mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

FINAL 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 ACTIVITITES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

NAME OF APPLICANT: **GLITTERY RESOURCES (PTY) LTD**

TEL NO: (+27) 072 700 2107

FAX NO:

POSTAL ADDRESS: 3998 Tshepisong
Roodepoort, 1725

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FILE REFERENCE NUMBER SAMRAD: MP 30/5/1/3/2/(12478) EM **(Annexure A)**

1 IMPORTANT NOTICE

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

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

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

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

It is furthermore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed

correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report is not cluttered with uninterpreted information and that it unambiguously represents the interpretation of the applicant.

2 Objective of the basic assessment process

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

(a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;

(b) identify the alternatives considered, including the activity, location, and technology alternatives;

(c) describe the need and desirability of the proposed alternatives,

(d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage , and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on the these aspects to determine:

   i. the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and

   ii. the degree to which these impacts—

      (aa) can be reversed;

      (bb) may cause irreplaceable loss of resources; and

      (cc) can be managed, avoided or mitigated;

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

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

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

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

PART A

SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

INTRODUCTION

Glittery Resources (Pty) Ltd (herein referred to as "Glittery Resources") has lodged an application for a Mining Permit in terms of section 27 of the Mineral and Petroleum Resources Development Act (MPRDA), 2002 (Act No. 28 of 2002). The proposed Koede Gold Mine is located approximately 50 km north-east and south-east from the town of Barberton and Nelspruit (Mbombela), respectively.

The proposed small-scale mining operation will involve mining of Gold ore (Au) using truck and shovel mining method. The operation will have following support infrastructure:

- Screening and crushing machine;
- Vat leach gold recovery unit;
- Mobile office complex;
- Portable water tank (Jojo tanks);
- Ablution facility;
- Workshop;
- 12 000 litre Water Browser for dust suppression;
- Weight-bridge;
- Security gate (boom gate) and fence (five strand barbed wire or Clear-Vu fence);
- General waste bins

The extent of the area applied for covers approximately 5 hectares. The project area is represented in the Regulation 2(2) Plan and regional locality map in annexure A. The life of mine (LoM) is estimated at 5 (five) years with Run of Mine (RoM) of 7 500 tonnes per month (tpa). The construction phase is expected to commence in the first (Q1) quarter of 2022, with first sealable product delivered in Q2 of 2022. Process water supply will be

sourced new groundwater abstraction boreholes to be drilled on the project site. The project area is represented as A, B, C, and D in the Regulation 2(2) Plan below.

