contractors are to be provided with a copy of the approved EMPr. Environmental training needs for each section should to be identified and addressed to ensure environmental management is part of day to day operations. The environmental risk responsibilities guide the training requirements of each individual. The responsibility for each level of management according to the Integrated Risk Management and ISO14001 role descriptions are. Environmental training recommended for the different levels of management guide the training needs identification process. This is a minimum guideline and any additional training can be added where section specific issues or high-risk items require training and awareness It is the responsibility of the line manager to ensure environmental training needs for individual staff members are identified, agreed to, facilitated and tracked.

9. UNDERTAKING

a) The EAP herewith confirms

- i. the correctness of the information provided in the reports
- ii. the inclusion of comments and inputs from stakeholders and I&APs ;
- iii. the inclusion of inputs and recommendations from the specialist reports where relevant; and
- iv. 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:

LUSHIKA SERVICES (PTY) LTD

Name of company:

SEPTEMBER 2020

Date:

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