



mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

DRAFT BASIC ASSESSMENT REPORT
And
ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

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

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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.

Objective of the basic assessment process

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

- (a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- (b) identify the alternatives considered, including the activity, location, and technology alternatives;
- (c) describe the need and desirability of the proposed alternatives,
- (d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine:
 - (i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
 - (ii) the degree to which these impacts —
 - (aa) can be reversed;
 - (bb) may cause irreplaceable loss of resources; and
 - (cc) can be managed, avoided or mitigated;
- (e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—
 - (i) identify and motivate a preferred site, activity and technology alternative;
 - (ii) identify suitable measures to manage, avoid or mitigate identified impacts; and
 - (iii) identify residual risks that need to be managed and monitored.

DEFINITIONS

Alternatives - In relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to –

- i. The property on which or location where it is proposed to undertake the activity;
- ii. The type of activity to be undertaken;
- iii. The design or layout of the activity;
- iv. The technology to be used in the activity, and;
- v. The operational aspects of the activity.

Baseline - Information gathered at the beginning of a study which describes the environment prior to development of a project and against which predicted changes (impacts) are measured.

Basic Assessment Process – This is the environmental assessment applied to activities listed in Government Notice No. R 983 (Listing 1) as amended by GNR 327 (dated 7/04/2017) and No. R985 (Listing 3) as amended by GNR 324 (dated 7/04/2017). These are typically smaller scale activities of which the impacts are generally known and can be easily managed. Generally, these activities are considered less likely to have significant environmental impacts and, therefore, do not require a full-blown and detailed Environmental Impact Assessment (see below).

Biodiversity - The diversity, or variety, of plants, animals and other living things in a particular area or region. It encompasses habitat diversity, species diversity and genetic diversity.

Borehole - Includes a well, excavation, or any other artificially constructed or improved groundwater cavity which can be used for the purpose of intercepting, collecting or storing water from an aquifer; observing or collecting data and information on water in an aquifer; or recharging an aquifer.

Community - Those people who may be impacted upon by the construction and operation of the project. This includes neighbouring landowners, local communities and other occasional users of the area.

Construction Phase - The stage of project development comprising site preparation as well as all construction activities associated with the development.

Consultation - A process for the exchange of views, concerns and proposals about a project through meaningful discussions and the open sharing of information.

Critical Biodiversity Area - Areas of the landscape that must be conserved in a natural or near-natural state in order for the continued existence and functioning of species and ecosystems and the delivery of ecosystem services.

Cumulative Impacts - Direct and indirect impacts that act together with current or future potential impacts of other activities or proposed activities in the area/region that affect the same resources and/or receptors.

Environment - The surroundings within which humans exist and that are made up of

- i. The land, water and atmosphere of the earth;
- ii. Micro-organisms, plant and animal life;
- iii. Any Part or combination of (i) and (ii) and the interrelationships among and between them; and
- iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

Environmental Authorisation (EA) – The authorisation by a competent authority of a listed activity.

Environmental Assessment Practitioner (EAP) – The person responsible for planning, management and co-ordination of environmental impact assessment, strategic environmental assessments, environmental management plans or any other appropriate environmental instrument introduced through regulations.

Environmental Impact Assessment (EIA) – In relation to an application to which scoping must be applied, means the process of collecting, organizing, analysing, interpreting and communicating information that is relevant to the consideration of that application. This process necessitates the compilation of an Environmental Impact Report, which describes the process of examining the environmental effects of a proposed development, the anticipated impacts and proposed mitigatory measures.

Environmental Impact Report (EIR) - A report assessing the potential significant impacts as identified during the Scoping phase.

Environmental Management Programme (EMPr) - A management programme designed specifically to introduce the mitigation measures proposed in the Reports and contained in the Conditions of Approval in the Environmental Authorisation.

Gross Domestic Product (GDP) by region - represents the value of all goods and services produced within a region, over a period of one year, plus taxes minus subsidies.

Hydrocarbons – Oils used in machinery as lubricants, including diesel and petrol used as fuel.

Impact - A change to the existing environment, either adverse or beneficial, that is directly or indirectly due to the development of the project and its associated activities.

Interested and Affected Party (I&AP) – Any individual, group, organization or associations which are interested in or affected by an activity as well as any organ of state that may have jurisdiction over any aspect of the activity.

Municipality –

- (a) Means a metropolitan, district or local municipality established in terms of the Local Government: Municipal Structures Act, 1998 (Act No. 117 of 1998); or
- (b) In relation to the implementation of a provision of this Act in an area which falls within both a local municipality and a district municipality, means
 - (i) The district municipality, or

- (ii) The local municipality, if the district municipality, by agreement with the local municipality, has assigned the implementation of that provision in that area to the local municipality.

NEMA EIA Regulations - The EIA Regulations means the regulations made under section 24(5) of the National Environmental Management Act (Act 107 of 1998) (Government Notice No. R 982, R 983, R984 and R 985 in the Government Gazette of 4 December 2014 refer as amended by GNR 324, 325, 326 and 327 of 7 April 2017.

No-Go Alternative – The option of not proceeding with the activity, implying a continuation of the current situation / status quo

Public Participation Process (PPP) - A process in which potential Interested and Affected Parties are given an opportunity to comment on, or raise issues relevant to, specific matters.

Registered Interested and Affected Party – All persons who, as a consequence of the Public Participation Process conducted in respect of an application, have submitted written comments or attended meeting with the applicant or environmental assessment practitioner (EAP); all persons who have requested the applicant or the EAP in writing, for their names to be placed on the register and all organs of state which have jurisdiction in respect of the activity to which the application relates.

Scoping process - A procedure for determining the extent of and approach to an EIA, used to focus the EIA to ensure that only the significant issues and reasonable alternatives are examined in detail

Scoping Report – The report describing the issues identified during the scoping process.

Significant impact – Means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

Spatial Development Framework (SDF) - A document required by legislation and essential in providing conservation and development guidelines for an urban area, which is situated in an environmentally sensitive area and for which major expansion is expected in the foreseeable future.

Specialist study - A study into a particular aspect of the environment, undertaken by an expert in that discipline.

Stakeholders - All parties affected by and/or able to influence a project, often those in a position of authority and/or representing others.

Sustainable development - Sustainable development is generally defined as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. NEMA defines sustainable development as the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.

Visibility - The area from which the project components would actually be visible and depends upon topography, vegetation cover, built structures and distance.

Visual Character - The elements that make up the landscape including geology, vegetation and land-use of the area.

Visual Quality - The experience of the environment with its particular natural and cultural attributes.

Visual Receptors - Individuals, groups or communities who are subject to the visual influence of a particular project.

ACRONYMS AND ABBREVIATIONS

amsl	Above mean sea level
BA	Basic Assessment
BPEO	Best Practicable Environmental Option
CBA	Critical Biodiversity Area
DM	District Municipality
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
DSR	Draft Scoping Report
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
ESA	Ecological Support Area
ESaA	Early Stone Age
FoT	"Free on Truck ": means there is no processing and that it's a raw product.
FSR	Final Scoping Report
GA	General Authorisation
GDP	Gross Domestic Product
GDPR	Regional Gross Domestic Product
GGP	Gross Geographic Product
GNR	Government Notice Reference
ha	Hectares
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
km	Kilometres
km ²	Square kilometres
LED	Local Economic Development
LM	Local Municipality
LoM	Life of Mine
LN	Listing Notice
L/s	Litres per second
LSA	Late Stone Age
m ³	Metres cubed
MAP	Mean Annual Precipitation
MAPE	Mean Annual Potential Evaporation
MASMS	Mean Annual Soil Moisture Stress (% of days when evaporation demand was more than double the soil moisture supply)
MFD	Mean Frost Days
MPRDA	Mineral and Petroleum Resources Development Act 28 of 2002
MSA	Middle Stone Age
MSDS	Material Safety Data Sheet
NEMA	National Environmental Management Act 107 of 1998 as amended
NEM:BA	National Environmental Management: Biodiversity Act 10 of 2004
NEM:WA	National Environmental Management: Waste Act 59 of 1998
NFEPA	National Freshwater Ecosystem Priority Area
NHRA	National Heritage Resources Act 25 of 1999
NWA	National Water Act 36 of 1998
PES	Present Ecological State
RDL	Red Data List
ROM	Run of Mine
S&EIR	Scoping and Environmental Impact Reporting
SAHRA	South African National Heritage Resources Agency
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SLP	Social and Labour Plan
StatsSA	Statistics South Africa
WMA	Water Management Area
WML	Waste Management License
WUL A	Water Use License Application

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1 Contact Person & Contact Details EAP

1.1 Details of EAP

Name of The Practitioner: N.J. van Zyl

EAPASA Number 2019/2034

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1.2 Expertise of the EAP

The qualifications of the EAP

Current qualifications in this field were obtained through formal studies at the Cape Town Technicon, Nelson Mandela Metropolitan University and the University of the Orange Free State, which is the following:

- National Diploma Nature Conservation (1986)
- National Higher Diploma (B-Tech) Nature Conservation (1992)
- Master's Degree Environmental Management (MOB 750) (2001)

Further qualifications in this field were also obtained through short courses at the University of the Orange Free State, which is the following:

Environmental Impact Assessment (2001)

Wildlife Management through Veld Management (2001)

Resource evaluation and game ranch management (2003)

Arc GIS (2009)

Summary of the EAP's past experience.

(In carrying out the Environmental Impact Assessment Procedure)

With the implementation of the Mineral and Petroleum Resources Development Act 28 of 2002 Mr. van Zyl has started assisting small scale miners with all facets of applications for mining permits in terms of section 27 and prospecting rights in terms of section 16 of the MPRDA. Mr van Zyl has an excellent knowledge of the relevant acts applicable to the mining sector including the following:

- Mineral and Petroleum Resources Development Act 28 of 2002
- Mineral and Petroleum Resources Development Amendment Act 49 of 2008
- Mineral and Petroleum Resources Regulations 2004
- National Environmental Management Act 107 of 1998 as amended
- National Environment Laws Amendment Act 25 of 2014 as amended
- NEMA: Environmental Impact Assessment Regulations, 2014
- NEMA: Financial Provisioning Regulations, 2015
- NEMA: Waste Act 59 of 2008 as amended
- NEMA: Regulations regarding the Planning and Management of Residue Stockpiles and Residue Deposits, 2015
- National Water Act 36 of 1998 as amended (with special attention to section 21 water uses)

Since 2002 Mr. van Zyl completed more than 150 applications for mining permits and more than 100 applications for prospecting rights. The mineral regulations and environmental management for most of these projects were managed throughout the life of the project including:

- Applications – manual and Samrad
- Prospecting work programs including financial and technical competence
- Public participation process
- EIA and EMP's now BAR and EMP's
- Annual Rehabilitation Plans
- Final Rehabilitation, Decommissioning and Mine Closure Plans including Risk Assessment Reports

- Execution and registration of rights including sec 42 diagrams for MPTR0
- Performance audits including reviews of Annual Closure Plans and Rehabilitation, Decommissioning and Mine Closure Plans together with financial quantum reviews.
- Application for closure certificate

Although Mr. van Zyl specializes in small scale mining operations and prospecting operations that requires investigation, assessment and communication according to the procedure as prescribed in regulations 19 and 20 of the EIA Regulations he also assists 5 mining rights with environmental management. Other sections of the MPRDA that Mr. van Zyl has experience in is:

- Section 102 applications and Section 20 applications
- Section 53 Applications and Section 11 Applications

2 Location of the overall Activity

Table 1: Location of the overall Activity

Farm Name:	Property 1: Portion 1 Farm Melkboschkuil 132 in extent approximately 2117.7402Ha. Registered in the name of O'okiep Copper Co (Pty) Ltd by virtue of title deed T1639/1942CTN. SG Code C05300000000013200001 Property 2: Portion 26 Farm Melkboschkuil 132 in extent approximately 615.8923Ha. Registered in the name of Du Toit Sarel Stephanus Francious by virtue of title deed T5729/2005CTN. SG Code C05300000000013200026 Property 3: Portion 27 Farm Melkboschkuil 132 in extent approximately 669.0363Ha. Registered in the name of Global Pact Trading 622 (Pty) Ltd by virtue of title deed T74196/2008CTN. SG Code C05300000000013200027 Property 4: Portion 28 Farm Melkboschkuil 132 in extent approximately 575.3558Ha. Registered in the name of Visser Rein Ronald Gerhard by virtue of title deed T145/2016CTN. SG Code C05300000000013200028 Property 5: Portion 33 Farm Melkboschkuil 132 in extent approximately 10.7449Ha. Registered in the name of South African National Roads Agency (Pty) Ltd by virtue of title deed T57897/2008CTN. SG Code C05300000000013200035 Property 6: Portion 35 Farm Melkboschkuil 132 in extent approximately 388.011Ha. Registered in the name of Z.M. Tollenaar by virtue of title deed T61072/2016CTN. SG Code C05300000000021400007 Property 7: Portion of Portion 23 Farm Melkboschkuil 132 in extent approximately 1492.2603Ha. Registered in the name of Nama Khoi Municipality by virtue of title deed T29905/2013CTN. SG Code C05300000000013200023 Property 8: Farm 635 in extent approximately 2270.0416Ha. Registered in the name of Marlin Granite (Pty) Ltd. by virtue of title deed T8797/2002CTN. SG Code C05300000000063500000
Application area (Ha)	7318.9358Ha
Magisterial district:	Namakwaland

Distance from nearest town	5km east and northeast of Springbok, Northern Cape Province
21-digit Surveyor General Code	Refer above

2.1 Locality map (show nearest town, scale not smaller than 1:250000). Refer to the locality plan **Figure 1** and **Figure 2** that shows the properties and co-ordinates.

3 Description of the scope of the proposed overall activity

3.1 Introduction and Background

This application employs a phased approach, where the work program is divided into several sequential sections. At the end of each section there will be a brief period of compiling and evaluating results. These results will not only determine whether the project proceeds, but also the manner in which it will go forward. Essentially, the Company will only action the next stage once satisfied with the results obtained. In addition, smaller, non-core parts of the work program will be undertaken if warranted.

Essentially the program can be summarized as:

Phase	Activity	Timeframe
Phase 1		Year 1 & 2 - desktop work, investigations and assessment of historical data
Phase 2		Year 3 & 4 - Drilling (RC and/or core drilling) and analysis
Phase 3		Year 5 - Consolidation, compilation & reporting

The prospecting work program below is schematic and applicable to “virgin territory”. Unforeseen circumstances, e.g., earlier than anticipated identification of mineralization, may necessitate that the prospecting phases or subphases be accelerated for a portion of the prospecting area, while proceeding elsewhere at a slower rate.