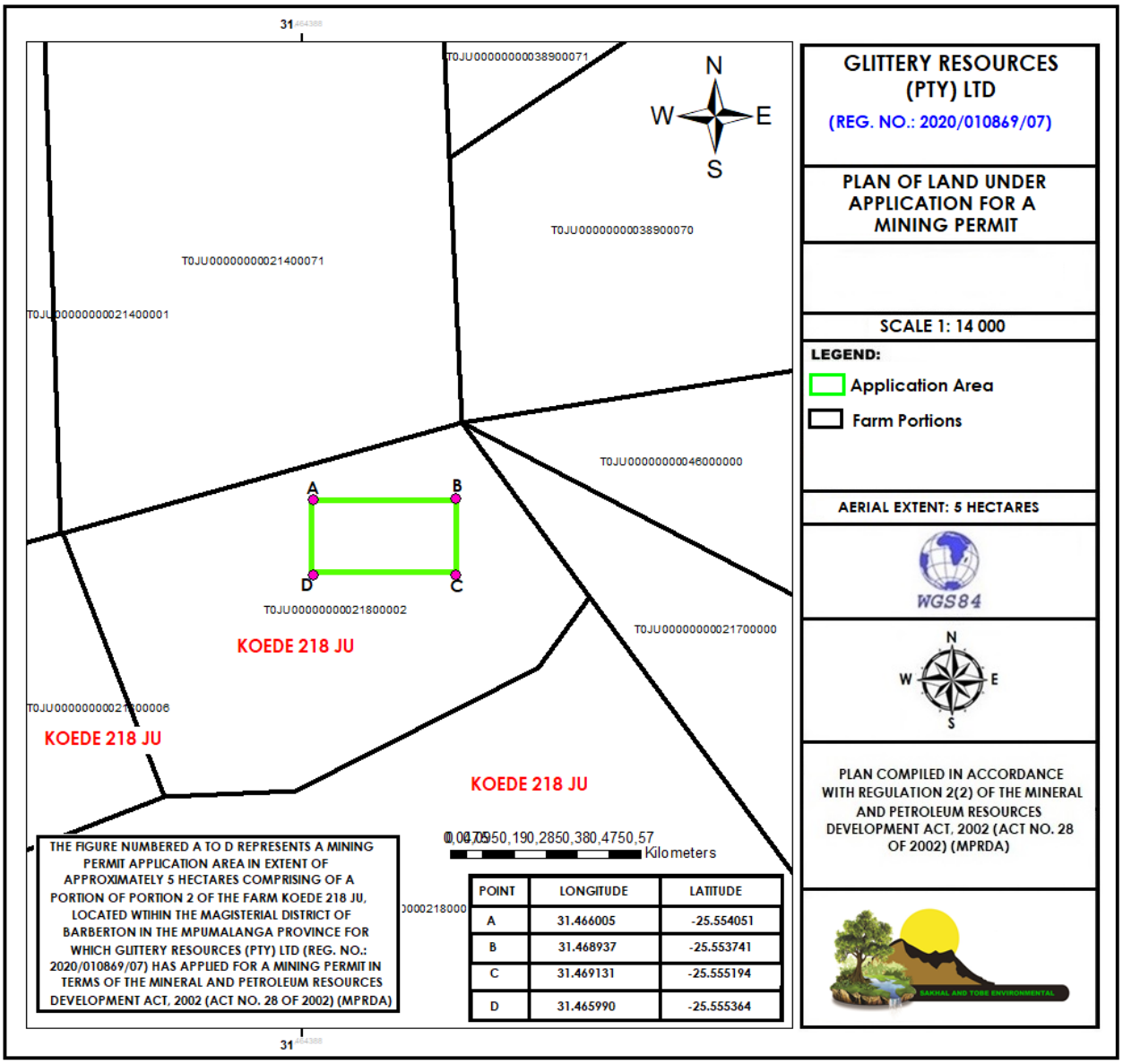

Figure 0-1: Regulation 2(2) Plan: Mining Permit Application Area

3 Contact Person and Correspondence Address

a) Details of

i. Details of the EAP

Name of the Practitioner: Sakhal and Tobe Environmental (Pty) Ltd

(Mr. Mandla Masango)

Tel No.: 011 655 7193

Cell No.: 072 714 8556

Fax No.: 086 719 9505

E-mail: mandlamasango@outlook.com/

mandla@stenvironmental.co.za

ii. Expertise of the EAP

(1) The qualifications of the EAP

(with evidence)

Mr. Mandla Masango:

Education:

- BSc. Hons. Hydrology and Water Resources (University of Venda);
- MSc. Hydrogeology (University of Venda)- currently enrolled and studying.

Professional Affiliations:

- South African Council for Natural Scientific Professions (SACNASP)
- Water Institute of South Africa (WISA)

(2) Summary of the EAP`s past experience

(In carrying out the Environmental Impact Assessment Procedure)

Mr. Mandla Masango is an Environmental Assessment Practitioner with 9 years of experience. He has a BSc. Hons. in Hydrology and Water Resources from the University of Venda and registered with SACNASP as a Scientist. Projects he has worked on include Environmental Impact Assessment for the mining sector, riverine and eco-parks rehabilitation, and other developments (residential and industrial developments). He

has experience in compiling Environmental Management Plans, Waste License Applications, Prospecting Right Applications, Environmental Risk Assessment and Environmental Legal Compliance Audits. He is experienced in public participation, presenting public meetings, managing specialists and general project management of environmental projects. He has outstanding and working knowledge of the relevant environmental legislation.

Please refer to **Annexure B** for the Curriculum Vitae of **Mr. Mandla Masango**.

b) Location of the overall Activity

The following table represents the location and associated cadastral details for the application area.

Table 3—1: Location and Property Details

Farm Name:	A portion of portion 2 (R/E) of the farm Koede 218 JU
Application area (Ha)	5 Hectares (Ha)
Magisterial District	The project site lies on the eastern and north-eastern parts of Mpumalanga Province in the Magisterial District of Barberton. The site falls within Nkomazi Local Municipality which is under Ehlanzeni District Municipality.
Distance and direction from the nearest town	The proposed Koede Gold Mine is located approximately 50 km north-east from the town of Barberton on a portion of portion 2 of the farm Koede 218 JU
21 digit Surveyor General Code for each farm	T0JU000000000021800002

Table 3—2: SG Digit Surveyor General Codes for the Mining Area

Property Name	Property Number	Registration Division	Property Portion	Extent (Hectares)	21-SG Code
Koede	218	JU	2	5 Ha	T0JU000000000021800002

c) Locality Map

(show nearest town, scale not smaller than 1:250,000)

The project site lies on the eastern and north-eastern parts of Mpumalanga Province in the Magisterial District of Barberton. Mpumalanga Province is bordered by Limpopo Province to the north, Mozambique on the north-eastern parts, to the east and southeast by Swaziland, KwaZulu-Natal Province and Free State Province on the south and south-western boundary and lastly Gauteng Province to the west.

The study area falls within ward 30 of Nkomazi Local Municipality which is under Ehlanzeni District Municipality. The farm Koede 218 JU is located approximately 50 km north-east from the town of Barberton. The project site covers an aerial extent of approximately 5 hectares and lies at geographical coordinates -25.554575° south and 31.467531° east. Access to the site is via a dirt road (gravel) connected to the N4 national road, approximately 5 km north of the project area.

