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).

NAME OF APPLICANT: Golden Tropic Mining (Pty) Ltd
Reg No.: 2014/018912/07
Representative: Reginald Ernest Howell (Redge)

CELL NO: 0612423926
E-Mail: yellowrock909@gmail.com
ADDRESS: 603 Milpark Building, Ixia Road, Milnerton 7441

FILE REFERENCE NUMBER SAMRAD: NC30/5/1/3/2/10858MP

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

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

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

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

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

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

(ii) the degree to which these impacts —

(aa) can be reversed;

(bb) may cause irreplaceable loss of resources; and

(cc) can be managed, avoided or mitigated;

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

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

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

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

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
EStA	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
km²	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
m³	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

Contents

PART A
SCOPE OF ASSSSMENT AND BASIC ASSESSMENT REPORT

1 Contact Person & Contact Details

1.1 Details of EAP

Name of The Practitioner: N.J. van Zyl
EAPSA Registration: 2019/2034
Tel No.: 082 8898696; Fax No.: 086 6562942
e-mail address: klaaskraalbos@gmail.com

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.

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 MPTRO
- 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

Farm Name:	Portion of Plot 2100 Concordia Township
Application area (Ha)	5 Ha
Magisterial district:	Namakwaland
Distance from nearest town	2 Km South of Concordia
21-digit Surveyor General Code	C05300020000210000000

3 Locality map

Refer to the locality plan attached at **Diagram 1.** **Diagram 2** shows the properties and co-ordinates.

Diagram 1: Locality map

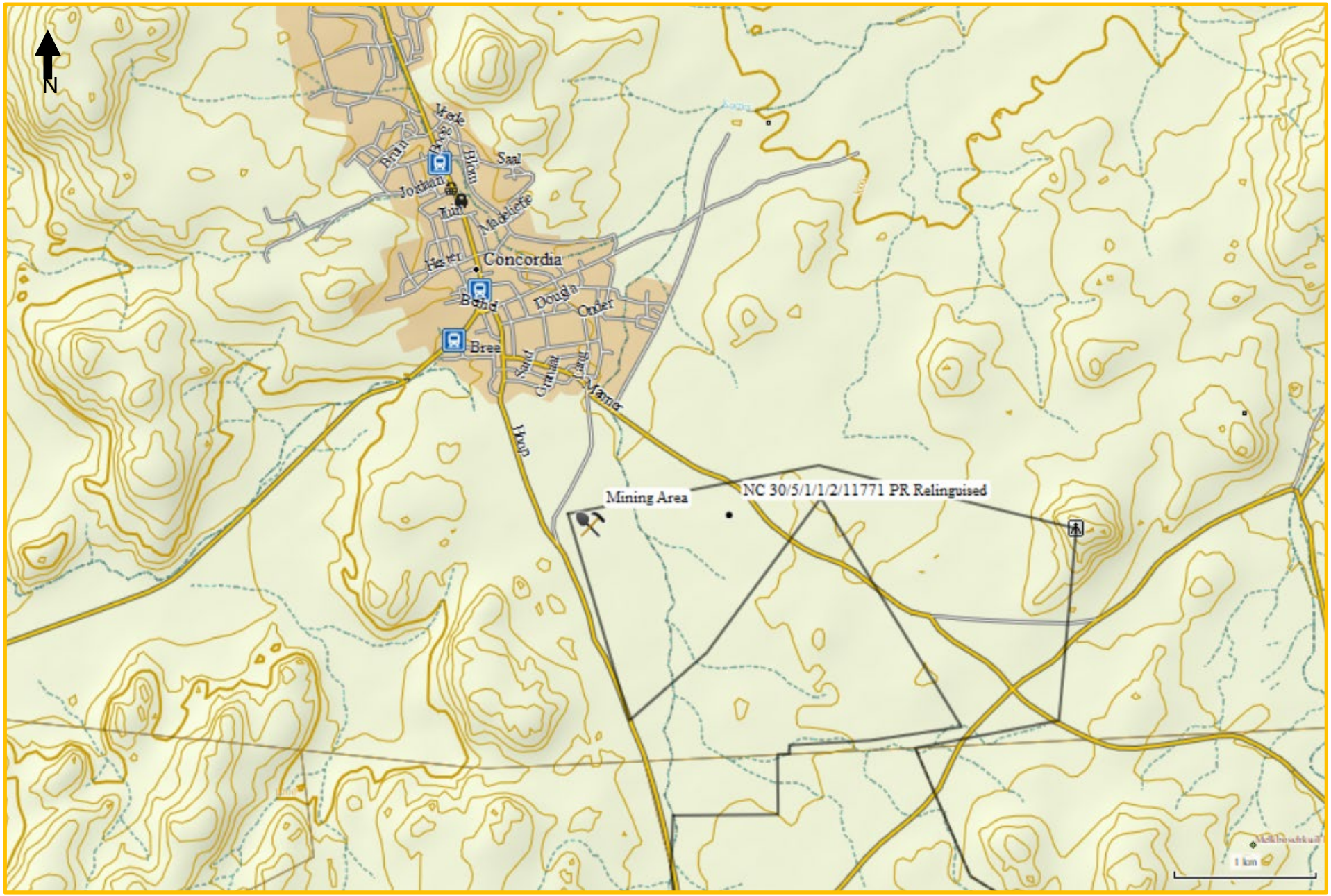
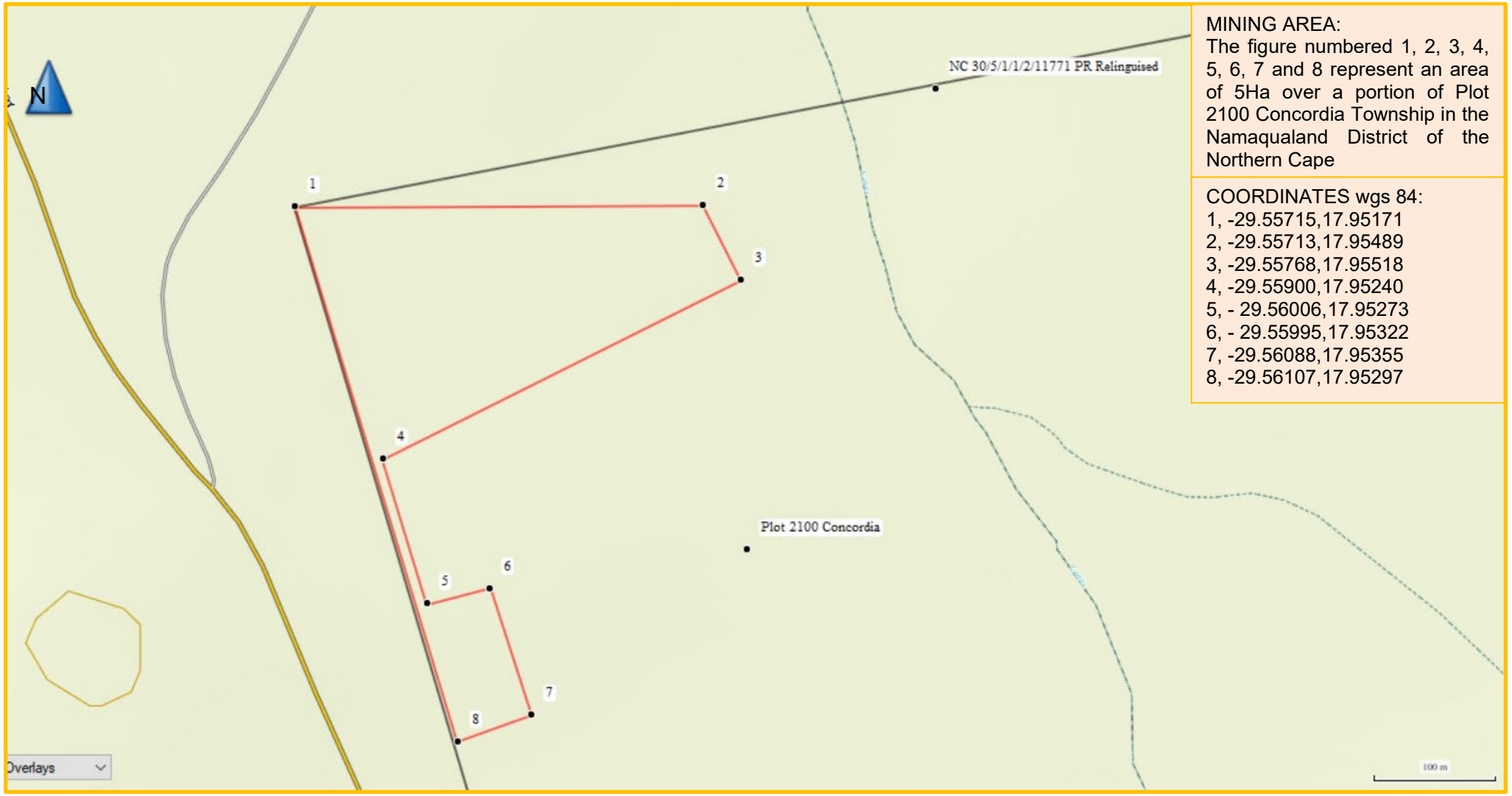


Diagram 2: Layout plan



MINING AREA:
The figure numbered 1, 2, 3, 4, 5, 6, 7 and 8 represent an area of 5Ha over a portion of Plot 2100 Concordia Township in the Namaqualand District of the Northern Cape

COORDINATES wgs 84:
1, -29.55715,17.95171
2, -29.55713,17.95489
3, -29.55768,17.95518
4, -29.55900,17.95240
5, - 29.56006,17.95273
6, - 29.55995,17.95322
7, -29.56088,17.95355
8, -29.56107,17.95297

4 Description of the scope of the proposed overall activity

The proposed Granite mining area is situated on a 5ha portion of Plot 2100 Concordia Township, which is zoned as Agriculture 1. The granite mining operation is to be carried out by the Applicant, Golden Tropic Mining (Pty) Ltd.

The Applicant has undertaken extensive prospecting for the past 7 years over the area applied. Only this one granite outcrop was identified for mining. Granite mining is dependent on market demand for specific colours that can change within a relative short period of time. Different quarries each with a specific colour therefore need to be available although not all of them will be active at the same time depending on the current market trend. In this case the area applied for has an Olive Green colour one of a few colours with a constant market demand.

Dimension stone is a collective term for various natural stones used for structural or decorative purposes in construction and monumental applications. The defining feature of dimension stone is that unlike other mineral commodities which have value mainly as a result of their physical properties, the physical properties of a rock are merely the minimum qualification in determining whether it is fit for use in dimension stone applications.

The ultimate success in marketing a natural stone as a dimension stone lies firstly in its appearance, and secondly in the possibility of producing rectangular blocks of suitable dimensions (hence the term "dimension stone") to allow for successful production of the final product in the required sizes.

This defining feature, together with the set of minimum physical properties required has important implications in terms of the environmental impacts of dimension stone mining, as well as the management thereof. When it is the intention to merely blast and remove stone for its physical properties (such as in crushed aggregate or ore mining), recovery can be almost 100% of the volume removed, while when the same stone is quarried with the intention of producing dimension stone blocks, recovery of saleable blocks is typically between 10% and 60%. This results in large quantities of waste rock which need to be disposed of, with resulting environmental implications.

The physical properties required of a successful dimension stone also have significant environmental implications - due to the requirement for inert materials which are not affected by weathering (and in today's context, the effect of severe chemically polluted atmospheric environments), dimension stone residues are typically benign from a pollution point of view. Like natural aggregates, dimension stone is used in its natural state, and does not require concentration and extraction from an ore. It is these latter two processes that usually results in significant environmental impacts such as acid mines drainage and other toxic effects associated with many of the metal extraction industries, and are therefore not applicable to this type of mining.

<u>Logistics:</u>

Most of the logistics to be used during mining is available at any of the nearby business hubs and at the quarry satellite logistics are supplied.

Development of infrastructure and waste management facilities still needs to be implemented as part of the construction phase, only for facilities not available at any of the nearby business hubs.

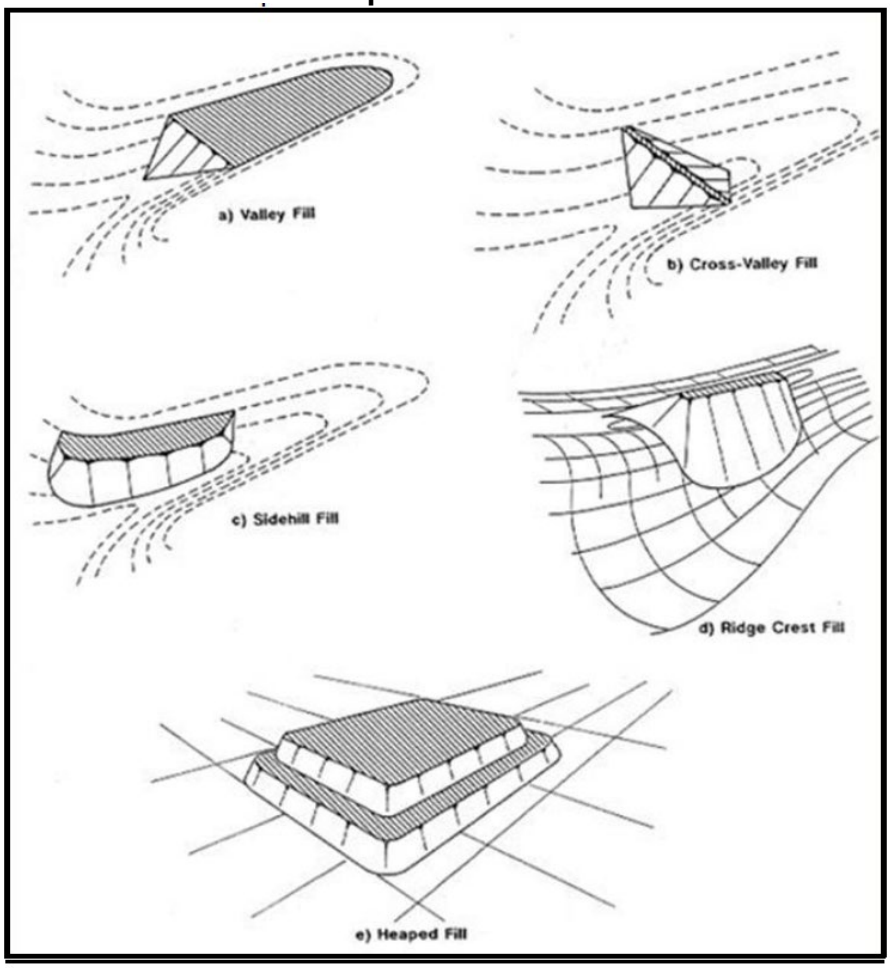
<u>Granite Waste Dumps</u>

Waste dumps must be designed to meet minimum slope stability and safety standards and vegetated with reduce erosion and runoff. Examples of waste dump classifications are provided in Illustration 2 below.

In view of the fact that the flat terrain of the project site and existing waste dumps with limited topsoil available, the best option for waste dumps is excavations to bedrock

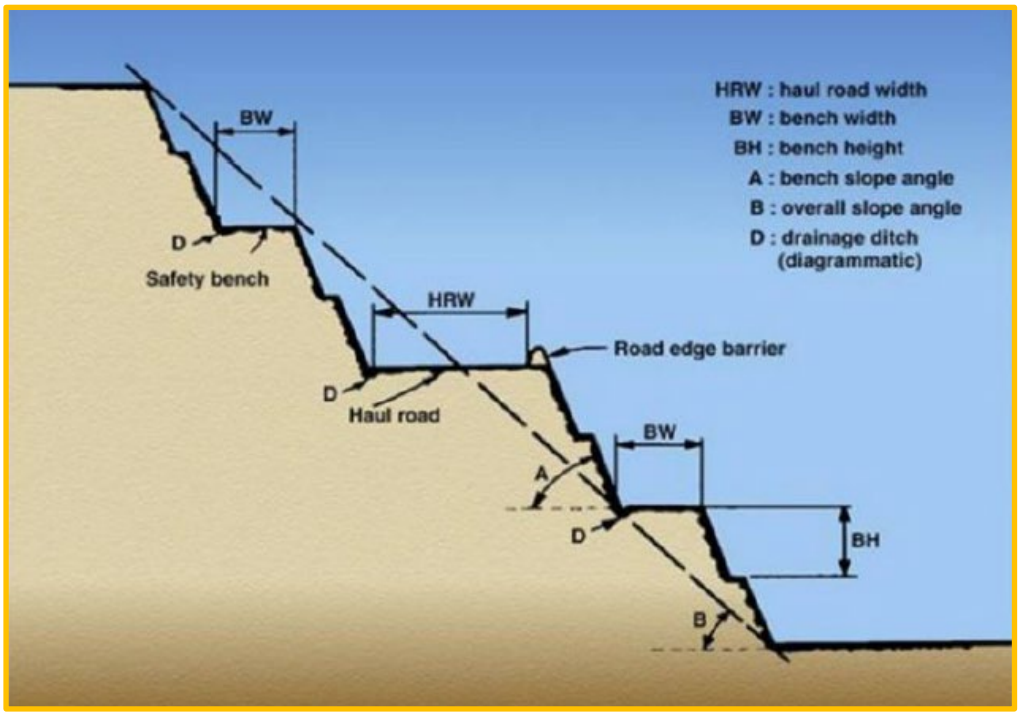
and filling and levelling the top of these dumps "heaped fill". In the case of "heaped fill" waste dumps, excavations with the final designed perimeter of the dump will be created to obtain cover material for the top of the dumps and profiling the slope of historic dumps to be extended. The excavations will serve as a base for extending the waste dump. Thereafter, dumping will proceed above surface on the top of this buried dump at successive tiers with an appropriate height of around 6 to 10m, leaving terraces of 6m wide and working from the perimeter toward the center. This will allow for reclamation of the outside profiles at a much earlier stage, resulting in very little outstanding reclamation toward the end of the life of the dump.

Illustration 1: Mine Dump Classification



This mining operation can be classified as quarrying the open or surface excavation of granite. Quarrying starts from the earth's surface and maintains exposure to the surface throughout the extraction period. For both access and safety, the excavation usually has stepped or benched side slopes as shown in Illustration 2 below.

Illustration 2: A simple diagram showing different design parameters



Quarrying methods depend mainly on the desired size and shape of the stone and its physical characteristics and the main equipment used are diamond saws (Rotary saws). Diamond saws are large diamond-impregnated circular blades up to 2 m in diameter that are used to form vertical cuts in the rock by moving the machine along a guideline or rail. Extremely accurate cuts can be made in this way. Wire saws are also used. These consist of several pulleys over which pass an endless carborundum or diamond-impregnated steel wire.