Figure 1: Locality plan with major Towns and Routes

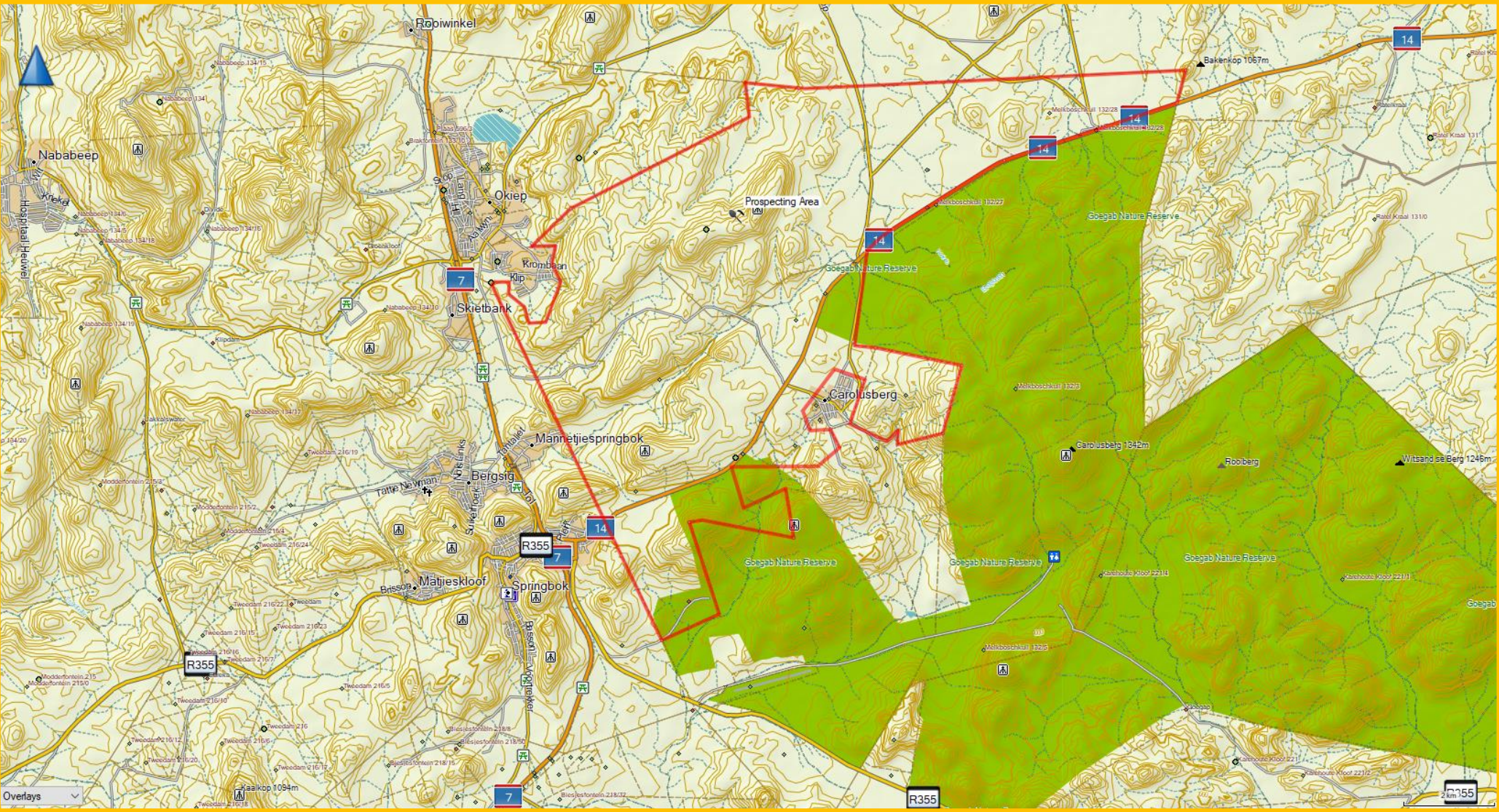


Figure 2: Layout plan

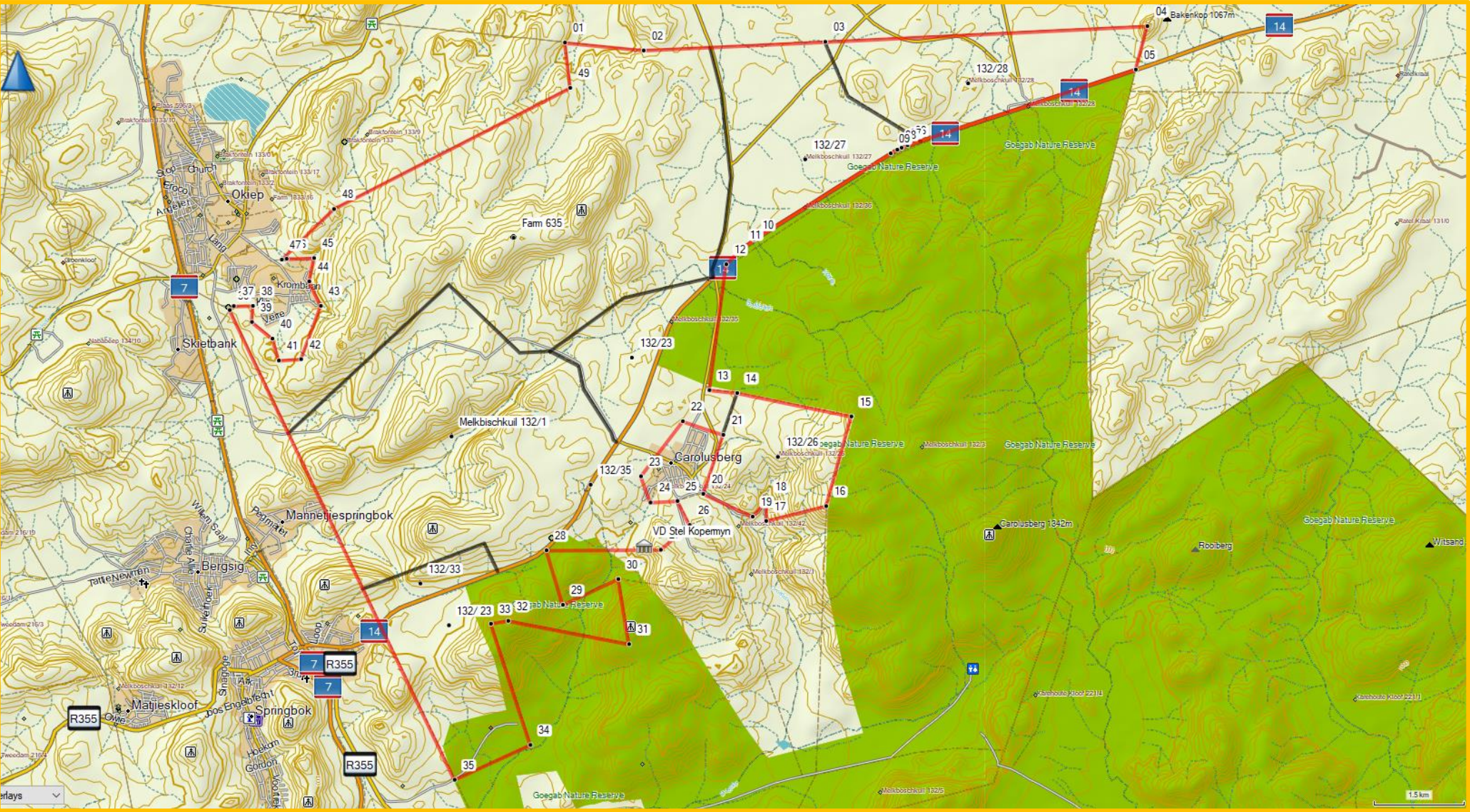


Figure 2a: Layout plan co-ordinates and land description

COORDINATES wgs 84		Properties
1:	S29.57202° E17.93389°	<p>The area numbered A to I represent an area of 7319Ha situated over:</p> <p>Farm 635 – 2270.0416Ha</p> <p>Melkboschkuil 132 Portion 1 - 2117.7420Ha</p> <p>Melkboschkuil 132 Portion of Ptn 23 - ±1300Ha</p> <p>Melkboschkuil 132 Portion 26 – 326.674 Ha</p> <p>Melkboschkuil 132 Portion 27 – 615.8923 Ha</p> <p>Melkboschkuil 132 Portion 28 – 575.3558 Ha</p> <p>Melkboschkuil 132 Portion 33 – 102.4843 Ha</p> <p>Melkboschkuil 132 Portion 35 – 10.7449 Ha</p> <p>Namaqualand District</p>
2:	S29.57317° E17.94628°	
3:	S29.57188° E17.97489°	
4:	S29.56954° E18.02565°	
5:	S29.57595° E18.02383°	
6:	S29.58722° E17.98786°	
7:	S29.58758° E17.98694°	
8:	S29.58788° E17.98627°	
9:	S29.58842° E17.98524°	
10:	S29.60123° E17.96370°	
11:	S29.60267° E17.96176°	
12:	S29.60490° E17.95931°	
13:	S29.62354° E17.95668°	
14:	S29.62397° E17.96106°	
15:	S29.62744° E17.97904°	
16:	S29.64075° E17.97507°	
17:	S29.64295° E17.96562°	
18:	S29.64008° E17.96576°	
19:	S29.64231° E17.96349°	
20:	S29.63892° E17.95571°	
21:	S29.63017° E17.95885°	
22:	S29.62818° E17.95250°	
23:	S29.63633° E17.94590°	
24:	S29.64022° E17.94740°	
25:	S29.63999° E17.95166°	
26:	S29.64357° E17.95356°	
27:	S29.64724° E17.94901°	
28:	S29.64734° E17.93102°	
29:	S29.65542° E17.93360°	
30:	S29.65158° E17.94234°	
31:	S29.66124° E17.94402°	
32:	S29.65778° E17.92498°	
33:	S29.65821° E17.92226°	
34:	S29.67620° E17.92850°	
35:	S29.68136° E17.91655°	
36:	S29.61171° E17.88109°	
37:	S29.61113° E17.88171°	
38:	S29.61109° E17.88472°	
39:	S29.61347° E17.88457°	
40:	S29.61595° E17.88781°	
41:	S29.61920° E17.88884°	
42:	S29.61898° E17.89233°	
43:	S29.61108° E17.89544°	
44:	S29.60747° E17.89360°	
45:	S29.60400° E17.89437°	
46:	S29.60411° E17.89003°	
47:	S29.60422° E17.88928°	
48:	S29.59672° E17.89749°	
49:	S29.57873° E17.93473°	

Table 2: Prospecting Work Program

Phase	Activity	Skill(s) required	Timeframe	Outcome	Timeframe for outcome	What technical expert will sign off on the outcome?
Phase 1 Year 1 & 2	NON - INVASIVE					
	Site establishment	Foreman, Site manager	0-4	Office, communications & staffing	4 months	Local manager
	Literature survey	Geologist	4-7	All past information & results. Initial report	7 months	Geologist
	Satellite Imagery studies	Geologist	4-7	Google Earth or similar study	12 months	Geophysicist
	Airborne Geophysics	Consulting geophysicist	7-12	Airborne survey	12 months	Geophysicist
	Geological mapping	Geologists	10 - 15	Geological map	15 months	Geologist
	Geochemical survey	Samplers, geologist	10 - 15	Geochemical map and targets	15 months	Geologist
	Geophysical survey/s	Geophysicist	15 - 20	Follow up survey	20 months	Geophysicist
	Interpretation	Geologist	18 - 24	Sections, plans and report	24 months	Geologist
Phase 2 Year 3&4	INVASIVE PROSPECTING					
	Drill planning and logistics	Driller, geologist	24 - 27	Exact locations, orientations, contract	27 months	Contract driller * site manager
	RC drilling	Foreman, driller, labour, geologist	27 - 33	Drill samples, assay	33 months	Geologist & compliance officer
	Diamond drilling	Labour, sampler driller, geologist	33 - 40	Foreman, labour, driller, geologist	40 months	Contractor and site manager
	Assay and data capture	Chemical analyst and geologist	28 - 41	Lab technician, geologist	41 months	Assay laboratory manager
	Down hole surveys	Geophysicist	40 - 42	Geophysics and radiometric	42 months	Consulting geophysicist

	Specialist drill chip/ core studies	Several specialists	40 – 44	Mineralogy, rock mechanics	44 months	Mineralogist, mining engineer
	Metallurgical test work	Sampler, consulting metallurgist	42 - 45	Information on crushing, milling, recovery and equipment	45 months	Metallurgist
	Interpretation of results	Data technician, geologist, engineers	42 - 48	Technical reports	48 months	Geologist, mining engineer
Phase 3 Year 5	NON-INVASIVE					
	Completion of all site work	Labour, Environmental specialist	48 - 51	Rehabilitation of site	51 months	Geologist, environmentalist
	Additional studies	Specialised inputs	48 – 52	Modelling, ore resources	52 months	IT & Resource specialists
	Valuation (initiated)	Mineral economist Finance specialist	52 - 55	Financial analysis, funding options	55 months	Mineral economist / Finance specialist
	Completion Report Prospecting Right renewal application	All disciplines	55 - 60	Pre-feasibility style report and possibly an initial resource statement	60 months	Geologist, mining engineer, mineral economist, senior manager

Initial prospecting will be carried out by the company itself, utilizing its own in-house geologists and engineers to conduct and oversee the majority of the work. Drilling will be contracted out to service providers. The methods detailed below would be used to investigate the area. It is not possible to give details of the drilling program before the surveys and surface work is completed. Drilling will be required both for new orebodies and twin drilling on known areas. Maximum drillhole depths are expected to be 200m, but with a number of shorter holes, especially when evaluating oxides.

3.2 The Scope of the Proposed Activities

3.2.1 Non-Invasive Investigations & surface surveys:

Method: Desk-top Studies

In order to direct the exploration programme in an efficient manner, there will be a review of information and data gathered during the previous exploration on the property (and in the area). This may include approaches to previous explorers with a view to obtaining previous prospecting results and information.

Later in the programme, short economic costing studies may be undertaken to define the mineable depth and critical mass of resources required to ensure that any identified deposits may be classed as resources in terms of their potential for economic extraction (a requirement of the SAMREC/JORC Code states that a 'Mineral Resource' may only be described as such if there are prospects for eventual economic extraction).

Method: Mineral Tenure and Environmental Work

This includes mineral rights acquisition, maintenance of existing rights, venture partnerships and legal work associated with the project. The mineral rights acquisition and maintenance is fundamental to the exploration project and has a strong impact on the pace of the exploration programme.

Method: Raising Finance

Important in exploration. In order to raise finance for the project regular reporting to the board/or directors/ shareholders is required.

Method: Geological Mapping

Geological mapping on a regional and detail basis using photo-geological, satellite imagery and resources as well as other interpretations from the previous stages as a guide. Data and information obtained during previous stages will be ground truth'd. This stage will also allow for initial site investigations relating to the prospecting stages regarding infrastructure and affected party liaison.

Practically this will be probably be done using the photogrammetry study or Google-Earth image as a base with localities positioned using GPS receivers.

Environmental disturbance is kept to a minimum and no environmental rehabilitation is generally required for this method of exploration.

Method: Geochemical Soil Sampling

Samples are collected at set intervals (commonly between 100m and 10m intervals) along each sample line and are often composited on a 50m or 100m basis.

Sample pits are dug to a consistent depth of 30cm (this is a typical depth but the depth is dependent on results from orientation survey) and the excavated soil is retained. A sample (in the region of 500g or smaller for Au and PGM) is taken from the bottom of the pit. The pit is then filled in with the retained soil. Soil and/or stream sediment samples collected along traverses will be screened to minus 80# or minus 200# (depending on the results of orientation studies) for analysis.

Indicative sample results may be obtained by doing a systematic handheld XRF assay programme under controlled procedures.

Chosen samples may be bagged in clear plastic bags, duplicate ticketed and dispatched to a commercial sample preparation and assay laboratory. The external sample preparation lab will dry and homogenize the samples. They will then dry screen the sample to 150 microns (or alternative, dependent on the orientation survey), and retain the remaining oversize material. A set weight of this sample material is processed by the laboratory and assayed. The assay methods will vary on the type of mineralisation, the host material of the sample and the orientation study. More than one assay method may be used.

Quality control samples are submitted in a chosen ratio, which is generally a 1 in 20 ratio.

The remaining screened material is stored at the laboratory or core shed for remedial or further work.

Environmental disturbance is kept to a minimum and no environmental rehabilitation is generally required for this method of exploration.

3.2.2 Invasive Investigations & surveys:

This prospecting work programme does not allow for large excavations, trenching or pitting, nor for bulk sampling. In the event that these methods are required then a Prospecting Work Programme amendment (and related Environmental Authorisation amendments) will be submitted in terms of the relevant legislation.

Drilling is currently the only invasive-prospecting methods planned.

Method: Drilling

Drilling to test the more promising geophysical and soil geochemical anomalies may follow. If economic grades of base metals are intersected, follow-up RC and/or diamond drill holes will be drilled for the purpose of delineating the economic zone.

RC Drilling

Reverse circulation or RC drilling is possibly the most definitive and powerful exploration tool in this hard rock environment. Under the direct supervision of a resident geologist, holes would be sited over interesting structures and hot spots located from earlier aerial and ground surveys. Cuttings would be collected by cyclone and the material split between the chip tray and sampling. Chippings would be photographed, logged and a sample taken for analysis on a 1m interval from all target horizons.

Diamond Core Drilling

Borehole sites are GPS located and pegged with a steel peg. The site is inspected and photographed prior to any disturbance. A drill pad is then cleared, keeping disturbance to the native vegetation to an absolute minimum. Any topsoil removed is stored separately for later reuse. These holes would be drilled in phases, with the first phase of holes being drilled as recce holes or on a wide grid on the target areas identified during Phase 1 and the balance being drilled on a tighter grid as the target becomes more resolved. If required, each percussion hole would be started as an 8-inch diameter hole to allow for casing to be inserted deep enough to stabilize overburden and thereafter progress to 60m as a 6-inch diameter hole. Diamond drilling may follow the percussion pilot drill or diamond drill will be used from surface with NQ, TNW or BQ core sizes. Plastic lining to prevent oil spillage is used under the rig. After the drilling operation is complete, each borehole collar is surveyed, and the site is rehabilitated and photographed. The retained topsoil is used to fill any sumps and is reseeded if necessary. Any spoils or drilling material is transported off site and disposed of in an approved area.

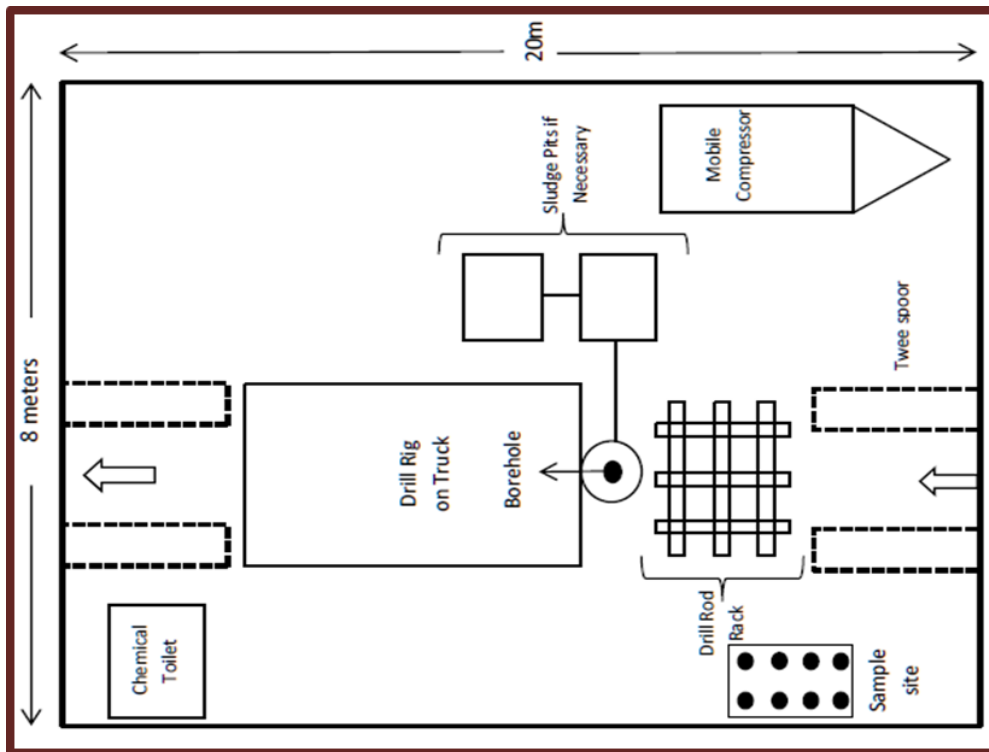


Figure 3 Typical layout of a diamond drill platform



Figure 4 Typical configuration of a diamond drill rig

General Drilling Procedures and Drill Sample Preparation

During the diamond drilling phase geological supervision and drill chip/ core processing can take place simultaneously. The drilling program may be interrupted occasionally to allow time for assaying, data processing and revision of the structural interpretation. Mineralised drill chip/ core will be split with a core splitter. One half of the split drill chip/ core will be sent for assay, while the other half is kept for record purposes. All drill chip/ cores will be stored after processing is completed. Borehole collars will be surveyed using a differential GPS Receiver. Down-hole surveys to

detect deviation will only be carried out on selected holes. Collars will be covered with numbered cement slabs until the end of the prospecting period.

Drill chip/ cores are logged by skilled personnel and samples chosen, core cut and representative samples would be submitted to a reputable assay laboratory for crushing, milling and assay using the best method as determined by the orientation survey.

For stone chips produced by reverse circulation drilling, drill chips are collected at a set interval, often 1m, in bags directly from the drill-rig, often using a cyclone to collect the whole sample and this reduces the dust.

The geologist logs a representative sample for each interval. A split of the sample is then processed for analysis if required.

After the drilling operation has been completed, each borehole collar will be surveyed, and the site will be rehabilitated and photographed. For percussion drilling the unrequired chips are sometimes returned down the hole and the hole may not be marked for short holes. The GPS co-ordinates are known.

The drill site is only considered rehabilitated when the project geologist has signed the drill pad rehabilitation off.

3.2.3 Compilation & reporting

Completion Studies and Pre-feasibility

Method: Metallurgical Test work

Metallurgical work may be undertaken using the drill cores obtained during drilling. At this stage only, bench scale test work is considered to define the likely upgrading and hydro-metallurgical process that would be applied to any ore grade material encountered. Other test work will focus on establishing preliminary bond work indices and ore grindability to be used for conceptual plant design.

Method: Pre-Feasibility Studies

The purpose of the pre-feasibility study is to determine if the information collected in the previous stages, in combination with other historical information suggests the establishment of a mining operation and confirms that the cost of a full feasibility study is warranted.

It is similar to a full Feasibility Study, except the confidence levels are lower and it is thus seen rather as an internal document where a policy decision is made rather than an external public document such as a full Feasibility Study used for fund raising.

The scope of this stage includes resource calculations and estimates, mine optimisation, layout and design, metallurgical process design, marketing and financial studies.

This stage involves:

- continued digital modelling and evaluation,
- the generation mineralization distribution histograms and
- mine pre-feasibility studies including:
 - Mining method selection and the development of a mining schedule and layout
 - Costing exercises
 - Metallurgical plant design, costing and feasibility.
 - Environmental and social scoping studies
 - Base case evaluation and cashflows

Method: Feasibility Studies

Provided the pre-feasibility stage is positive and finance is available, a Feasibility Study detailing the plans for exploitation of the deposit may be undertaken. This will likely fall into the renewal period of the right. This would be done in conjunction with an internationally reputable geological and mining consulting firms who would

undertake independent 'sign off' on the studies. This is similar in content to the pre-feasibility study except it is conducted to a higher degree of confidence and encompasses other associated studies such as EIA, social and other studies that would ultimately form part of a Mining License/Right, should a production decision result. This will include water usage studies and water license applications and other regulatory studies and documentation.

3.2.4 Associated infrastructure

Accommodation will be provided off-site in one of the nearby towns, and not at the drill site.

Diesel will be contained in a mobile bowser.

Equipment will be transported to site via the existing roads (including gravel and jeep track). No new roads will be required.

No water will be abstracted in terms of section 21(a) of National Water Act, 1998 (Act no. 36 of 1998) and no water reticulation will be laid-on to the mine work area(s) either.

No processing plant and services will be developed on the prospecting area.

No offices and accommodation will be provided onsite that need decommissioning.

A temporary equipment laydown area will form part of the drill pad. This is also the area where the drill rig will be parked when not in use and will include an equipment/materials laydown (storage) area and a chemical toilet.

3.2.5 Rehabilitation

Rehabilitation is carried out on a continuous basis as part of the annual rehabilitation plan. Such rehabilitation is undertaken by scarifying the disturbed and or compacted areas to promote natural revegetation.

The rehabilitation work will be conducted in-house under the supervision of an ECO and be monitored continuously to ensure effective restoration and revegetation of disturbed areas.

The post closure objective is to restore the land to its pre-prospecting land use for stock farming taking into account the transformed areas due to historic mining activities. Re-vegetation of the disturbed areas on virgin land will follow a process of natural plant succession starting with pioneer plants.

Post prospecting topography for most of the area will follow the original landform shape except where changes due to historic disturbances occurred that will not form part of the environmental responsibilities of the applicant due to the specific nature of the exploration program with drilling as the only invasive prospecting activity.

Rehabilitation will take place according to the approved Rehabilitation and Closure Plan and only involve shaping to construct the required profile of the drill sumps and removing of drill spoils. It consists mostly of backfilling drill holes with the drill chips, removing of drill spoils from possible sumps, backfilling and profiling of sumps. The compacted areas due to drilling platforms and tracks used for drilling will be ripped to promote natural re-vegetation.

The operation will not create any overburden or fine residue dumps. No water reticulation will be laid-on to the mine work area(s) either. No processing plant and services will be developed on the prospecting area and no offices and accommodation will be provided onsite that need decommissioning. Roads, access control and fencing will remain as part of agricultural operations.

3.3 Listed and specified activities

Table 3: Listed and specified activities

NAME OF ACTIVITY	Aerial extent of the Activity Ha or m ²	LISTED ACTIVITY	APPLICABLE LISTING NOTICE	WASTE MANAGEMENT AUTHORISATION
Prospecting Activities Non-invasive	7319Ha	Yes	LN 1 - GNR 517 of 2021 Activity 20	No
Drilling Activities including drill platforms	< 1Ha 160m ² per platform refer Fig 2	Yes	Any activity including the operation of that activity which requires a prospecting right in terms of section 16 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity as contained in Listing Notice 1 or in Listing Notice 3 of 2014, required to exercise the prospecting right.”;	No
Chip & Core Sampling	±18m ³	Yes		No
Soil- and Stream Sampling	±1m ³	Yes	LN 1 - GNR 517 of 2021 Activity 20	No
Drill traverses (tracks)	950m tracks ±3.5m wide	Yes	LN 1 - GNR 517 of 2021 Activity 20	No
Hydrocarbon storage	± 5m ³	No Total volume < 80m ³	Not listed	No
Sanitation requirements (Chemical)	± 5 m ²	No	Not listed	No

Drill sumps if required will be approximately 2.5m x 2.5m x 1.7m each drill pad will be contained to an area of about 160m².

The estimated volume of material to be extracted from each drill hole is 1.8m³ (based on a diameter of drill hole of 165mm, and depth of drill hole of 100m). This total ±9m³ of material that will be extracted from the drill holes, and thereafter replaced during rehabilitation of the drill holes.

Soil samples of less than 0.01m³ each will be collected from streams and the total samples will not exceed 100 totaling 1m³.