In terms of catchment basis, the application area falls within Quaternary Catchment X24D (Crocodile River Catchment) of the Inkomati water management area (WMA). The project area is represented in the Regulation 2(2) plan below.

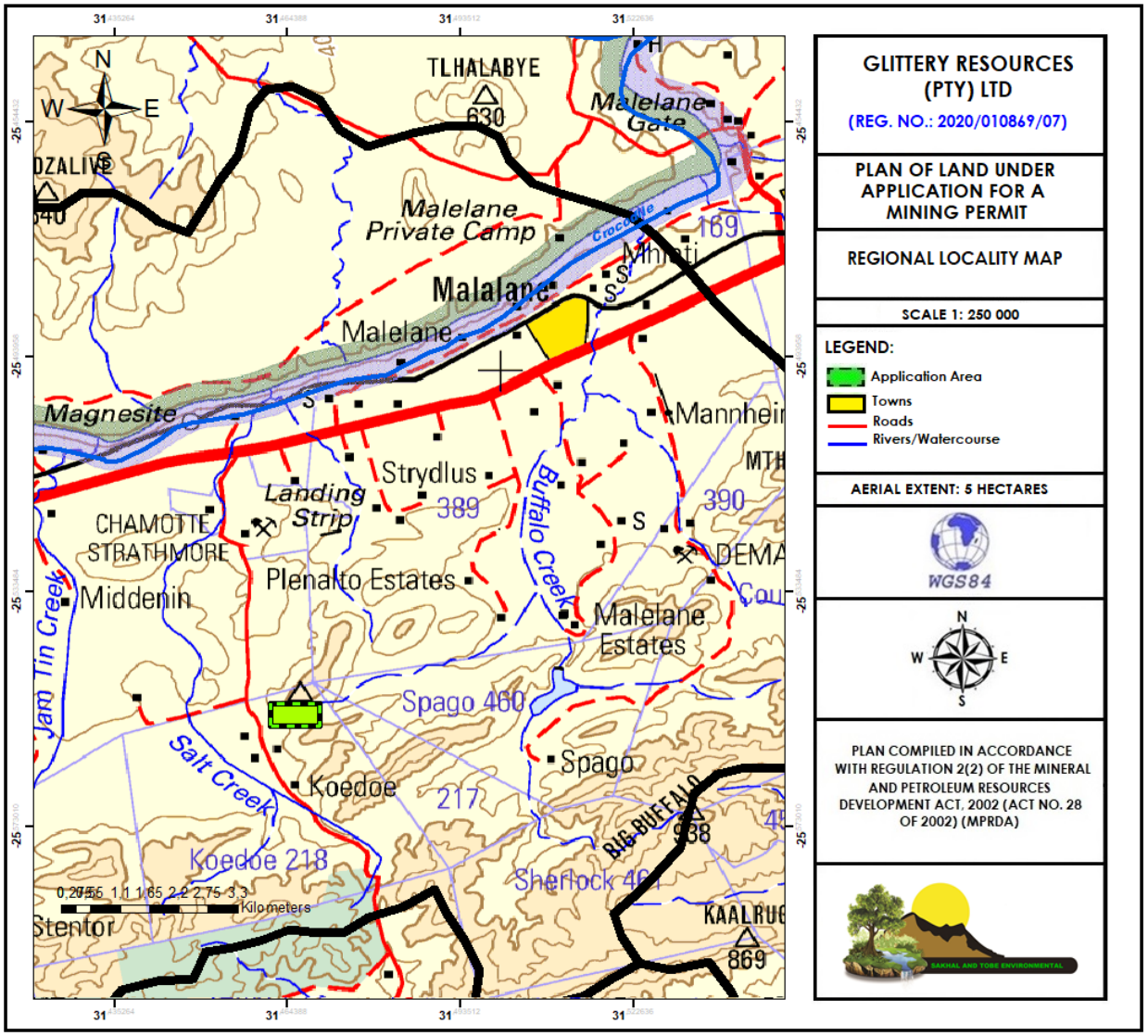

Figure 3-1: Regional Locality Map of the Study Area

d) Description of the scope of the proposed overall activity

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

Koede Gold Mine will involve mining of Gold ore (Au) mineral deposits contained within the Barberton supergroup formation. Most of the known occurrences of gold within the BGB have been found localised in the region to the north and north-east of the Barberton, known locally as the James and Sheba Hills, and in the area immediately south-west of Barberton, in the Moodies Hills. Apart from these areas, additional gold

concentrations occur along and adjacent to the major strike and faults as well as in a few localities in Swaziland near the granite-greenstone contacts.