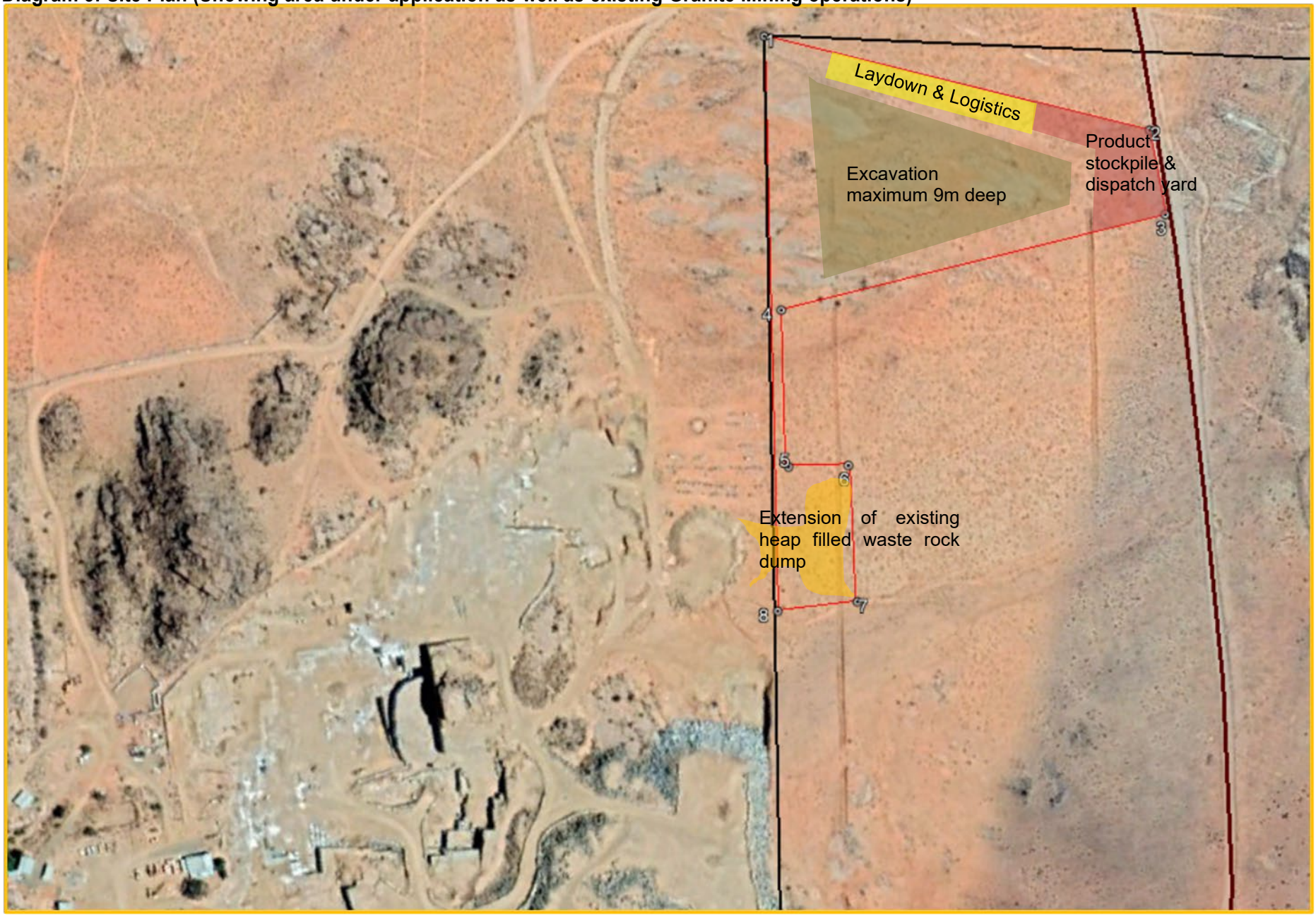
It must be note that the market requires solid blocks of a specific minimum dimension and any blocks smaller that such or exhibiting any cracks or blemishes are not exported but dumped on site. In this case it was calculated that recovery will be at between 20% and 30%. It is worth noting that the mining method using circular diamond saws maximises recovery.

The mining model requires an absolutely flat floor upon which rails are placed for use by the rotary blades. In order to achieve the flat floor, the rock may initially be hewn by diamond wire saws. The efficiency in respect of a dimension stone mine is related to the actual mining of the material and is a result of many factors such as:

- Structural integrity of the material
- Efficiency of the mining method
- Operator experience
- Dressing success.

Granite mining does not require any processing except for dressing of the cut blocks to make them square.

Diagram 3: Site Plan (Showing area under application as well as existing Granite Mining operations)



4.1 Listed and specified activities

NAME OF ACTIVITY	Aerial extent of Activity Ha or m²	LISTED ACTIVITY	APPLICABLE LISTING NOTICE	WASTE MANAGEMENT AUTHORISATION
Application for Mining Permit	Total footprint is 5 Ha	Yes	GNR 983 Listing Notice 1 of 2014 (dated 8 December 2014), as amended by GNR 327 (dated 7 April 2017): **Activity 21:** Any activity including the operation of that activity which requires a mining permit in terms of section 27 of MRPDA, including - (a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing.	Refer to Waste Activities included below where applicable.
Mine planning including development of waste dumps stockpiles and haul roads				
Demarcate mining areas as defined in Mine Plan Using visible poles or fences as demarcation system.	1Km linking with existing mine boundary	No	NA	No
Conduct Environmental Induction training	All staff members	No	NA	No
All access roads are already in place	NA	No	NA	No
Prepare areas for infrastructure such as: mobile containers for site office and secure storage area once fully operational; waste management facilities (laydown areas, waste scrap salvage yard, petrochemical and hazardous waste; bio-cell/soil farm); generator bays for generators; product stockpile and dispatch yards;	Product stockpile Approx. 0.5 Ha Laydown and Logistics Approx. 0.5 Ha	Yes	**GNR 983 (dated 8/12/ 2014) LN1 Activity 28, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 28:** Commercial or industrial developments where such land was used for agriculture on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare. GNR 985 (dated 8/12/2014) LN3 Activity 12, as amended by GNR 324 (dated 7/04/2017) LN3 Activity 12(g) iv: The clearance of an area of 300 square metres or more of indigenous vegetation (g) in the Northern Cape iv. on land where at the time of coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	No
Hydrocarbon storage	< 30m³	No	NA: Will be less volume than limits for EA	No
Sanitation requirements (chemical toilets)	Part of logistics	No	NA	No

Operational phase including excavations and development of waste rock dumps					
Develop flat mining floor using diamond wire cutting saws	Excavations 2.5Ha	Yes	**GNR 983 (dated 8/12/ 2014) LN1 Activity 28, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 28:** Commercial or industrial developments where such land was used for agriculture on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare. GNR 985 (dated 8/12/2014) LN3 Activity 12, as amended by GNR 324 (dated 7/04/2017) LN3 Activity 12(g) iv: The clearance of an area of 300 square metres or more of indigenous vegetation (g) in the Northern Cape iv. on land where at the time of coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.		No
Remove vegetation and sand ahead of waste rock dump to be used in future rehabilitation of waste rock dump	Waste Rock Dump 0.5Ha	Yes	**GNR 985 (dated 8/12/2014) LN3 Activity 12, as amended by GNR 324 (dated 7/04/2017) LN3 Activity 12(g) iv.:** The clearance of an area of 300 square metres or more of indigenous vegetation (g) in the Northern Cape iv. on land where at the time of coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning		No
Cut blocks from ore body Lift block out from exaction with block carrying front end loader or derrick crane and transport to dispatch yard, or transport to waste rock dump	NA	No	NA	GNR 921 (dated 29/11/ 2013) Category B: Disposal of waste on land (9) The disposal of inert waste to land in excess of 25 000 tons, excluding the disposal of such waste for the purposes of levelling and building which has been authorized by or under other legislation. GNR 921 (dated 29/11/ 2013) Category B: Construction of facilities and associated structures and infrastructure (10) The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity). GNR 633 (dated 24/07/2015): Category B: Residue stockpiles or residue deposits (11) The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right in terms of the MRPDA (28of 2002)	

Decommissioning phase including safety measures for remaining excavations				
Cover waste rock dump leading edge with sand removed prior to extension.	Leading edge	No	Na	No
Backfill leftover product in excavations and fence remaining dangerous excavations securely	Approximately 1000m	No	Na	No
Remove all structures, foundations and footings not required by landowner	0.5 Ha	No	Na	No
Rip all hardened areas and allow to revegetate naturally	Approx. 2 Ha	No	Na	No
AFTERCARE PERIOD				
Remove alien vegetation, if present	Total area 5Ha	No	Na	No
Conduct final environmental audit	Total area 5Ha	No	Na	No
Lodge Closure Application	Total area 5Ha	Yes	GNR 983 (dated 8/12/2014) LN1 Activity 22, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 22: The decommissioning of any activity requiring- (i) a closure certificate in terms of section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002). Only applies at time of final closure.	GNR 921 (dated 29/11/ 2013) Category A: Construction, expansion or decommissioning of facilities and associated structures and infrastructure (14) The decommissioning of a facility for a waste management activity listed in Category A or B of this schedule.

4.2 Description of the activities to be undertaken

The project is divided into three phases as listed below:

- Construction, including the planning and implementation phases, creation of infrastructure, mine or pit footprint, access ramps and haul roads, waste, residue and product stockpiles, handling areas, water reticulation and provision of power.
- Operation, including daily activities, mine development and expansion.
- Decommissioning and Closure, including scaling down of activities ahead of temporary or permanent closure, cessation of mining or production, implementation of the rehabilitation programme, monitoring and maintenance for prescribed period after cessation of operations; and closure, including completion of rehabilitation goals, application for closure, transfer of liability to the State and agreed post-closure monitoring or maintenance.

The methodology and technology to be employed in each phase is described below:

Construction Phase:

Due to the small scale of operations no permanent infrastructure will be developed and only existing farm tracks will be used. Upgrading of the existing tracks will be done as part of the construction phase. Most of the logistics to be used during mining is available at any of the nearby business hubs and at the quarries satellite logistics are supplied.

Development of infrastructure and waste management facilities still needs to be implemented as part of the construction phase, only for facilities not available at any of the nearby business hubs, and when fully developed the logistics area with waste management facilities will consist of the following:

- Access and Haul Roads
- With regard to access to the mine the existing roads will be used and must be upgraded and maintained as haul roads for trucks as needed by the mine.
- Refer to Diagram 3 for the location of the existing farm tracks that provide access to the proposed project site.
- Existing farm tracks will be used as haul roads and no new roads will be developed.
- Services and associated infrastructure
- Water will be sourced from the local authority and trucked onto site to be stored in 5 000-liter plastic tanks.
- Electrical supply for the rock saws and logistics are generated by mobile gensets.
- Accommodation and Logistics
- Accommodation will be arranged at any of the nearby business hubs
- Mobile shipping containers to be used for site office and secure storage area.
- The sorting and dispatch yard together with stockpile area for low grade blocks to be demarcated and the footprint contained.
- A demarcated laydown area to be demarcated and the footprint contained.
- A demarcated salvage yard for temporary storage of scrap to be demarcated and the footprint contained.
- Petrochemical and hazardous waste including contaminated/used spares, filters and used to be collected and stored in special containers with spill containment measures and transported weekly to be disposed at a registered disposal site.
- Waste management facilities
- Bio cell for bioremediation of any potential petrochemical pollution
- The generators need to be supplied with generator bays with a sump for collection of spills and contaminated run off
- Domestic waste will be collected in plastic containers and transported on a regular basis to the municipal waste disposal site.

- Oil/grease/diesel management systems
- Will consist of a drip trays for stationary equipment to be provided in the parking area and service bay
- Contaminated soil and sludge from the collection sumps will be treated in a bio cell (soil farm) to be provided on site.

Operational Phase

The mining method consists of:

- The establishment of a flat floor through the use of diamond wire saws.
- The flat floor is then fitted with parallel rails which serve the rotary saws which cut blocks from the ore body with less waste than other systems. The saws have a diameter of 3-4m.
- Cutting will be done according to benches not higher than 2meters so as to ensure at final closure no high wall will be left that needed to be profiled and the remaining steps will blend in with the natural topography of the area.
- A total of four benches will be developed.
- The base of the blocks is separated by small diameter plug and feather technique.
- The raw cut block is lifted out of the hole and placed for transport by block carrying front end loader to the dressing area.
- At the dressing area, the block is neatened up through removal of any protuberances and the 1st grade blocks are then transported to the dispatch yard and the 2nd grade blocks to a separate stockpile area.
- Waste blocks and offcuts are transported by block carrying front end loader to the waste rock dump. Excavators are used to keep the top of the waste dump level to promote traffic movement.
- At final closure of the operation all remaining product (blocks) from the demarcated dispatch yard and low-grade stockpile area will be removed to the waste rock dump or stacked within the quarry against the remaining high wall or used to fill any remaining deep excavations if any.

Decommissioning and Closure Phase

Planning for closure and restoration from the beginning of an operation makes the process more efficient:

- Waste can be removed as it is created,
- Excavation can be planned so that topography restoration is less complicated, and
- Topsoil can be re-used at shorter interval.
- Site rehabilitation can make the land more valuable and attractive for resale. Additionally, establishing a closure strategy (and communicating that activity to the public) can help enhance the company's reputation as a socially-responsible operation.
- Rehabilitation is carried out on a continuous basis as work progresses. Such rehabilitation is undertaken by scarifying the disturbed and or compacted areas to promote natural revegetation. This will be monitored continuously to ensure effective restoration and revegetation of disturbed areas. The rehabilitation work will be conducted in-house under the supervision of an ECO.

The decommissioning and closure phase at the end of the life of the mine will consist of implementing the Final Rehabilitation, Decommissioning and Closure Plan (attached at Appendix 1).

5 Policy and Legislative Context

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLIY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT
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.	Mining activities	The mining 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 mining permit in terms of Section 27 for an area not exceeding 5 hectares in extent.	The conditions and requirements attached to the issuing of the Mining Permit will apply to the mining activities. DMR is the Competent Authority (CA) for this NEMA and NEM:WA application.
Mine, Health and Safety Act (Act 29 of 1996) and Regulations	Mining activities	Control measures are to be Implemented upon the approval of the EMPr.
National Environmental Management Act, No 107 of 1998 (as amended) (NEMA) GNR 983 Listing Notice 1 of 2014 (dated 8 December 2014), as amended by GNR 327 (dated 7 April 2017) Listing Notice 1, Activity 21	Application to the DMR for Environmental Authorisation in terms of the 2014 EIA Regulations	An Application for Environmental Authorisation must be submitted to DMR for an Environmental Authorisation. The listed activities that are triggered determine the Environmental Authorisation (EA) application process to be followed. The appropriate EA will be obtained before proceeding with any mining activities. Measures will be implemented to prevent any pollution occurring during the mining activities. The disturbed area shall be rehabilitated in such a way that is stable, non-polluting, non-eroded, free from alien invasive species and suitable for the agreed post closure land use.
Financial Provisioning Regulations 2015 as amended by GNR639 of 21 September 2018	Appendix 1 Final Rehabilitation, Decommissioning and Mine Closure Plan including rehabilitation cost calculations and provision	The compilation of this Basic Assessment Report, Final Rehabilitation, Decommissioning and Mine Closure Plan and the Public Participation Process are required in terms of NEMA.

National Environmental Management: Waste Act, Act 59 of 2008 (NEMWA)NEM: WA (as amended) Waste listed activities in GNR 921 (dated 29/11/ 2013) 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.	Refer to Sec 4.1 for the waste listed activities in GNR 921 (dated 29/11/ 2013) Category B: Disposal of waste on land.	The listed activities that are triggered determine the Environmental Authorisation (EA) application process to be followed. The Application for Environmental Authorization has included these listed wastes activities as shown in Table 2 Mitigation measures for the waste blocks of granite are included in the EMPr, and Closure Plan (Appendix 1).
Hazardous Substances Act (Act 15 of 1973) and Regulations read together with NEMA and NEMWA Definition, classification, use, operation, modification, disposal or dumping of hazardous substances.	Sect 16 EMPr General waste management measures as part of environmental awareness plan	The generation of potential waste will be minimized through ensuring employees of the Applicant are subjected to the appropriate environmental awareness campaign before commencement of mining. All waste generated during the mining activities will be disposed of in a responsible legal manner. Proof of legal disposal will be maintained on site.
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)	Section 9 Diagram 4, 5, 6, 7 & 8.	There are no listed Critically Endangered, Endangered or Vulnerable ecosystems on site. The site is located within in a CBA1 Area and not within a River FEPA sub catchment.
Fencing Act (Act 31 of 1963) Section 17: States that any person erecting a boundary fence may clean any bush along the line of the fence up to 1.5m on each side thereof and remove any tree standing in the immediate line of the fence. However, this provision must be read in conjunction with the environmental legal provisions relevant to protection of flora	Section 9	Restriction on vegetation clearing is included in the EMPr.
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) [NEMBA] Alien and Invasive Species List, 2016 (in GN No. 864 dated 29 July 2016)	Section 9	Alien invasive vegetation management is included in the EMPr.
Conservation of Agricultural Resources Act (Act 43 of 1983) CARA Regulation GN R1048, published on 25 May 1984 Section 5: Implementation of control measures for alien and invasive plant species; Section 6: Control measures	Section 9	Control measures are to be Implemented upon the approval of the EMPr.
National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004). National Dust Control Regulations in GN R827 of 1 November 2013	Section 9	Dust control measures are included in the EMPr
National Heritage Resources Act, 25 of 1999 (“NHRA”)	Section 9	Refer to Appendix 3 for a copy of the Heritage Impact Assessment

National Water Act (Act 36 of 2008)	Section 9	No Water Use activities in terms of Section 21 will be triggered as water will be obtained from the local authority and trucked onto site.
Promotion of Administrative Justice Act, 2000 (Act 3 of 2000) [PAJA]	Decision by the Competent Authority	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
Road Traffic Act (Act 93 of 1997) and Regulations	Section 9	Control measures are included in the EMPr
Spatial Planning and Land Use Management (Act 16 of 2013 (SPLUMA) Regulations GN R239 published on 23 March 2015 in terms of SPLUMA	Comments required from the Nama Khoi Local Municipalities.	Consent use in terms of the Municipal Planning By-Law, 2015 is required to permit mining on properties that are zoned for Agricultural purposes.
Municipal Plans and Policies		
Namakwa District Municipality Integrated Development Plan (IDP) 2017/2022	Section 6	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), 2018/2019	Section 6	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 6 & 9. Diagram 4	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 6	
DEA Guideline on PPP DMR Guideline on Consultation with Communities and I&APs (undated)	Section 8.2 & 8.3	Used during PPP
DEAT Integrated Environmental Management Information Series 5: Impact Significance (2002)	Section 9	Used during Impact Assessment
DEAT Integrated Environmental Management Information Series 7: Cumulative Effects Assessment (2004)	Section 9	Used during Impact Assessment
Namakwa District Biodiversity Sector Plan (2008)	Baseline environmental description and	Used during desktop research to identify sensitive environments within the mining right area.
BGIS (www.bgis.sanbi.org)		

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.

6 Need and desirability of the proposed activities

6.1 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 Mining area as shown in **Diagram 4** are: Category A: Statutory Protected Areas; 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 (refer to **Diagram 8**), 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. This FBAR and EMPr provide the environmental impact assessment required for the activities triggered.