4 Policy and Legislative Context

Table 4: Policy and Legislative Context

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT (E.g., In terms of the National Water Act a Water Use License has/has not been applied for)
Legislation		
Constitution of South Africa, specifically everyone has a right; a. to an environment that is not harmful to their health or wellbeing; and b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that: i. prevents pollution and ecological degradation; ii. promote conservation; and iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.	Prospecting activities	The prospecting activities shall be conducted in such a manner that significant environmental impacts are avoided, where significant impacts cannot all together avoided be minimised and mitigated in order to protect the environmental right of South Africans.
Minerals and Petroleum Development Resources Act, Act 28 of 2002 (MPRDA) section 16 (as amended) MPRDA Regulations as amended by GNR349 of 18 April 2011.	Application to the DMR for a prospecting right in terms of Section 16	The conditions and requirements attached to the granting of the Prospecting Right will apply to the prospecting activities. DMR is the Competent Authority (CA) for this NEMA and NEM:WA application.
National Environmental Management Act, No 107 of 1998 (as amended) (NEMA)	Application to the DMR for Environmental Authorisation in terms of the 2014 EIA Regulations as amended by the 2021 EIA Regulations. Refer to Table 3	An Application for Environmental Authorisation must be submitted to DMR for an Environmental Authorisation. The listed activities in Table 3 that are triggered determine the Environmental Authorisation (EA) application process to be followed. The appropriate EA will be obtained before proceeding with any prospecting activities in terms of the prospecting right application. The compilation of this BAR, EMPr and the Public Participation Process is required in terms of NEMA.

<p>National Environmental Management: Waste Act, Act 59 of 2008 (NEMWA)NEM: WA (as amended)</p> <p>Waste listed activities in GNR 921 (dated 29/11/ 2013)</p> <p>Regulations regarding the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation in GNR 632 of 24 July 2015.</p>	<p>Refer to Table 3</p> <p>No applicable waste activities identified in terms of GNR 921 (dated 29/11/ 2013)</p> <p>General waste management measures as part of EMP and environment awareness plan</p>	<p>No listed activities are triggered or included as part of the Environmental Authorisation (EA) application process.</p> <p>The generation of potential waste will be minimized through ensuring employees of the drilling contractor are subjected to the appropriate environmental awareness campaign before commencement of drilling.</p> <p>All waste generated during the drilling activities will be disposed of in a responsible legal manner.</p> <p>Proof of legal disposal will be maintained on site.</p>
<p>National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) [NEMBA] National list of ecosystems that are threatened and in need of protection, 2011 (in GN 1002 dated 2 December 2011)</p>	<p>Section 8</p> <p>Figure 10</p>	<p>The major part of the prospecting area is located within a Critical Biodiversity Area One (CBA 1). CBA 1 & 2 require an EIA process to address the issues of sustainability. Due to the small scale of invasive activities <1Ha less than 0.01% of the area will be disturbed and rehabilitation is provided for in the EMPR</p>
<p>National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) [NEMBA]</p> <p>Alien and Invasive Species List, 2016 (in GN No. 864 dated 29 July 2016)</p>	<p>Section 8</p>	<p>Alien invasive vegetation management is included in the EMPr.</p>
<p>National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004). National Dust Control Regulations in GN R827 of 1 November 2013</p>	<p>Section 8</p>	<p>Dust control measures are included in the EMPr</p>
<p>National Heritage Resources Act, 25 of 1999 ("NHRA")</p>	<p>Section 8</p>	<p>A desktop AIA and PIA were done to identify no go areas during drilling and all mitigation measures and conditions form part of the EMPr</p>
<p>National Water Act (Act 36 of 2008)</p>	<p>Section 8 for description of water resources in local area,</p>	<p>A Water Use Authorisation (License or GA) is only required for drilling within or within 500m of any drainage channels.</p> <p>No water use license is required for this application.</p> <p>Any water required for drilling activities will be obtained from a legal source i.e., local authority and brought in via a mobile water tanker.</p>
<p>Promotion of Administrative Justice Act, 2000 (Act 3 of 2000) [PAJA]</p>	<p>Decision by the Competent Authority</p>	<p>Gives effect to section 33 of the Constitution that requires that "Everyone has the right to administrative action that is lawful, reasonable and procedurally fair". All administrative actions must be based on the relevant considerations</p>
<p>Land Use Planning Act, 2014 (Act 3 of 2014) (LUPA)</p>	<p>Comments required from the Nama Khoi Local Municipality.</p>	<p>Consent use in terms of the Municipal Planning By-Law, 2015 is required to permit mining on properties that are zoned for Agricultural purposes.</p>
Municipal Plans and Policies		

Namakwa District Municipality Integrated Development Plan (IDP) 2017/2022	Section 5.2	The Need & Desirability of the project is referenced in terms of the District Municipality IDP, specifically relating to employment creation, and ensuring the implementation of environmentally sustainable practices, along with an integrated approach to addressing climate change response, which are included in the EMPr
Nama Khoi Local Municipality Integrated Development Plan (IDP), Draft 2018/2019	Section 5.3	The Need & Desirability of the project is referenced in terms of the IDP, specifically relating to employment creation and sustainable resource utilisation. Relevant mitigation measures are included in the EMPr.
Standards, Guidance and Spatial Tools		
Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, and South African National Biodiversity Institute. 2013. Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector. Pretoria.	Section 5 & 8. Figure 5	The mitigation measures to address and mitigate the potential impacts of the mining are included in the EMPr.
DEA Guideline on Need & Desirability (2017)	Section 5.6	Refer to Section 5.6
DEA Guideline on PPP DMR Guideline on Consultation with Communities and I&APs (undated)	Section 7 & Table 5	Refer to Section 7 & Table 5
DEAT Integrated Environmental Management Information Series 5: Impact Significance (2002)	Section 8	Refer Impact Assessment Tables
DEAT Integrated Environmental Management Information Series 7: Cumulative Effects Assessment (2004)	Section 8	Refer Impact Assessment Tables
Namakwa District Biodiversity Sector Plan (2008) BGIS (www.bgis.sanbi.org)	Baseline environmental description	Used during desktop research to identify sensitive environments within the mining right area.
SANS 10103:2008 The Measurement and Rating of Environmental Noise with Respect to Land Use, Health, Annoyance and to Speech Communication	Management / Monitoring measures	Used to set the standard allowable for noise mitigation measures are included in the EMPr.
SANS 1929:2005 Edition 1.1 – Ambient Air Quality Limits for Common Pollutants		Standard for dust fallout. Dust mitigation measures are included in the EMPr.

5 Need and desirability of the proposed activities

5.1 Mining and Biodiversity Guidelines (2013)

The Mining and Biodiversity Guidelines (2013)¹ state that: “Sustainable development is enshrined in South Africa’s Constitution and laws. The need to sustain biodiversity is directly or indirectly referred to in a number of Acts, not least the National Environmental Management: Biodiversity Act (No. 10 of 2004) (hereafter referred to as the Biodiversity Act) and is fundamental to the notion of sustainable development. International guidelines and commitments as well as national policies and strategies are important in creating a shared vision for sustainable development in South Africa”.

DMR, as custodian of South Africa’s mineral resources, is tasked with enabling the sustainable development of these resources. This includes giving effect to the constitutional requirement to “prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development”².

The primary environmental objective of the MPRDA is to give effect to the “environmental right”³ contained in the South African Constitution. The MPRDA further requires the Minister to ensure the sustainable development of South Africa’s mineral resources, within the framework of national environmental policies, norms and standards, while promoting economic and social development.

The Mining and Biodiversity Guidelines (2013) document identifies four categories of biodiversity priority areas in relation to their biodiversity importance and implications for mining. The categories of relevance to this Prospecting Right area as shown in **Figure 5** are: Category B: Highest Biodiversity importance – highest risk for mining; Category C: High Biodiversity Importance – high risk to mining; and “Category D: Moderate Biodiversity Importance” – moderate risk for mining.

These categories have since been super-ceded by the Critical Biodiversity Area (CBA) map (**Fig 10**), which would be interpreted as Category B is now CBA 1, Category C is now CBA 2 and Category D is now Ecological support areas.

These categories basically require an environmental impact assessment process to address the issues of sustainability.

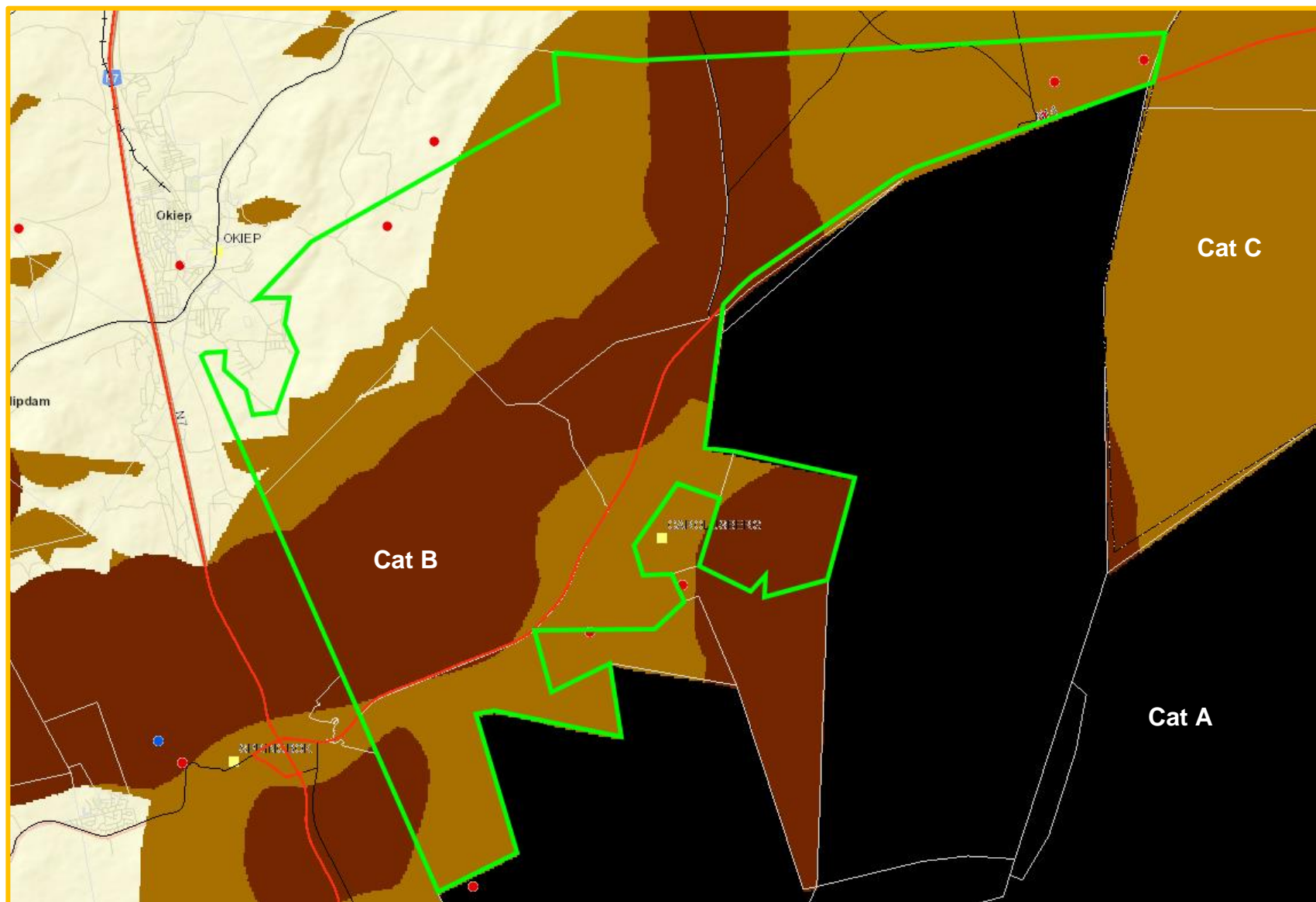
In terms of employment opportunities and job security, the prospecting activities themselves would not directly lead to job opportunities. Should prospecting activities prove that a feasible resource mineral is present to allow for mining, a new mine may be developed which would generate extensive employment opportunities in an area where employment is needed.

¹ Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, and South African National Biodiversity Institute. 2013. Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector. Pretoria.

² Constitution of the Republic of South Africa (No. 108 of 1996).

³ Section 24 of the Constitution states that “everyone has the right (a) to an environment that is not harmful to their health or well-being; and (b) 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.”

Figure 5: Location of Prospecting area in terms of Mining and Biodiversity Guidelines sourced off SANB BGIS Map Viewer



5.2 Namakwa District Municipality IDP 2017-2022

The vision of the Namaqua District Municipality IDP is: “Namakwa District Municipality, a centre of excellence!”

The Mission Statement is:

- The stimulation of radical economic and social transformation;
- The fostering of partnership with relevant role-players;
- Supporting and capacitating of local municipalities;
- Transparent and accountable processes; and
- Providing of local leadership

The Strategic Objectives are

- Monitor and support local municipalities to deliver basic services which include water, sanitation, housing, electricity and waste management
- Support vulnerable groups
- Improve administrative and financial viability and capability
- Promote and facilitate Local Economic development
- Enhance good governance
- Promote and facilitate spatial transformation and sustainable urban development
- Improve communication and communication systems
- Establish a customer care system
- Invest in the improvement of ICT systems
- To render a municipal health service
- To coordinate the disaster management and fire management services in the district
- Implement the climate change response plan
- Caring for the environment

Values

- The Namakwa District Municipality adheres to the values contained in the Batho Pele Principles.
- Caring for the environment and the effects of climate change, such as flood events, on the proposed prospecting project will be mitigated as per the measures contained in the EMPr. The mitigation for emissions of greenhouse gases from vehicles and machinery associated with the prospecting activities are addressed in the EMPr.

5.3 Nama Khoi Local Municipality IDP (Draft 2018-2019)

In the Constitution of South Africa (108 of 1996) the objectives of a municipality or local government structure are described as follows under “section 152. (1) The objects of local government are-

- (a) to provide democratic and accountable government for local communities;
- (b) to ensure the provision of services to communities in a sustainable manner;
- (c) to promote social and economic development;
- (d) to promote a safe and healthy environment; and
- (e) To encourage the involvement of communities and community organisations in the matters of local government”.

The vision of the Nama Khoi Local Municipality is: “To proudly deliver sustainable local economic development & climate resilient quality services to the Nama Khoi Municipality”

The IDP states that it is important that economic opportunities are expanded in local areas, in a way that takes both people and biodiversity into account to ensure sustainable livelihoods.

The report highlights that the Industrial mining corridor as indicated in the PSDF must be investigated for opportunities and exploited where possible.

The IDP identifies its strengths which include high quality & unspoiled environment, diversity of scenic landscapes and vast amounts of open land, a large labour pool and solar energy; weaknesses which include undiversified economy: over-dependence on mining and government services sectors, lack of jobs and economic development, lack of skills and poor quality of education; opportunities which include unexploited mineral opportunities' and Eco-tourism initiatives; and threats as water supply, water quality and brain-drain as individuals from the Northern Cape migrate from scarcity of business, finance and technical skills.

In terms of employment opportunities and job security, the prospecting activities themselves would not directly lead to job opportunities. Should prospecting activities prove that a feasible resource mineral is present to allow for mining, a new mine may be developed which would generate extensive employment opportunities in an area where employment is needed. The proposed prospecting operation will however assist in providing job security, local employment, local skills transfer and economic upliftment, in a sustainable manner.

5.4 Northern Cape Provincial Spatial Development Framework (NCPSDF)

The NCPSDF states that the: "Northern Cape is not one of South Africa's richest provinces in monetary terms. Accordingly, there is a need for coherent prioritisation of projects within a spatial economic framework that takes due cognisance of environmental realities and the imperative to create a developmental state". The NCPSDF was designed as an integrated planning and management tool for all spheres of government to facilitate on-going sustainable development throughout the province.

The NCPSDF, together with the Provincial Growth and Development Strategy (PGDS), is set to fulfil an important role as a spatial and strategic guideline that addresses the key challenges of poverty, inequality and environmental degradation through the innovative use of the resources (capital) of the province for the benefit of all concerned."

The potential for job security, employment and skills transfer are identified as positive environmental impacts in this impact assessment.

5.5 Northern Cape Provincial Growth and Development Strategy (NCPGDS)

The NCPGDS has the following vision for the province: "Building a prosperous, sustainable growing provincial economy to reduce poverty and improve social development." The strategy for the growth and development of the province is guided by the following key principles:

- Equality – notwithstanding the need to advance persons previously disadvantaged, development planning should ensure that all persons should be treated equally;
- Efficiency –the promotion of the optimal utilisation of existing physical, human and financial resources;

- Integration – the integration of spatially coherent regional and local economic development and improved service delivery systems.
- Good Governance – the promotion of democratic, participatory, cooperative and accountable systems of governance and the efficient and effective administration of development institutions;
- Sustainability – the promotion of economic and social development through the sustainable management and utilisation of natural resources and the maintenance of the productive value of the physical environment;
- Batho Pele – the placement of people and their needs at the forefront of its concern and serve their physical, psychological, developmental, economic, social and cultural interests equitably.

5.6 DEA Guideline on Need and Desirability (2017)

As referenced in the DEA Guideline on Need and Desirability (2017), NEMA defines “evaluation” as “the process of ascertaining the relative importance or significance of information, in the light of people’s values, preferences and judgements, in order to make a decision.” In evaluating each impact (negative and positive) in terms of each of the aspects of the environment, “need and desirability” must specifically be considered in the analysis of each impact of the proposed activity. However, to determine if the proposed activity is the best option when considering “need and desirability”, it must also be informed by the sum of all the impacts considered holistically. In this regard “need and desirability” also becomes the impact summary with regard to the proposed activity.

These Guidelines state that: “In considering the impact summary it must be remembered that ultimately the aim of EIA is to identify, predict and evaluate the actual and potential risks for and impacts on the geographical, physical, biological, social, economic and cultural aspects of the environment, in order to find the alternatives and options that best avoid negative impacts altogether, or where negative impacts cannot be avoided, to minimise and manage negative impacts to acceptable levels, while optimising positive impacts, to ensure that ecological sustainable development and justifiable social and economic development outcomes are achieved”.

The **principles of Integrated Environmental Management (EIM)** as set out in Section 23 of NEMA have been considered in this environmental assessment as explained below.

- **Environmental management placing people and their needs at forefront of its concern, and serve their physical, physiological, developmental, cultural and social interests equitably** – This process is being undertaken in a transparent manner and all effort is being made to involve all the relevant stakeholders and interested and affected parties. Public participation is being undertaken to obtain the issues / concerns / comments of the affected people for input into the process. Refer to Section 7 in this report.
- **Socially, environmentally and economically sustainable development** – All aspects of the receiving environment and how this will be impacted have been considered and investigated to ensure a minimum detrimental impact to the environment. Where the impact could not be avoided, suitable and effective mitigation measures have been proposed to ensure that the impact is mitigated, and these are detailed and included in the EMP.
- **Consideration for ecosystem disturbance and loss of biodiversity** – the project site includes portions identified as Critical Biodiversity Areas (CBA) 1 (**Figure 10**). The vegetation type found on site is not listed in the "National List of

Threatened Ecosystems that are Threatened and in Need of Protection" in GN 1002 dated 9/12/2011. Ecosystem disturbance and loss of biodiversity are considered in the impact assessment. The prospecting process that only include limited drilling is considered to be a relatively benign type of operation. Rehabilitation back to the natural state is a key component and will be undertaken in a phased manner as the activities progress. This EMPr and Closure Plan (**Annexure 1**) proposes mitigation measures which will minimise the impacts of the mining on the environment.

- **Pollution and environmental degradation** – The implementation of recommendations made and proposed mitigations are detailed in the EMPr, and Closure Plan (**Annexure 1**) to ensure minimum environmental degradation.
- **Landscape disturbance** – All aspects of the receiving environment and how this will be impacted have been considered and investigated to ensure a minimum detrimental impact to the environment. Where the impact could not be avoided, suitable and effective mitigation measures have been detailed in the EMPr and Closure Plan (**Annexure 1**) to ensure that the impacts are mitigated. For example, landscape disturbance impacts associated with the development of drill pads, erosion and dust have been identified and detailed mitigation measures are included in the EMPr to minimise the impacts.
- **Waste avoidance, minimisation and recycling** – These aspects were considered and incorporated into the EMPr and the Closure Plan (**Annexure 1**).
- **Responsible and equitable use of non-renewable resources** – These aspects have been considered and there is not much scope to reduce the use of non-renewable resources, such as vehicle transport.
- **Avoidance, minimisation and remedying of environmental impacts** - All aspects of the receiving environment and how this will be impacted have been considered and investigated to ensure a minimum detrimental impact to the environment. Where the impact could not be avoided, suitable and effective mitigation measures will be proposed to ensure that the impact is mitigated. A number of mitigation measures have been included in the EMPR and the Closure Plan (**Annexure 1**).
- **Interests, needs and values of Interested and Affected Parties** – This process has been undertaken in a transparent manner and all effort is being made to involve all the relevant stakeholders and interested and affected parties (I&APs). Comments received from I&APs on the Draft Basic Assessment Report to be included as part of the Final Basic Assessment Report are summarised in Section 7, **Table 4**.
- **Access of information** – Potential Interested and Affected Parties were notified of the proposal and the availability of the DBAR. They were also notified of having the opportunity to register as an I&AP and registered I&APs have been kept informed of the commencement of the Basic Assessment process.
- **Promotion of community well-being and empowerment** – This process is being undertaken in a transparent manner and all effort is being made to involve all the relevant stakeholders and registered I&APs.