Mining will commence with the removal of the first 50 mm of topsoil using an excavator and front-end loader. The topsoil from the first block will then be stored in a topsoil berm on the mining area. Due to the rich source of seeds contained in the topsoil, vegetation will usually establish naturally. However, if self-establishment does not occur, the topsoil stockpile will be seeded to ensure the effective management of topsoil. Mining will involve the use of mechanized earth moving equipment (excavator and front-end loader also known as "truck and shovel") to move the unconsolidated material in bulk. Mining will continue to a depth of approximately ±30 m.

Gold will be recovery in the Carbon in-leach processing plant and Vat Leach gold recovery system. The mining process will only require 20 full time workers on site, and 2 – 4 drivers transporting the Run of Mine (RoM) material from the open pit to the processing plant. The excavator and front-end loader that will be used on site will be stored in a small workshop to be developed on site. Only support equipment and infrastructure required to conduct mining will be on site.

The excavations will be sloped after mining and covered with the topsoil (concurrent rehabilitation) to ensure establishment of vegetation on site after mining. The proposed land use after mine rehabilitation will include cattle grazing.

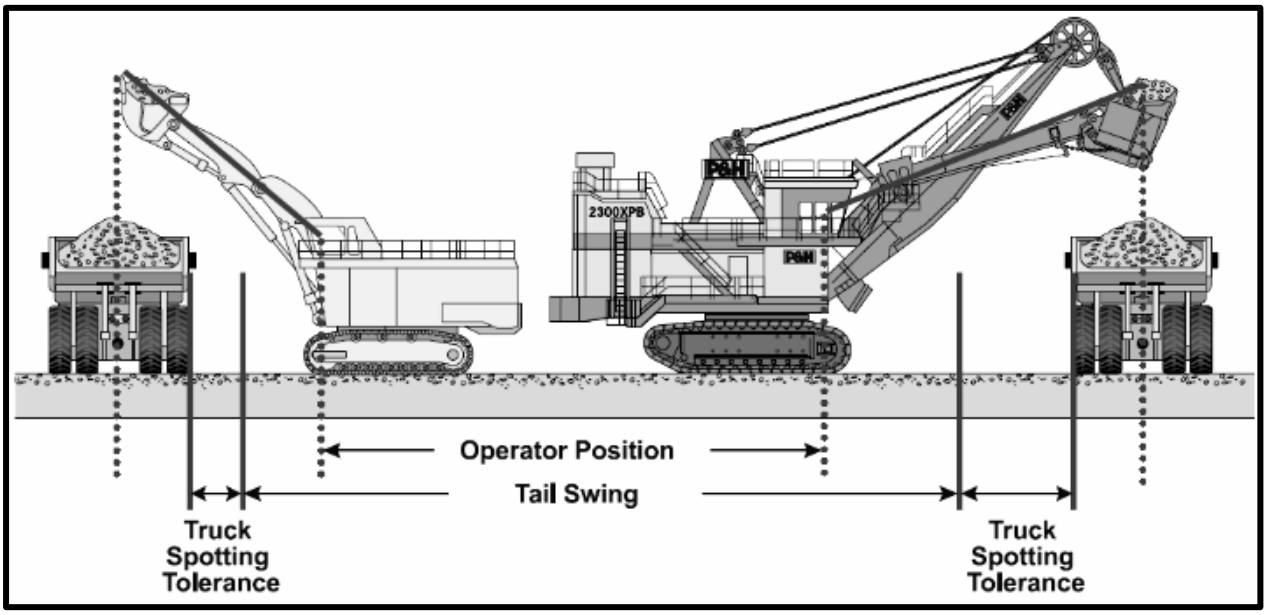

Figure 3-2: Truck and Shovel Mining Method

Construction Phase

The proposed Koede Gold Mine Life of Mine (LoM) is estimated at two (2) years with a possibility for extension (additional 3 years) of the LoM. Construction is expected to commence in the first quarter (Q1) of 2022, whilst the operational phase (production) is scheduled for April (second quarter) 2022.

ITEM	TIMEFRAMES
Fencing of the Mining Area	2 weeks
Preparation of Access Road	1 week
Establishment of ablution facilities	3 weeks
Establishment of Contractor's yard	1 week
Construction of Mine haul roads	1 week
Box-cut development	1 week

Access Roads

Existing farm access road will be used on site. However, haul roads will be developed on site to provide access to the mine workings and office complex. Access to the site is

via a dirt road (gravel) connected to the N4 national road, approximately 5 km north of the project area.

Security and Access Control

A permanent security house and boom gates will be constructed at the mine entrance. The structures will comprise of brick and mortar and will be supplied with electricity from a diesel driven generator.

Water Supply

Process water supply for the operation will sourced from new boreholes to be drilled on-site and will be pumped into a process water reservoir with a capacity of approximately 1 400 m^3 to allow for seven (7) days retention. The water will be used in the carbon in-leach processing plant for gold recovery and dust suppression as well as ablution facilities. However, dust suppression will be conducted as and when necessary.