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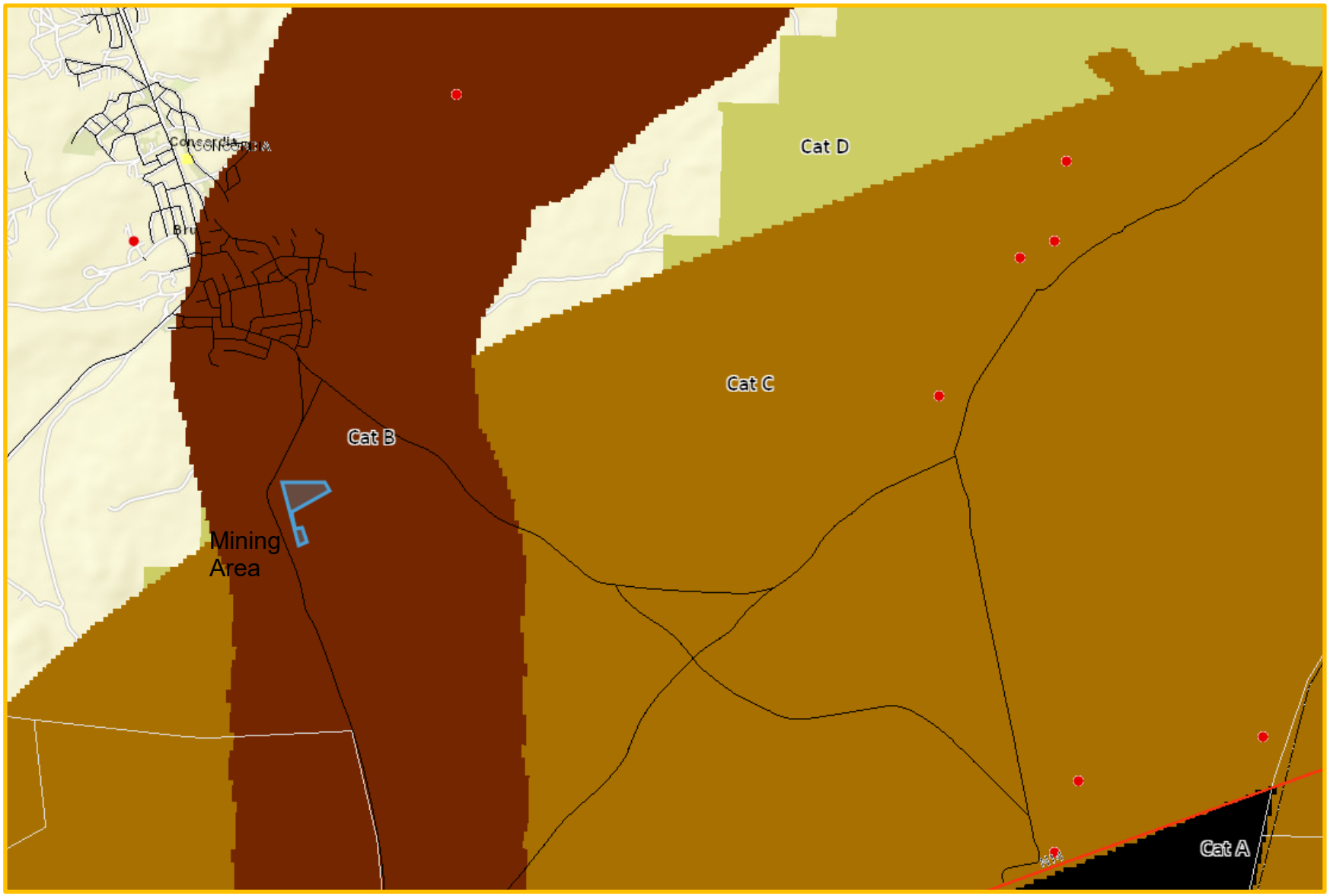
[1] Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, and South African National Biodiversity Institute. 2013. Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector. Pretoria.

[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."

Diagram 4: Location of Mining area in terms of Mining and Biodiversity Guidelines sourced off SANB BGIS Map Viewer



6.2 Granite Material Supply and Employment Benefits

The defining feature of dimension stone is that unlike other mineral commodities which have value mainly as a result of their physical properties, the physical properties of a rock are merely the minimum qualification in determining whether it is fit for use in dimension stone applications. Dimension stone can be defined as "naturally occurring rock material cut, shaped or selected for use in blocks, slabs, sheets or other construction units of specialised shapes and sizes". A dimension stone block thus has value as a result of its dimensions and appearance, underlain by a set of minimum physical properties (among these are various strength parameters, workability, ability to take a polish, and resistance to physical and chemical weathering). The dimension stone product in this case is granite blocks cut from the resource. The blocks vary in size but an average of 2m x 1m x 1m is assumed. The ultimate success in marketing a natural stone as a dimension stone lies firstly in its appearance, and secondly in the possibility of producing rectangular blocks of suitable dimensions (hence the term "dimension stone") to allow for successful production of the final product in the required sizes.

All products are to be sold as a FOT product at the mine and transported to a Depot in Cape Town from where it will be exported for further cutting at international locations. As mentioned above, dimension stone is a collective term for various natural stones used for structural or decorative purposes in construction and monumental applications. The material is sent as blocks to cutters overseas with the final product consumer home decor materials (counter tops, tiles, etc.).

In terms of employment opportunities and job security at this mining area, there is a total of 15 employment opportunities.

6.3 Nama Khoi Local Municipality IDP (Draft IDP 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 Municipality is:

'To proudly deliver sustainable local economic development and climate resilient quality services to the Nama Khoi Municipality"

The development and implementation of the Nama Khoi Local Economic Development (LED) strategy aims at ensuring the alignment to the economic sectors and also assist the SMME's in co-operation with other stakeholders:

- ✓ To initiate, lead and sustain an environment for job creation in the Nama Khoi Municipal Area.
- ✓ To leverage municipal assets and the municipal procurement process with the view to stimulate redistribution and growth.

The Macro Strategic Development concept provides a broad spatial development framework for the total municipal area and contains spatial planning proposals based on the following concepts (only those of relevance referenced here):

SPATIAL OBJECTIVE 3: To develop sustainable and diverse local economies by the utilisation of opportunities in the different spatial categories.

MINING

- ✓ There is a concentration of minerals around the Springbok area (where this mining area is located), as well as in a broad band along the south of the Orange River.
- ✓ Although many of these sources have been depleted, there are still plenty occurrences that can be exploited and this should be considered for small scale mining.
- ✓ The Industrial mining corridor as indicated in the PSDF must be investigated for opportunities and exploited where possible.
- ✓ To solve the disputes and issues related to mining rights and to investigate the possibility for local communities to gain access and limited mining rights in areas to be identified for this.

SPATIAL OBJECTIVE 4: To protect the pristine and unique natural environment with its four distinct bio-geographical regions by means of effective management and managed use.

CORE & BUFFER AREAS

- ✓ To protect and manage the following environmentally important areas in line with the objectives and targets of the NBSAP:
  - The western part of the local municipality from the coast to the east of the N7, which has been identified as a SANBI priority area; and
  - The western mountain ranges including the Kamiesberg and the Hantam which has been identified as a SANBI Escarpment.
- ✓ To protect the natural spaces affected by the Terrestrial and Aquatic Critical Biodiversity areas against development and overgrazing, due to its vital role in maintaining biodiversity.
- ✓ To support the Critical Biodiversity Corridor Linkages towards the surrounding municipalities.
- ✓ To expand the statutory protected conservation areas in the municipal area, i.e., Goegap Provincial Nature Reserve, Namaqua National Park.
- ✓ To rehabilitate all mining areas and damaged areas in the region and to remove and terminate unwanted activities and undesirable structures in and around protected areas.
- ✓ To investigate and eradicate the invasive Prosopis tree which poses a significant threat to biodiversity and ecosystem services in the Northern Cape Province of South Africa.

OTHER

- ✓ To ensure that future planning in the region consider the mitigation of climate change, including the curbing of greenhouse emissions associated with transport and electricity use. A Climate-Neutral Strategy is to be developed for the Northern Cape. The implementation of this strategy into land use management regulations would be mandatory on all municipalities and the private sector.
- ✓ To improve the urban areas' natural character through landscaping, tree planting, the development of natural parks and the protection of natural areas and (flowers) in the neighbourhoods.
- ✓ To rehabilitate the old mining areas to improve the environmental character of the area.
- ✓ To develop additional environmental awareness campaigns and environmental education programmes for the communities and visitors.

6.4 Namakwa District Municipality Draft IDP 2017 2018

The vision of the Namaqua District Municipality IDP is: "Namakwa District Municipality, a centre of excellence!" The Mission Statement is:

- ✓ A government institution legislatively mandated to stimulate economic and social transformation within the jurisdiction of the Namakwa District Municipality;
- ✓ By fostering partnership with relevant institutions to ensure sustainable development;
- ✓ Proactively supporting and capacitating B-municipalities;
- ✓ Be a transparent and accountable centre of excellence; and,
- ✓ Provide local leadership on environmental sustainability and climate change response.

The Namakwa District Municipality adheres to the values contained in the Batho Pele Principles.

The effects of climate change, such as flood events, on the proposed mining project will be mitigated as per the measures to be contained in the EMPr. The mitigation for emissions of greenhouse gases from vehicles and machinery associated with the mining activities will be addressed in the EMPr and Closure and Rehabilitation Plan.

6.5 Northern Cape Provincial Spatial Development Framework (NCPSDF)

The NCPSDF states that the: “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. The potential negative environmental impacts will be mitigated through the implementation of the EMPr and the Closure and Rehabilitation Plan, to ensure a sustainable mining activity.

6.6 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.

6.7 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. The Impact summary will be included in the BAR. 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 been made to involve all the relevant stakeholders and Interested and Affected Parties. I.e., Public participation is being undertaken to obtain the issues / concerns / comments of the affected people for input into the process. Refer to Section 8 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 included in the EMPr.
- Consideration for ecosystem disturbance and loss of biodiversity – the project site is identified as Critical Biodiversity Area (CBA) 1 but large areas adjacent to the mining area are transformed areas (refer Diagram 8). 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 granite extraction process is considered to be a relatively benign type of mining. Rehabilitation back to the natural state is a key component, and will be

undertaken in a phased manner as the mining activities progress. This report together with the EMPr (Part B) and Closure Plan (Appendix 1) proposes mitigation measures which will minimise the impacts of the mining activities on the environment.

- Pollution and environmental degradation – The implementation of recommendations made and proposed mitigations are detailed in the EMPr, and Closure Plan (Appendix 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 (Appendix 1) to ensure that the impacts are mitigated.
- Waste avoidance, minimisation and recycling – These aspects were considered and incorporated into the EMPr and the Closure Plan (Appendix 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 (Appendix 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 8.
- 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.

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

- The preferred and only location of the Quarry, waste rock dump site, and the Dispatch yard, Infrastructure, Site Camp and Laydown Area is as per the demarcated areas shown in Diagrams 3.
- The preferred and only activity is the mining of Granite as dimension stone for the international market already established.
- The preferred and only technology is the use of the saws, machinery to move the blocks and to shape the blocks, and transportation off-site to its destination.

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.

8 Process to Reach the Proposed Preferred Alternative

8.1 Details of the development footprint alternatives considered.

With reference to the site plans provided as Diagram 3 showing the location of the individual activities on site, details are provided below of the alternatives considered.

8.1.1 Location or Site Alternatives

The design or layout of the mining area is determined by the shape, position and orientation of the granite mineral resource. Most of the logistics to be used during mining is already available at the nearby business hubs. Infrastructure, buildings and waste management facilities consist of mobile containers. Existing farm tracks will be used and upgrading of the tracks will be undertaken as part of the construction phase, and maintenance as part of the operational phase.

No electricity is available on the mine and all electricity will be generated by mobile diesel-powered generators. Process and potable water are obtained from the local authority with collection sumps for the recycling of process water used to cool the saws used for cutting of the granite blocks. Water is to be stored in plastic tanks.

The existing waste rock dump (WRD) site developed for the adjacent mining right activities will be extended as a “heap fill” waste rock dump, as shown in Diagram 3.

8.1.2 Type of Activity

The Applicant is not the land owner, so it would not be realistic for this company to propose another type of activity, as their core business is the mining of granite.

The holder of a mining right is required to rehabilitate the environment affected by mining to its natural state or to another predetermined land use. Although the mining activity takes place over a long-time period, the best post-mining land use alternative is to return the site to its natural state. Other activity alternatives have therefore not been considered as the purpose of the proposed project is to mine granite from the identified deposits with the application area. The only other activity required to be assessed in terms of NEMA is the "do-nothing" alternative, as detailed further below.

8.1.3 Design or Layout of Activity

The applicant has undertaken extensive prospecting for the past 7 years over the area applied for. The granite outcrop identified for mining have a unique colour with an established international market.

The design or layout of a mining project is determined by the shape, position and orientation of the mineral resource. Best practice dictates that it is better to mine and rehabilitate the area sequentially in mining blocks, as this minimises the disturbance to the mining blocks once they have been rehabilitated. The significance of the environmental impacts associated with different possible design or layout alternatives would be very similar.

8.1.4 Technology Alternatives

The technology used in a mining project is determined by the shape, position and orientation of the mineral resource. This mining operation can be classified as quarrying the open or surface excavation of granite. Quarrying starts from the earth's

surface and maintains exposure to the surface throughout the extraction period. For both access and safety, the excavation usually has stepped or benched side slopes. Quarrying methods depend mainly on the desired size and shape of the stone and its physical characteristics and the main equipment used are diamond wire saws and rotary saws.
The mining method for all of the quarries is the same and consists of:

- The establishment of a flat floor through the use of diamond wire saws.
- The flat floor is then fitted with parallel rails which serve the rotary saws which cut blocks from the ore body with less waste than other systems. The saws have a diameter of 3-4m and for purposes of planning are deemed to have a cutting depth of 1.7m.
- The base of the blocks is separated by small diameter plug and feather technique.
- The raw cut block is lifted out of the hole and placed for transport by block carrying front end loader to the dressing area.
- At the dressing area, the block is neatened up through removal of any protuberances and the 1st grade blocks are then transported to the dispatch yard and the 2nd grade blocks to a separate stockpile area.
- Waste blocks and offcuts are transported by block carrying front end loader to the waste rock dump. Excavators are used to keep the top of the waste dump level to promote traffic ability.

There are no reasonable or feasible technology alternatives for further consideration.

8.1.5 Operational alternatives

The Mining Work Plan sets out the operational plan for the mine based on the international demand per granite colour. There are no reasonable or feasible operational alternatives for further consideration.

8.1.6 The No-go Alternative

The No-Go Alternative will mean that the existing granite prospecting will not be realised into a mining operation. There will be no supply of granite for the international market. There will be no employment opportunities, and no beneficiation for the local community.
The assessment of alternatives must at all times include the "no-go" option as a baseline against which all other alternatives must be measured. The "no go" alternative is therefore assessed together with the preferred alternative.
The project site has been selected based on the results from prospecting. The layout and technology of the quarry has been determined by the shape, position and orientation of the mineral resource. The Dispatch Yard, Infrastructure, Site Camp and Laydown Area is centrally located as shown in Diagram 3.
The existing access roads will be utilised, and the existing WRD site will be expanded.
The operational approach is practical and based on best practice to ensure a phased mining, followed by rehabilitation in sequential stages.

8.2 Details of the Public Participation Process Followed

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 **Appendix 2** Public Participation Process).

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:

- Letters of notification to directly affected landowners;
- Written notifications to other stakeholders including neighbors, Local and District Municipalities (including traditional authorities where applicable); and
- Media advertisements and site notices.
- Circulation of a Background Information Document (BID) with the notification letter to the landowner, neighbouring landowners and potential I&APs;
- 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.

8.3 Summary of issues raised by I&Aps

(To be included in the FBAR after the 30-day PPP period)

Interested and Affected Parties, persons consulted is marked with an X		Date Comments Received	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					
Landowners or Lawful occupier/s of the land					
Landowners or lawful occupiers on adjacent properties					
Municipality					
Communities					
Traditional Leaders					
None identified	NA				
Interested parties - Reply on advertisement and site notices					

8.4 The Environmental attributes associated with the project site

8.4.1 Type of Environment Affected by the Proposed Activity

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.

Landscape and Land Use

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.

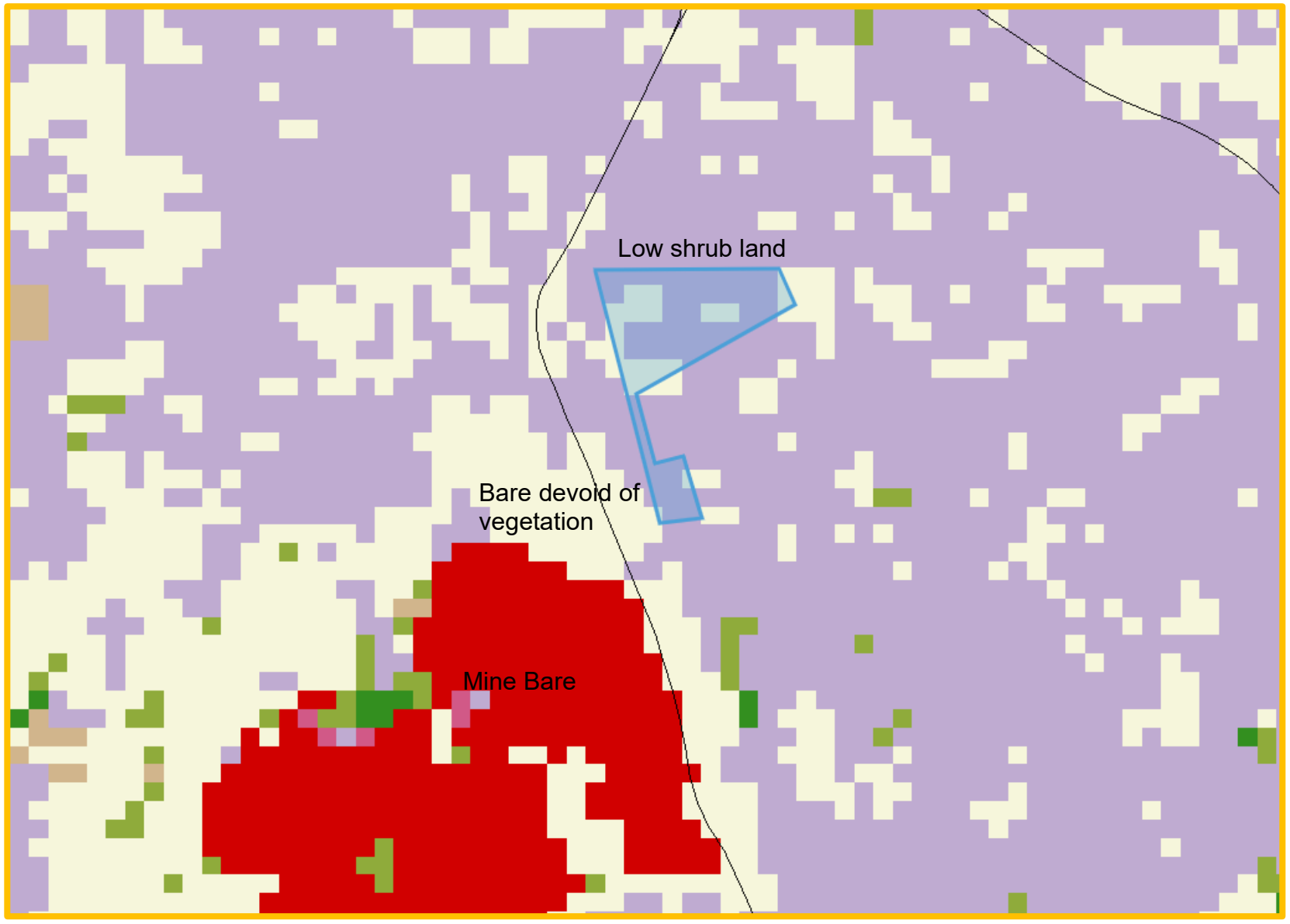
Tourism is a seasonal feature – with visitors to the region arriving almost exclusively between July and October in order take in the world-renowned yearly flower display. Urban development is not a major feature of the landscape and is not expected to increase much in the coming years. As such the proposed 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 mining development
- expansion of crop agriculture
- 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. Refer to Diagram 5 which shows the land-use as per the SANBI BGIS map viewer Land Cover database dated 2014. The white areas are either eroded areas or areas devoid of vegetation, as the area is very rocky with large rock surfaces. The light purple indicates low shrub land.