Potential impacts on the biophysical environment and socio-economic conditions have been assessed, and steps have been taken to mitigate negative impacts, and enhance positive impacts. Adequate and appropriate opportunity is being provided for public participation. Environmental attributes have been considered based on the available information, and environmental management practices have been identified and

established to ensure that the proposed activities will proceed in accordance with the principles of IEM.

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

- The preferred and only location of the prospecting activity is on the earmarked sections.
- The preferred and only activity is the prospecting for Base Metals.
- The preferred and only technology is the use of drilling equipment for the location of potential Base Metal Ore bodies.
- The Site Plan or layout of the activity on the site is shown in **Figure 1 and 2**.

There are therefore no other reasonable or feasible sites, layouts, activities, technologies, or operational alternatives for further consideration in the impact assessment component, other than the mandatory “no-go” alternative that must be assessed for comparison purposes as the environmental baseline.

7 Details of the Public Participation Process Followed

7.1 Introduction

The public participation process has been conducted according to the requirements as prescribed in Regulations 40 to 44 of the EIA Regulations, 2014 (as amended).

The formal public participation process, which meets the requirements of the NEMA EIA Regulations and the MPRDA has been followed and include the following activities: (Refer **Annexure 2** Public Participation Summary)

Potential I&APs were notified about the project and of commencement of the Basic Assessment (BA) process and invited to registration as stakeholders by means of:

- Personal notification to directly affected landowners together with a Background Information Document (BID);
- Written notifications to other stakeholders including neighbours, Relevant Government Department, Local and District Municipalities (including traditional authorities where applicable) together with a Background Information Document (BID); and
- Media advertisements and site notices.
- Registered I&APs including the Relevant Government Department were given the opportunity to review and comment on the Draft Basic Assessment Report.
- Registered I&APs will be notified of the outcome of the environmental authorisation, and if required the appeal process to be followed.

7.2 Summary of issues raised by I&Aps

Table 5: Summary of issues raised by I&Aps (To be completed after public participation process)

Interested and Affected Parties, persons consulted is marked with an X	Date Received	Comments	Issues raised	EAPs response to issues as mandated by the applicant	Reference in this report where the issues and or response were incorporated.
ORGANS OF STATE					
Dept. Water & Sanitation					
SAHRA	X				
Department Environment and Nature Conservation					
Dept of Roads and Public Works					
Namakwa District Municipality Municipal Manager					
National Department of Transport; Environmental Co-ordinator					
Landowners or Lawful occupier/s of the land					
O'okiep Copper Co (Pty) Ltd					
Du Toit Sarel Stephanus Francious					
Global Pact Trading 622 (Pty) Ltd					
Visser Rein Ronald Gerhard					
Z.M. Tollenaar					
Nama Khoi Municipality					
Marlin Granite (Pty) Ltd					
Landowners or lawful occupiers on adjacent properties					
Goegap Nature Reserve					
Other Interested parties					

8 Process to reach the proposed preferred alternative

8.1 Process to Reach the Proposed Preferred Alternative

No site or technology alternatives have been considered for this prospecting application. The areas included in the prospecting right application were identified through historical prospecting and production records for the area and from designated research. Exploration in the general area has been ongoing for many years.

Geophysical methods have been proven to be very useful in detecting potential targets and will therefore be used to identify optimal locations of potential bodies of economic interest within the prospecting area prior to drilling. Subsequent drilling has been proven to be a suitable technique for sampling and recovering material to test for economic potential.

- The preferred and only location of the prospecting activity is on the earmarked section.
- The preferred and only activity is the prospecting for any potential mineral ore bodies.
- The preferred and only technology is the use of drilling equipment for the location of potential ore bodies.
- The Site Plan or layout of the activity on the site is shown in **Figure 1 and 2**.

There are therefore no other reasonable or feasible sites, layouts, activities, technologies, or operational alternatives for further consideration in the impact assessment component, other than the mandatory “no-go” alternative that must be assessed for comparison purposes as the environmental baseline. The No-Go Alternative will mean that mining will not take place. There will be no supply of base metals for industrial purposes. There will be no new employment opportunities or guaranteed job security for the existing mine employees on the adjacent mine.

The No-Go Alternative will result in the status quo remaining, and the ore deposit located adjacent to the existing mines not being exploited.

8.2 The Environmental attributes associated with the alternatives (Baseline Environment)

8.2.1 Regional setting

The project site is located within the Succulent Karoo Biome. The Succulent Karoo Biome is found mostly west of the western escarpment from the Luderitz District of Namibia through the western belt of the Northern Cape and Western Cape Provinces, and inland of the Fynbos Biome to the Little Karoo. Much of the terrain is flat to gently undulating, such as the western coastal platform, Knersvlakte and Tanqua Karoo. Hilly and more rugged topography occurs in Namaqualand, the Robertson Karoo and Little Karoo and parts of the western escarpment. The extreme altitudinal range is from sea level to about 1 500 m, but most of the area lies below 800 m.

The Succulent Karoo is a semidesert region with a strong maritime influence characterised by an even, mild climate. Most of the biome falls within a typical unimodal winter-rainfall region (Namaqualand and the western Great Escarpment), The Mean Annual Precipitation (MAP) for most of the area is between 100 and 200 mm. Some of the areas like the Richtersveld adjoining the Namib and Gariep Deserts as well as some of the Namaqualand Coastal areas have a MAP below 100 mm. The overall biome average is about 170 mm.

8.2.2 Geology

The regional geology in the area of the prospecting right application is predominantly Namaqua Metamorphic Complex with hybrid migmatites and granites / granodiorites and minor mafic intrusives, such as gabbro's and diorites in the form of sills and dykes. In the eastern portion granitoid emplacements predominate and are then replaced by metamorphosed schists and phyllites. Metamorphic alteration declines eastwards but is still regionally high-grade. Excluding some of the later intrusives, all these rocks are Precambrian in age. There is a large variety of lithologies, many of which graduate into another, are genetically related and influenced by poly-phase intrusion and metamorphism.

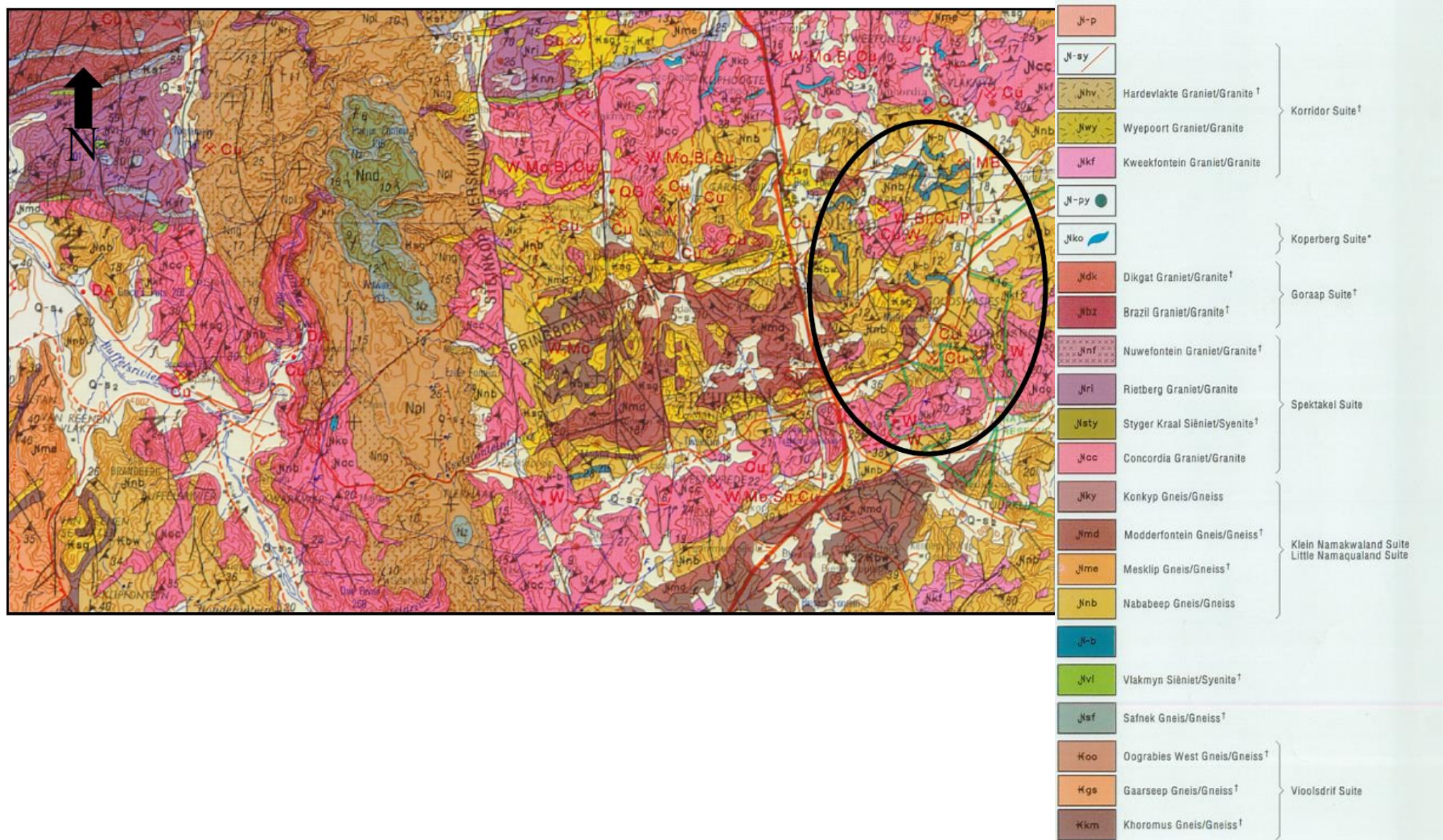
The Copper District in Namaqualand is underlain by a basement complex of a meta-volcano-sedimentary rocks known as the Bushmanland Group (previously the Okiep Group). Sequential intrusions followed with the Gladkop Suite, then the Klein Namaqualand Suite, the Spektakel Group and finally the Koperberg Suite. The latter comprises copper bearing basic intrusives and associated megabreccias. Rock types include anorthosites, diorites, glimmerites, norites and hypersthene. The mineralisation is predominantly found in the latter two lithologies.

The mineralisation in the Koperberg Suite is found where the host rock is a set of upright, easterly trending fold structures, known as "steep structures". It is within these folds that most mineralisation occurs and hence study and identification of the structural geology is highly important. Mineralisation can be quite variable in the form of podiform, massive and disseminated sulphides with higher concentrations in lensoid bodies along margins which form massive sulphides. The oxides are dominated by malachite and chrysocolla but are limited to shallow depths matching the shallow weathering profile. Generally, the sulphides form the bulk of the mineralisation and consist of bornite and chalcopyrite with lesser pyrite, pyrrhotite and chalcocite.

The property is adjacent to an OCC target area with a long mining history of high grade, shallow orebodies. Prospecting plans to investigate the potential for deeper and higher tonnage, lower grade areas. In some cases, mineralisation is evident at surface and extends to unknown depths. (Modified after K. van Wyk and Bulletrap, 2020)

Orion Minerals has recently, successfully used state-of the art geophysics in their Areachap Belt Project (near Prieska) to identify hidden targets and plan to be equally successful in this area of historically consistent economic ore deposits. (**Refer Figure 6**).

Figure 6: Geology of Prospecting area



8.2.3 Soil and land capability

Approximately 90% of NDM is used for livestock grazing and production, with the remainder comprising of mining, agriculture and urban development. The main crops currently grown in the NDM include Lucerne, oats, wheat and rooibos. Approximately 10% of the crops are planted near rivers for chance/accidental irrigation. The other approximately 90% are dry land crops, which are being planted in high rainfall areas with approximately 600mm/year.

Tourism is a seasonal feature – with visitors to the region arriving almost exclusively between July and October in order to take in the world-renowned yearly flower display. Urban development is not a major feature of the landscape and is not expected to increase much in the coming years. As such the proposed prospecting activities will not have an impact on agricultural land or agricultural production.

Land use involves mostly cultivated drylands and mining (diamonds, copper, base-metals, granite, sandstone and gypsum), as well as salt pans. Future pressures on biodiversity are likely to come from:

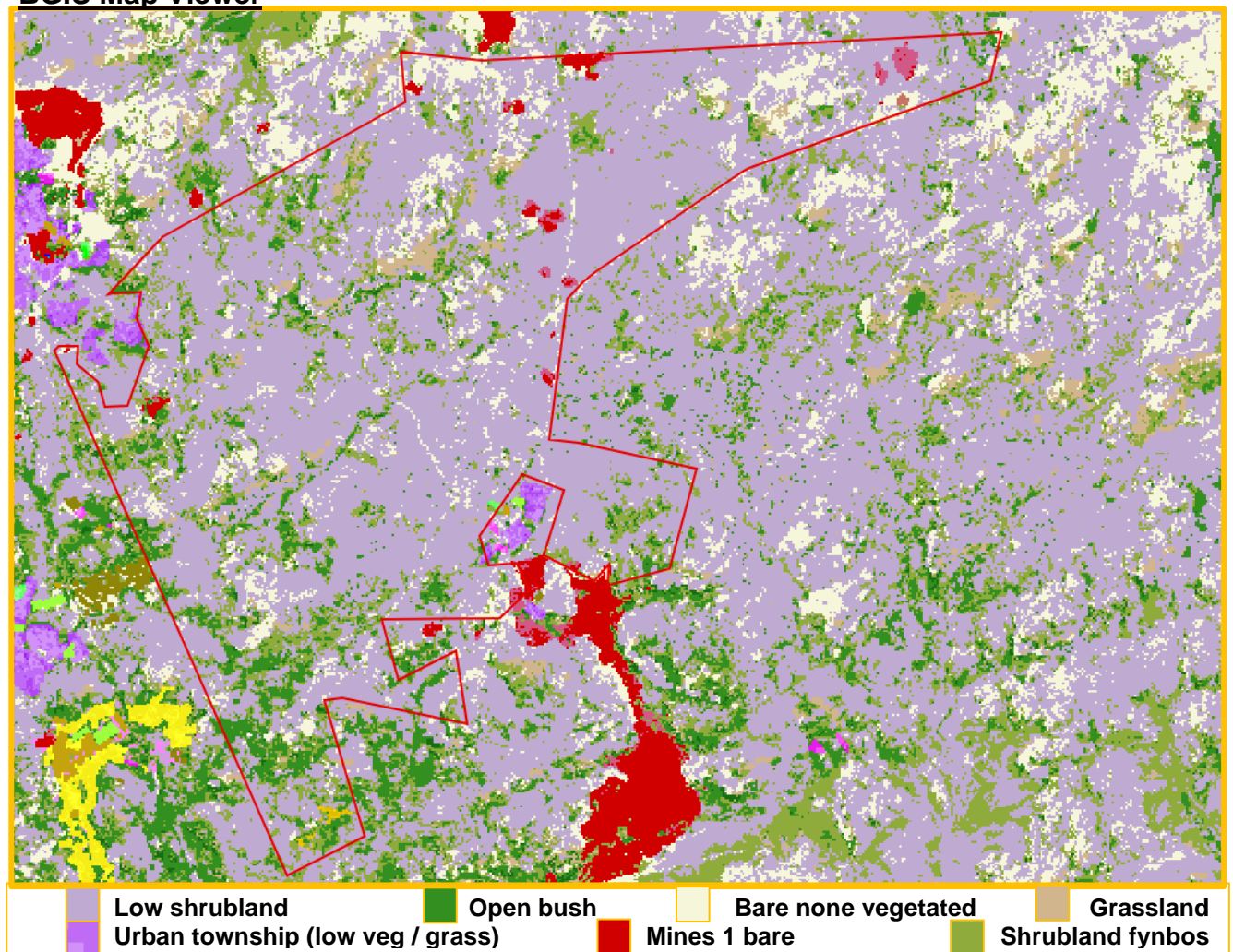
- new solar and wind farm development
- new mining development
- unsustainable use of natural resources, (especially due to overgrazing), and
- to a certain extent urban development

Note that current land cover indicators do not take into account degradation due to, for example, spread of alien plants, secondary impacts of mining (e.g., sand mobilization) or overgrazing by livestock. The Land Capability map is provided as **Figure 7**.

Table 6. A summary of the extent (% of total LM area) of different land cover categories for local municipalities based on 2005 SPOT5 satellite imagery.

LM Name	Natural	Cultivated Dryland	Cultivated Irrigated	Mining	Settlement
DMA Bushmanland	99.75	0.17	0.02	0.04	0.02
DMA Tankwa	98.69	1.06	0.24	0	0.01
Hantam	97.71	2	0.21	0.01	0.07
Kamiesberg	97.35	2.14	0	0.43	0.07
Karoo Hoogland	99.49	0.32	0.13	0.01	0.06
Khâi-Ma	99.63	0.02	0.18	0.07	0.11
Nama Khoi	98.85	0.36	0.08	0.52	0.19
Richtersveld	97.7	0	0.06	2.15	0.09

Figure 7: Location of Prospecting area in terms of Land Cover sourced off SANB BGIS Map Viewer



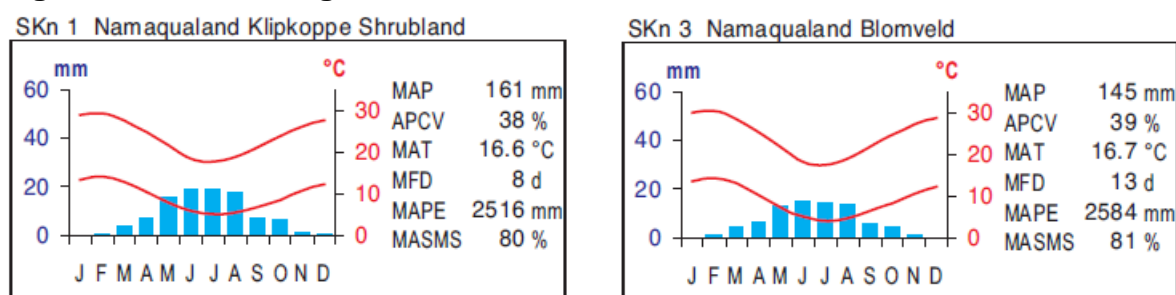
8.2.4 Landscape - Topography

Refer to Figure 2 which shows the contours at 20-meter intervals located between 920m and 1280m above mean sea level.

8.2.5 Climate

The cold Benguela Current that flows northwards along the coast of Namaqualand has a marked effect on the climate with regular fog occurring over the coastal zone, adding substantially to high soil moisture levels. Similar to the coast of Namibia further north, but not as extreme, the Namaqualand coastal region is a hyper- arid area. It experiences winter rainfall ranging between 50 mm and 100 mm per annum (Le Roux, 2005). Seasonal winter rainfall (May to September). MAP about 160 mm, with epizodic drought periods (well below 100 mm per year) of one or two years in succession. Dew is present throughout the winter. MAT 16.6°C. Hot summers, with mean maximum and minimum daily temperatures 30°C and 5°C for January and July, respectively. Frost occurs about 8 days per year but can vary widely from year to year. See also climate diagram (**Figure 8**).

Figure 8: Climate diagram



8.2.6 Biodiversity (Flora and Fauna)

The proposed prospecting right is located in the Succulent Karoo Biome and dominated by the Namaqualand Klipkoppe Shrubland (SKn1), and Namaqualand Blomveld (SKn3) vegetation units (**Figure 9**).

The eastern portion of the prospecting area is classified as Critical Biodiversity Area 2 (CBA 2) but the majority of the area is classified as Critical Biodiversity Area 1 (CBA 1) (**Figure 10**).

There are no Centres of Endemism that occur near to the proposed prospecting area but part of the area is included as part of the Kamiesberg Bushmanland Augrabies NPAES. The Goegap Nature Reserve a formal protected areas are located adjacent to the prospecting area.

Namaqualand Klipkoppe Shrubland (SKn1)

The conservation status of the Namaqualand Klipkoppe Shrubland, according to Driver et al. 2005 and Mucina et al. 2006 is given as Least Threatened. The conservation target is 28% with only 6% statutorily conserved in Namaqua National Park (incl. former WWF Skilpad Wild Flower Reserve), Goegap Nature Reserve with spectacular granite-koppie landscapes, and a small portion in the Moedverloren Nature Reserve. This vegetation is largely without any alien invaders and hardly any transformation due to agriculture (steep rocky habitats), but old mine spoils (mainly copper) are a disturbing view in some localities. Erosion is moderate (35%), very low (35%) or low (30%).

Namaqualand Blomveld (SKn3)

The conservation status of the Namaqualand Blomveld, according to Driver et al. 2005 and Mucina et al. 2006 is given as is given as Least threatened with a Target of 28%. Small areas (1.5%) statutorily conserved in Goegab Nature Reserve and Namaqua National Park. Some protection is warranted on private game farms. Only about 6% of the total area is transformed, mainly by grain cultivation and some planting of salt-bush (*Atriplex nummularia*). Overgrazing is found almost throughout this unit.