Potable Water Supply

Potable water required for the proposed mining operation is approximately 40 litres per day (ℓ/day). The water will be used for drinking purposes and will be sourced from local water vendors within Matsulu, Malelane and Nelspruit. The water will be supplied in cooled water dispensers.

Ablution

Ablution facility at the mine will utilize a package sewage treatment plant. All raw sewage from these mobile toilets will be disposed of into the nearest wastewater treatment works within the Magisterial District of Barberton.

Mine Office Complex

Mine office complex will be established on site and will include the following:

- Vehicles and equipment area
- Ablution facility (chemical mobile toilet)
- Mobile office (mobile container)

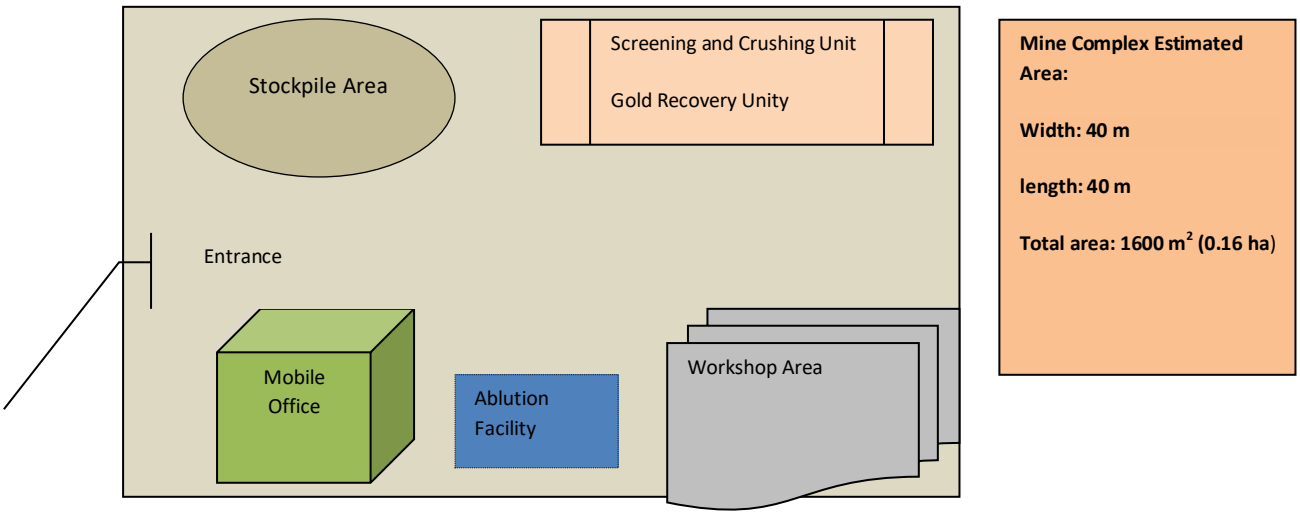

Figure 3-3: Site Layout Plan

Accommodation

No accommodation for workers will be provided on site. Employment will be sourced from nearby residential areas such as Matsulu, Malelane and Nelspruit.

Blasting

No blasting will take place on site.

Operational Phase

- Given the soil profile of the land, the topsoil layer is about 50 mm thick;
- The target gold bearing material will be mined in a box cut method to ensure systematic mining in linear progression to allow for practical concurrent rehabilitation. The box cuts will be developed in phases of 20 m x 20 m each to ensure systematic progression. An excavator will be used to break hard matter and load it into a tipper truck;
- Mined material will be loaded into dump trucks directly from the excavations and hauled to the screening (sieving) plant, where the material will be screened into different mesh sizes and then to the carbon in-leach processing plant and vat leach system for gold recovery;
- The proposed mining operation will employment 20 full-time employees;
- The Run of Mine (RoM) is estimated at 29 000 tonnes per month;

- No industrial or mine waste is generated during the mining process;
- The depth of the mining operations will be an average depth of ±30 metres as only the top layer contains gold bearing soil material will be mined. The total area under excavation will be approximately 4 ha and gold, copper and iron ore will be removed over the total area. Backfilling of the mined-out areas will be conducted with both overburden material then followed by topsoil;
- Only minor repairs are done on site. A PVC lining and drip trays are used during maintenance and accidental spills are cleaned up immediately by removing of the contaminated soil. The small volume of contaminated soil will be disposed of in a registered hazardous landfill facility such as the Holfontein Hazardous Landfill Site.
- Mining and related activities will be conducted 7 days a week with shifts, operating during the week only between 7h30 and 17h00 during normal working hours;
- As part of this phase training of personnel in the implementation of the EMPr will be undertaken and the implementation of the environmental awareness plan as part of the EMPr will be an on-going process.