Diagram 5: Location of Mining area in terms of Land Cover sourced off SANB BGIS Map Viewer

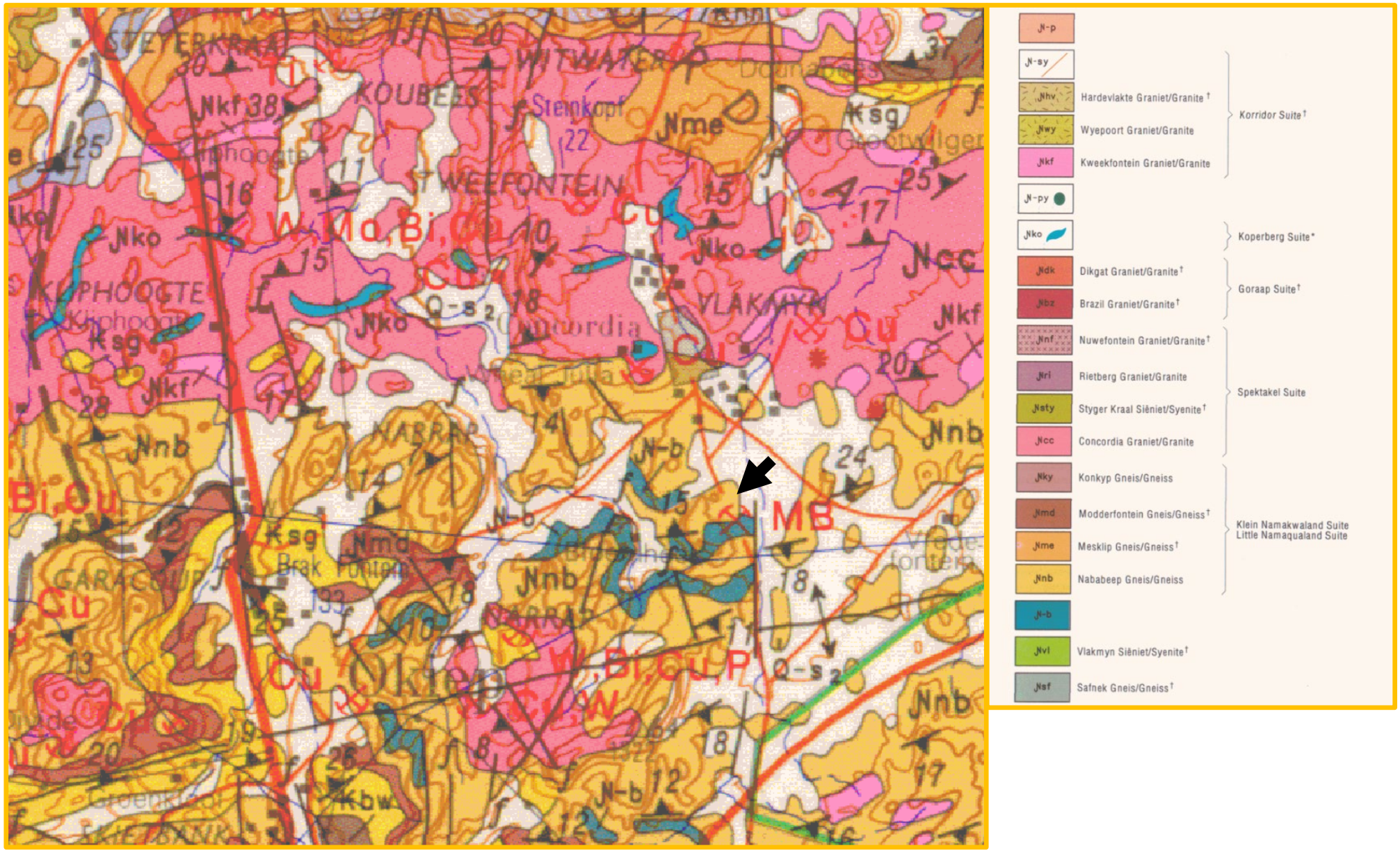


Geology and soils

The regional rocks are predominantly hybrid migmatites with grantes / 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. Metamorphism declines towards the East but is still regionally intense. Excluding some of the intrusives, all these rocks are Precambiran in age and form part of the Namaqua Metamorphic Complex. There is a large variety of lithological types, many of which grade into one another and are genetically related and influenced by poly-phase intrusion and metamorphism.

The copper district in Namaqualand underlain by a basement of a meta-volcanosedimentary rocks known as the Bushmanland Group (previously the Okiep Group). Sequential intrusions followed with the Gladkop Suite, the Klein Namaqualand Suite, the Spektakel Group and the youngest Koperberg Suite. The latter comprises copper bearing basic intrusives and associated megabreccias. Rock types include anothosites, diorites, glimerites, norites and hyperstenites. (Refer Diagram 6).

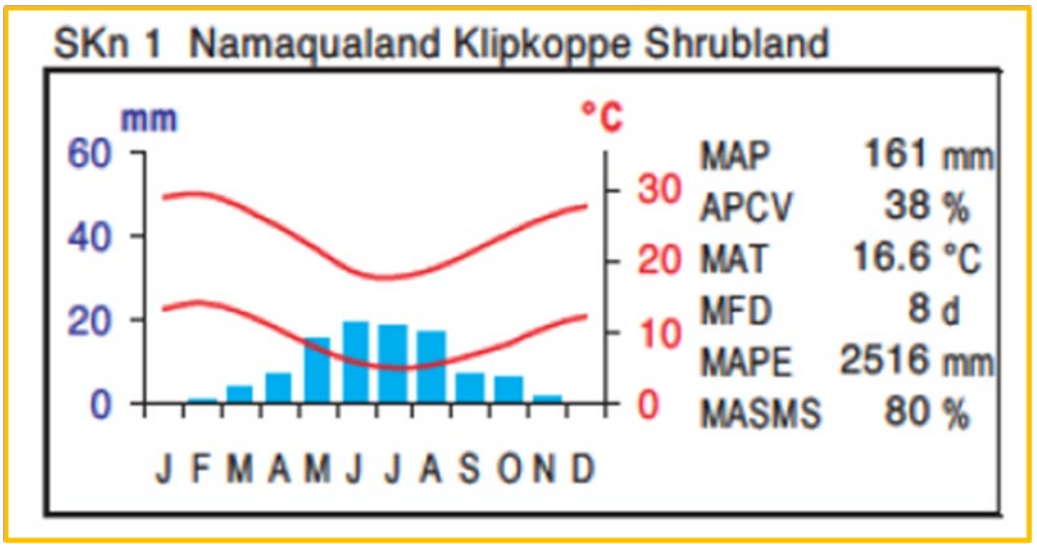
Diagram 6: Geology of Mining area



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 1).

Figure 1: Climate diagram



Biodiversity (Flora and Fauna)

The mining area is located in the Succulent Karoo Biome and dominated by the Namaqualand Klipkoppe Shrubland (SKn1) and Namaqualand Blomveld (SKn3) vegetation units (**Refer Diagram 7**).

The conservation status of the Namaqualand Blomveld, according to Driver et al. 2005 and Mucina et al. 2006 is also Least Threatened. Conservation Target 28%. Small areas (1.5%) statutorily conserved in Goegap 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. All alien infestations are only of local extent. Erosion is low (40%), very low (30%) or moderate (30%).

The mining area is classified as a Critical Biodiversity Area 1 (CBA 1) (**Refer Diagram 8**). here are no Centers of Endemism that occur near to the mining area and the area is not included as part of the NPAES. No protected areas are located within a 5Km radius of the mining area.

Diagram 7: Vegetation

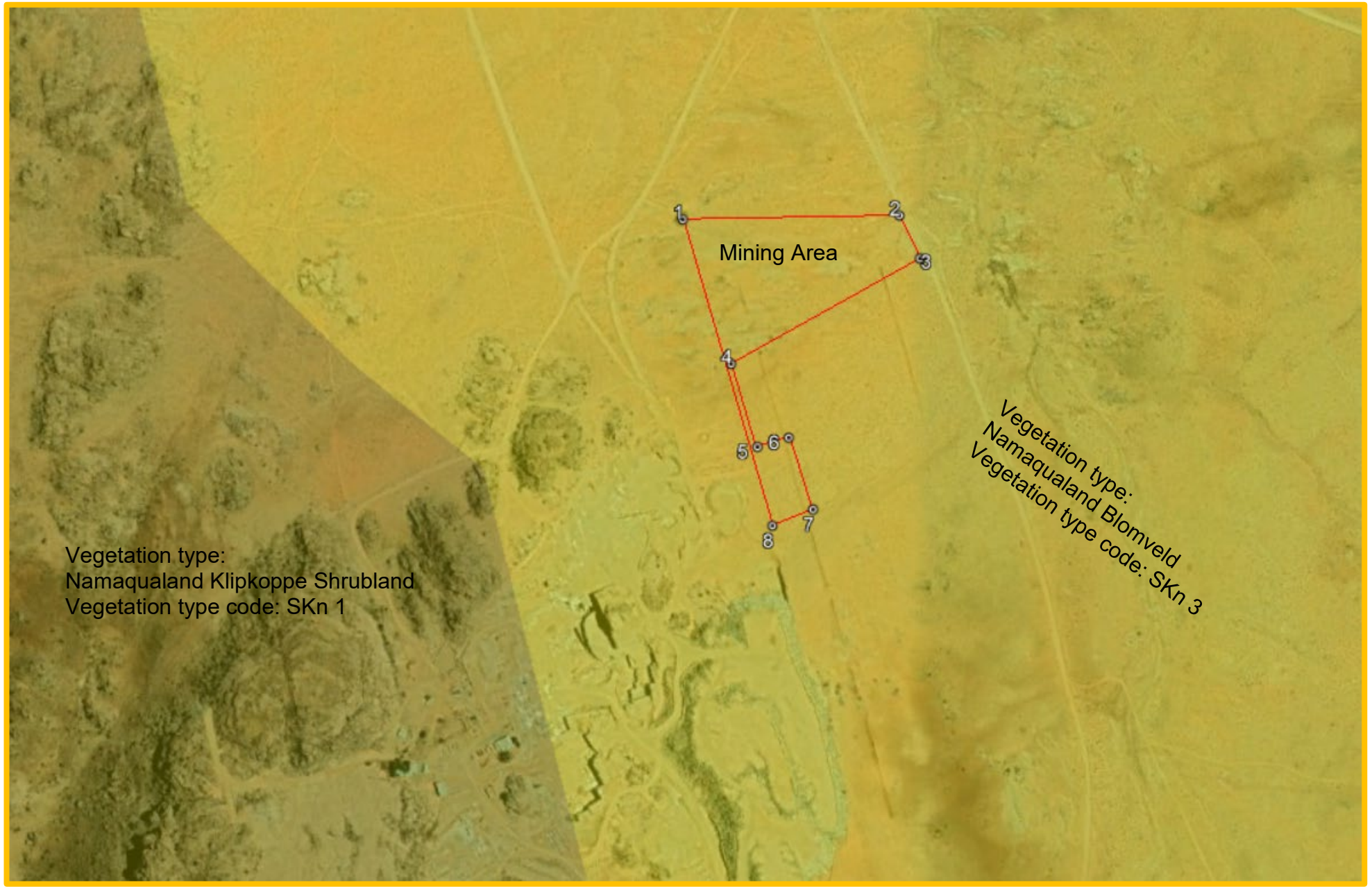
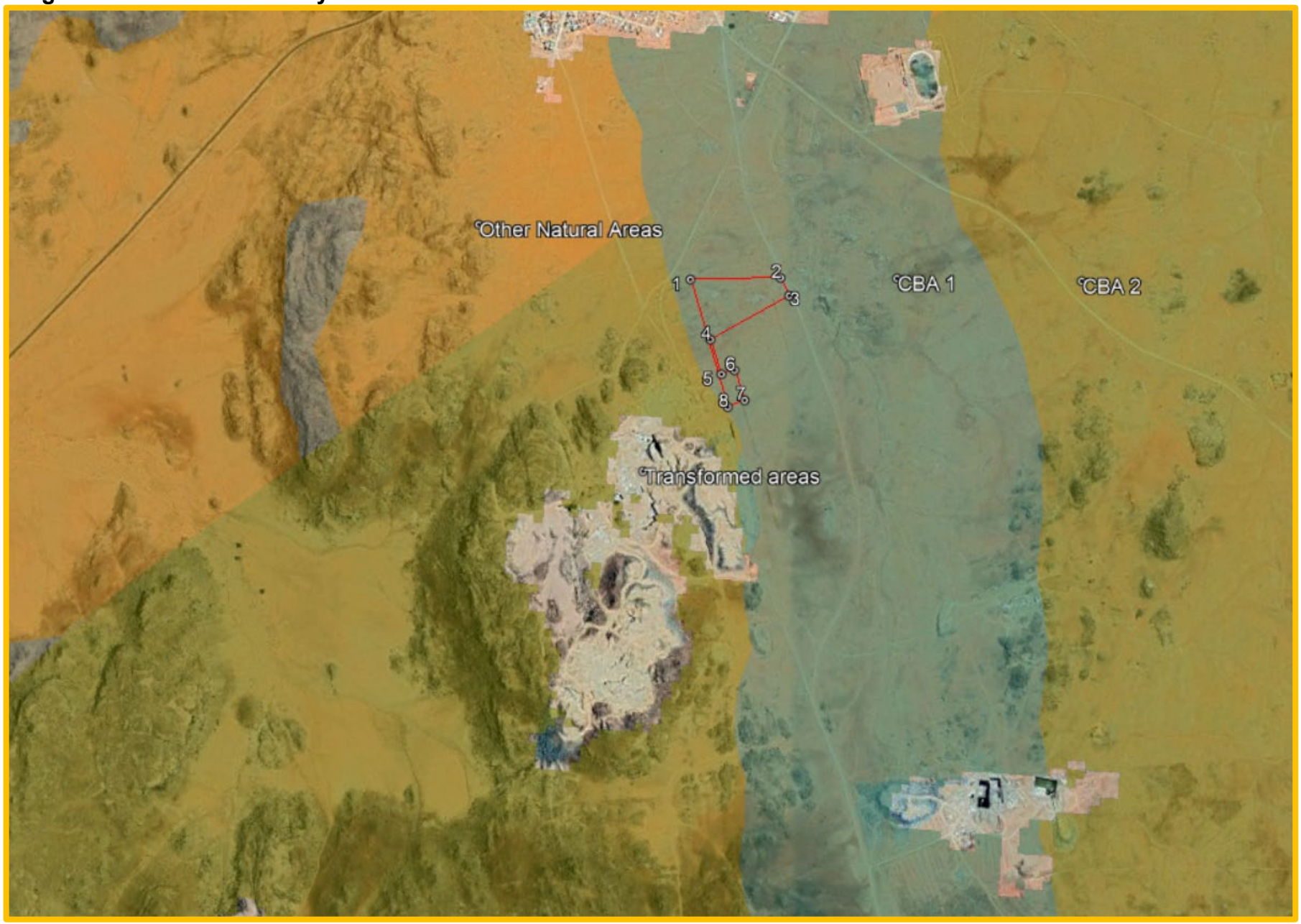


Diagram 8: Threatened Ecosystems



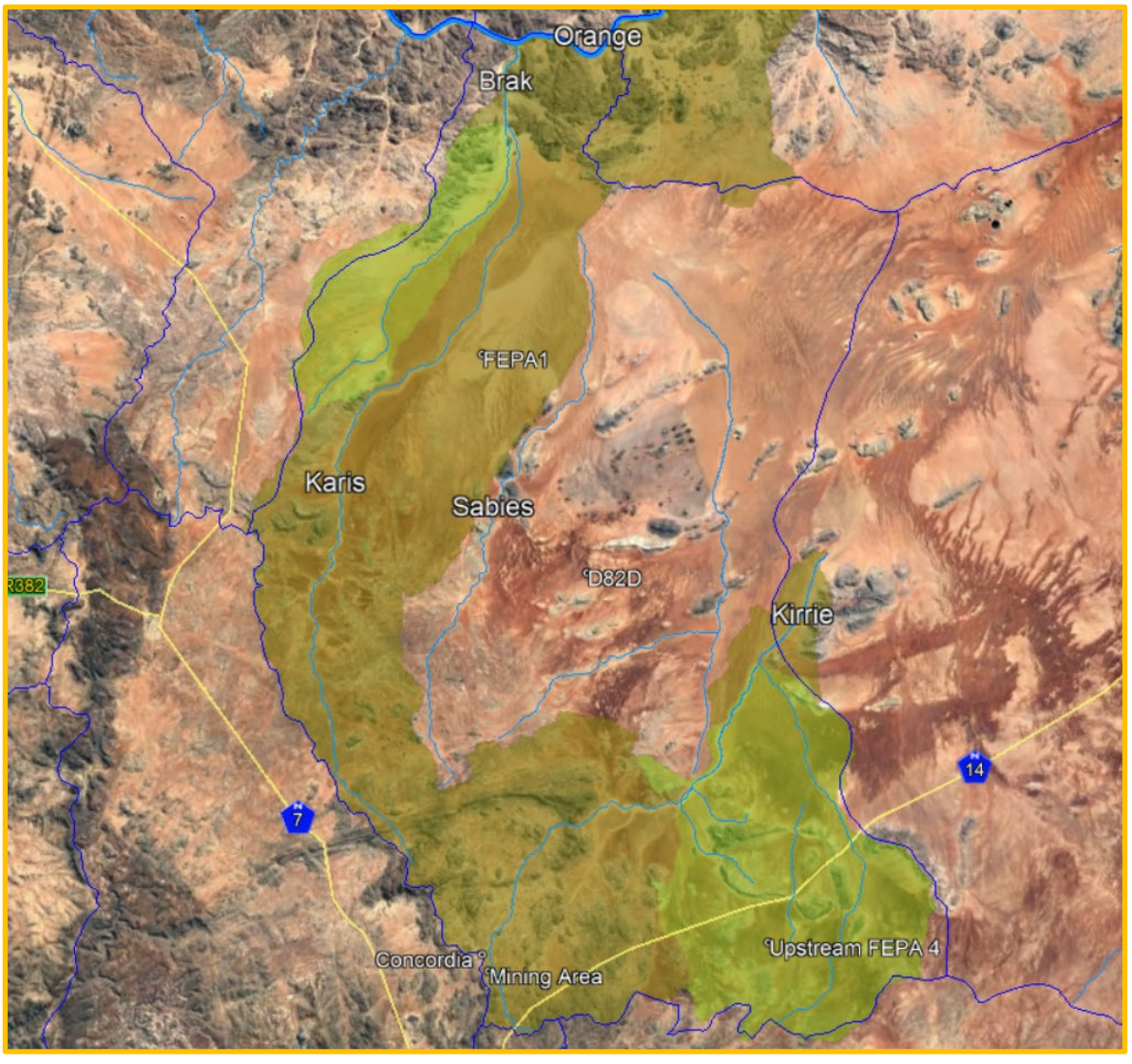
Water Resources

The property is located within the Department of Water & Sanitation's Lower Orange Water Management Area (14) and quaternary drainage area D82D. Within the quaternary drainage area only the Koeries River a nonperennial (Class B Largely Natural river) are close to the mining area and are classified as National Freshwater Ecosystems Priority Areas (NFEPA) – River. A large portion of this quaternary drainage area including the mining area has been identified as a Freshwater Ecosystem Priority Area (Code 1 FEPA) (Refer Diagram 9). No Strategic Water Source Area and wetlands are present within this quaternary drainage area.

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 106mm occurring mainly in the winter months, high evaporation rates, and shallow grade of the slope toward the drainage channels and the permeability of the soils. The surface water quality (when available) is suitable for animal consumption but not for potable water.

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.

Diagram 9: Location of Mining area in relation to NFEPA Water Management Areas and NFEPA Rivers



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 ±55dBA).

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.

Socio-economic

The project site falls within the Namakwa District Municipality, and the Local Municipality of Nama Khoi. The socio-economic profiles are referenced from the IDPs and included below.

The Namakwa District Municipality 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 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 sectors.

Nama Khoi had the largest number of people employed, unemployed, economically active and not economically active in 2004 and 2014. In 2014 Nama Khoi made the largest contribution to employment in the following industries: mining (65.6%), manufacturing (42.6%), electricity (45.7%), trade (42.0%), transport (46.0%), finance (35.4%), community services (37.9%) and households (35.3%). This municipality also employed the largest proportion of people in the district, accounting for 38.2 per cent of the people in formal employment.

Cultural, Heritage and Palaeontological Resources

An Archaeological/Heritage Impact Assessment was prepared by ASHA Consulting (attached as Appendix 3) and submitted to the South African Heritage Resources Agency (SAHRA) during the 30-day public participation comment period. The recommended mitigation measures from the Report are as follow:

Impacts to heritage resources are minimal. As such, it is recommended that the project be authorised, but subject to the following recommendations:

- The small kraal in the north-western corner of the application area should be avoided and protected from harm by a small fence running 5 m from the stone walling;
- All exposed fresh bedrock (mine faces and rock dump) must be rehabilitated during mine closure so as to reduce the visual contrast between weathered and fresh rock; 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.