The most serious invasive plants are *Amsinckia retrorsa*, *Eurasian Erodium*, *Bromus* and *Atriplex lindleyi*. All alien infestations are only of local extent. Erosion is low (40%), very low (30%) or moderate (30%).

Figure 9: Vegetation

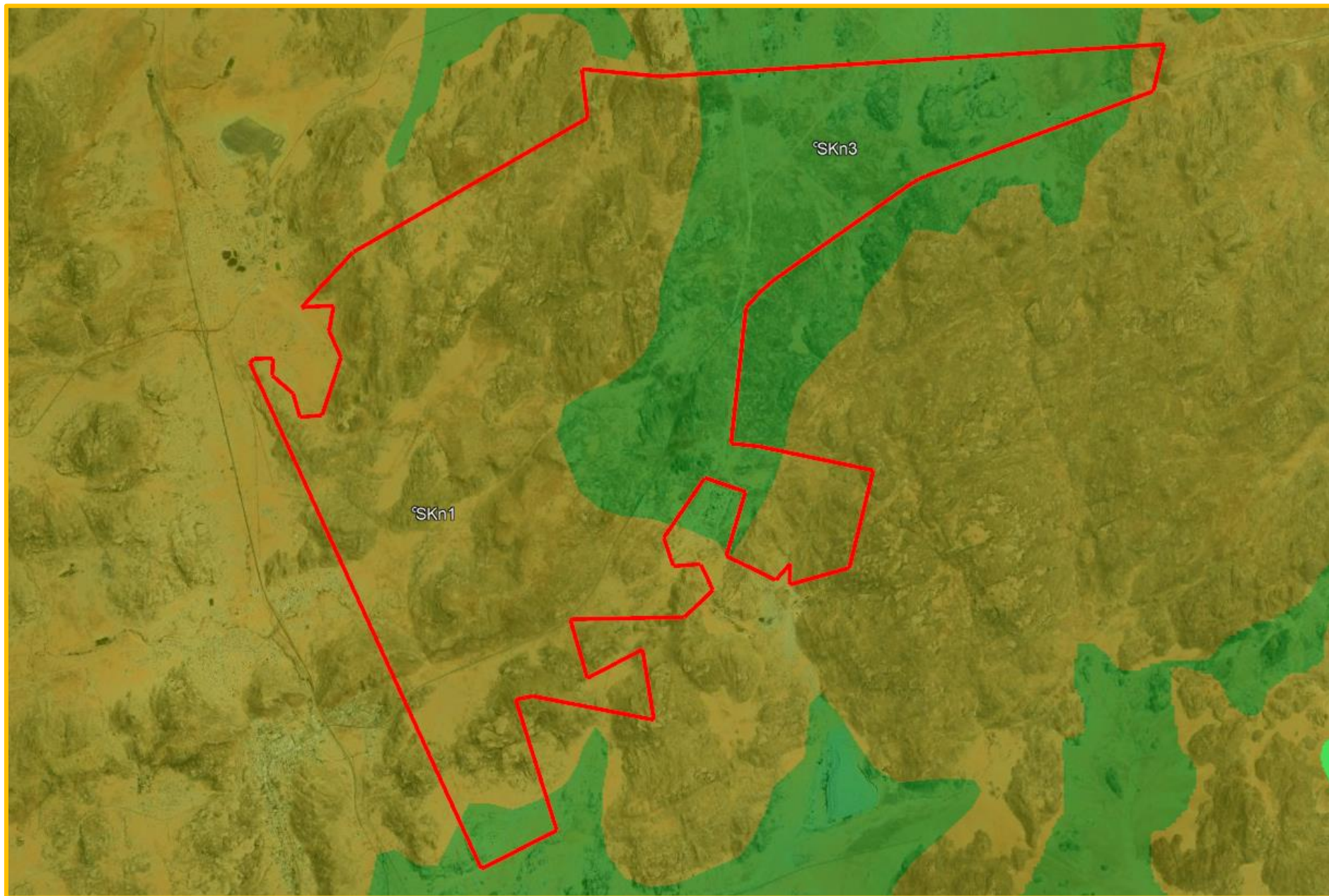
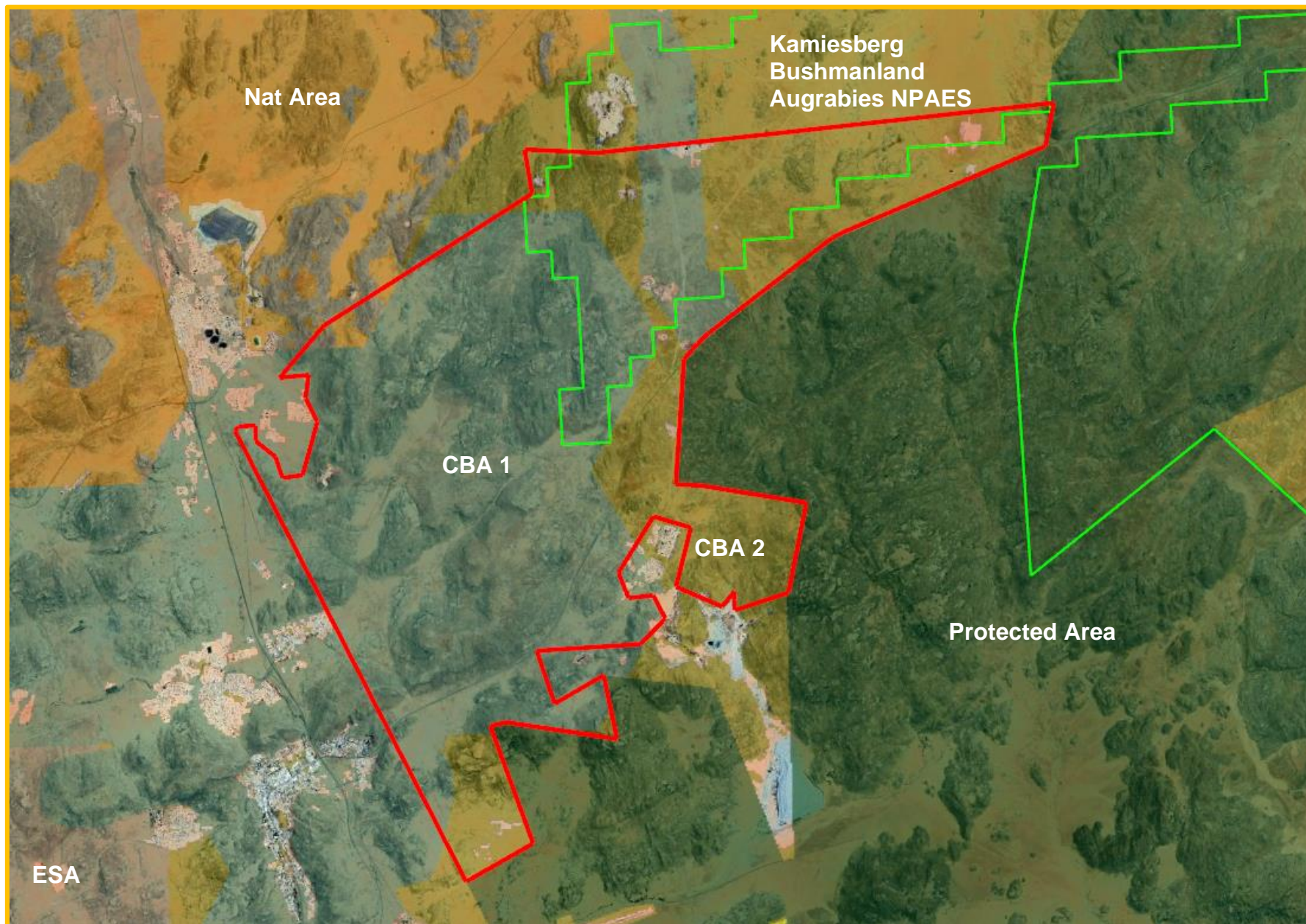


Figure 10: Threatened Ecosystems



8.2.7 Water Resources

The property is located within the Department of Water & Sanitation's Lower Orange Water Management Area (14) and quaternary drainage area D82D, F30E, F30D and F30C. All the F30 quaternary drainage areas have been identified as Freshwater Ecosystems Priority Areas (Upstream FEPA). Within this D82D quaternary drainage area one river the Koeries River is in the prospecting area (**Figure 11**).

Surface water only accumulates in the drainage channels after exceptionally good rains. The Mean Annual Run-off (MAR) is in any event very low given the low rainfall average is between 145mm and 161mm occurring mainly in the winter months and high evaporation rates. The surface water quality (when available) is suitable for animal consumption but not for potable water. No natural wetlands exist in the area. Due to the shallow nature of operations the impact on the groundwater is considered insignificant. The absence of a waste handling program can however have a significant impact through oil and fuel spills and soil contamination.

8.2.8 Emissions

Air Quality

Dust is generated by wind over un-vegetated or denuded areas and given the surrounding extent of semi-desert dust generation is high under windy conditions (dust storm). Dust is generated off un-surfaced roadways on site, and during the existing mining operations from the adjacent mine which has transported the finer sand over the adjacent areas. Mining activities will take place in a very remote area and dust generation will be limited to a small radius around the operation.

Noise

Farm traffic-generated noise occurs in the area and such noise levels are low (observed estimate at ± 55 dBA).

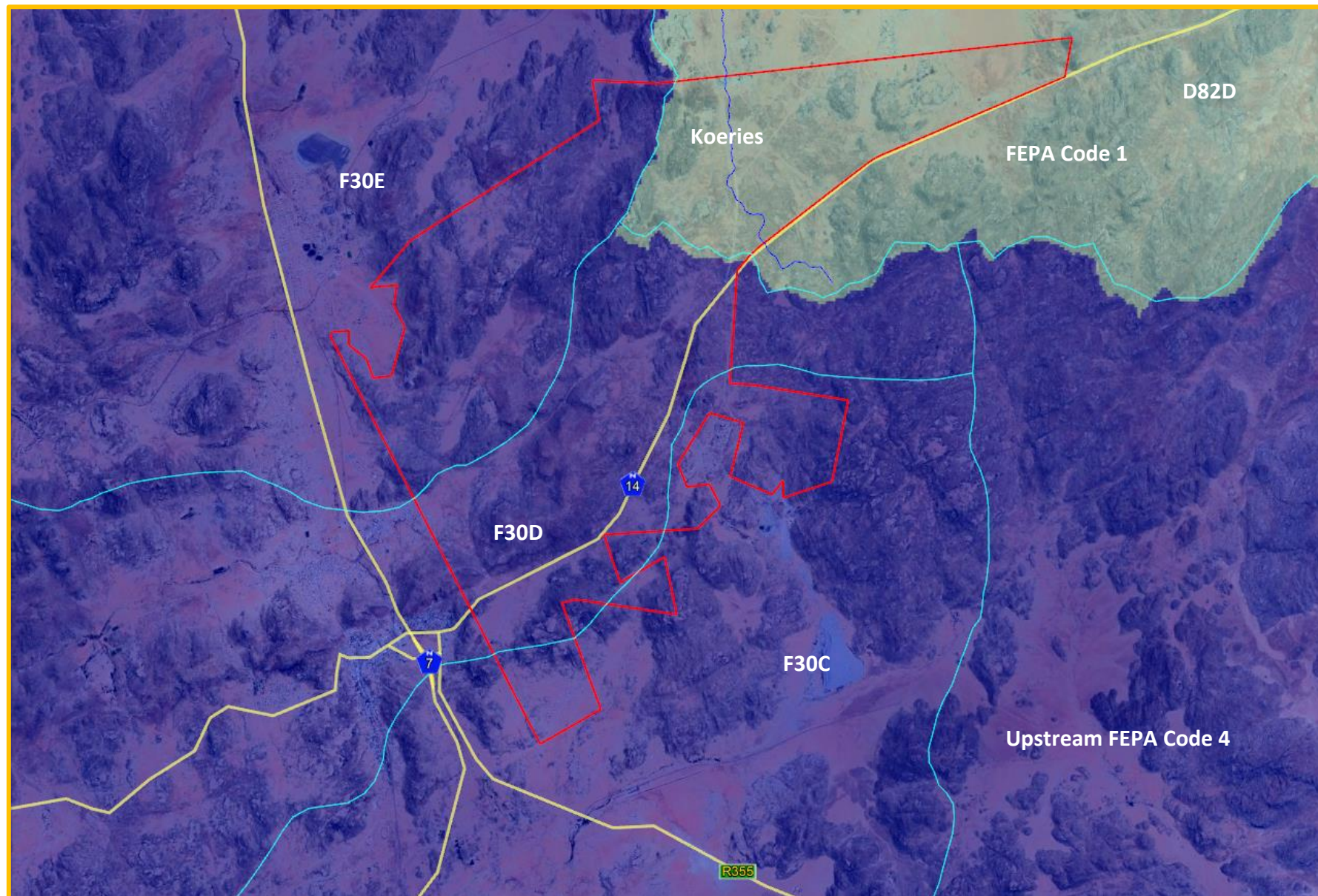
Noise from earth moving equipment and machinery associated with the existing mining operation on the adjacent mine will be within the norm and due to the remote locality of the operation will have no impact.

8.2.9 Socio-economic

The Namaqua District is sparsely populated, with a population of 115 842 and is the least populated district in the Northern Cape Province (and Country, although geographically the largest) with a population comprising 10,11% of the province's total population.

- The average growth rate for GGP in the area from 1996-2011 was 5.4 % and in 2007-2011 this has slowed down slightly to an average growth rate of 4.8%.
- The largest contributing sector to employment in the local economy (21.12% of total employment in the formal sector) is the Retail, Catering and accommodation sector

Figure 11: Location of Prospecting area in relation to NFEPA Rivers



8.2.10 Description of specific environmental features and infrastructure on the site

Based on the outcomes of the initial prospecting phases (non-invasive activities), the location of any invasive activities such as drilling will be determined and the impacts on the identified water courses will subsequently be determined. It is expected that for the invasive activities (drilling), only localised clearing of shrubs is required in order to prepare a drill pad.

Due to the ecological sensitivity of the area an ecological impact assessment on the identified drilling areas will be conducted and all hotspots will be avoided as far as possible or managed in terms of the mitigating measures as part of the specialist study.

The farmstead dwellings and other farm infrastructure will be avoided. The area also has a number of farm tracks that traverse the site from the N14. The invasive activities will seek to use existing roads in order to access the property and it is not expected that any new access roads will be opened up. The map **Figure 2** above gives an overview of the prospecting area, settlements and roads that traverse the site.

8.2.11 Environmental and current land use maps

Refer to **Figure 7** provided as part of the specific attributes

9 Impacts and risks identified

As described earlier in this report, the prospecting activities will comprise of desktop and geophysical activities and dependant on the outcome of these phases, targets will be selected for drilling activities. The impact assessment therefore focuses only on the invasive aspects (drilling and associated activities) as these will have the potential to impact on the biophysical and social environment. The impact assessment is furthermore separated into three distinct phases, namely:

- Construction phase (Site establishment);
- Operational phase (Sampling and Drilling), and.
- Decommissioning

Table 7: The potential environmental and social impacts

Phase	Activities	Potential Impacts	Reversible	Irreplaceable Damage	Can impact be avoided
Construction Phase Site establishment	Site Access and Site Establishment Activities required for drilling operations	Soil compaction from repeated use of access track to drill sites (two-spoor) and Soil erosion from exposed areas	Yes	No	Yes
		Water resources (Quality & Quantity) from activities within drainage channels and water abstraction	Yes	No	Yes
		Disturbance of onsite Wildlife and Vegetation from removal of existing vegetation from drill platforms and drill traverses. Soil compaction from ongoing repeated use of movement areas and driving off-road slowing natural re-vegetation.	Yes	No	No
		Noise Generation	Yes	No	No
		Dust fall, nuisance from activities & visual intrusion from drill pad development	Yes	No	No
		Socio- economic impact	Yes	No	No
		Destruction or loss of Cultural and Heritage Resources	No	Yes	Yes
Operational Phase Drilling	Drilling and Sample Analysis (including: refueling, soil/ rock-chip sample collection & analysis, drill mud collection, storage & evaporation, waste generation & management)	Contamination and disturbance (compaction) of soil due to drilling activities	Yes	No	No
		Surface- and groundwater use and contamination from drill fluids, hydrocarbon spills and drill maintenance activities	Yes	Yes	Yes
		Wildlife and Vegetation disturbance from drilling	Yes	No	No
		Noise caused by the drilling rig travelling to and being established on each site, the diesel engine driving the drill, vehicles going to and from the drilling site	Yes	No	No
		Dust fall, nuisance from activities & visual intrusion	Yes	No	No
		Socio- economic impact on existing land use practices	Yes	No	No
Decommissioning Phase	Removal of excess drilling mud, soil rock chips and rehabilitation of the drill site by scarifying compacted areas and vehicle tracks, spreading topsoil and borehole capping)	Dust emission from decommissioning activities (vehicle entrained dust)	Yes	No	Yes
		Soil erosion of topsoil before vegetation is re-established	Yes	No	Yes

9.1 Methodology used in assessing the potential environmental impacts

Evaluating the impact of a risk is to determine the probability (likelihood) of occurring, severity (reversibility of the impact and the degree to which the impact may cause irreplaceable loss of resources), frequency and duration (time scale) of the risk.

These are all valued separately and then the individual scores are added and a risk impact is assigned. The calculated sums of the possible permutations of probability, severity, frequency and duration range from 4 to 12.

Environmental Significance rating of insignificant (green - combined score 0-6)

An insignificant impact is likely to contribute to positive decisions about whether or not to proceed with the project. It will have little real effect and is unlikely to have an influence on project design or alternative motivation.

Environmental Significance rating of medium (yellow- combined score 7-9)

If left unmanaged, an impact of medium significance could influence a decision about whether or not to proceed with a proposed project. Mitigation measures should be implemented.

Environmental Significance rating of significant (red- combined score 10-12)

A significant impact could influence a decision about whether or not to proceed with the proposed project, regardless of available mitigation options.

For a risk with a rating of significant, strategies are put in place to reduce the risk to insignificant or medium, provided that the risk can be controlled with management actions. To maintain the rating at insignificant or medium, monitoring is implemented for a period of time to enable the confirmation of the risk as insignificant or as medium and under control.

At the time of final mine closure an application will be made to DMR for a mine closure certificate only when all risks have been confirmed as insignificant or medium and under control via management actions.

9.1.1 Evaluating the probability

There are no standard methods of evaluating the probability or likelihood of occurrence of a risk. All methods used rely on some form of subjective judgment and, therefore, agreed criteria have to be used in the evaluation. Values are assigned for the probability of occurrence of the relative strength of the factors involved to each of the criteria. Three evaluation ratings are used, viz.

1 for unlikely to occur (0 – 25% probability)

2 for may occur, likely to occur or unknown (26 – 75% probability)

3 for definite/has happened/highly likely (>75% probability of occurring)

9.1.2 Evaluating the severity

In evaluating the severity of a potential impact there are various criteria that can be applied to determine the level of risk associated with the consequences of an action occurring. These are the quantity of material/substance released and the probable size of the covered area or possible spread of impact. Combinations of descriptions for what are considered to be different levels of importance for the criteria can be integrated.

Values are assigned for the severity of the relative strength of the factors involved to each of the criteria. Three evaluation ratings are used, viz.

1 for insignificant, - natural and social functions and processes are not affected or minimally affected,

2 for medium significance - affected environment is notably altered; natural and social functions and processes continue albeit in a modified way and

3 for high significance - natural or social functions or processes could be substantially affected or altered to the extent that they could temporarily or permanently cease.

9.1.3 Evaluating the frequency

When evaluating the frequency of a potential impact any repetitive, continuous or time-linked characteristics of the impacts are taken into account. Values are assigned for the frequency of the factors involved to each of the criteria. Three evaluation ratings are used, viz.

1 for once off,

2 for intermittent, and

3 for ongoing/continuing/usually.

9.1.4 Evaluating the duration

The duration of a potential impact is based on the duration of the impact should the risk realise, i.e., the duration could be short-term, medium-term, long-term or permanent. Values are assigned for the duration of the factors involved to each of the criteria. Three evaluation ratings are used, viz. 1 for an instant/point in time, 2 for temporary/ intermittent, and 3 for forever.

9.2 Positive and negative impacts of proposed activity and alternatives

Refer to Table 8 for the impact assessment.