Decommissioning and Closure Phase

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

- Waste (general and hazardous waste) will be removed as it is created,
- Excavation will be planned so that topography restoration is less complicated, and
- Topsoil can be re-used at shorter interval.
- Site rehabilitation will ensure that the land more valuable and attractive for resale.
- Concurrent rehabilitation will commence with the completion of each box. The material salvaged out of screening (discard) will be used as backfill. Rehabilitation of the site will be done in accordance with a rehabilitation plan.

(i) Listed and specified activities

In terms of the 2014 Environmental Impact Assessment (EIA) Regulations enacted in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (as amended), the proposed Koede Gold Mine will involve activities that fall within the ambits of Government Notice (GN) 983 (08 December 2014). The proposed project will require authorisation from the Department of Mineral Resources and Energy (DMRE) through the Basic Assessment Process outlined in GNR 982.

A Basic Assessment Process (BAR) is an effective planning and decision-making tool, which allows for the identification of potential environmental consequences of a proposed project, and its management through the planning process. The process will involve consultation with interested and affected parties (I &APs) and submit a Basic Assessment and Environmental Management Plan Report to the DMRE.

Table 3—3: Project Listed Activities in terms GNR 983

NAME OF ACTIVITY **(E.g. For prospecting -** drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc **E.g. for mining,-** excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)	**Aerial extent of the Activity** **Ha or m²**	**LISTED ACTIVITY** **Mark with an X where applicable or affected.**	**APPLICABLE LISTING NOTICE** ***(GNR 544, GNR 545 or GNR 546)***
Mining of gold ore including: • Removal of topsoil; • Development of access and haul roads on site; • Temporary stockpiling of extracted run of mine material prior to processing in a carbon in-leach processing plant and vat leach system; • Refuse collection containers; • Screening and crushing plants; • Mobile ablution facilities; • Removal of natural and alien vegetation; • Workshop area; • Waste rock dumps; • Package sewage management system; • Topsoil stockpiles; • Mine office complex.	**5 Ha**	**X**	**Activity 21 of GN 327 (April, 2017)**
Mining of gold ore as well as processing	5 hectares	**X**	**Activity 27 of GN**

of minerals will require the clearance of an area of 1 hectare or more of indigenous vegetation.			**327 (April, 2017)**

(ii) Description of the activities to be undertaken

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

Koede Gold Mine will involve mining of Gold ore (Au) mineral deposits contained within the Barberton supergroup formation. Most of the known occurrences of gold within the BGB have been found localised in the region to the north and north-east of the Barberton, known locally as the James and Sheba Hills, and in the area immediately south-west of Barberton, in the Moodies Hills. Apart from these areas, additional gold concentrations occur along and adjacent to the major strike and faults as well as in a few localities in Swaziland near the granite-greenstone contacts.

Mining will commence with the removal of the first 50 mm of topsoil using an excavator and front-end loader. The topsoil from the first block will then be stored in a topsoil berm on the mining area. Due to the rich source of seeds contained in the topsoil, vegetation will usually establish naturally. However, if self-establishment does not occur, the topsoil stockpile will be seeded to ensure the effective management of topsoil. Mining will involve the use of mechanized earth moving equipment (excavator and front-end loader also known as "truck and shovel") to move the unconsolidated material in bulk. Mining will continue to a depth of approximately ±30 m.

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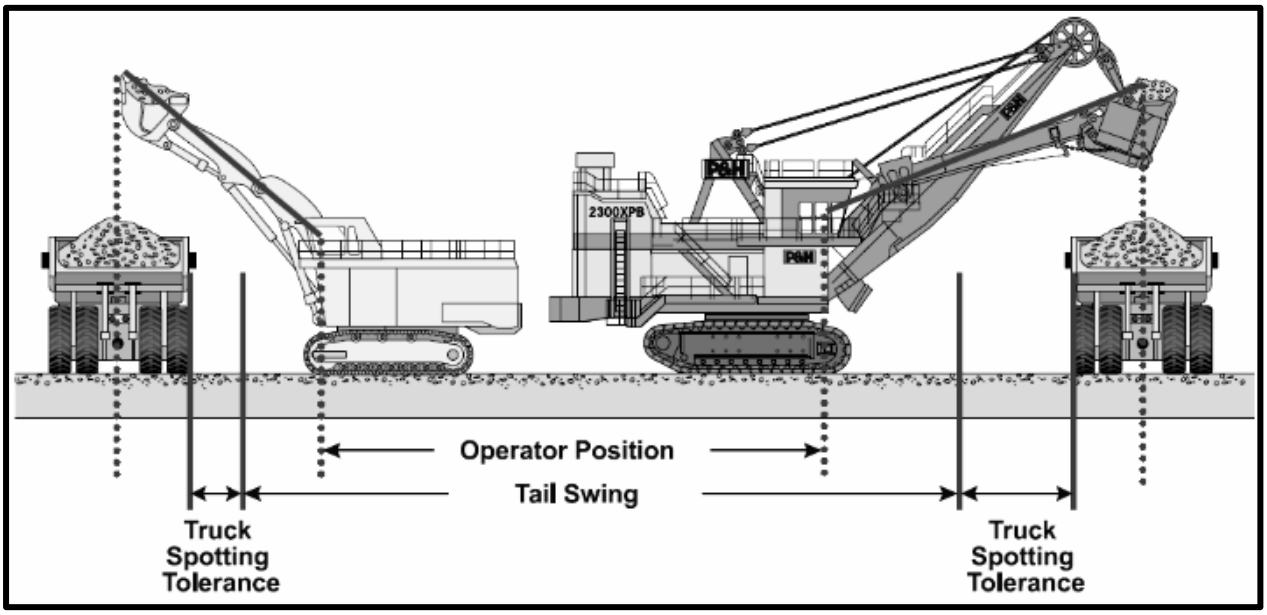