8.4.2 Current land uses

There are existing mining sites in the project site, as detailed in Section 3 above. There is also extensive livestock community farming in the area.

8.4.3 Environmental features and infrastructure on the site

Refer to Diagrams 3 that provide an overview of the project. Diagram 4 to 9 and the corresponding paragraphs in Section 9 provide a description of the environmental features on site.

8.4.4 Environmental and current land use maps

Refer to Diagram 4 to 9 provided as part of the specific attributes

8.5 Impacts and risks identified

The potential risks arising from the mining operation are generic for any granite mine and are listed below.

8.5.1 Potential Risks with regard to excavations (safety)

- Granite mining operations commonly have a permanent impact on rock masses that influences the topography on the site and can impact post-mining slope stability. As the ore body is traced deeper and deeper into the ground a series of benches for both access and safety needs to be used. Sometimes rock surrounding the ore has to be removed so that the sides of the pit do not become dangerously steep. The waste rock is dumped away from the pit onto a heap fill waste dump. The opportunities for land use following open-pit mining are limited, because it is very expensive to fill the pit. The main objective is usually to make the pit high walls safe and to landscape the waste rock dumps.
- Collapsing slope(s) of mine pit can be detrimental to the safety and health of humans and animals.
- Potentially dangerous areas like deep mine pit or equipment left behind and uncontrolled access to a potentially unsafe post-mining area.
- Post mining topography not compatible with original landform.
- Unsafe erosion gullies.

8.5.2 Potential risk of residual environmental impact (waste)

- Post mining landscape that increases the requirement for long term monitoring and management.
- Unwanted ruins, buildings, foundations, footings and waste management practices creating or leaving legacies.
- Sub-surface infrastructure remaining behind, limiting the intended post closure land use including footings and foundations and power supply and water installations including pumps and pipelines.
- Equipment and other items used during the mining operation left behind.
- Incomplete removal of re-usable infrastructure.
- Rubble from demolished infrastructure left behind.
- Waste classes not kept in separate streams and incomplete removal of waste.
- Large volumes of large blocks and boulder rubble that requires large dumping areas.

- Creation of waste rock residue deposits or stockpiles with infiltration of leachate due to inadequate basal sealing or leakage from sealed pollution control facilities.
- Stockpiles and leftover product left behind.
- Increased erosion, dust generation and potential chemical contaminants reduce surface water quality or result in discharge that exceeds the maximum concentrations permitted.
- Vehicle wash bays and workshop facilities produce petrochemical and solvent contaminated runoff.
- Sanitary conveniences, fuel depots or storage facilities of potentially polluting substances can contaminate surface water.
- Oil fuel leaks onto virgin soil through the earthmoving and transport equipment and machinery or spillage of fuel during transfer from fuel bowser to equipment in the field.
- Inadequate capping or sealing of the boreholes can lead to infiltration of potentially contaminated surface water leading to chemical or biological contamination of groundwater.
- Drainage of benches and concentration of rainfall leads to creation of large volume open water bodies in worked out pit and can lead to increased groundwater recharge and potential regional impact of low-quality water.
- Pumping of process water from the pit sump can discharge poor quality water exceeding minimum standards.

8.5.3 Potential impacts and risks associated with economically viable and sustainable land

With granite mines complete disruption of the surface always occurs, which affects the soil, fauna, flora and surface water, thereby influencing all types of land use. Opencast mining and related infrastructure are a permanent destruction and rehabilitation cannot restore all pre-mining habitats. Granite quarries cannot be completely refilled and form permanent depressions that must be accommodated through imaginative utilisation during the post-closure period and the residual impact of open-pit mining is usually a completely different land use.

Risks associated with economically viable and sustainable land include:

- Uncontrolled expansion of mining footprint by not restricting the area disturbed by mining and the associated activities/infrastructure, resulting in loss of land with agricultural potential. Uncontrolled development of roads where existing farm roads is not used for mining operations and redundant internal roads are left behind. Duel used roads still needed by the landowner and fences not maintained or repaired.
- Post mining landform not compatible with the surrounding landscape and not capable of a productive land use that achieves a land capability equal to that of pre-mining conditions.
- Long term changes in land use caused by not implementing prompt rehabilitation and maintenance of disturbances when possible as part of annual rehabilitation plan.
- Unsuccessful rehabilitation can reduce the post-mining land use options. Rehabilitated areas could be too unstable to support post-mining land use objectives compatible with surrounding areas.
- Disturbance of agricultural potential and subdivision of high potential arable land into uneconomic farming units. Inadequate planning or loose development

can subdivide high potential land or habitats into un-viable small areas.

- Disturbance of ecology due to loss of habitat and cumulative impact of illegal collecting during long-term or life of mine can degrade areas and reduce the viability of adjacent areas. Inadequate control of alien species can result in establishment of populations or seed sources that threaten adjacent areas.

8.5.4 Potential Risks with regard to stable, free draining post mining landform

Opencast pit mining creates an area of lowered topography that can act as a sump for storm water runoff and can intersect groundwater and if the operation extends to depths below the water table, it will affect the near-surface groundwater. Apart from reducing natural recharge to the shallow and deep groundwater zones, the increased runoff and altered storm hydrograph will also impact areas downstream or downslope where the flow is concentrated.

- Impact on surface water through modification of infiltration rates by increasing the extent of hardened surfaces.
- Inadequate topsoil restoration or creation of unnatural surface topography or slope form which could impact lower or adjacent slopes due to increased runoff velocity.
- Altered storm water runoff response due to large impervious areas and concentrated runoff in drainage systems. Concentrated storm runoff from the pit surrounds and infrastructure areas is erosive, causing sheet, rill and donga erosion features.
- River diversions also change the overall gradient and therefore the flow rates and impact flood discharge and erosion/sedimentation patterns at the site and downstream.

8.5.5 Potential Risks with regard to benefits for the social environment

- A lack of a positive and transparent relationship with stakeholders and a lack of maintaining communication channels, such as not providing stakeholders including government authorities with relevant information as per legislative requirements.
- Not undertaking environmental management according to approved EMPr and plans and no auditing of the environmental management system.
- Disturbance to sensitive environments such as land with historical or conservation value, urban areas, wetlands or rivers, high potential agricultural land, transport infrastructure, power transmission lines. Slow continuous damage to habitat, such as wood collection, are typical impacts on adjacent areas.
- Staff losing their jobs due to mine closure can have devastating effects on communities that are reliant on mine-based income as does job losses in secondary industries, businesses and contractors. There can also be issues with contractual agreements with service providers surpassing the mine closure date.
- Closure standards not accepted and/or are changing. Mine closure being jeopardised by other land uses.
- Poorly defined transition from mining to farming activities within different legislation.
- Mine closure stalled due to non-compliance with South African legislation (national, provincial and local). Insufficient funds for completion of rehabilitation.

8.5.6 Potential Risks with regard to aesthetic impact

Terrain morphology plays a critical role in defining the visual envelope of mining developments and can either reduce or enhance visual impact. Apart from visual intrusion there is also the risk of reduced sense of place. The visual intrusion impact of mining activity would be on nearby roads, homesteads, settlements and tourist sites.

- Visual disturbance from the public road views - excavations or overburden dumps blocking the view. Large buildings, colour contrast of disturbed areas against adjacent veld or dust emission plumes. Nuisance effects of air emissions (dust) no implementation and maintenance of dust monitoring programs accompanied by dust suppression activities if required.
- Accumulation of spoils from rock saws (fines) can expose highly erodible fine sediment to wind transport and lead to dust generation and dispersal. Dust can retard vegetation growth and reduce the palatability of vegetation.
- Dust generated on haul roads reduces visibility in opencast pit, representing a safety hazard.
- The cumulative effect of a raise in the ambient noise levels or high noise levels in specific areas that exceed specified levels. Noise disturbance and light pollution as a result of night activities.

8.5.7 Potential Risks with regard to archaeological sites, cultural heritage sites or graves

- Disturbance of archaeological sites and not implementing mitigating measures according to the archeological assessment.
- Progressive development can encroach upon or disturb archaeological sites, cultural heritage sites or graves.

8.5.8 Potential Impacts and Risks associated with the No-Go Alternative

- There would be no change to the biophysical environment with the No-Go Alternative. The surrounding biophysical environment is currently in various stages of mining.
- The No-Go Alternative implies that the Applicant would forgo an opportunity to provide employment and the generation of an income from this project, with positive socio-economic spin-offs for the local community.

Potential Impacts and Risks associated with the Preferred Alternative

Phase	Activities - Risk source	Potential Impacts	Reversible	Irreplaceable Damage	Can impact be avoided
CONSTRUCTION PHASE	**Site Access and Establishment** Access and Haul Roads Services and associated infrastructure Accommodation and Logistics Surface disturbance Waste management facilities Oil/grease/diesel management	Compaction and soil disturbance due to driving off-road and topsoil stockpiling	Yes	No	No
		Dust fall and nuisance from activities, dust emission from top soil stripping and vehicles using existing access and haul roads.	Yes	No	Yes
		Soil and groundwater contamination from hydrocarbons	No	Yes	Yes
		Vehicle wash bays and workshop facilities produce petrochemical and solvent contaminated runoff.	No	Yes	Yes
		Sanitary conveniences, fuel depots or storage facilities of potentially polluting substances can contaminate surface water.	No	Yes	Yes
		Disturbance of biodiversity - Wildlife and vegetation due to site preparation	Yes	No	No
		Visual intrusion - Unwanted ruins, buildings, foundations, footings and waste management practices creating or leaving legacies	Yes	Yes	Yes
		Emissions: Dust, Noise Generation from vehicles that also emit Greenhouse Gases.	Yes	No	No
		Impact on heritage artefacts, heritage sites or grave yards	No	Yes	Yes
		Socio- economic impact on existing land use practices Sub-surface infrastructure remaining behind, limiting the intended post closure land use including footings and foundations and power supply and water installations including pumps and pipelines.	Yes	No	Yes
OPERATIONAL PHASE	**Quarry and waste dumps** Opencast workings and excavations (including final voids and ramps) Residue deposits overburden and spoils	Collapsing slope(s) of high walls can be detrimental to the safety and health of humans and animals.	No	Yes	Yes
		Potentially dangerous areas like high walls or equipment left behind and uncontrolled access to a potentially unsafe post-mining area	Yes	No	Yes
		Removal of granite blocks change in topography and post mining topography not compatible with original landform.	No	Yes	No
		Unsafe erosion gulley's and erosion control or runoff diversion structures led to soil compaction	Yes	No	Yes
		Oil fuel leaks onto virgin soil through the earthmoving and transport equipment and machinery or spillage of fuel during transfer from fuel bowser to equipment in the field.	No	Yes	Yes
		Drainage of benches and concentration of rainfall leads to creation of large volume open water bodies in worked out pit and can lead to increased groundwater recharge and potential regional impact of low-quality water.	No	Yes	Yes
		Pumping of process water from the pit sump can discharge poor quality water exceeding minimum standards.	No	Yes	Yes

OPERATIONAL PHASE	**Quarry and waste dumps**	Creation of waste rock residue deposits or stockpiles with infiltration of leachate due to inadequate basal sealing or leakage from sealed pollution control facilities.	No	Yes	Yes
		Biodiversity - Wildlife and vegetation disturbance	Yes	No	No
		Uncontrolled expansion of mining footprint by not restricting the area disturbed by mining and the associated activities/infrastructure - loss of land with agricultural potential.	Yes	No	Yes
		Disturbance of ecology due to loss of habitat and cumulative impact of illegal collecting or land use during long-term or life of mine can degrade areas and reduce the viability of adjacent areas. Inadequate control of alien species can result in establishment of populations or seed sources that threaten adjacent areas.	Yes	No	Yes
		Long term changes in land use caused by not implementing prompt rehabilitation and maintenance of disturbances when possible as part of annual rehabilitation plan.	Yes	No	Yes
		Visual Intrusion: Visibility of the mining operations - Large volumes of large blocks and boulder rubble that requires large dumping areas	No	Yes	No
		Emissions: Dust, Noise Generation from vehicles that also emit Greenhouse Gases	Yes	No	No
		Increased erosion, dust generation and potential chemical contaminants reduce surface water quality or result in discharge that exceeds the maximum concentrations permitted.	No	Yes	Yes
		Altered storm water runoff response due to large impervious areas and concentrated runoff in drainage systems. Concentrated storm runoff from the pit surrounds and infrastructure areas is erosive, causing sheet, rill and donga erosion features.	No	Yes	Yes
		Impact on heritage artefacts, heritage sites and grave yards	No	Yes	Yes
		Socio- economic impact on existing land use practices	Yes	No	No
		Post mining landform not compatible with the surrounding landscape and not capable of a productive land use that achieves a land capability equal to that of pre-mining conditions	No	Yes	No

DECOM-MISSIONING PHASE	Implementation of Final Rehabilitation, Decommissioning and Mine Closure Plan	Post mining landscape that increases the requirement for long term monitoring and management.	No	Yes	Yes
		Unwanted ruins, buildings, foundations, footings and waste management practices creating or leaving legacies	No	Yes	Yes
		Sub-surface infrastructure remaining behind, limiting the intended post closure land use including footings and foundations and power supply and water installations including pumps and pipelines.	No	Yes	Yes
		Equipment and other items used during the mining operation left behind	No	Yes	Yes
		Incomplete removal of re-usable infrastructure	No	Yes	Yes
		Rubble from demolished infrastructure left behind.	No	Yes	Yes
		Waste classes not kept in separate streams and incomplete removal of waste	No	Yes	Yes
		Stockpiles and leftover product left behind	No	Yes	Yes
		Unsuccessful rehabilitation can reduce the post-mining land use options. Rehabilitated areas could be too unstable to support post-mining land use objectives compatible with surrounding areas.	No	Yes	Yes
		Staff losing their jobs - mine closure can have devastating effects on communities that are reliant on mine-based income Job losses of secondary industries, businesses and contractor's Contractual agreements with service providers surpassing mine closure date	No	Yes	No

8.6 Methodology used in evaluating 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 valuated 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.

8.6.1 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)

8.6.2 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.

8.6.3 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.

8.6.4 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.

8.7 Positive and negative impacts of proposed activity and alternatives

Positive impacts

- Creation of employment with economic spin-offs for local community.
- Provision of granite dimension stone for international markets.
- Income generation for the landowners "The Transitional Council of Concordia" where subsistence livestock farming is prevalent.

Negative impacts

The key potential negative impacts associated with the granite mining activity include the following:

- Noise caused by the machinery and vehicles on site, and by vehicles going to and from the mining site.
- Visibility of the mining operations
- Dust emissions from general site activities (vehicle entrained dust).
- Removal of granite blocks change in topography
- Disturbance of biodiversity - vegetation and fauna
- Soil compaction from driving off-road
- Soil and groundwater contamination from hydrocarbons
- Compaction and soil disturbance due to topsoil stockpiling
- Socio- economic impact on existing land use practices
- Impact on heritage artefacts, heritage sites or grave yards

8.8 The possible mitigation measures that could be applied

Refer to Section 10 and 22.4 for the possible mitigation measures included under each impact.

8.9 Motivation where no alternative sites were considered

Alternatives have been considered for this project, as described in Section 6 above. Where alternatives will not be considered in the Impact Assessment Phase, reasons have been provided in Section 6 above.

8.10 Statement Motivating the Preferred Sites

Refer to Section 6 above.

The layout and technology have been determined by the type, shape, position and orientation of the mineral resource. The granite outcrop identified for mining have a unique colour with the establishment of an international market. The resource was determined by an in-house Geologist that has determined the specifications with regard to pattern, rock integrity and colour. With regard to granite resources lithology, mineral content and mineral distribution is not a factor as granite is visible above surface and only pattern, rock integrity and colour had to be investigated to establish a market.

The operational approach is practical and based on best practice to ensure a phased approach of mining followed by rehabilitation in sequential stages

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

9 Process undertaken to identify, assess and rank the impacts and risks

Refer to Diagram 3 for the Site Plan of the Preferred and Only Alternative.

Refer to Section 8.5 above where the risks have been described.

Refer to Section 8.6 above where the methodology has been described.

Refer to Section 10 below and section 22.4 for the full Impact Assessment for the Preferred and Only Alternative (Granite Mining Activity) compared to the “No-Go” Alternative.

This BAR and EMPr were compiled through a detailed desktop investigation and site assessment in order to determine the environmental setting in which the project is located. Input from stakeholders during the public participation process will also assist the EAP in the identification of any additional impacts associated with the proposed mining activities.

The methodology described above was used to assess the significance of the potential impacts of the mining activities. The assessment of impacts is based on the experience of the EAP.

The mitigation measures proposed are considered to be reasonable and based on the location of the mining area and must be implemented in order for the outcome of the assessment to be accurate.

10 Assessment of each identified potentially significant impact and risk

Significance of Impacts per Activity per Phase

PROJECT ACTIVITY	POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE										MITIGATION SUMMARY
		BEFORE					AFTER MITIGATION					
		Probability	Severity	Frequency	Duration	SIGNIFICANCE	Probability	Severity	Frequency	Duration	SIGNIFICANCE	
Site Access and Site Establishment	SOIL EROSION & SOIL COMPACTION: The clearing of areas for waste dump extensions or extensions to logistics 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. 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. Residual impacts: Potential loss of invertebrates that live in the top layers of the soil.	2	2	1	1	**6**	1	1	1	1	**4**	• Existing farm roads and tracks must be used as far as possible; • After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff. • • Stabilized areas shall be demarcated accordingly. • Movement of vehicles and machinery will be restricted to demarcated areas and roads with no off-road driving permitted. • Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces. • Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and potential stormwater run-off. • 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. • Temporarily halt material handling in windy. Where new access tracks are required, such tracks must be scarified during decommissioning; • Duel use access roads must be handed back to the landowner in a good state of repair. • 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. • Soil erosion is to be regularly monitored and repaired. • Compacted areas that are no longer required shall be scarified after use as part of the annual rehabilitation plan.

Site Access and Site Establishment	SOIL AND GROUNDWATER CONTAMINATION & WASTE MANAGEMENT: 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. The Koeries River located close to the site is non-perennial and is classified as Class B: Largely Natural and is a Freshwater Ecosystem Priority Area (FEPA). No permanent surface water resources are in close proximity to the quarries or mining logistics. Indirect impacts: Rainfall is very seldom and evaporation rate is very high. Indirect impacts on surface water are very unlikely. Windblown litter will cause visual blight. Hydrocarbons are toxic and will cause vegetation die-back and soil poisoning. Residual impacts: A lack of waste food management encourages vermin.	1	3	1	1	**6**	1	1	1	1	**4**	• Implement and follow water saving procedures and methodologies. • Fuel storage must be contained in mobile bowsers and refuelling will be done with care to minimise the chance of spillages • Only re-fuel machines at fueling station, 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. • A spill kit will be available on each site where activities are in progress. • Provide mobile ablution facilities and take care that 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. • 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 prevents 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. • 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. • Drinking and process water to be brought on site. • No water will be abstracted in terms of section 21(a) of National Water Act, 1998 (Act no. 36 of 1998). • Waste water (i.e., including process water and grey water) must be kept separate from clean water. • Establishing controlled runoff from washing bays, • The flow and end destination of decontamination washing water will be controlled. • 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. • Slow storm water runoff with storm water diversion and erosion control contour berms • Separate clean and contaminated water systems around the pit and infrastructure areas.