Table 8: Impact assessment

PROJECT ACTIVITY - Site Access and Site Establishment			
POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE	BEFORE MITIGATION	AFTER MITIGATION
<p>Soil erosion & soil compaction: The clearing of areas for drill platforms and drill traverses by drill rig will result in the removal of existing vegetation and topsoil, which will disturb the soil increasing the potential for soil erosion by wind and loss of soil in the event of rainfall. Soil compaction will result from ongoing repeated use of movement areas and driving off-road.</p> <p>Indirect impacts: Dust impacting on adjacent vegetation and causing a nuisance to workers. Compaction of topsoil where vehicles drive outside demarcated areas damages seed bank and habitat for invertebrates.</p> <p>Residual impacts: Potential loss of invertebrates that live in the top layers of the soil.</p>	Probability	2	1
	Severity	2	1
	Frequency	1	1
	Duration	1	1
	SIGNIFICANCE	6	4
MITIGATION SUMMARY			
<ul style="list-style-type: none"> • Existing farm roads and tracks must be used as far as possible; • No vegetation will be cleared for access by the drilling rig, Leaving roots intact will prevent soil loss and enable vegetation to coppice and regrow. • No clear scraping (dozing) or removal of topsoil will be carried out if possible • Where clear scraping (dozing) or removal of vegetation cannot be avoided areas should be kept to an absolute minimum. • Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces. • After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff. • Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and potential stormwater run-off. • Stabilized areas shall be demarcated accordingly. • Top soil shall be removed and stockpiled separately from other soil base layers. • The stockpile areas for topsoil are temporary as they will be re-used on a cut and fill basis. • Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material. • Topsoil storage areas must be convex and should not exceed 2m in height. • Topsoil must be treated with care, must not be buried or in any other way be rendered unsuitable for further use (e.g. by mixing with spoil) and precautions must be taken to prevent unnecessary handling and compaction. • In particular, topsoil must not be subject to compaction greater than 1 500 kg/m² and must not be pushed by a bulldozer for more than 50 metres. Trucks may not be driven over the stockpiles. • Reduce drop height of material to a minimum. • Separate clean and contaminated water systems around the drill site • Although erosion and runoff are natural processes it should be managed by maintaining topsoil in any areas not in use and maintaining maximum vegetation coverage. • Stormwater must be diverted around the drill site to prevent ingress of stormwater; • Slow storm water runoff with storm water diversion and erosion control contour berms • Soil erosion is to be regularly monitored and repaired. 			

POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE	BEFORE MITIGATION	AFTER MITIGATION
Water resources (Quality & Quantity): Mitigated impact of the proposed facility on the groundwater quality is deemed insignificant during all phases although surface and groundwater contamination from hydrocarbons is a possibility. Indirect impacts: Rainfall is very seldom and evaporation rate is very high. Indirect impacts on surface water are very unlikely. Residual impacts: None	Probability	1	1
	Severity	3	1
	Frequency	1	1
	Duration	1	1
	SIGNIFICANCE	6	4
MITIGATION SUMMARY			
<ul style="list-style-type: none"> • Prevent any drilling activities within 100m from a water course. • No water will be abstracted in terms of section 21(a) of National Water Act, 1998 (Act no. 36 of 1998). • Implement and follow water saving procedures and methodologies. • Provide mobile ablution facilities • Take care that temporary onsite sanitation facilities are well maintained and serviced regularly. • Draw-up and strictly enforce procedures for the storage, handling and transport of different hazardous materials. • Ensure that good housekeeping rules are applied. • Drinking and process water to be brought on site. 			
POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE	BEFORE MITIGATION	AFTER MITIGATION
Wildlife and Vegetation The clearing of areas for drill platforms and drill traverses by drill rig will result in the removal of existing vegetation. Soil compaction slowing natural re-vegetation will result from ongoing repeated use of movement areas and driving off-road. Indirect impacts: Compaction of topsoil where vehicles drive outside demarcated areas damages seed bank and habitat for invertebrates. Residual impacts: Potential loss of invertebrates that live in the top layers of the soil.	Probability	2	2
	Severity	3	1
	Frequency	1	1
	Duration	1	1
	SIGNIFICANCE	7	5
MITIGATION SUMMARY			
<ul style="list-style-type: none"> • Mitigation measures for soil erosion & soil compaction will also be applicable to promote natural revegetation: • The drill sites will be informed by the findings of non- invasive prospecting. • The drill sites must be clearly demarcated, and no activities may take place outside of demarcated areas. • Vehicles speed must take into account the possibility of collisions with fauna. • Movement of vehicles and machinery will be restricted to demarcated areas and roads with no off-road driving permitted. 			

POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE	BEFORE MITIGATION	AFTER MITIGATION
Noise Generation	Probability	1	1
	Severity	1	1
	Frequency	1	1
	Duration	1	1
	SIGNIFICANCE	4	4
MITIGATION SUMMARY			
<ul style="list-style-type: none"> Separation distance of minimum 100m, but preferably 500m to be maintained between drill sites and inhabited dwellings and if not possible agreements with occupants needs to be put in place. 			
POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE	BEFORE MITIGATION	AFTER MITIGATION
Dust fall, nuisance from activities & visual intrusion	Probability	3	2
	Severity	2	1
	Frequency	1	1
	Duration	1	1
	SIGNIFICANCE	7	5
MITIGATION SUMMARY			
<ul style="list-style-type: none"> Separation distance of minimum 100m, but preferably 500m to be maintained between drill sites and inhabited dwellings and if not possible agreements with occupants needs to be put in place. 			
POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE	BEFORE MITIGATION	AFTER MITIGATION
Socio- economic impact	Probability	3	2
	Severity	3	2
	Frequency	2	2
	Duration	2	2
	SIGNIFICANCE	10	8
MITIGATION SUMMARY			
<ul style="list-style-type: none"> All access will be arranged beforehand with landowner and a supervisor will be present at all times and will report to the landowner when accessing and leaving the property. Indemnity will be signed by all mining personnel entering the property to cover the landowner against any claims regarding injuries or damage to equipment. Any other mining companies or land users operating legally will be regarded as affected parties and consulted. Areas of operations will be demarcated and no overlapping will be allowed or agreements regarding environmental liabilities need to be put in place. Agreements between any existing mining operations or other land users and landowner will be respected and adopted as part of this operation. 			

POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE	BEFORE MITIGATION	AFTER MITIGATION
Destruction or loss of Cultural and Heritage Resources	Probability	1	1
	Severity	2	2
	Frequency	1	1
	Duration	1	1
	SIGNIFICANCE	5	5
MITIGATION SUMMARY			
<ul style="list-style-type: none"> Once the drilling locations are known, a map should be provided to an archaeologist for desktop analysis. If any potentially sensitive areas cannot be avoided then a brief site visit should be carried out to confirm sensitivity and, in consultation with the prospecting geologists, propose alternative nearby drill sites. An opinion should then be expressed in a letter that should be submitted to SAHRA confirming whether or not drilling may proceed; Where necessary, directional drilling will be practised to assess ore reserves situated below identified resources. Regardless of the above archaeological opinion, all drill sites should be carefully inspected by project staff to ensure that no heritage features are present; The fossil Chance Finds Procedure as part of the HIA must be implemented in the event of any chance finds of fossils, and If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution. A safe distance of at least 100 metres will be maintained between the identified heritage resource and drilling rig or any other development associated with the prospecting activities. Any identified heritage feature will be cordoned off with stakes and Chevron tape. All personnel including contractors involved in the construction activities will be made aware of the locations of all identified heritage resources, the necessity of avoiding impacts on such resources and the penalties for damaging them. Personnel will be informed about the consequences of unlawful removal of cultural and historical remains and artefacts associated with heritage sites. It will be emphasised that archaeological artefacts such as potsherds, stone tools, grinding stones, etc. must be left in situ and undisturbed. 			

PROJECT ACTIVITY - Target drilling and sample collection

POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE	BEFORE MITIGATION	AFTER MITIGATION
Contamination and disturbance of soil:	Probability	2	1
	Severity	2	1
	Frequency	1	1
	Duration	1	1
	SIGNIFICANCE	6	4

MITIGATION SUMMARY

- The impact on contamination can be reduced by the mitigating measure applicable to water contamination.
- Limiting activities to the smallest area that is necessary.

POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE	BEFORE MITIGATION	AFTER MITIGATION
Surface water and groundwater use and contamination from hydrocarbon spills and drill maintenance activities	Probability	2	1
	Severity	3	2
	Frequency	2	1
	Duration	1	1
	SIGNIFICANCE	8	5

MITIGATION SUMMARY

- Fuel storage must be contained in mobile bowsters and refuelling will be done with care to minimise the chance of spillages
- Only re-fuel machines at fueling station if possible, construct structures to trap fuel spills at fueling station
- Immediately clean oil and fuel spills and dispose contaminated material (soil, etc.) at licensed sites only.
- Oils and lubricants must be stored within sealed containment structures.
- Minimise storage of hazardous substances onsite
- Any mechanical equipment maintenance must be undertaken on drip trays or UPVC sheets to prevent spills/ leaks onto the soil.
- When not in use, a drip tray must be placed beneath mechanical equipment and vehicles.
- Ensure vehicles and equipment are in good working order and regularly inspected for leaks and drivers and operators are properly trained.
- A spill kit will be available on each site where prospecting activities are in progress.
- Any spillages will be cleaned up immediately.
- Waste materials generated on site must be stored in suitable lidded containers and removed off site to a suitable disposal facility.
- Waste separation must be undertaken if practical for recycling.
- Waste water (i.e., including drill spoils) must be kept separate from clean water.

POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE	BEFORE MITIGATION	AFTER MITIGATION
Wildlife and Vegetation The clearing of areas for drill platforms and drill traverses by drill rig will result in the removal of existing vegetation. Soil compaction slowing natural re-vegetation will result from ongoing repeated use of movement areas and driving off-road. Indirect impacts: Compaction of topsoil where vehicles drive outside demarcated areas damages seed bank and habitat for invertebrates. Residual impacts: Potential loss of invertebrates that live in the top layers of the soil.	Probability	2	2
	Severity	3	1
	Frequency	1	1
	Duration	1	1
	SIGNIFICANCE	7	5
MITIGATION SUMMARY			
<ul style="list-style-type: none"> Disturbed areas that are no longer required shall be scarified after use as part of the annual rehabilitation plan. Drill holes must be backfilled as soon as is practically possible after drilling is completed. Drill sites where clear scraping were required must be rehabilitated by scarifying trampled and compacted areas to a dept of ±300mm areas Wndrows created by scarifying needs to be left in place to create a rough surface that can act as seedtrap and create an micro-habitat to promote natural re-vegetation. Drilling activities will be aligned in consultation with landowner not to coincide with the breeding season. Vehicles speed must take into account the possibility of collisions with fauna. 			
POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE	BEFORE MITIGATION	AFTER MITIGATION
Noise Generation	Probability	3	1
	Severity	2	1
	Frequency	1	1
	Duration	1	1
	SIGNIFICANCE	7	4
MITIGATION SUMMARY			
<ul style="list-style-type: none"> All prospecting activities will be limited to daylight hours during weekdays and no activities on Sundays and public holidays. If drilling on Sundays and public holidays cannot be avoided then agreements with any potential noise recipient must be put in place at least 7 days before activities. Noise abatement equipment, such as mufflers on diesel engines, will be maintained in good condition. Minimise use of reverse alarms by proper route planning If intrusive noise levels are experienced by any person at any point, the source of the noise will be moved if practical, or it will be placed in an acoustic enclosure, or an acoustic barrier will be erected between the source and the recipient. 			

POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE	BEFORE MITIGATION	AFTER MITIGATION
Dust fall, nuisance from activities & visual intrusion	Probability	3	2
	Severity	2	1
	Frequency	1	1
	Duration	2	1
	SIGNIFICANCE	8	5
MITIGATION SUMMARY			
<ul style="list-style-type: none"> Temporarily halt material handling and drilling in windy conditions. Low vehicle speeds will be enforced on unpaved surfaces. A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers using the access road and entering the site will be informed of the speed limit. The drilling rig and other visually prominent items on the site will be located in consultation with the landowner. Make use of existing vegetation as far as possible to screen the prospecting operations from view. If necessary, the operations can be screened from view by erecting a shade cloth barrier. 			
POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE	BEFORE MITIGATION	AFTER MITIGATION
Socio- economic impact	Probability	3	2
	Severity	3	2
	Frequency	2	2
	Duration	2	2
	SIGNIFICANCE	10	8
MITIGATION SUMMARY			
<ul style="list-style-type: none"> Co-ordinate invasive activities with existing mining activities or land uses to reduce the time of disturbances Landowner will be updated with regard to the progress of implementing the PWP and any invasive operation and concurrent rehabilitation will be planned in consultation with landowner. All operations will be carried out under the guidance of strong, experienced manager and ECO with proven skills in public consultation and conflict resolution. All personnel will be made aware of the local conditions and sensitivities in the prospecting area and the requirements of the local residents. There will be a strict requirement to treat local residents with respect and courtesy at all times. 			

PROJECT ACTIVITY - Decommissioning and closure			
POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE	BEFORE MITIGATION	AFTER MITIGATION
Dust emission from decommissioning activities (vehicle entrained dust)	Probability	1	1
	Severity	1	1
	Frequency	1	1
	Duration	1	1
	SIGNIFICANCE	4	4
MITIGATION SUMMARY			
<ul style="list-style-type: none"> Due to the remote location of the site, dust emissions are unlikely to be a source of nuisance; however the site must be wetted if required. 			
POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE	BEFORE MITIGATION	AFTER MITIGATION
Soil erosion of topsoil before vegetation is re-established	Probability	2	2
	Severity	1	1
	Frequency	1	1
	Duration	1	1
	SIGNIFICANCE	5	5
MITIGATION SUMMARY			
<ul style="list-style-type: none"> As one borehole has been completed and the site has been decommissioned the disturbed site should be rehabilitated by scarifying trampled areas Duel use access roads must be handed back to the landowner in a good state of repair. 			

9.3 The possible mitigation measures that could be applied and the level of risk. Refer to **Table 8** for the impact assessment and the key measures to mitigate the potential impacts. The detail mitigating measures are as follows:

9.3.1 Site Access and Site Establishment

Contamination and disturbance of soil from drill pad preparation, compaction and soil disturbance due to repeated use of access track to drill sites and topsoil stockpiling

The impacts of soil compaction have been assessed as being of **insignificance** even before mitigation.

The impact can be avoided by only using existing farm roads and tracks. Where new access tracks are required to get the drill rig to the drilling site, the impact can be reduced if no vegetation will be cleared. Leaving roots intact will prevent soil loss and enable vegetation to coppice and regrow. Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces. Where clear scraping (dozing) or removal of vegetation cannot be avoided areas should be kept to an absolute minimum. All tracks and drill traverses (twee-spoor) will be scarified and any topsoil stockpiled removed to be spread over the disturbed area. Dual use access roads must be handed back to the landowner in a good state of repair.

The impact on contamination can be reduced by the mitigating measure above and by limiting the activities and clearance of the drill pad to the smallest area that is necessary. Furthermore, no clear scraping (dozing) will be carried out unless absolutely necessary to establish a level drill pad. All drill pads will be scarified and any topsoil stockpiled removed to be spread over the disturbed area immediately after completion of the activity.

Surface water and groundwater use and contamination

The impact of contamination with hydrocarbons and disturbance of water resources is assessed as being of **insignificance** even before mitigation.

The impact can be avoided by ensuring that measures are put in place to prevent any drilling activities within 100m from a water course. Maintaining all equipment as per supplier specification and lining under the drill rig and diesel bowser with PVC plastic lining to contain any spillages, should it occur including having oil spill kit as a recovery measure will prevent contamination.

Disturbance of wildlife and vegetation

The impacts of drilling (drill pad clearing and compaction) have been assessed as being of **medium significance** before mitigation.

The impact can be reduced to **insignificant** by limiting the activities and clearance to the smallest area that is necessary and rehabilitating the disturbed area as soon as possible. Furthermore, no clear scraping (dozing) will be carried out unless absolutely necessary to establish a level drill pad. Rather that surface vegetation be cleared to make way for the drilling rig leaving the roots intact so that vegetation can coppice and regrow. Vehicle's speed must take into account the possibility of collisions with fauna. Due to the ecological sensitivity of the area an ecological impact assessment on the identified drilling areas will be conducted and all hotspots will be avoided as far as possible or managed in terms of the mitigating measures as part of the specialist study.

Noise

Taking into account the existing background noise levels of the general area which is rural in nature, the significance of the noise caused by the drilling rig travelling to and being established on each site, vehicles going to and from each drilling site and the

voices of the drilling crew, the impact is assessed as being **insignificant** before mitigation.

Typical noise levels generated by various types of construction equipment are listed in the table below.

Equipment	Typical operational Noise level at given offset (dBA)							
	5m	10m	25m	50m	100m	250m	500m	100m
Air compressor	91	85	77	71	65	57	51	46
Crane (mobile)	93	87	79	73	67	59	53	47
Dozer	95	89	81	75	69	61	55	49
Pump	86	80	72	66	60	52	46	40
Rock Drill	108	102	94	88	82	74	68	62
Trucks	87	81	73	67	64	60	57	54

In South Africa, the noise impact on human receptors is evaluated in terms of the SANS 10103 guidelines for sound pressure levels as listed in the table below.

Type of District	Equivalent continuous rating level for ambient noise - dBA						
	Outdoors			Indoors with windows open			
	Day-night	Daytime	Night	Day-	Daytime	Night-	
Rural districts	45	45	35	35	35	25	
Suburban district	50	50	40	40	40	30	
Urban traffic	55	55	45	45	45	35	
Urban districts	60	60	50	50	50	40	
Central business district	65	65	55	55	55	45	
Industrial district	70	70	60	60	60	50	

Daytime and night-time refer to the hours from 06h00 to 22h00 and 22h00 to 06h00 Respectively

If mitigation measure is put in place the significance rating remains the same at **insignificant**. Mitigation if required will include limiting the site establishment activities to daylight hours (06h00 to 18h00) and not undertaking such activities at all on Sundays and public holidays, as well as by applying a separation distance of a minimum 100m, but preferably 500m between drill sites and any dwellings. The vehicles on site will be limited to the absolute minimum required. It must be noted that the speed limit for driving within a community and prospecting area shall be limited to 40Km/h.

Dust fall, nuisance from activities & visual intrusion

The nuisance impact of the construction / setup activities is assessed as being of **Medium significance** before mitigation.

The impact can be reduced to one of insignificance by taking into account available vegetation screening, the locations of visual receptors on the prospecting areas and adjacent properties and locating the drilling rig in a way that it is screened from points of visual reception wherever possible.

It is important to note that people experience dust deposition as a nuisance effect, and that there are no direct human health implications because the dust is not inhaled.

Heavy dust deposition can have detrimental effects on plants if the leaves are smothered to the extent where transpiration and photosynthesis are affected.

The proposed operation falls within the boundaries of the Namakwa District Municipality's and the company may be required to operate within the air quality requirements of the Municipality's Air Quality Management Plan.

The impact can be reduced by wet suppression and enforcement of low vehicle speeds. Separation of distance of minimum 100m, but preferably 500m to be maintained between drill sites and dwellings will also reduce the impact of dust fall.

Acceptable dust fall rates in terms of the National Dust Control Regulations (GN R. 827 of 1 November 2013) are presented in the table below. In terms of these

regulations, the local air quality officer may prescribe a dust fall monitoring programme, the implementation of dust control measures and continuous ambient air quality monitoring.

The method to be used for measuring dust fall rate and the guideline for locating sampling points shall be ASTM D1739: 1970, or equivalent method. Acceptable dust fall rates are provided in the table below.

Restriction Areas	Dust fall rate (D) (mg/m ² /Day, 30- day average)	Permitted frequency of exceeding dust fall rate
Residential area	D < 600	Two within a year, not sequential months
Non-residential area	600 < D < 1 200	Two within a year, not sequential months

Socio- economic impact

The prospecting sites are located in a rural farming area with farm dwellings. Some landowners cherish the peaceful and quiet lifestyle of the area and friction between local residents and a crew of strangers is very possible. Conflict with other mining companies or land users on the same property is also a possibility. The potential for conflict is assessed as being **significant**.

The impact can be reduced to one of medium significance by taking appropriate social management measures.

Non-invasive activities will be completed off-site. All access will be arranged beforehand with landowner and a supervisor will be present at all times and will report to the landowner when accessing and leaving the property. Indemnity will be signed by all mining personnel entering the property to protect the landowner against claims regarding personal loss and injury.

Landowner will be updated with regard to the progress of implementing the PWP and any invasive operation and concurrent rehabilitation will be planned in consultation with landowner.

Agreements between any existing mining operations or other land users and landowner will be respected and adopted as part of this operation.

Destruction or loss of Cultural and Heritage Resources

The impact on Cultural and Heritage Resources is assessed as being of **insignificance** even before mitigation.

The impact can be avoided by ensuring that recommendations from specialist studies are implemented and by implementing the fossil Chance Finds Procedure provided as part of the HIA in the event of any chance finds of fossils. If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

Once the drilling locations are known, a map should be provided to an archaeologist for desktop analysis. If any potentially sensitive areas cannot be avoided then a brief site visit should be carried out to confirm sensitivity and, in consultation with the prospecting geologists, propose alternative nearby drill sites. An opinion should then be expressed in a letter that should be submitted to SAHRA confirming whether or not drilling may proceed;

Where necessary, directional drilling will be practised to assess ore reserves situated below identified resources.

Regardless of the above archaeological opinion, all drill sites should be carefully inspected by project staff to ensure that no heritage features are present;

Drilling equipment moving on site will, where ever possible, be confined to established roads and tracks. Where this is not possible, access routes will be walked prior to entry of equipment to ensure that there are no graves present.