Figure 3-4: Truck and Shovel Mining Method

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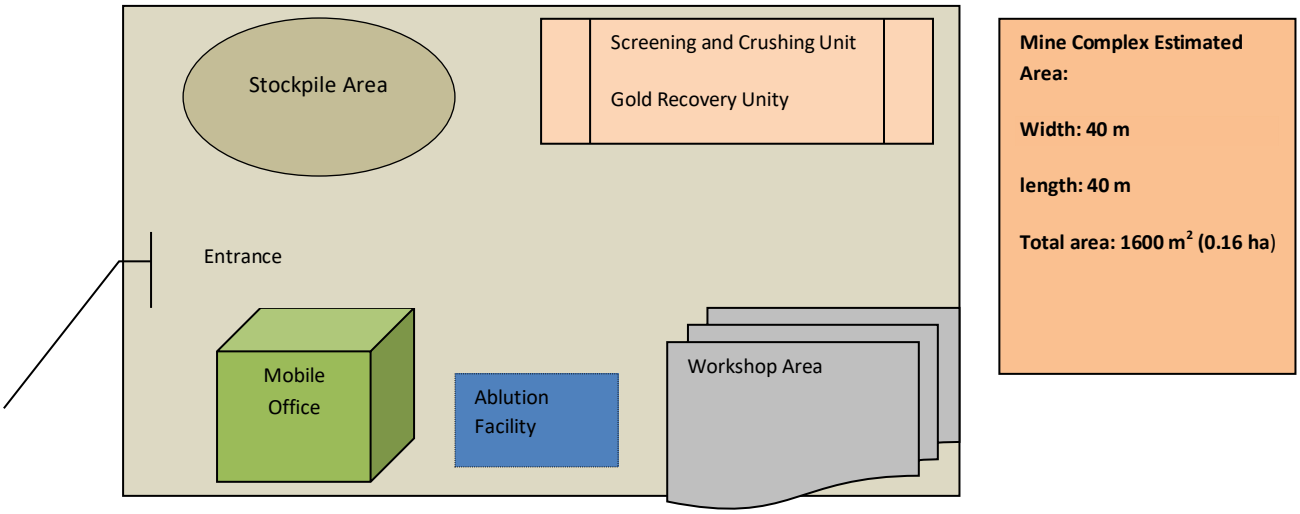

Figure 3-5: Site Layout Plan

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Operational Phase

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- Only minor repairs are done on site. A PVC lining and drip trays are used during maintenance and accidental spills are cleaned up immediately by removing of the contaminated soil. The small volume of contaminated soil will be disposed of in a registered hazardous landfill facility such as the Holfontein Hazardous Landfill Site.
- Mining and related activities will be conducted 7 days a week with shifts, operating during the week only between 7h30 and 17h00 during normal working hours;
- As part of this phase training of personnel in the implementation of the EMPr will be undertaken and the implementation of the environmental awareness plan as part of the EMPr will be an on-going process

Hydrocarbon Storage

During mining on site, limited quantities of diesel fuel, oil, and lubricants will be stored on site. Diesel fuel will be stored in significant quantities in above ground diesel storage tanks with a gross storage capacity of approximately 40 m^3. In the event of a significant hydrocarbon spill, the following procedure is required:

- The source of the spillage shall be isolated
- The spillage must be contained using sand berms, sandbags, pre-made booms, saw dust or absorbent materials.
- The area shall be cordoned off, secured and made safe.
- The incident will be recorded and reported to the Department of Mineral Resources and Energy (DMRE) and Department of Environmental Affairs (DEA) as well as property owners.

- Depending on the nature of and extent of the spill, contaminated soil will be removed and disposed of in a waste deposit receptacle for final disposal at a licensed hazardous landfill site.
- Where relevant, the polluted soil will be treated using absorbent material as well as oil-digestive powders.
- If necessary, oil absorbent sheeting or pads or similar alternatives will be attached to leaky machinery or equipment.
- Material used for the remediation of petrochemical spills must be used according to the product specification and guidance for use.
- Contaminated remediation materials will be carefully removed from the area of the spill so as to prevent further release of hazardous substance to the environment, and stored in adequate containers until appropriate disposal.