Site Access and Site Establishment	LIMITED LOSS OF NATURAL VEGETATION AND ECOLOGICAL FUNCTIONING IN A CRITICAL BIODIVERSITY AREA 1 (CBA 1) Wildlife and Vegetation disturbance Indirect impacts: Soil disturbance caused by vegetation clearing will provide suitable conditions for the establishment and spreading of alien invasive vegetation. Removal of alien invasive vegetation if required, is a positive impact, and will benefit the ecological functioning. Residual impacts: The local fauna is familiar with the existing mining activities on site.	3	3	1	1	**8**	2	1	1	1	**5**	• Refer to Diagrams 3, which show the proposed area for mining and the existing tracks that will be used. • Mining is adjacent to existing large scale granite mining where little vegetation naturally occurs. • All development areas must be clearly demarcated, and no activities may take place outside of demarcated areas. • Limiting activities to the smallest area that is necessary. • Remove alien invasive vegetation if required and ensure ongoing alien vegetation clearing in the area. • No indigenous plants outside of the demarcated work areas may be damaged. • Impliment concurrent rehabilitation in terms of the annual rehabilitation planThe noise and vibration caused by the earthmoving equipment will disturb smaller animals (e.g., snakes). These will move away whilst operations are in progress. Should any animals be encountered these should be moved away if necessary. • Vehicles speed must take into account the possibility of collisions with fauna.
	VISUAL INTRUSION: Caused by machinery, topsoil stockpiles, cleared areas, and movement of trucks on site during preparation of site establishment. The site is remote and rural in nature with very few receptors (people or nearby public roads) and is located on private property. Indirect impacts: There are few indirect impacts as the area is remote and rural, with no people (receptors) living near the site.. Residual impacts: Good housekeeping will ensure a neat and well-maintained construction area reducing visual impact.	3	2	1	3	**9**	2	2	1	2	**7**	• The construction areas shall be kept neat and tidy at all times. • Equipment must be kept in designated areas and storing/stockpiling shall be kept orderly.

Site Access and Site Establishment	EMMISSIONS (DUST, VEHICLES & NOISE): Noise and dust will be created by mining equipment (e.g. front- end loaders) and vehicles, which will emit Greenhouse Gases. Indirect impacts: Carbon emissions from vehicle exhausts have a negative impact on the ozone layer. Local residents along the access tracks and roads would be impacted on by noise, dust and vehicle emissions during the construction activities. Increase in Greenhouse Gas Emissions from vehicles. Residual impacts: Carbon emissions have impact on climate change.	3	2	1	1	**7**	1	1	1	1	**4**	• The Applicant shall adhere to the local by-laws and regulations regarding the noise and associated hours of operation • All mining activities will be limited to daylight hours during weekdays and no activities on Sundays and public holidays. • Noise abatement equipment, such as mufflers on diesel engines, will be maintained in good condition. • The Applicant shall limit noise levels (e.g. install and maintain silencers on machinery). The provisions of SANS 1200A Sub clause 4.1 regarding "built-up" area shall apply to all areas within audible distance of residents whether in urban, peri-urban or rural areas. • 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. • 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. • Hauling vehicles shall adhere to municipal and provincial traffic regulations including speed limits. • Vehicles used on site for the construction related activities shall be maintained and in a good working condition so as to reduce emissions. • Engines shall be turned off when the vehicle is temporarily parked or stationery for long periods. • Stockpiles must be maintained (covered where necessary) to avoid wind erosion of the material. • Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces.
	POTENTIAL FOR HERITAGE, PALAEONTOLOGICAL AND CULTURAL IMPACTS: Refer to Appendix 2. The archaeological resources were identified during a field assessment and their heritage significance is rated as low-moderate. Some mitigation has been proposed. Indirect impacts: Loss of context Residual impacts: None identified for insignificant findings.	1	2	1	1	**5**	1	1	1	1	**4**	• If any heritage or paleontological resources are discovered as a result of the mining activities, such activities will cease with immediate effect and a qualified archaeologist and or palaeontologist will be commissioned to assess their significance and determine appropriate mitigation measures. • All personnel and contactors will be made aware of the locations of all identified resources and the necessity of avoiding them. • A safe distance of at least 50 metres will be maintained between the identified resource and mining activities.

Site Access and Site Establishment	CREATION OF EMPLOYMENT & JOB SECURITY DURING CONSTRUCTION PHASE WITH LOCAL AND REGIONAL ECONOMIC SPIN-OFFS Indirect impacts: Upskilling Local economic spin-offs through increased income earned, and through purchasing of local materials Income generation for landowners in a time of severe drought where livestock farming is not sustainable. Residual impacts: The upliftment of unemployed people, with positive impact on standard of living for their families. Local and regional economic spin-offs from investment.					POSITIVE IMPACT					POSITIVE IMPACT	• Employment of local previously disadvantaged labour wherever possible, with provision of training (upskilling). • Any other mining companies operating legally will be listed as affected parties and consulted. Areas of operations will be demarcated and no overlapping will be allowed. • All operations will be carried out under the guidance of strong, experienced manager with proven skills in public consultation and conflict resolution. • There will be a strict requirement to treat local residents with respect and courtesy at all times.

OPERATIONAL	CHANGE IN TOPOGRAPHY: Granite mining operations commonly have a permanent impact on rock masses that influences the topography on the site and can impact post-mining slope stability. Indirect impacts: Increase in habitat creation for fauna (rock hyrax and lizards) on waste rock dumps. Residual impacts: Visual change in landscape and topography following rehabilitation. Creation of new habitats.	3	2	2	3	**10**	3	1	1	2	**7**	The focus of topographic rehabilitation may not be obvious at the time of mine planning and must be addressed as the mine develops and the Closure Plan must be reviewed periodically for continued relevance in the light of changed mine path or long-term plans. Implementation of the following tasks to manage the risks associated with high wall stability and slope stability of the waste dump will ensure a safe post mining landscape without the requirement for long term monitoring and management. Regular inspections and audits will be used as management system to ensure compliance. • Due to cutting with circular saws smaller and vertical benches of average 1m are created that can be planned so as to prevent an excessive highwall remaining. • During construction terrain form will be used to shield the opencast pit from developed or sensitive areas as protection in the unlikely event of highwall or slope collapse. • During production the height of highwalls will be reduced by separating benches to increase stability. • Overall slope angle between 60° and 70° will fit in with the natural topography of the mountainous terrain and due to the massive and competent nature of the ore body will still be stable. • At final closure geotechnical investigations will identify unstable rock conditions, slopes that require support in the short-, medium- and long-term. Geotechnical slope stabilisation methods including concreting (gunnite), rock bolting, wire mesh restraint, bench wrecking to lower highwalls, rehabilitative blasting etc. which will be investigated and implemented during decommissioning. • A row of blocks will be packed in a straight line at the base of the high wall to reduce the overall height as an additional preventative measure, minimizing safety risks. After the rehabilitation phase no maintenance will be required as the blocks will be permanent fixtures that can only be moved via front end loaders. • During operations pump rainwater that collects in the pit and stored for use as process water or dust suppression. • Any remaining high wall will be fenced off at final closure in order to deter people or animals from falling over. • At final closure of the operation all remaining product (blocks) from the demarcated stockpile will be restored to pits wherever possible to reduce highwall height and provide surface for rehabilitation or used to fill any remaining deep excavations if any.

OPERATIONAL	CHANGE IN TOPOGRAPHY: Continue											• Waste dumps must be designed to meet minimum slope stability and safety standards and vegetated to reduce erosion and runoff. • In the case of waste dumps in the valleys “heaped fill” excavations with the final designed perimeter of the dump will be created to obtain cover material for the top of the dumps . The excavations will serve as a base for extending the waste dump. Thereafter, dumping will proceed above surface on the top of this buried dump at successive tiers with appropriate height around 6-10m, leaving terraces of 6m wide, and working from the perimeter toward the centre. This will allow for reclamation of the outside profiles at a much earlier stage, resulting in very little outstanding reclamation toward the end of the life of the dump. • The main closure objective therefore is to leave the site in as safe and self-sustaining a condition as possible and in a situation where no post-closure intervention is required. The aim is to ensure that the affected environment is maintained 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. The aesthetic value of the area will also be reinstated. • The basic rehabilitation methodology will therefore strive to replicate the pre-mining topography, wherever possible, or at least not to increase overall slope gradients without emplacement of adequately designed erosion control or runoff diversion structures.
	SOIL EROSION & SOIL COMPACTION: The potential for soil erosion by wind and storm water run-off; soil compaction from repeated use of access tracks. 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. Residual impacts: Unmanaged soil erosion will result in loss of topsoil. Unmanaged dust from unsurfaced roads will cause a nuisance and impact on the health of the workers. Dust impacting on adjacent vegetation decreasing palatability for livestock and fauna.	2	2	1	1	**6**	1	1	1	1	**4**	• After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff. • • Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces. • Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and potential stormwater run-off. Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material. • Reduce drop height of material to a minimum. • Temporarily halt material handling in windy conditions. • 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. • Compacted areas that are not required for access shall be scarified after use during decommissioning and rehabilitation. • The basic rehabilitation methodology will therefore strive to replicate the pre-mining topography, wherever possible, or at least not to increase overall slope gradients without emplacement of adequately designed erosion control or runoff diversion structures. • Provision must also be made for efficient storm water control to prevent erosion of roadways. • Soil erosion on haul roads is to be regularly monitored and repaired.

OPERATIONAL	SOIL AND GROUNDWATER CONTAMINATION & WASTE MANAGEMENT: 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. The Koeries River located close to the site is non-perennial and is classified as Class B: Largely Natural and is a Freshwater Ecosystem Priority Area (FEPA). No permanent surface water resources are in close proximity to the quarries or mining logistics. Water will be obtained from the local athority and storage consists of a 5000 litre plastic tank that can be re-used. Water reticulation is provided to the mine work area to feed water to the logistics, where water is recycled. Due to semi-arid conditions the opencast pits will not intercept shallow groundwater table zones. Any hydrocarbon spillages have low potential to contaminate groundwater.	2	3	1	1	**7**	1	1	1	1	**4**	• Water used for cooling of saw blades together with the fine residue (cutting spoils) will be collected in a series of settling dams from where the water will be recycled. • Ensure maintenance of reticulation pipes for water supply. • Place oil traps under stationary machinery, only re-fuel machines at fueling station, 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. • Draw-up and strictly enforce procedures for the storage, handling and transport of different hazardous materials • Implement and follow water saving procedures and methodologies. • Fuel storage must be contained in mobile bowsers and refuelling will be done with care to minimise the chance of spillages • Only re-fuel machines at fueling station, 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. • A spill kit will be available on each site where activities are in progress. • 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. • 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 prevents 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. • 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. • Provide mobile ablution facilities • Drinking and process water to be brought on site.

OPERATIONAL	SOIL AND GROUNDWATER CONTAMINATION & WASTE MANAGEMENT: Continue Indirect impacts: Rainfall is very seldom and evaporation rate is very high. Indirect impacts on surface water are very unlikely. Should natural surface run-off occur on excavated surfaces that are being actively mined, it could pool in areas of accumulated water being re-used for cooling of saw blades. Windblown litter will cause visual blight. Hydrocarbons are toxic and will cause vegetation die-back and soil poisoning. Residual impacts: Pooled water could provide drinking source for local fauna. A lack of waste food management encourages vermin. Increase in habitat creation for fauna (rock hyrax and lizards) on waste rock dumps. Recycling of waste material creates employment.											• Waste water (i.e., including process water and grey water) must be kept separate from clean water. • Establishing controlled runoff from washing bays, • The flow and end destination of decontamination washing water will be controlled. • 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. • Slow storm water runoff with storm water diversion and erosion control contour berms • Separate clean and contaminated water systems around the pit and infrastructure areas. • Waste that is collected within the settling dams and dimenion stone residues are typically benign from a pollution point of view. • Water used for cooling of saw blades together with the fine residue (cutting spoils) will be collected in a a settling dam from where the water will be re-used if possible. • Sludge collected within the settling ponds will be disposed of within the waste rock dump. • Waste or un-saleable blocks will be dumped in the demarcated waste dump on a regular basis. • Bury all surplus loose, isolated waste rock and un-saleable blocks in designated sub surface pits and cover with growth medium. • Waste or low-grade blocks can be subjected to secondary processing by cutting into smaller blocks, used as refill or landscaping, crushed for other applications (such as concrete production), or otherwise dealt with responsibly. • Stored overburden in the form of boulder rubble and other stone waste should not be left in piles and should be used to cover waste dumps. • Soil removal creates permanent impacts that can be mitigated through restoration of soil cover, although the significance of the impact remains high. • Remove and stockpile 300mm topsoil in berms or heaps less than 1,5m high and turn soil or re-use every six months. Do not use as permanent storm water control feature. • Remove and stockpile topsoil from roads, building platforms and stockpile areas prior to construction for use to restore disturbed areas. To ensure long-term stability, the restored soil cover should attempt to mimic the pre-mining distribution of soil texture and thickness. • Contaminated soil must be treated by first removing the source of contamination - removing the source of contamination should allow the system to recover without further cleanup required. • Petrochemical spillages to be collected in a drip tray and drum to store excavated spill affected soil for disposal at a registered facility or onsite treatment.

OPERATIONAL	SOIL AND GROUNDWATER CONTAMINATION & WASTE MANAGEMENT: Continue											• Any product stockpiles left or oversize builders must be removed and used to backfill excavations or to slope remaining high walls. • Waste or low-grade blocks can be subjected to secondary processing by cutting into smaller blocks, used as refill or landscaping, crushed for other applications (such as concrete production), or otherwise dealt with responsibly. • Distinguished between farming and mining infrastructure and waste in consultation with landowner • Separation of wastes into classes will ensure that waste is disposed of safely and according to the correct procedure. In order to ensure that waste classes are kept in separate streams, communication will be passed on and people will be trained on the different waste classes. • Domestic waste - Separated at source into recyclable products. These must then be removed and recycled by recognised contractors. (Note that the mine is responsible for the waste from cradle to grave). • Disposal at a registered and officially permitted commercial or municipal landfill site is the most cost-effective option for materials that cannot be recycled. • Domestic waste generated by workers needs to be sorted and all biodegradable waste must be stored in separate drums provided for. • This biodegradable waste will be dumped in a landfill provided for onsite. • Unwanted steel, sheet metal and equipment needs to be stored in a demarcated salvage yard. • Unwanted steel, sheet metal and equipment in the salvage yard will be sold or disposed of as scrap metal. • Recycling and reusing materials may reduce garbage haul fees or generate income through the sale of scrap metal and old equipment. • All steel structures and reinforcing will be discarded or sold as scrap. • All equipment and other items used during the mining operation needs to be removed from the site. • Used oils / hydrocarbons fuels / liquids are to be collected in sealed containers (stored on concrete slabs) and removed from site for recycling by a reputable company. • Clean out content of oil traps and dispose of waste at registered and purpose designed landfill sites. • All temporary waste storage areas need to be cleaned out and waste removed. • Tyres to be return to supplier or a company that uses old tyres for making door mats, shoes, swings, etc. • Batteries to be return to supplier or dispose at a permitted hazardous waste facility. • Industrial chemicals (laboratory waste) - Returned to supplier or disposed of at a permitted facility that is capable of disposing of the waste. These liquid wastes cannot be disposed of on the waste dumps.

OPERATIONAL	LIMITED LOSS OF NATURAL VEGETATION AND ECOLOGICAL FUNCTIONING IN A CRITICAL BIODIVERSITY AREA 1 (CBA 1) Wildlife and Vegetation disturbance Indirect impacts: Soil disturbance caused by vegetation clearing will provide suitable conditions for the establishment and spreading of alien invasive vegetation. Removal of alien invasive vegetation if required, is a positive impact, and will benefit the ecological functioning. Residual impacts: The local fauna is familiar with the existing mining activities on site.	3	3	1	1	**8**	2	1	1	1	**5**	• Refer to Diagrams 3, which show the proposed area for mining and the existing tracks that will be used. • Mining is adjacent to existing large scale granite mining where little vegetation naturally occurs. • All development areas must be clearly demarcated, and no activities may take place outside of demarcated areas. • Limiting activities to the smallest area that is necessary. • Remove alien invasive vegetation if required and ensure ongoing alien vegetation clearing in the area. • No indigenous plants outside of the demarcated work areas may be damaged. • Impliment concurrent rehabilitation in terms of the annual rehabilitation planThe noise and vibration caused by the earthmoving equipment will disturb smaller animals (e.g., snakes). These will move away whilst operations are in progress. Should any animals be encountered these should be moved away if necessary. • Vehicles speed must take into account the possibility of collisions with fauna.
	VISUAL INTRUSION: Caused by machinery, topsoil stockpiles, cleared areas, and movement of trucks on site during preparation of site establishment. Indirect impacts: There are few indirect impacts as the area is remote and rural, with no people (receptors) living near the site. The local topography and landscape is already altered due the existing mines. Residual impacts: Good housekeeping will ensure a neat and well-maintained construction area reducing visual impact.	3	2	1	2	**8**	1	1	1	1	**4**	• The construction areas shall be kept neat and tidy at all times. • Equipment must be kept in designated areas and storing/stockpiling shall be kept orderly. • The natural red-brown colour of rock is a result of weathering of the outer 1-2mm of the rock surface, and the natural process can be mimicked by coating the rock surface with ferric chloride (FeC13) available commercially in large quantities, as it is extensively used in sewage treatment. Concentrations of around 40% give the best results and are ideal, as one of the products supplied commercially for sewage treatment is a 43% concentration of contained FeC13. Freshly sprayed areas need several days to dry as rain within the first 24-48 hours after spraying causes much of the ferric chloride to be washed off, requiring that the work be repeated. Due to these factors, it is preferential that spraying of rock surfaces with ferric chloride be conducted during the dry season. However, care must be taken, as experience has shown that where there is excessive dust collection on the rock surfaces, such as is the case with dumps close to haul roads, haematite tends to form around the dust particles rather than on the rock surface, resulting in substantial loss of coverage when the rains wash off the dust. This can be overcome by washing down these surfaces with water several days prior to spraying, or by treating these areas during dry window periods within the rainy season. • Mitigation of the visual impact of “heaped fill dumps” and “sidehill dumps” will include rock shading and limited topsoil application to the slope and revegetation on the top of the dump.

OPERATIONAL	EMMISSIONS (DUST, VEHICLES & NOISE): Noise and dust will be created by mining equipment (e.g. front- end loaders) and vehicles, which will emit Greenhouse Gases. Indirect impacts: Carbon emissions from vehicle exhausts have a negative impact on the ozone layer. Local residents along the access tracks and roads would be impacted on by noise, dust and vehicle emissions during the construction activities. Increase in Greenhouse Gas Emissions from vehicles. Residual impacts: Carbon emissions have impact on climate change.	3	2	1	1	**7**	1	1	1	1	**4**	• Health and safety equipment is required for workers. • Vehicles used on site for the construction related activities shall be maintained and in a good working condition so as to reduce emissions. • Engines shall be turned off when the vehicle is temporarily parked or stationery for long periods. • 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. • Stockpiles must be maintained (covered where necessary) to avoid wind erosion of the material. • Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces. • The wetting of the saws helps reduce dust generation during cutting of the blocks. • Existing tracks will be used as haul roads and will only be upgraded to facilitate haul trucks by applying dust suppression and/or hardening compound such as Macadamite. • On public roads the vehicles shall adhere to municipal and provincial traffic regulations including speed limits. • The Applicant shall adhere to the local by-laws and regulations regarding the noise and associated hours of operation • All mining activities will be limited to daylight hours during weekdays and no activities on Sundays and public holidays. • Noise abatement equipment, such as mufflers on diesel engines, will be maintained in good condition. • The Applicant shall limit noise levels (e.g. install and maintain silencers on machinery). The provisions of SANS 1200A Sub clause 4.1 regarding “built-up” area shall apply to all areas within audible distance of residents whether in urban, peri-urban or rural areas. • 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.