Should graves be identified, the access route will be realigned to avoid such heritage resources, which will then be clearly marked with stakes and Chevron tape to minimise risk of accidental damage.

Any identified heritage feature will be cordoned off with stakes and Chevron tape and measures put in place to prevent any drilling activities within 100m. All personnel including contractors involved in the construction activities will be made aware of the locations of all identified heritage resources, the necessity of avoiding impacts on such resources and the penalties for damaging them. Personnel will be informed about the consequences of unlawful removal of cultural and historical remains and artefacts associated with heritage sites. It will be emphasised that archaeological artefacts such as potsherds, stone tools, grinding stones, etc. must be left in situ and undisturbed.

9.3.2 Operational Phase

Contamination and disturbance of soil

The impacts of soil compaction have been assessed as being of **insignificance** even before mitigation.

The impact on contamination can be reduced by the mitigating measure applicable to water contamination and by limiting the activities and clearance of the drill pad to the smallest area that is necessary. Furthermore, no clear scraping (dozing) will be carried out unless absolutely necessary to establish a level drill pad. All drill pads will be scarified and any topsoil stockpiled removed to be spread over the disturbed area immediately after completion of the activity.

Surface- and groundwater contamination and use

The potential contamination of surface and groundwater with hydrocarbons is assessed as an impact of **Medium** significance.

The impact can be reduced to one of insignificant by implementing the measures recommended for the construction phase. Drilling muds will be contained in lined drill sumps and this material will be removed from site and disposed in a licensed disposal facility.

Fuel storage must be contained in mobile bowsters and refuelling will be done with care to minimise the chance of spillages. Only re-fuel machines at fuelling station, if possible, construct structures to trap fuel spills at fuelling station. Oils and lubricants must be stored within sealed containment structures and minimise storage of hazardous substances onsite.

Only emergency repairs to mechanical equipment will take place onsite. Repairs must be undertaken on drip trays or UPVC sheets to prevent spills/ leaks onto the soil. When not in use, a drip tray must be placed beneath mechanical equipment and vehicles. Ensure vehicles and equipment are in good working order and regularly inspected for leaks and drivers and operators are properly trained.

Any spillages will be cleaned up immediately and dispose contaminated material (soil, etc.) at licensed sites only. A spill kit will be available on each site where prospecting activities are in progress.

Water is only required when drilling activities commence and will be sourced on agreement from an existing authorized water user which could be either the land owner or local municipality. The department responsible for water resources shall be consulted with regards to any water related agreement with either the land owner or

local municipality prior to drilling. No water will be abstracted in terms of section 21(a) of National Water Act, 1998 (Act no. 36 of 1998).

Disturbance of wildlife and vegetation

Disturbance of wildlife and vegetation in areas where drilling is done is rated as being of **medium significance**.

The impact can be reduced to insignificant by prior delineation of the drill site area via geophysical characterisation and drilling in order to minimise the area that needs to be cleared. Furthermore, no clear scraping (dozing) must be carried out unless absolutely necessary to establish a level drill pad. Rather that surface vegetation be cleared to make way for the drilling rig leaving the roots intact so that vegetation can coppice and regrow.

Drill sites where clear scraping were required must be rehabilitated by scarifying trampled and compacted areas to a dept of $\pm 300\text{mm}$ areas. Windrows created by scarifying needs to be left in place to create a rough surface that can act as seed trap and create a micro-habitat to promote natural re-vegetation.

Invasive drilling activities will be aligned in consultation with landowner not to coincide with the breeding or hunting season.

Noise

The noise impact caused by the operation of the drilling rig, vehicles travelling to and from each drilling site and the voices of the drilling crew is assessed as being of **medium significance**.

The impact can be reduced to one of **insignificant** by limiting the prospecting activities to daylight hours (06h00 to 18h00) and not undertaking such activities at all on Sundays and public holidays. If drilling on Sundays and public holidays cannot be avoided then agreements with any potential noise recipient must be put in place at least 7 days before activities.

Furthermore, a separation distance of minimum 100m, but preferably 500m should be maintained between drill sites and dwellings as far as possible.

If intrusive noise levels are experienced by any person at any point, the source of the noise will be moved if practical, or it will be placed in an acoustic enclosure, or an acoustic barrier will be erected between the source and the recipient.

Dust fall, nuisance from activities & visual intrusion

The nuisance impact of the prospecting activities is assessed as being of **Medium Significance**.

Visual impact can be reduced to one of insignificance by appropriate location of the drilling rig and other visually prominent items on the site and placement in consultation with the landowner. Existing vegetation must be use as far as possible to screen the prospecting operations from view. If necessary, the operations can be screened from view by erecting a shade cloth barrier.

The impact of dust generated by vehicles travelling over unpaved areas can be readily mitigated by enforcement of low vehicle speeds, as well as by applying a separation distance of a minimum 100m, but preferably 500m between drill sites and any dwellings.

Socio- economic impact

The prospecting sites are located in a rural farming area with farm dwellings. Some landowners cherish the peaceful and quiet lifestyle of the area and friction between local residents and a crew of strangers is very possible. Conflict with other mining companies on the same property is also a possibility. The potential for conflict is assessed as being **significant**.

The impact can be reduced to one of medium significance by taking appropriate social management measures.

Most of the time will be spent on non-invasive activities that will be completed off-site. All access will be arranged beforehand with landowner and the supervisor will be present at all times and will report to the landowner when accessing and leaving the property. Indemnity will be signed by all mining personnel entering the property.

Co-ordinate invasive activities with existing mining activities or land uses to reduce the time of disturbances.

Landowner will be updated with regard to the progress of implementing the PWP and any invasive operation and concurrent rehabilitation will be planned in consultation with landowner.

All operations will be carried out under the guidance of strong, experienced manager and ECO with proven skills in public consultation and conflict resolution. All personnel will be made aware of the local conditions and sensitivities in the prospecting area and the requirements of the local residents. There will be a strict requirement to treat local residents with respect and courtesy at all times.

9.3.3 Decommissioning phase:

As one borehole has been completed and the site has been decommissioned the disturbed site should be rehabilitated immediately as part of the annual rehabilitation plan. Dual use access roads must be handed back to the landowner in a good state of repair.

A review of the final rehabilitation, decommissioning and closure plan must be done annually to ensure all outstanding environmental liabilities are covered and sufficient funds are available to implement the closure plan.

9.3.4 Assessment of potential cumulative impacts

Cumulative impacts are the successive, incremental and combined impacts of one, or more, activities on society, the economy and the environment. Cumulative impacts result from the aggregation and interaction of impacts on a receptor and may be the product of past, present or future activities.

In this case the potential cumulative impacts will be insignificant due to the small scale of operations. The total prospecting area is $\pm 8400\text{Ha}$ but the total footprint of all disturbance planned is less than 2Ha or 0.02% at the end of the prospecting operation.

9.4 Motivation where no alternative sites were considered.

As discussed in previous sections, the proposed prospecting right area holds potential because of the presence of known mineral occurrences in the area as well as the copper mining activities. The prospecting location has been informed by historical prospecting and production records for the area, as well as the most likely position of potential mineral deposits. As such the applicant believes there is a possibility of encountering further mineral ore bodies within the prospecting area. The area included in this prospecting application is therefore regarded as the preferred site and alternative sites are not considered. The preferred site is informed by the most likely location of mineral deposits.

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

As discussed in previous sections, each of the prospecting phases is dependent on the results of the preceding phase. The location and layout of drill sites will be determined based on information derived from the desktop and geophysical surveys

(non-invasive activities). Proposed drill sites will be selected so as to avoid known heritage sites, water courses, dwellings and infrastructure where practicable. Since the invasive prospecting phase (drilling) is dependent on the outcomes of the first part of phase 1 and the final site layout will be finalised on completion of these initial prospecting activities.

10 ENVIRONMENTAL IMPACT ASSESSMENT

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

This BAR and EMPr were compiled through a detailed desktop investigation in order to determine the environmental setting in which the project is located. Input from stakeholders during the public participation process also assist the EAP in the identification of any additional impacts associated with the proposed prospecting activities. The methodology described above was used to assess the significance of the potential impacts of the prospecting activities. The assessment of impacts is based on the experience of the EAP with similar projects. The applicant also has practical experience through exploration geologists and therefore the identification of impacts and assessment of their significance is informed by first-hand experience of drilling activities. The mitigation measures proposed in Table 8 are considered to be reasonable and based on the location of the prospecting area and must be implemented in order for the outcome of the assessment to be accurate.

10.2 Assessment of each identified potentially significant impact and risk

The impact assessment is provided in Table 8 and the supporting risk assessment is provided as part of **Annexure 1** the Final Rehabilitation, decommissioning and mine closure plan including Environmental Risk Assessment

10.3 Summary of specialist reports.

The only specialist study completed as per the table below is a desktop Heritage Impact Assessment.

Due to the ecological sensitivity of the area an ecological impact assessment on the identified drilling areas will be conducted and all hotspots will be avoided as far as possible or managed in terms of the mitigating measures as part of the specialist study.

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	RECOMMENDATIONS INCLUDED IN THE EIA REPORT	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE RECOMMENDATIONS HAVE BEEN INCLUDED.
<p>HERITAGE IMPACT ASSESSMENT: PROPOSED PROSPECTING ON FARM 632 AND VARIOUS PORTIONS OF FARM MELKBOSCHKUIL 132, NAMAKWALAND MAGISTERIAL DISTRICT, NORTHERN CAPE Required under Section 38(8) of the National Heritage Resources Act (No. 25 of 1999) as part of a Heritage Impact Assessment.</p>	<p>It is recommended that SAHRA allow the prospecting project to proceed as planned, but subject to the following recommendations:</p> <ul style="list-style-type: none"> • Once the drilling locations are known, a map should be provided to an archaeologist for desktop analysis. If any potentially sensitive areas cannot be avoided then a brief site visit should be carried out to confirm sensitivity and, in consultation with the prospecting geologists, propose alternative nearby drill sites. An opinion should then be expressed in a letter that should be submitted to SAHRA confirming whether or not drilling may proceed; • Regardless of the above archaeological opinion, all drill sites should be carefully inspected by project staff to ensure that no heritage features are present; • A fossil Chance Finds Procedure must be included in the project EMPr and implemented in the event of any chance finds of fossils, • If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution. 	<p>Yes</p>	<p>Table 8 and Section 9.3 The possible mitigation measures that could be applied and the level of risk.</p> <p>Section 13.1 Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act</p>

11 Environmental impact statement

11.1 Summary of the key findings of the environmental impact assessment

The majority of the prospecting activities are non-invasive and hence will have no environmental or social impact. The invasive activities will only entail drilling which will have a minimal environmental and social impact.

The total anticipated area for disturbance is anticipated at less than 1Ha which need to be viewed in the context of the entire prospecting area under application which covers 7319Ha. The assessed impact ratings after implementation of the mitigation measures described above are as follows:

Site Access and Site Establishment

- Soil erosion & soil compaction - insignificant;
- Water resources (Quality & Quantity) - insignificant;
- Wildlife and Vegetation - medium significance, reducing to insignificant
- Noise – insignificant;
- Dust fall, nuisance from activities & visual intrusion - medium significance, reducing to insignificant
- Socio - economic impact – significant impact reducing to medium significance.
- Cultural and heritage - insignificant;

Target drilling and sample collection

- Contamination and disturbance of soil - insignificant;
- Surface water and groundwater use and contamination from hydrocarbon spills and drill maintenance activities - medium significance, reducing to insignificant;
- Wildlife and Vegetation - medium significance, reducing to insignificant;
- Noise – medium significance, reducing to insignificant;
- Dust fall, nuisance from activities & visual intrusion - medium significance, reducing to insignificant
- Socio - economic impact – significant impact reducing to medium significance.

All of the identified impacts will occur for a limited period and the extent of the impacts will be localised. All of the identified impacts can be suitably mitigated with the residual impact ratings being of insignificant.

The conservation status of the vegetation types in the area is regarded as “Least Threatened”; and no threatened ecosystems are present (Refer to **Figure 8, 9 & 10**). The main impacts associated with the drilling activities (site disturbance) can be suitably mitigated. After drilling activities have been completed and the drill pads rehabilitated to predrilling status, the impacts will cease to exist

11.2 Final Site Map

Please refer to **Figure 10 and 11** for the Environmental Sensitivities Map

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

11.3.1 Positive Impacts

This application is for prospecting activities. Should favourable results be obtained from exploratory drilling, and it is believed that mining will be economically viable; such mining would contribute to one of the main employment sectors of the Local Municipality. The prospecting activities themselves would not directly lead to job opportunities.

11.3.2 Negative Impacts

- Noise Generation from construction / set-up and operational activities of drilling;
- Visual intrusion caused by the drilling activities in the largely rural setting;
- Dust fall & nuisance from construction / drill site set-up;

- Wildlife and vegetation disturbance from drill pad preparation during the construction / set-up and operational phase as contractors rehabilitate one site and move to the next site and prepare it;
- Surface water and groundwater contamination from hydrocarbons during the construction/set-up and operational activities which include drill rig operation and use of vehicles on site; and
- Socio-Economic impact due to conflicting land uses during the construction / set-up and operational phase.

11.4 Proposed impact management objectives and the impact management outcomes

- Provide sufficient information to strategically plan the prospecting activities as to avoid unnecessary social and environmental impacts.
- Provide sufficient information and guidance to plan prospecting activities in a manner that would reduce impacts (both social and environmental) as far as practically possible.
- Ensure an approach that will provide the necessary confidence in terms of environmental compliance.
- Provide a management and closure plan that is effective and practical for implementation.
- Through the implementation of the proposed mitigation measures it is anticipated that the identified social & environmental impacts can be managed and mitigated effectively.
- Through the implementation of the mitigation and management measures it is expected that: Heritage/cultural resources can be managed by avoidance of known resources and through consultation with landowners/stakeholders. Contractor personnel will also be briefed of these sensitivities and consequences of any damage/removal of such features;
- Noise generation can be managed through consultation and restriction of operating hours and by maintaining equipment and applying noise abatement equipment if necessary;
- Visual intrusion can be managed through consultation with landowners /stakeholders and by suitable siting of drill pads and use of screens (natural vegetation or shade cloth etc);
- Dust fall can be managed by reducing driving speeds when driving on unpaved roads and the use of water during drilling;
- Wildlife disturbance and clearance of vegetation at drill pad areas will be limited to the absolute minimum required and disturbed areas will be prepared to facilitate natural re-vegetation with locally indigenous species as soon as possible;
- Surface water and groundwater contamination by hydrocarbons can be managed by conducting proper vehicle maintenance, refuelling with care to minimise the chance of spillages and by having a spill kit available on each site where prospecting activities are in progress;
- Socio - economic impact can be managed by employing strong, experienced personnel with proven skills in public consultation and conflict resolution during stakeholder consultation phases. All prospecting personnel will be made aware of the local conditions and sensitivities in the prospecting area and that they treat local residents with respect and courtesy at all times.

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

This report has been completed to the best of the EAPs ability, based on his experience and on information currently available to the EAP as well as provided by the applicant.

Comment received on the draft BAR were reviewed and incorporated into this finalised BAR. As such, the public perception of the proposed activity is known. In addition, comments and inputs received from the authorities and public provided additional information which has been considered.

Mitigation measures are proposed which are considered to be reasonable and must be implemented in order for the outcome of the assessment to be accurate.

The location of drill sites is not yet known and will be identified through the phased approach of the prospecting programme. This assessment is therefore based on a desktop approach at a broad scale and assuming that drilling could occur anywhere around the anomalies identified for this programme.

In addition, landowners will be re-engaged at this stage to communicate the company's intent to progress to drilling and to discuss the proposed drilling activities and identified locations with the I&AP's at that point in time.

11.6 Reasoned opinion as to whether the proposed activity should or should not be authorized

11.6.1 Reasons why the activity should be authorized or not.

It is the opinion of the EAP that the proposed prospecting activities should be authorised. In reaching this conclusion the EAP has considered that;

- Based on historical prospecting results, there is a good possibility of encountering mineral deposits in the area
- The exploration program will be developed in a stepwise manner commencing with non-invasive activities to bring refinement to understanding of the geological anomaly.
- Should the exploration program advance to include the need for exploration drilling, the environmental impacts associated with the limited drilling activities are deemed to be minimal provided that the proposed mitigation is implemented;
- The spatial extent of the physical impact is less than 1Ha over a prospecting right application area of 7684 hectares;
- With appropriate care and consideration, the impacts resulting from drilling can be suitably avoided, minimised or mitigated;
- With implementing the appropriate rehabilitation activities, the impacts associated with the drilling activities can be reversed.
- Without implementation of prospecting activities, the knowledge concerning the potential mineral resource within the prospecting right area will not be confirmed.

11.6.2 Conditions that must be included in the authorisation

It is the opinion of the EAP that the following conditions should form part of the authorisation:

- Maintain a buffer of 100m from a water course;
- Maintain a minimum 100m (preferably 500m) buffer from any infrastructure or dwelling;
- Landowners and land occupiers as well as SAHRA should be engaged (re-consulted) at least 1 month prior to any site activities being undertaken once drill sites are known.

- Due to the ecological sensitivity of the area an ecological impact assessment on the identified drilling areas will be conducted and all hotspots will be avoided as far as possible or managed in terms of the mitigating measures as part of the specialist study.

11.6.3 Period for which the Environmental Authorisation is required.

The authorisation is required for the duration of the prospecting right which is an initial 5 years plus a potential to extend the right by an additional 3 years. Normally there is also a time delay in the granting of applications for renewal therefore a total period of 10 years may be required.

11.6.4 Undertaking

An undertaking is provided at the end of this report.

12 Financial Provision

12.1 Legal Framework

Regulations pertaining to the financial provision for prospecting, exploration, mining or production operations under section 44, read with sections 24 of the National Environmental Management Act, 1998 (Act No.107 of 1998) were issued in 2015.

According to the Financial Provisioning regulations, 2015 as amended regulation 7 the applicant or holder of a right or permit must ensure that the financial provision is, at any given time, equal to the sum of the actual costs of implementing the plans and report contemplated in regulation 6 and regulation 11.

In terms of regulation 11(1) the holder of a right or permit must ensure that a review is undertaken of the requirements for (a) annual rehabilitation, as reflected in an annual rehabilitation plan; (b) final rehabilitation, decommissioning and closure of the prospecting, exploration, mining or production operations at the end of the life of operations as reflected in a final rehabilitation, decommissioning and mine closure plan; and (c) remediation of latent or residual environmental impacts which may become known in the future, as reflected in an environmental risk assessment report.

12.2 Calculation

Financial provision in terms of Regulation 6 of the Financial Provisioning Regulations, 2015 as amended, is covered by the requirements for the actual costs of implementation of the measures required for final rehabilitation, decommissioning and closure of the mining operations at the end of the life of operations as reflected in the final rehabilitation, decommissioning and mine closure plan attached as **Annexure 1**.

12.3 Explain how the aforesaid amount was derived.

According to regulation 6 an applicant must determine the financial provision through a detailed itemisation of all activities and costs, calculated based on the actual costs of implementation of the measures required for— (a) annual rehabilitation, as reflected in an annual rehabilitation plan; (b) final rehabilitation, decommissioning and closure of the prospecting, exploration, mining or production operations at the end of the life of operations, as reflected in a final rehabilitation, decommissioning and mine closure plan; and (c) remediation of latent or residual environmental impacts which may become known in the future, as reflected in an environmental risk assessment report (**Refer Annexure 1**).

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

The amount needed for the implementation of the final rehabilitation, decommissioning and closure plan will be provided to DMR in the form of a bank guarantee and the plan will be revised on an annual basis in terms of regulation 11(1) of the Nema Financial Provisioning Regulations 2015 as amended.

Provision for implementation of annual rehabilitation plan to be provided as part of the environmental audit report in terms of Regulation 34 (1)(b) of the NEMA EIA Regulations (2014) will be provided as part of the operational budget and proof of access to the necessary fund were provided as part of the PWP together with proof of access to the necessary financial resources.

13 Specific Information required by the competent Authority

13.1 Compliance with sections 24(4)(a) and (b) of NEMA

According to the National Environmental Management Act (Act 107 of 1998). the EIA report must include the impact on:

The socio-economic conditions of any directly affected person.

A full consultation process has been implemented during the environmental authorisation process. The purpose of the consultation was to provide affected persons the opportunity to raise any potential concerns. Concerns raised has been captured and addressed within the public participation section of this report to inform the decision-making process.

As the final positioning of the drill sites cannot be confirmed without completion of phase 1 of the prospecting work programme, a recommendation has been made to ensure that the directly affected landowners are re-consulted at least 1 month prior to any site activities being undertaken once drill sites are known. The purpose of the re-consultation is to allow for socio-economic impacts on directly affected persons to be raised and where possible addressed.

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

A desktop HIA and PIA were conducted by a suitably qualified specialist in order to identify any sensitive areas and resources of significance to be avoided when planning the drill traverses. According to the desktop HIA and PIA, the only aspect that may cause physical damage to heritage resources is drilling. Each drill hole would require a cleared area of maximum 160m² and drilling would occur through use of a truck-mounted drill rig.