OPERATIONAL	POTENTIAL FOR HERITAGE, PALAEONTOLOGICAL AND CULTURAL IMPACTS: Refer to Appendix 2. The archaeological resources were identified during a field assessment and their heritage significance is rated as low-moderate. Some mitigation has been proposed. Indirect impacts: Loss of context Residual impacts: None identified for insignificant findings.	1	2	1	1	**5**	1	1	1	1	**4**	• If any heritage or paleontological resources are discovered as a result of the mining activities, such activities will cease with immediate effect and a qualified archaeologist and or palaeontologist will be commissioned to assess their significance and determine appropriate mitigation measures. • All personnel and contactors will be made aware of the locations of all identified resources and the necessity of avoiding them. • A safe distance of at least 50 metres will be maintained between the identified resource and mining activities.
	CREATION OF EMPLOYMENT & JOB SECURITY DURING CONSTRUCTION PHASE WITH LOCAL AND REGIONAL ECONOMIC SPIN-OFFS Indirect impacts: Upskilling Local economic spin-offs through increased income earned, and through purchasing of local materials Income generation for landowners in a time of severe drought where livestock farming is not sustainable. Residual impacts: The upliftment of unemployed people, with positive impact on standard of living for their families. Local and regional economic spin-offs from investment.					**POSITIVE IMPACT**					**POSITIVE IMPACT**	• Employment of local previously disadvantaged labour wherever possible, with provision of training (upskilling). • Any other mining companies operating legally will be listed as affected parties and consulted. Areas of operations will be demarcated and no overlapping will be allowed. • All operations will be carried out under the guidance of strong, experienced manager with proven skills in public consultation and conflict resolution. • There will be a strict requirement to treat local residents with respect and courtesy at all times.

Decommisioning and Closure Phase	REHABILITATION OF MINED AND CLEARED AREAS: As per Rehabilitation, Decommissioning and Mine Closure Plan (Appendix 1) Indirect impacts: Ore bodies like granite that lend themselves to open-pit mining are not prone to causing water pollution and therefore water accumulating in the rehabilitated pit can usually be used for a number of purposes. Residual impacts: Increase in natural habitat following rehabilitation processes.					**POSITIVE IMPACT**					**POSITIVE IMPACT**	• Implementation of Final Rehabilitation, Decommissioning and Mine Closure Plan. • The focus of topographic rehabilitation may not be obvious at the time of mine planning and must be addressed as the mine develops and the Closure Plan must be reviewed periodically for continued relevance in the light of changed mine path or long-term plans. • Implementation of the tasks detailed under waste management to manage the risks associated with high wall stability of the quarry and slope stability of the waste dump will ensure a safe post mining landscape without the requirement for long term monitoring and management. Regular inspections and audits will be used as management system to ensure compliance. • At final closure of the operation all remaining product (blocks) from the demarcated stockpile will be restored to pit wherever possible to reduce highwall height and provide surface for rehabilitation or used to fill any remaining deep excavations if any. • The infrastructure area will be screened for petrochemical spills and cleaned and waste from the temporary storage facility will be removed and the area cleaned. • The compacted salvage yard, lay down and movement areas will be screened for petrochemical spills and cleaned before it is ripped and levelled. • Redundant structures, buildings and civil foundations (down to one meter below surface for subsurface infrastructure) will be removed for use elsewhere or demolished and discarded. • All redundant infrastructure and services needs to be demolished including ruins, buildings, foundations and footings. • Building rubble will be used as backfill in excavations or removed from site in the absence of excavations. • Remove all power and water supply installations not to be retained by landowner in terms of section 44 of the MPRDA. • Removing underground infrastructure to one meter below surface. • Excavations created by removing subsurface infrastructure needs to be filled, levelled and compacted. • Final walk through of complete mining lease area to ensure no mining related waste and of re-usable infrastructure remain on site. • As part of this phase training of personnel in the implementation of the Closure Plan will done and the implementation of the environmental awareness plan will be an ongoing process.

11 Summary of specialist reports.

Table 9: Summary of Specialist Reports

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS INCLUDED IN THE EIA REPORT	SECTION WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
Heritage Impact Assessment (Attached as Appendix 3)	No mitigation is required. Should any heritage resources be found SAHRA should be contacted immediately.	Yes	Section 8 and Section 10

12 Environmental impact statement

12.1 Summary of the key findings of the environmental impact assessment

The significance ratings of impacts after mitigation on the key aspects of the "preferred alternative" and the "no go" alternative are shown per Phase in the following table.

Summary of the Significance Ratings of Impacts after Mitigation

IMPACTS AND ASPECTS	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
1. SOIL EROSION AND COMPACTION: The clearing of areas for waste dump extensions or extensions to logistics 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.	Low / Insignificant Risk	N/A
2. SOIL AND GROUNDWATER CONTAMINATION & WASTE MANAGEMENT: 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. The Koeries River located close to the site is non-perennial and is classified as Class B: Largely Natural and is a Freshwater Ecosystem Priority Area (FEPA). No permanent surface water resources are in close proximity to the quarries or mining logistics.	Low / Insignificant Risk	N/A
3. CHANGE IN TOPOGRAPHY: Granite mining operations commonly have a permanent impact on rock masses that influences the topography on the site and can impact post-mining slope stability.	Medium / Significant Risk	
4. LIMITED LOSS OF NATURAL VEGETATION AND ECOLOGICAL FUNCTIONING IN A CRITICAL BIODIVERSITY AREA 1 (CBA 1) Wildlife and Vegetation disturbance	Low / Insignificant Risk	N/A
5. VISUAL INTRUSION: Caused by machinery, topsoil stockpiles, cleared areas, and movement of trucks on site during preparation of site establishment. The site is remote and rural in nature with very few receptors (people or nearby public roads) and is located on private property.	Medium / Significant Risk	N/A
6. EMMISSIONS (DUST, VEHICLES & NOISE): Noise and dust will be created by mining equipment (e.g., front- end loaders) and vehicles, which will emit Greenhouse Gases.	Low / Insignificant Risk	N/A
7. POTENTIAL FOR HERITAGE, PALAEONTOLOGICAL AND CULTURAL IMPACTS: The archaeological resources were identified during a field assessment and their heritage significance is rated as low-moderate. Some mitigation has been proposed.	Low / Insignificant Risk	N/A

8. CREATION OF EMPLOYMENT & JOB SECURITY WITH LOCAL AND REGIONAL ECONOMIC SPIN-OFFS	Medium (+)	Medium (-)

All of the negative identified impacts will occur for a limited period and the extent of the negative impacts will be localised. All of the identified impacts can be suitably mitigated. There is a correlation between cumulative impacts post mitigation, and significance rating of impacts after mitigation as indicated in Section 10.

12.2 Final Site Map

Please refer to **Diagram 3** for the target area of interest for proposed mining activities.

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

Refer to Section 12.1 above.

13 Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr

13.1 Management Objectives

- Objective 1 - To create a safe and healthy post-mining environment
  - Safe excavations
    - Slope stability of remaining excavation
    - No potentially dangerous areas secured if required
  - Limited residual environmental impact
    - Develop a landscape that reduces the requirement for long term monitoring and management
    - No surface and/or groundwater contamination
    - Waste management practices not creating or leaving legacies
- Objective 2 - To create a stable, free draining post mining landform, which is compatible with the surrounding landscape
  - Economically viable and sustainable land, as close as possible to its natural state.
    - 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
    - Prevent long term changes in land use by implementing prompt rehabilitation and maintenance of disturbances when possible as part of annual rehabilitation plan.
  - Stable, free draining post mining landform
    - Prevent alteration or diverting natural drainage lines and reduced natural runoff.
    - Prevent concentration of runoff, mixing of clean runoff with contaminated runoff and creation of large open water bodies.
- Objective 3 – To provide optimal post-mining social opportunities
  - Optimised benefits for the social environment
    - Positive and transparent relationships with stakeholders and maintaining communication channels, providing stakeholders including government authorities with relevant information as per legislative requirements.

- Undertaking environmental management according to approved EMP and Closure plans and regular auditing of the environmental management system.

➢ Minimal negative aesthetic impact
- Mitigate the nuisance effects of air emissions (dust), visual intrusion and the cumulative effect of a raise in the ambient noise levels
- Prevent disturbance of archaeological sites and implement mitigating measures according to the archeological impact assessment.

13.2 Outcomes

- By providing sufficient information to strategically plan the mining activities, unnecessary social and environmental impacts be avoided.
- Ensure an approach that will provide the necessary confidence in terms of environmental compliance.
- Provide a management plan that is effective and practical for implementation.
- Through the implementation of the proposed mitigation measures it is anticipated that the identified social and environmental impacts can be managed and mitigated effectively.
- Noise generation can be managed through consultation and restriction of operating hours and by maintaining equipment and applying noise abatement equipment if necessary.
- Dust fall can be managed by reducing driving speeds when driving on unpaved roads.
- Wildlife disturbance and clearance of vegetation will be limited to the absolute minimum required and disturbed areas will be re-vegetated with locally indigenous species as soon as possible.
- Surface water and groundwater contamination by hydrocarbons can be managed by conducting proper vehicle maintenance, refueling with care to minimise the chance of spillages and by having a spill kit available on each site where mining activities are in progress.

14 Aspects for inclusion as conditions of Authorisation.

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

- All mining and rehabilitation to be conducted as per the approved EMPr, and Rehabilitation, Decommissioning and Closure Plan (Appendix 1).
- Concurrent mining and rehabilitation must be done.
- The proposed mining area must be clearly demarcated with semi-permanent markers.
- Eradicate all alien vegetation in the area during mining.
- The mining operator must appoint a suitably qualified ECO who will be responsible for ensuring compliance with the requirements of the EMPr during the mine operation and decommissioning.
- Should any burials, fossils or other historical material be encountered during construction, work must cease immediately and SAHRA must be contacted, as detailed in Appendix 2.
- The mine operation must follow an Integrated Waste Management approach. Control measures must be implemented to prevent pollution of any water resource or soil surface by oil, grease, fuel or chemicals. Appropriate pollution prevention

measures must be implemented to prevent dust.
- A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers will be informed of the speed limit applicable. The access road will be maintained during operational activities.

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

- The desk-top research included reference to the SANBI BGIS database map viewer for the various baseline environmental attributes, and any assumptions or gaps in knowledge expressed by SANBI in the provision of this information would be applicable to this information as referenced.
- It is assumed that the proposed mitigation measures as listed in this report and included in the EMPr will be implemented and adhered to. Mitigation measures are proposed which are considered reasonable and must be implemented in order for the outcome of the assessment to be accurate.
- It is assumed that the Rehabilitation, Decommissioning and Closure Plan (Appendix F) and any annual rehabilitation plans as part of production, will be implemented and adhered to.

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

16.1 Reasons why the activity should be authorized or not

It is the opinion of the EAP that the proposed mining activity should be authorised. In reaching this conclusion the EAP has considered that:

- The “preferred alternative” takes into account location alternatives, activity alternatives, layout alternatives, technology alternatives and operational alternatives.
- The approach taken is that it is preferable to avoid significant negative environmental impacts, wherever possible.
- The site is located in a Critical Biodiversity Area 1 (CBA1). It is the opinion of the EAP that the underlying biodiversity objectives and ecological functioning will not be compromised, subject to the strict adherence to the EMPr and Rehabilitation, Decommissioning and Closure Plan (Appendix 1).
- No significant negative impacts have been identified that are so severe as to prevent the proposed mining activity from taking place.
- The activity has been assessed to have a positive socio-economic impact, especially in terms of the creation of employment and the provision.
- Provided the recommended mitigation measures are implemented and mining activities are managed in accordance with the stipulations of the EMPr, and Rehabilitation, Decommissioning and Mine Closure Plan (Appendix 1), in an environmentally sound manner, the potential negative impacts associated with the implementation of the preferred alternative can be reduced to acceptable levels.

16.2 Conditions that must be included in the authorisation

As per section 14 above:

17 Period for which the Environmental Authorisation is required

The authorisation is required for the duration of the mining permit which is an initial 2 years plus a potential to extend the permit 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.

18 Undertaking

It is confirmed that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the Basic Assessment Report (BAR) and the Environmental Management Programme report (EMPr).

19 Financial Provision

19.1 Legal Framework

According to regulation 7 of the NEMA Financial Provisioning Regulation, 2015 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(1).

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, including the pumping and treatment of polluted or extraneous water, as reflected in an environmental risk assessment report.

Financial provision in terms of reg. 6(c) are 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 in terms of regulation 6(b) and attached as **appendix 1**.

19.2 Calculation

Financial provision in terms of reg. 6(c) 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 in terms of regulation 6(b) and attached as **appendix 1**.

19.3 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, including the pumping and treatment of polluted or extraneous water, as reflected in an environmental risk assessment report (**Refer Appendix 1**).

19.4 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 Regulations 2015.

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.

20 Specific Information required by the competent Authority

20.1 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 a description of the impact on the following:

20.1.1 Impact on the socio-economic conditions of any directly affected person
A full consultation process is being implemented during the environmental authorisation process. The purpose of the consultation is to provide affected persons the opportunity to raise any potential concerns. Concerns raised have been captured and addressed within the public participation section of this report (attached as Appendix 3) to inform the decision-making process.

20.1.2 Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act
The potential impact on heritage resources is unlikely due to the nature of the mining activity, as confirmed by the Heritage Impact Assessment attached at Appendix 3.

21 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 above.

PART B
ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

22 Environmental Management Program

22.1 Details of the EAP,

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

22.2 Description of the Aspects of the Activity

This has already been covered. Refer **Section 4** of this document.

22.3 Composite Map

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

22.4 Impacts to be mitigated in their respective phases

ACTIVITY - Site Access and Site Establishment	**PHASE** Construction	**SIZE AND SCALE of disturbance** Logistical facilities & movement area 2.0Ha Quarry Floor/Excavation 2.0Ha Heap Fill Waste Rock Dump 0.4Ha Dispatch Yard/Sorting Area: 0.6Ha Total footprint is 5ha
COMPLIANCE WITH STANDARDS NEMA Section 2 Principles Environmental Authorisation	**TIME PERIOD FOR IMPLEMENTATION OF MITIGATION MEASURES** Start of activity and continuous as mining progresses over the site during construction period (site access and site establishment activities). Upon cessation of each activity where applicable. Immediately in the event of spills	

MITIGATION MEASURES Impact 1: Soil erosion & soil compaction

- Existing farm roads and tracks must be used as far as possible;
- After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff.
- Stabilized areas shall be demarcated accordingly.
- Movement of vehicles and machinery will be restricted to demarcated areas and roads with no off-road driving permitted.
- Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces.
- Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and potential stormwater run-off.
- 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.
- Temporarily halt material handling in windy.
- Where new access tracks are required, such tracks must be scarified during decommissioning;
- Dual use access roads must be handed back to the landowner in a good state of repair.
- 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.
- Soil erosion is to be regularly monitored and repaired.
- Compacted areas that are no longer required shall be scarified after use as part of the annual rehabilitation plan.

MITIGATION MEASURES Impact 2: Soil and Water Contamination & General Waste Management

- Implement and follow water saving procedures and methodologies.
- Fuel storage must be contained in mobile bowsers and refuelling will be done with care to minimise the chance of spillages
- Only re-fuel machines at fuelling station, construct structures to trap fuel spills at fuelling station
- Immediately clean oil and fuel spills and dispose contaminated material (soil, etc.) at licensed sites only.
- A spill kit will be available on each site where activities are in progress.
- Provide mobile ablution facilities and take care that 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.
- 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 prevents 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.
- Waste separation must be undertaken if practical for recycling.
- Waste materials generated on site must be stored in suitable lidded containers and removed off site to a suitable disposal facility.
- Drinking and process water to be obtained from legal source (Local Authority) and trucked onto site.
- No water will be abstracted in terms of section 21(a) of National Water Act, 1998 (Act no. 36 of 1998).
- Waste water (i.e., including process water and grey water) must be kept separate from clean water and will be recycled.
- Separate clean and contaminated water systems around the pit and infrastructure areas.
- Establishing controlled runoff from laydown area and the flow and end destination of decontamination water will be controlled.
- 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.
- Slow storm water runoff with storm water diversion and erosion control contour berms

MITIGATION MEASURES Impact 3: Limited loss of Biodiversity – Natural Vegetation and Ecological Functioning

- Refer to Diagrams 3, which show the proposed area for mining and the existing tracks that will be used.
- Although situated in a CBA 1 the area where mining is to take place has been transformed due to adjacent large scale granite mining and overgrazing of communal land.
- All development areas must be clearly demarcated, and no activities may take place outside of demarcated areas.
- Limiting activities to the smallest area that is necessary.
- Remove alien invasive vegetation if required and ensure ongoing alien vegetation clearing in the area.
- No indigenous plants outside of the demarcated work areas may be damaged.
- Implement concurrent rehabilitation in terms of the annual rehabilitation plan.
- The noise and vibration caused by the earthmoving equipment will disturb smaller animals (e.g., snakes). These will move away whilst operations are in progress. Should any animals be encountered these should be moved away if necessary.
- Vehicles speed must take into account the possibility of collisions with fauna.

MITIGATION MEASURES Impact 4: Visual Intrusion

- The construction areas shall be kept neat and tidy at all times.
- Equipment must be kept in designated areas and storing/stockpiling shall be kept orderly.

MITIGATION MEASURES Impact 5: Emissions (Greenhouse Gases, Dust and Noise)

- The Applicant shall adhere to the local by-laws and regulations regarding the noise and associated hours of operation
- All mining activities will be limited to daylight hours during weekdays and no activities on Sundays and public holidays.
- Noise abatement equipment, such as mufflers on diesel engines, will be maintained in good condition.
- The Applicant shall limit noise levels (e.g., install and maintain silencers on machinery). The provisions of SANS 1200 A Sub clause 4.1 regarding "built-up" area shall apply to all areas within audible distance of residents whether in urban, peri-urban or rural areas.
- 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.
- 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.
- Hauling vehicles shall adhere to municipal and provincial traffic regulations including speed limits.
- Vehicles used on site for the construction related activities shall be maintained and in a good working condition so as to reduce emissions.
- Engines shall be turned off when the vehicle is temporarily parked or stationery for long periods.
- Stockpiles must be maintained (covered where necessary) to avoid wind erosion of the material.
- Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces.

MITIGATION MEASURES Impact 6: Potential for Heritage, Palaeontological & Cultural Impacts

- he small kraal in the north-western corner outside the application area should be avoided and protected from harm by a small fence running 5 m from the stone walling
- If any heritage or paleontological resources are discovered as a result of the mining activities, such activities will cease with immediate effect and a qualified archaeologist and or palaeontologist will be commissioned to assess their significance and determine appropriate mitigation measures.
- All personnel and contactors will be made aware of the locations of all identified resources and the necessity of avoiding them.
- A safe distance of at least 50 metres will be maintained between the identified resource and mining activities

MITIGATION MEASURES Impact 7: Job creation with Local and Regional Economic Spin-Offs

- Employment of local previously disadvantaged labour wherever possible, with provision of training (upskilling).
- Any other mining companies operating legally will be listed as affected parties and consulted. Areas of operations will be demarcated and no overlapping will be allowed.
- All operations will be carried out under the guidance of strong, experienced manager with proven skills in public consultation and conflict resolution.
- There will be a strict requirement to treat local residents with respect and courtesy at all times.

ACTIVITY - Removal of granite, loading and hauling, waste generation and management	PHASE Operational	SIZE AND SCALE of disturbance Logistical facilities & movement area 2.0Ha Quarry Floor/Excavation 2.0Ha Heap Fill Waste Rock Dump 0.4Ha Dispatch Yard/Sorting Area: 0.6Ha Total footprint is 5ha
COMPLIANCE WITH STANDARDS NEMA Section 2 Principles Environmental Authorisation	**TIME PERIOD FOR IMPLEMENTATION OF MITIGATION MEASURES** Start of activity and continuous as mining progresses over the site during construction period (site access and site establishment activities). Upon cessation of each activity where applicable. Immediately in the event of spills	

MITIGATION MEASURES Impact 1: Change in Topography

- The focus of topographic rehabilitation may not be obvious at the time of mine planning and must be addressed as the mine develops and the Closure Plan must be reviewed periodically for continued relevance in the light of changed mine path or long-term plans.
- Manage the risks associated with high wall stability and slope stability of the waste dump to ensure a safe post mining landscape without the requirement for long term monitoring and management.
- Regular inspections and audits will be used as management system to ensure compliance.
- Due to cutting with circular saws smaller and vertical benches of average 2m are created that can be planned so as to prevent an excessive highwall remaining.
- During construction terrain form will be used to shield the opencast pit from developed or sensitive areas as protection in the unlikely event of highwall or slope collapse.
- During production the height of highwalls will be reduced by separating benches to increase stability.
- Overall slope angle between 60° and 70° will fit in with the natural topography of the mountainous terrain and due to the massive and competent nature of the ore body will still be stable.
- At final closure geotechnical investigations will identify unstable rock conditions, slopes that require support in the short-, medium- and long-term. Geotechnical slope stabilisation methods including concreting (gunnite), rock bolting, wire mesh restraint, bench wrecking to lower highwalls, rehabilitative blasting etc. which will be investigated and implemented during decommissioning.
- A row of blocks will be packed in a straight line at the base of the high wall to reduce the overall height as an additional preventative measure, minimizing safety risks. After the rehabilitation phase no maintenance will be required as the blocks will be permanent fixtures that can only be moved via front end loaders.
- During operations pump rainwater that collects in the pit and stored for use as process water or dust suppression.
- Any remaining high wall will be fenced off at final closure in order to deter people or animals from falling over.
- At final closure of the operation all remaining product (blocks) from the demarcated stockpile will be restored to pits wherever possible to reduce highwall height and provide surface for rehabilitation or used to fill any remaining deep excavations if any.

MITIGATION MEASURES Impact 1: Change in Topography Continue

- Waste dumps must be designed to meet minimum slope stability and safety standards and vegetated to reduce erosion and runoff.
- In the case of waste dumps in the valleys “heaped fill” excavations with the final designed perimeter of the dump will be created to obtain cover material for the top of the dumps. The excavations will serve as a base for extending the waste dump. Thereafter, dumping will proceed above surface on the top of this buried dump at successive tiers with appropriate height around 6-10m, leaving terraces of 6m wide, and working from the perimeter toward the centre. This will allow for reclamation of the outside profiles at a much earlier stage, resulting in very little outstanding reclamation toward the end of the life of the dump.
- The main closure objective therefore is to leave the site in as safe and self-sustaining a condition as possible and in a situation where no post-closure intervention is required. The aim is to ensure that the affected environment is maintained 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. The aesthetic value of the area will also be reinstated.
- The basic rehabilitation methodology will therefore strive to replicate the pre-mining topography, wherever possible, or at least not to increase overall slope gradients without emplacement of adequately designed erosion control or runoff diversion structures.

MITIGATION MEASURES Impact 2: Soil erosion & soil compaction

- After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff.
- Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces.
- Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and potential stormwater run-off.
- Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material.
- Reduce drop height of material to a minimum.
- Temporarily halt material handling in windy conditions.
- 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.
- Compacted areas that are not required for access shall be scarified after use during decommissioning and rehabilitation.
- The basic rehabilitation methodology will therefore strive to replicate the pre-mining topography, wherever possible, or at least not to increase overall slope gradients without emplacement of adequately designed erosion control or runoff diversion structures.
- Provision must also be made for efficient storm water control to prevent erosion of roadways.
- Soil erosion on haul roads is to be regularly monitored and repaired.

MITIGATION MEASURES Impact 3: Soil and Water Contamination & General Waste Management

- Water used for cooling of saw blades together with the fine residue (cutting spoils) will be collected in a series of settling dams from where the water will be recycled.
- Ensure maintenance of reticulation pipes for water supply.
- Place oil traps under stationary machinery, only re-fuel machines at fuelling station, construct structures to trap fuel spills at fuelling station, immediately clean oil and fuel spills and dispose contaminated material (soil, etc.) at licensed sites only.
- Draw-up and strictly enforce procedures for the storage, handling and transport of different hazardous materials
- Implement and follow water saving procedures and methodologies.
- Fuel storage must be contained in mobile bowsers and refuelling will be done with care to minimise the chance of spillages
- Only re-fuel machines at fuelling station, construct structures to trap fuel spills at fuelling station
- Immediately clean oil and fuel spills and dispose contaminated material (soil, etc.) at licensed sites only.
- A spill kit will be available on each site where activities are in progress.
- 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.
- 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 prevents 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.
- 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.
- Provide mobile ablution facilities
- Drinking and process water to be brought on site.
- Waste water (i.e., including process water and grey water) must be kept separate from clean water.
- Establishing controlled runoff from washing bays,
- The flow and end destination of decontamination washing water will be controlled.
- 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.
- Slow storm water runoff with storm water diversion and erosion control contour berms
- Separate clean and contaminated water systems around the pit and infrastructure areas.
- Waste that is collected within the settling dams and dimenion stone residues are typically benign from a pollution point of view.
- Water used for cooling of saw blades together with the fine residue (cutting spoils) will be collected in a a settling dam from where the water will be re-used if possible.
- Sludge collected within the settling ponds will be disposed of within the waste rock dump.
- Waste or un-saleable blocks will be dumped in the demarcated waste dump on a regular basis.
- Bury all surplus loose, isolated waste rock and un-saleable blocks in designated sub surface pits and cover with growth medium.

MITIGATION MEASURES Impact 3: Soil and Water Contamination & General Waste Management - Continue

- Waste or low-grade blocks can be subjected to secondary processing by cutting into smaller blocks, used as refill or landscaping, crushed for other applications (such as concrete production), or otherwise dealt with responsibly.
- Stored overburden in the form of boulder rubble and other stone waste should not be left in piles and should be used to cover waste dumps.
- Soil removal creates permanent impacts that can be mitigated through restoration of soil cover, although the significance of the impact remains high.
- Remove and stockpile 300mm topsoil in berms or heaps less than 1,5m high and turn soil or re-use every six months. Do not use as permanent storm water control feature.
- Remove and stockpile topsoil from roads, building platforms and stockpile areas prior to construction for use to restore disturbed areas. To ensure long-term stability, the restored soil cover should attempt to mimic the pre-mining distribution of soil texture and thickness.
- Contaminated soil must be treated by first removing the source of contamination - removing the source of contamination should allow the system to recover without further clean-up required.
- Petrochemical spillages to be collected in a drip tray and drum to store excavated spill affected soil for disposal at a registered facility or onsite treatment.
- The most promising techniques for in on-site treatment involve bioremediation. Bioremediation involves the use of microorganisms to destroy hazardous contaminants.

MITIGATION MEASURES Impact 4: Limited loss of Biodiversity – Natural Vegetation and Ecological Functioning

- Refer to Diagrams 3, which show the proposed area for mining and the existing tracks that will be used.
- Mining is adjacent to existing large scale granite mining where little vegetation naturally occurs.
- All development areas must be clearly demarcated, and no activities may take place outside of demarcated areas.
- Limiting activities to the smallest area that is necessary.
- Remove alien invasive vegetation if required and ensure ongoing alien vegetation clearing in the area.
- No indigenous plants outside of the demarcated work areas may be damaged.
- Implement concurrent rehabilitation in terms of the annual rehabilitation plan
- The noise and vibration caused by the earthmoving equipment will disturb smaller animals (e.g., snakes). These will move away whilst operations are in progress. Should any animals be encountered these should be moved away if necessary.
- Vehicles speed must take into account the possibility of collisions with fauna.

MITIGATION MEASURES Impact 5: Visual Intrusion

- The construction areas shall be kept neat and tidy at all times.
- Equipment must be kept in designated areas and storing/stockpiling shall be kept orderly.
- The natural red-brown colour of rock is a result of weathering of the outer 1-2mm of the rock surface, and the natural process can be mimicked by coating the rock surface with ferric chloride (FeC13) available commercially in large quantities, as it is extensively used in sewage treatment.
- Concentrations of around 40% give the best results and are ideal, as one of the products supplied commercially for sewage treatment is a 43% concentration of contained FeC13. Freshly sprayed areas need several days to dry as rain within the first 24-48 hours after spraying causes much of the ferric chloride to be washed off, requiring that the work be repeated.

MITIGATION MEASURES Impact 5: Visual Intrusion - Continue

- Due to these factors, it is preferential that spraying of rock surfaces with ferric chloride be conducted during the dry season. However, care must be taken, as experience has shown that where there is excessive dust collection on the rock surfaces, such as is the case with dumps close to haul roads, haematite tends to form around the dust particles rather than on the rock surface, resulting in substantial loss of coverage when the rains wash off the dust. This can be overcome by washing down these surfaces with water several days prior to spraying, or by treating these areas during dry window periods within the rainy season.
- Mitigation of the visual impact of “heaped fill dumps” and “sidehill dumps” will include rock shading and limited topsoil application to the slope and revegetation on the top of the dump.

MITIGATION MEASURES Impact 6: Emissions (Greenhouse Gases, Dust and Noise)

- Health and safety equipment are required for workers.
- Vehicles used on site for the construction related activities shall be maintained and in a good working condition so as to reduce emissions.
- Engines shall be turned off when the vehicle is temporarily parked or stationery for long periods.
- 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.
- Stockpiles must be maintained (covered where necessary) to avoid wind erosion of the material.
- Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces.
- Existing tracks will be used as haul roads and will only be upgraded to facilitate haul trucks by applying dust suppression and/or hardening compound such as Macadamite.
- On public roads the vehicles shall adhere to municipal and provincial traffic regulations including speed limits.
- The Applicant shall adhere to the local by-laws and regulations regarding the noise and associated hours of operation
- All mining activities will be limited to daylight hours during weekdays and no activities on Sundays and public holidays.
- Noise abatement equipment, such as mufflers on diesel engines, will be maintained in good condition.
- The Applicant shall limit noise levels (e.g., install and maintain silencers on machinery). The provisions of SANS 1200 A Sub clause 4.1 regarding “built-up” area shall apply to all areas within audible distance of residents whether in urban, peri-urban or rural areas.
- 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.

MITIGATION MEASURES Impact 7: Potential for Heritage, Palaeontological & Cultural Impacts

- If any heritage or paleontological resources are discovered as a result of the mining activities, such activities will cease with immediate effect and a qualified person will be commissioned to assess their significance and determine appropriate mitigation measures.
- All personnel and contactors will be made aware of the locations of all identified resources and the necessity of avoiding them.
- A safe distance of at least 50 metres will be maintained between the identified resource and mining activities.

MITIGATION MEASURES Impact 8: Job creation with Local and Regional Economic Spin-Offs

- Employment of local previously disadvantaged labour wherever possible, with provision of training (upskilling).
- Any other mining companies operating legally will be listed as affected parties and consulted. Areas of operations will be demarcated and no overlapping will be allowed.
- All operations will be carried out under the guidance of strong, experienced manager with proven skills in public consultation and conflict resolution.
- There will be a strict requirement to treat local residents with respect and courtesy at all times.

ACTIVITY – Rehabilitation of mined and disturbed areas	PHASE Decommissioning	SIZE AND SCALE of disturbance Logistical facilities & movement area 2.0Ha Quarry Floor/Excavation 2.0Ha Heap Fill Waste Rock Dump 0.4Ha Dispatch Yard/Sorting Area: 0.6Ha Total footprint is 5ha
COMPLIANCE WITH STANDARDS NEMA Section 2 Principles Environmental Authorisation	**TIME PERIOD FOR IMPLEMENTATION OF MITIGATION MEASURES** Upon cessation of each activity where applicable. Mine closure	

MITIGATION MEASURES

- Implementation of Final Rehabilitation, Decommissioning and Mine Closure Plan.
- The focus of topographic rehabilitation may not be obvious at the time of mine planning and must be addressed as the mine develops and the Closure Plan must be reviewed periodically for continued relevance in the light of changed mine path or long-term plans.
- Implementation of the tasks detailed under waste management to manage the risks associated with high wall stability of the quarry and slope stability of the waste dump will ensure a safe post mining landscape without the requirement for long term monitoring and management. Regular inspections and audits will be used as management system to ensure compliance.
- At final closure of the operation all remaining product (blocks) from the demarcated stockpile will be restored to pit wherever possible to reduce highwall height and provide surface for rehabilitation or used to fill any remaining deep excavations if any.
- The infrastructure area will be screened for petrochemical spills and cleaned and waste from the temporary storage facility will be removed and the area cleaned.
- The compacted salvage yard, lay down and movement areas will be screened for petrochemical spills and cleaned before it is ripped and levelled.
- Redundant structures, buildings and civil foundations (down to one meter below surface for subsurface infrastructure) will be removed for use elsewhere or demolished and discarded.
- All redundant infrastructure and services need to be demolished including ruins, buildings, foundations and footings.
- Building rubble will be used as backfill in excavations or removed from site in the absence of excavations.
- Remove all power and water supply installations not to be retained by landowner in terms of section 44 of the MPRDA.
- Removing underground infrastructure to one meter below surface.
- Excavations created by removing subsurface infrastructure needs to be filled, levelled and compacted.
- Final walk through of complete mining lease area to ensure no mining related waste and of re-usable infrastructure remain on site.
- As part of this phase training of personnel in the implementation of the Closure Plan will done and the
- implementation of the environmental awareness plan will be an ongoing process.

22.5 Impact Management Outcomes

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
Site access	Disturbance of fauna and flora	Biodiversity in an CBA 1	Construction	Remedy through restriction and rehabilitation	Impacts minimised and mitigated. End use objectives achieved through rehabilitation.
	Soil compaction and erosion	Soil resource		Control through monitoring and management	
Site establishment, including waste generation and management	Visibility	Visual intrusion	Construction	Control through monitoring and management	Impacts minimised and mitigated. End use objectives achieved through rehabilitation.
	Emissions (dust, noise & vehicles)	Noise & Air quality		Control through monitoring and management	
	Disturbance of fauna and flora	Biodiversity in an CBA 1		Remedy through restriction and rehabilitation	
	Soil and water contamination, general waste management	Soil and water resource		Remedy through restriction and rehabilitation & control through monitoring and management	
	Destruction or loss of Heritage resources	Cultural and Heritage		Avoidance by relocation of activity if required. Refer to **Appendix 3** – no mitigation required for project site assessed	Impact avoided
Removal of granite, loading and hauling, waste generation and management	Visibility	Visual	Operation	Control through monitoring and management	Impacts minimised and mitigated. End use objectives achieved through rehabilitation.
	Emissions (dust, noise & vehicles)	Noise & Air quality		Control through monitoring and management	
	Disturbance of fauna and flora	Biodiversity in an ESA		Remedy through restriction and rehabilitation	
	Soil and water contamination, general waste management	Soil and water resource		Remedy through restriction and rehabilitation & control through monitoring and management	
	Destruction or loss of Heritage resources	Cultural and Heritage		Refer to **Appendix 3** – no mitigation required for project site investigated.	Impact avoided
Removal of temporary infrastructure and site rehabilitation	Dust emissions (vehicle entrained dust)	Soil resource	Decommissioning	Control through monitoring and management	Impacts minimised and mitigated. End use objectives achieved through rehabilitation.
	Soil erosion due to slow recovery of vegetation	Soil resource & biodiversity		Remedy through restriction and rehabilitation & control through monitoring and management	

22.6 Impact Management Actions

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
Site access	Disturbance of fauna and flora	Remedy through restriction and rehabilitation Control through monitoring and management	Concurrently with site access activities Upon cessation of activity	Remain within the ambit of the Annual Rehabilitation Plan and Environmental Authorisation
	Soil compaction and erosion			
Site establishment, including waste generation and management	Visibility	Control through monitoring and management		
	Emissions (dust, noise & vehicles)			
	Disturbance of fauna and flora	Remedy through restriction and rehabilitation		
	Soil and water contamination, general waste management	Remedy through restriction and rehabilitation & control through monitoring and management		
	Destruction or loss of Heritage resources	Avoidance by relocation of activity if required		
Removal of granite, loading and hauling, waste generation and management	Visibility	Control through monitoring and management	Concurrently with mining activities Upon cessation of activity	Remain within the ambit of the Annual Rehabilitation Plan and Environmental Authorisation
	Emissions (dust, noise & vehicles)	Control through monitoring and management		
	Disturbance of fauna and flora	Remedy through restriction and rehabilitation		
	Soil and water contamination, general waste management	Remedy through restriction and rehabilitation & control through monitoring and management		
	Destruction or loss of Heritage resources	Refer to **Appendix 3**- none required.		
Removal of temporary infrastructure and site rehabilitation	Dust emissions (vehicle entrained dust)	Control through monitoring and management	Upon cessation of activity	Remain within the ambit of the Environmental Authorisation and Final Rehabilitation, Decommissioning and Closure Plan
	Soil erosion due to slow recovery of vegetation	Remedy through restriction and rehabilitation & control through monitoring and management		

23 Financial Provision

23.1 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 excavations
    - Slope stability of remaining excavation
    - No potentially dangerous areas secured if required
  - Limited residual environmental impact
    - Develop a landscape that reduces the requirement for long term monitoring and management
    - No surface and/or groundwater contamination
    - Waste management practices not creating or leaving legacies
- Objective 2 - To create a stable, free draining post mining landform, which is compatible with the surrounding landscape
  - Economically viable and sustainable land, as close as possible to its natural state.
    - 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
    - Prevent long term changes in land use by implementing prompt rehabilitation and maintenance of disturbances when possible as part of annual rehabilitation plan.
  - Stable, free draining post mining landform
    - Prevent alteration or diverting natural drainage lines and reduced natural runoff.
    - Prevent concentration of runoff, mixing of clean runoff with contaminated runoff and creation of large open water bodies.
- Objective 3 – To provide optimal post-mining social opportunities
  - Optimised benefits for the social environment
    - Positive and transparent relationships with stakeholders and maintaining communication channels, providing stakeholders including government authorities with relevant information as per legislative requirements.
    - Undertaking environmental management according to approved EMP and Closure plans and regular auditing of the environmental management system.
  - Minimal negative aesthetic impact
    - Mitigate the nuisance effects of air emissions (dust), visual intrusion and the cumulative effect of a raise in the ambient noise levels
    - Prevent disturbance of archaeological sites and implement mitigating measures according to the archeological assessment.

23.2 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 and was made available to all registered interested and affected parties.

23.3 Rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities

Refer Final Rehabilitation, decommissioning and mine closure plan **appendix 1**.

23.4 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 mining activities back to its original condition. The rehabilitation plan provides the detail on how this will be achieved as detailed in **Appendix 1**.

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

As per **appendix 1**.

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

As per **appendix 1**.

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

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
All mining activities	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 EAP.	Annual Undertake and submit an environmental performance audit to DMR
Site access and site establishment	Visual inspection of soil erosion and/or compaction	All exposed areas, access roads and soil stockpiles must be monitored for erosion on a regular basis, specifically after rainfall events.	Site Manager and Independent EAP	Weekly, and after rain-fall events 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.
Granite Mining	Visual inspection of biodiversity impacts Visual inspection of water resource functionality Visual inspection of waste management, housekeeping and maintenance.	Visual inspection of mining activities and other possible secondary impacts • Control and prevent the development of new access tracks. • Control and prevent growth of alien vegetation in cleared areas and on stockpiles. • Standard waste management practices must be implemented to prevent contamination and littering. • All spill incidents will be reported and corrective action taken in accordance with an established spill response procedure.	Site Manager & Contractor (or sub-contractors)	Weekly monitoring reports to be signed-off by the Site Manager. Corrective action to be confirmed and signed-off by the Project Site Manager. Consolidated monthly monitoring reports (including confirmation of corrective action taken, with photographic evidence) to be submitted. Report incidents in terms of the relevant legislation, including the MPRDA, NWA and NEMA.
Closure & Rehabilitation	Revegetation; Stability; River profile; Soil erosion; Alien invasive species	Inspection of all rehabilitated areas to assess whether soil erosion is occurring and to implement corrective action where required.	Site Manager	A final audit report for site closure must be submitted to the DMR for approval.

23.8 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.

24 Environmental Awareness Plan

24.1 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 mining 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.

24.2 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.

25 Specific information required by the Competent Authority

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

Not applicable at this stage

26 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.

N.J. van Zyl

Signature of the environmental assessment practitioner:

Private Enterprise

Name of company:

January 2021

Date:

-END-

Appendix 1: Final Rehabilitation, decommissioning and mine closure plan and quantum calculations

Appendix 2: Public Participation Process

Appendix 3: Heritage Impact Assessment