The desktop assessment recommended that SAHRA allow the prospecting project to proceed as planned, but subject to the following recommendations that were also included as part of the mitigation measures:

- Once the drilling locations are known, a map should be provided to an archaeologist for desktop analysis. If any potentially sensitive areas cannot be avoided then a brief site visit should be carried out to confirm sensitivity and, in consultation with the prospecting geologists, propose alternative nearby drill sites. An opinion should then be expressed in a letter that should be submitted to SAHRA confirming whether or not drilling may proceed;
- Regardless of the above archaeological opinion, all drill sites should be carefully inspected by project staff to ensure that no heritage features are present;
- A fossil Chance Finds Procedure must be included in the project EMP and implemented in the event of any chance finds of fossils, and
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would

need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

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

A motivation for not investigating reasonable and feasible alternatives is provided in **Section 9.4** above. The prospecting location has been informed by historical prospecting and production records for the area. The proposed prospecting activities requested as part of this authorisation is the only current viable manner in which a mineral resource can be evaluated to determine its economic viability.

14 Environmental Management Program

14.1 Details of the EAP,

This has already been covered. Refer **Section 1** of this document

14.2 Description of the Aspects of the Activity

This has already been covered. Refer **Section 3** of this document

14.3 Composite Map

This has already been covered. Refer **Figure 1 & 2**.

14.4 Description of Impact management objectives including management statements

The main management objectives for the invasive drilling activities are:

- Avoid potential impacts by positioning the drill sites in a manner which avoids /minimise potential impacts. This can be achieved by implementing appropriate buffer zones;
- Reduce impacts through implementing realistic operational management measures such as imposing restrictions on the time of day when drilling can take place and adherence to the site EMP; and
- Ensure that chemical and hydrocarbon spillages are avoided, where they cannot all together be avoided minimised and mitigated.
- Establish appropriate waste management system
- Restore the physical impact of drilling through implementation of concurrent rehabilitation as and when drilling at one site is completed.

14.5 Determination of closure objectives.

- Objective 1 - To create a safe and healthy post-mining environment with no residual environmental impact.
 - Safe mining area
 - Limited residual environmental impact
- Objective 2 - To create a stable, free draining post mining landform, which is compatible with the surrounding landscape and which is capable of a productive land use that achieves a land capability equal to that of pre-prospecting conditions
 - Economically viable and sustainable land fit for grazing, as close as possible to its natural state.
- Objective 3 – To provide optimal post-mining social opportunities
 - Optimised benefits for the social environment
 - Minimal negative aesthetic impact

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

The water that will be used for the prospecting activities if required will be sourced on agreement from an existing authorized water user which could be either the land owner or local municipality. No water will be abstracted in terms of section 21(a) of National Water Act, 1998 (Act no. 36 of 1998).

14.7 Has a water use license has been applied for?

No – Based on the limited water needs of the proposed prospecting activities, water from a legal source will be brought to the drill sites by mobile water tanker as and when required.

The department responsible for water resources shall be consulted with regards to any water related agreement with either the land owner or local municipality prior to drilling.

14.8 Impacts to be mitigated in their respective phases

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

ACTIVITIES	PHASE	SIZE AND SCALE of disturbance	MITIGATION MEASURES Refer Table 8 for complete EIA with mitigation measures	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
Non-invasive activities	Pre-Construction	7319Ha	<ul style="list-style-type: none"> • All operations will be carried out under the guidance of a strong, experienced manager with proven skills in public consultation and conflict resolution, including environmental coordinator where applicable. • All prospecting personnel will be made aware of the local conditions and sensitivities in the prospecting area and the fact that some of the local residents may not welcome the prospecting activities in the area. 	Environmental Awareness Plan	Before and during prospecting activities
Site Access Access Roads (temporary, jeep track roads less than 4m wide)	Construction	±2 600m ²	<ul style="list-style-type: none"> • Existing farm roads and tracks must be used as far as possible; • Where new access tracks are required to get the drill rig to the drilling site, such tracks must be scarified during decommissioning; • Vehicle's speed must take into account the possibility of collisions with fauna. • All compacted roads and drill traverses will be scarified and any topsoil stockpiled to be spread over the disturbed area. 	Approved PWP Environmental Authorisation; NEMA Section 2 Principles.	Upon cessation of the individual activity

<p>Site establishment activities:</p> <ul style="list-style-type: none"> - Vegetation clearance - Topsoil stripping & stockpiling - Drill pad compaction - Placement of temporary portable toilets and resting place. 	Construction	<p>160m² per drill site Max ±3 200 m² for 20 holes</p>	<ul style="list-style-type: none"> • Avoid cultural/heritage impacts by maintaining 100m buffer from any identified heritage feature and demarcation. • Any buried artefacts that may be uncovered during site activities will require such activities to stop to assess their significance and determine appropriate mitigation measures • The minimal area required for site establishment must be provided. • The soil disturbance and clearance of vegetation at drill pad areas will be limited to the absolute minimum required and will not be dozed or scraped with vegetation roots left intact for later re-growth. • Topsoil must be kept aside for rehabilitation; • The design of the drill fluid sump must be such that it prevents fauna from gaining access to site and becoming trapped. • Storm water must be diverted around the drill site stockpile to prevent erosion, if necessary. 	Heritage Act Environmental Authorisation; NEMA Section 2 Principles	Before and during drilling activities Upon cessation of the individual activity
<p>Exploration drilling:</p> <ul style="list-style-type: none"> - Drilling - Core or chip sample collection & storage 	Operational phase	<p>Estimated 20 drill holes 165mm diameter and average depth of 100m Chip samples 1.8m³ per hole ±36m³ for 20 holes Equipment laydown area & Sanitation requirements < 1Ha</p>	<ul style="list-style-type: none"> • The drilling rig and other visually prominent items on the site will be located in consultation with the landowner; • Make use of existing vegetation as far as possible to screen the prospecting operations from view; and • If necessary, the operations can be screened from view by erecting a shade cloth barrier. • Low vehicle speeds will be enforced on unpaved surfaces. • Maintain a buffer of 100m between drill sites and dwellings. 	SANS 10103 guideline GN R. 827 (NEM:AQA) GN R. 704 (NWA) NEMA	Upon cessation of the individual activity

<p>Exploration drilling:</p> <ul style="list-style-type: none"> - Drill maintenance & refuelling - Vehicle movements - Waste generation & management 	Operational phase	<p>Sludge from drilling activities <5m³</p> <p>Hydrocarbon storage <30m³</p>	<ul style="list-style-type: none"> • Oils and lubricants must be stored within sealed containment structures. • Fuel storage must be contained in mobile bowsters. • All chemicals and hydrocarbons shall be stored within 110% bund wall capacity. • Any mechanical equipment maintenance must be undertaken on drip trays or UPVC sheets to prevents spills/ leaks onto the soil. • Refuelling will be done with care to minimise the chance of spillages. • A spill kit will be available on each site were prospecting activities are in progress; and any spillages will be cleaned up immediately. • Underneath the drill rig or any equipment with potential oil spillages shall be lined with plastic liner to prevent soil and water contamination. • When not in use, a drip tray must be placed beneath mechanical equipment and vehicles. • Avoid hydrocarbon spills by employing proper vehicle maintenance. • A lined sump (with sufficient capacity) will be constructed to receive drill fluids and allow for evaporation should clays be intersected in the borehole. • Storm water must be diverted around the drill site to prevent ingress of storm water. • Waste materials generated on site must be stored in suitable lidded containers and removed off site to a suitable disposal facility. Waste separation must be undertaken if practical for recycling. • Drill muds to be contained in lined sump and disposed of off-site at licensed facility. 	<p>SANS 10103 guideline</p> <p>GN R. 827 (NEM:AQA)</p> <p>GN R. 704 (NWA)</p> <p>NEMA</p>	<p>Immediately in case of spills</p> <p>Upon cessation of the individual activity</p>
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Final Rehabilitation and removal of temporary infrastructure	Decommissioning	<1Ha	<ul style="list-style-type: none"> • Due to the remote location of the site, dust emissions are unlikely to be a source of nuisance; however, the site must be wetted if required. • Rehabilitation and preparation for re-vegetation must be done as soon as work is completed and before moving to the next drill site. • The disturbed site should be rehabilitated by scarifying hardened areas and filling the sludge catch pits (if any were required). • Any stored topsoil should be spread over the scarified surface to promote re-vegetation and prevent soil erosion. 	Environmental Authorisation; NEMA Section 2 Principles	Ongoing during construction and operation phase.
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14.9 Impact Management Outcomes

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

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	MITIGATION TYPE	STANDARD TO BE ACHIEVED
General prospecting	Conflict with other land users	Social	Life of operation	Control through monitoring & management	Impact minimised and mitigated.
Site Access	Disturbance of onsite flora and fauna	Fauna and Flora	Construction	Remedy through restriction and rehabilitation	Impact minimised and mitigated.
	Soil compaction from repeated use of access road to drill sites	Soil resources		Remedy through rehabilitation	
Site Establishment Drill pads and laydown area Vegetation clearance	Disturbance of onsite flora and fauna	Fauna and Flora	Construction	Remedy through restriction and rehabilitation	Impact mitigated end use objectives
	Noise Generation	Noise		Control through monitoring & management	Impact mitigated
	Visual intrusion	Visual			Impact mitigated
Site Establishment Drill pads and laydown area Topsoil stripping & stockpiling Compaction due to levelling and vehicle movement	Destruction or loss of Cultural and Heritage Resources	Cultural and Heritage	Construction	Avoidance by relocation of activity	Impact avoided
	Soil disturbance and compaction and topsoil stockpiling	Soil		Remedy through restriction and rehabilitation	Impact mitigated end use objectives
	Noise Generation	Noise		Control through monitoring & management	Impact mitigated
	Dust fall & nuisance from activities	Air quality			Impact mitigated
Erection of temporary structures such as drill rod racks, toilets, fuel tanker, water tanker	Visual intrusion	Visual	Construction	Remedy through restriction and rehabilitation	Impact mitigated end use objectives

Drilling Core and Chip sample collection & storage	Vehicle and drill noise disturbing on-site flora and fauna	Noise	Operational	Control through management and monitoring	Impact mitigated
	Dust emissions from drilling and general site activities (vehicle entrained dust)	Air quality		Control through management and monitoring	Impact mitigated
Drill maintenance & refuelling Waste generation & management facilities	Surface and ground water contamination From hydrocarbons	Soil and water		Avoidance through management and monitoring	Impact avoided
Removal of temporary infrastructure and drill site rehabilitation	Dust emissions (vehicle entrained dust)	Air quality	Decommissioning	Control through management and monitoring	Impact mitigated
	Erosion due to slow recovery of vegetation	Soil and vegetation		Remedy through restriction and rehabilitation	Impact mitigated

14.10 Impact Management Actions

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

ACTIVITY whether listed or not	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
General prospecting	• Conflict with other land users	Control through monitoring & management	Concurrently with prospecting activities	Remain within the ambits of the Prospecting Works Programme and Environmental Authorisation.
Site Access	• Disturbance of onsite flora and fauna • Soil compaction from repeated use of access road to drill sites	Remedy through restriction and rehabilitation	Immediately on cessation of drilling.	
Site Establishment Drill pads and laydown area Vegetation clearance	• Disturbance of onsite flora and fauna • Noise Generation • Visual intrusion	Remedy through restriction and rehabilitation Control through monitoring & management	Concurrently with prospecting activities as far as possible, otherwise immediately on cessation of drilling.	
Site Establishment Drill pads and laydown area Topsoil stripping & stockpiling Compaction due to levelling and vehicle movement	• Destruction or loss of Cultural and Heritage Resources • Soil disturbance and compaction and topsoil stockpiling • Noise Generation • Dust fall & nuisance from activities	Avoidance by relocation of activity Remedy through restriction and rehabilitation Control through monitoring & management		
Erection of temporary structures such as drill rod racks, toilets, fuel tanker, water tanker	• Visual intrusion	Remedy through restriction and rehabilitation		

Drilling Core and Chip sample collection & storage	<ul style="list-style-type: none"> • Vehicle and drill noise disturbing on-site flora and fauna • Dust emissions from drilling and general site activities (vehicle) 	Control through management and monitoring	Concurrently with prospecting activities as far as possible, otherwise immediately on cessation of drilling.	Remain within the ambits of the Prospecting Works Programme and Environmental Authorisation.
Drill maintenance & refuelling Waste generation & management facilities	<ul style="list-style-type: none"> • Soil, surface and ground water contamination From hydrocarbons 	Avoidance through management and monitoring		
Removal of temporary infrastructure and drill site rehabilitation	<ul style="list-style-type: none"> • Dust emissions (vehicle entrained dust) • Erosion due to slow recovery of vegetation 	Control through management and monitoring Remedy through restriction and rehabilitation		

15 Financial Provision

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

- Objective 1 - To create a safe and healthy post-mining environment
 - Safe mining area
 - Maintain affected environment in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof.
 - No potentially dangerous areas; secured if required
 - Limited residual environmental impact
 - No surface and/or groundwater contamination
 - Waste management practices not creating or leaving legacies
 - Develop a landscape that reduces the requirement for long term monitoring and management
- Objective 2 - To create a stable, free draining post mining landform, which is compatible with the surrounding landscape
 - Economically viable and sustainable land fit for grazing, as close as possible to its natural state.
 - Improve Land use with an increased production with regard to grazing.
 - Minimise disturbance of ecology due to loss of habitat and noise/visual/dust
 - Minimise risk of erosion from either increased base flow or prospecting operations:
 - Management of air emissions to minimise nuisance effects; implementation of dust suppression activities.
 - Increase of land with agricultural potential: profiling and sloping of remaining drill sumps and removal of all drill spoils and ripping of all compacted areas to facilitate recovery of natural vegetation through colonization by dispersing species (patch dynamics)
 - Prevent long term changes in land use: revert back to mainly stock farming (grazing).
 - Prepare area to promote natural re-establishment of vegetation that is self-sustaining, perpetual and provides a sustainable habitat for local fauna and successive flora species
- Objective 3 – To provide optimal post-mining social opportunities
 - Optimised benefits for the social environment
 - Maintain positive and transparent relationships with stakeholders: maintaining communication channels to all stakeholders and forums.
 - Provide stakeholders with relevant information: making all information available to stakeholders and providing information to authorities as per legislative requirements.
 - Undertaking environmental management in accordance with the implementation, maintenance and auditing of an environmental management system.
 - Minimal negative aesthetic impact
 - Maintain affected environment in an improved state containing no foreign debris or other materials.

The legal framework within which all the above lies entails:

- Defining and meeting closure standards.
- Complying with legislation.
- Sufficient financial provision for mine closure activities.
- Monitoring and plan for latent environmental impact.

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

The closure objectives were reported in the draft BAR as well as the Final Rehabilitation, decommissioning and mine closure plan Including Environmental Risk Assessment and was made available to all registered interested and affected parties.

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

Refer Final Rehabilitation, decommissioning and mine closure plan Including Environmental Risk Assessment **Annexure 1**.

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

The closure objectives are to return the land disturbed by drilling activities back to its original condition taking into account the transformation due to historic large-scale mining in the area. The rehabilitation plan provides the detail on how this will be achieved. Through experience, it can be confirmed that effective rehabilitation of drill sites is possible and achievable with the rehabilitation plan set out in **Annexure 1**.

15.5 Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline As per Paragraph 11 of this report and **Annexure 1**.

15.6 Confirm that the financial provision will be provided as determined. As per Paragraph 11 of this report and **Annexure 1**.

15.7 Mechanisms for monitoring compliance with and performance assessment against the environmental management program and reporting thereon, including

- i) Monitoring of Impact Management Actions
- ii) Monitoring and reporting frequency
- iii) Responsible persons
- iv) Time period for implementing impact management actions
- v) Mechanism for monitoring compliance

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
All Prospecting Activities	N/A	Ensure that the prospecting programme is being implemented in line with the approved prospecting works programme	Site Manager and Geologist	Annual Submit a prospecting progress report to DMR
	All commitments contained in the BA Report and accompanying EMPr	Ensure commitments made within the approved BAR and EMPr are being adhered to.	Site Manager and independent EAP	Annual Undertake and submit an environmental performance audit to DMR
Site establishment	Visual inspection of soil erosion and/or compaction	All exposed areas, access roads, the drill site and soil stockpiles must be monitored for erosion on a regular basis and specifically after rain events.	Site Manager Contractor (or sub-contractors)	Weekly, and after rain events (only during invasive activities) Weekly monitoring reports to be signed-off by the Site Manager Corrective action to be confirmed and signed-off by the Site Manager Consolidated monthly monitoring reports (including confirmation of corrective action taken, with photographic evidence) to be submitted to the Site Manager.
Drilling Activities	Visual inspection of biodiversity impacts	Visual inspection of drill site activities and other possible secondary impacts <ul style="list-style-type: none"> • Ensure that the fire brake is maintained. • Rehabilitation of drill pads • Records of water intersections on borehole logs • Monitor groundwater quality and level within 500m from a drill site (If any). • Control and minimise the development of new access tracks • Appropriate storage and handling of topsoil 		

Drilling Activities	Visual inspection of pollution incidents, the integrity of secondary containment structures and waste management Housekeeping & maintenance	<ul style="list-style-type: none"> • All secondary containment structure will be inspected on a daily basis to confirm the integrity thereof and to identify potential leaks timeously. • All spill incidents will be reported and corrective action taken in accordance with an established spill response procedure. • Standard waste management practices must be implemented to prevent contamination and littering. 	Site Manager Contractor (or sub-contractors)	<p>Weekly monitoring reports to be signed-off by the Site Manager</p> <p>Corrective action to be confirmed and signed-off by the PSM</p> <p>Consolidated monthly monitoring reports (including confirmation of corrective action taken, with photographic evidence) to be submitted</p> <p>Report incidents in terms of the relevant legislation, including the MPRDA, NWA and NEMA.</p>
Post Drilling Post Closure	Groundwater Revegetation Stability Soil erosion Alien invasive species	<p>Inspection of all rehabilitated areas to assess whether soil erosion is occurring and to implement corrective action where required.</p> <ul style="list-style-type: none"> • Identify any areas of subsidence around drill holes and under take additional backfilling if required. 	Site Manager	<p>Final Closure</p> <p>A final audit report for site closure must be submitted by the DMR for approval</p>

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

An external environmental performance audit shall be conducted annually by an independent environmental assessment practitioner that include an annual rehabilitation plan for implementation during the next reporting period. A review of the Final decommissioning, rehabilitation and mine closure Plan will also be done on an annual basis together with an update of the quantum calculations for financial provision for rehabilitation.

16 Environmental Awareness Plan

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

Training is part of its Induction process and environmental Management System (EMS). The induction includes:

- Awareness training for contractors and employees;
- Job specific training – training for personnel performing tasks which could cause
- potentially significant environmental impacts;
- EMS training;
- Comprehensive training – on emergency response, spill management, etc;
- Specialised skills; and
- Training verification and record keeping

Before commencement of the prospecting activities all employees and contractors who are involved with such activities should attend relevant induction and training. It is standard practice for employees and the employees of contractors that will be working on a new project or at a new site to attend an induction course where the nature and characteristics of the project and the site are explained.

The training course should include key information abstracted from the EMP pertaining to the potential environmental impacts, the mitigation measures that will be applied, the monitoring activities that will be undertaken and the roles and responsibilities of contractors' and personnel.

The full EMP document is also made available to attendees.

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

Environmental risks and how to manage them are dealt with in the induction course referred to in section (m) (i) above. If an incident of environmental pollution or damage does occur it is analysed and appropriate prevention and/or mitigation measures are developed. These measures are added to the EMP and conveyed to the relevant personnel.

All unplanned incidents with the potential to cause pollution or environmental degradation or conflict with local residents will be reported to the Mineral Resources Manager within 24 hours.

Hydrocarbon Spills

Hydrocarbon spills that are considered to be emergency incidents are large-scale spills (cover a surface area >1m²), resulting from situations such as; a leaking diesel bowser, an oil drum that is knocked over, large spillages from equipment, etc.

Activities that are involved in the clean-up of such instances include:

- The containment of the spill,
- The removal of all contaminated material, and

- The disposal (at a licenced hazardous disposal facility) or bioremediation (at a licenced facility) of this material.

Fire

There is the potential for fire to occur in the following locations of the drill site:

- Veld fires across vegetated areas; and
- Vehicles and equipment.

Veld fires: Any person who observes the fire must report it to the fire brigade immediately and then to their supervisor. If possible, additional personnel may be sent to contain the fire, but only if the lives of the personnel will not be endangered.

Vehicles and Equipment: Fire extinguishers will be available at the site where drilling activities will take place and in the vehicles. All staff members will be trained in the use of fire-fighting equipment.

16.3 Specific information required by the Competent Authority

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

Not applicable at this stage

17 Undertaking

The EAP herewith confirms

the correctness of the information provided in the reports

the inclusion of comments and inputs from stakeholders and I&APs

the inclusion of inputs and recommendations from the specialist reports where relevant; and

that the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein.

Signature of the environmental assessment practitioner:



N.J. van Zyl

Reg. EAP (EAPASA 2019/2034)

September 2021

-END-

**Annexure 1: Final Rehabilitation, decommissioning and mine closure plan
Including Environmental Risk Assessment and quantum
calculations**

~~Annexure 2: PPP summary~~

~~Annexure 3: Desktop HIA~~