Decommissioning and Closure Phase

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

- Waste (general and hazardous waste) will be removed as it is created,
- Excavation will be planned so that topography restoration is less complicated, and
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- Site rehabilitation will ensure that the land more valuable and attractive for resale.
- Concurrent rehabilitation will commence with the completion of each box. The material salvaged out of screening (discard) will be used as backfill. Rehabilitation of the site will be done in accordance with a rehabilitation plan.

e) Policy and Legislative Context

Table 3—4: Policy and Legislative Context

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT
Specific Environmental Management Acts (SEMAs)		
National Legislation		
Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA)	Section 27 and 39 of MPRDA	The conditions and requirements attached to the granting of Mining Permit will apply to the proposed mining operation.
National Environmental Management Act, 1998 (Act No 107 of 1998) as amended (NEMA): Environmental Impact Regulations (2014)	Listed Activity 21 and 27 of Regulation 321 (April, 2017)	The appropriate environmental authorisation will be obtained before proceeding with any mining activities. Measures will be implemented to prevent any pollution that may occur during 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 agreed post closure land use.
National Water Act, 1998 (Act 36 of 1998) (NWA)	**Not applicable**	There are proposed water uses activities falling within the ambit of **section 21 of the National Water Act, 1998 (Act No. 36 of 1998).**

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT
		A water use license is required for this application.
National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004): National Dust Control Regulations (GN 827)	Not applicable	Appropriate dust extractions/ suppression equipment will be a condition imposed on the drill contractor for their drill rigs.
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)(NEMWA) as amended	Waste management on site	The generation of potential waste will be minimised through ensuring that mine employees 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 Heritage Resources Act, 1999 (Act No. 25 of 1999)(NHRA)	Section 38 of NHRA	A heritage case will be opened with the South African Heritage Resources Agency
Constitution of the Republic of South Africa (Bill of Rights), 1996	Chapter 2 section 24	Mining activities shall be conducted in such a manner that significant environmental impacts are avoided, where significant impacts cannot all together be avoided, be minimised and mitigated in order to protect the environmental right of South Africans.

f) Need and desirability of the proposed activities

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

South Africa is known for its abundance of mineral resources. It is estimated to have the world's fifth-largest mining sector in terms of gross domestic product value and its mining companies are key players in the global industry. South African mining and mining real estate remains attractive for development. Mining creates an environment that lead the community to be more involved in the projects and result in more sustainable job creation strategies within the surrounding communities as well as attracting foreign investment.

In addition, the South African economy heavily relies on the mining sector. Mining for gold ore minerals will boost the current struggling national economy. The mining sector has provided more employment opportunities for the citizens in general. The provincial citizens of the Mpumalanga Province will be awarded more employment opportunities. Should the proposed mining operation be authorized, the following economic development activities will result:

- Job creation;
- Development of skills;
- Potential for business opportunities;
- Establishment of bursaries and scholarships; and
- Stimulate economic activities in the local vicinity.

Employment

The proposed mine development will lead to jobs for 20 semi-skilled workers for 2 years of the proposed mine (A mining permit is granted for two years, renewable for another 3 years and cannot extend over 5 ha).

Glittery Resources is committed to the socio-economic empowerment of people who were previously disadvantaged and believes that gender equity is critical to economic growth and wealth creation in South Africa. Furthermore, Glittery Resources y is

committed to creating a workplace in which employees of ability and application can develop rewarding careers at all levels, regardless of their background, race, gender or disability. The mine will therefore advance non-discrimination employment practices and supports the principles of employment, development and advancement of HDSA's. This plan is applicable to all employees who are South African citizens or permanent residents.

Participation of Women in Mining

Glittery Resources will offer women an equal opportunity to participate in all of its operations, and at all levels of responsibility.

- The 10 % target for women in mining will be met through the Employment Equity Plan;
- Female employees will have the opportunity to participate in suitable responsibilities and challenges equal to those afforded to male employees;
- Mentorship programmes will provide equal opportunities for the participation of female candidates;
- The career progression plan will include a women-specific element to ensure that females with potential for progress are considered fully alongside their male counterparts, and are not inadvertently passed over in the promotion process.

Environmental Impact

The impacts on the environment have been evaluated as part of this assessment (basic assessment) of the project. Low to moderate impacts are expected in terms of air quality, noise and visual character. It is the role of the independent environmental practitioner to assess the impact of the development project on the environment, assess the benefit / disadvantage of the project to the people of South Africa and to provide clear mitigation measures and recommendations under which conditions such a project could be a sound development project in the best interest of South Africa (including the economy, the environment and its people). The environmental impacts and economical gains need to be carefully weighed in order to assess whether the proposed project can contribute to a better South Africa for all.

Rehabilitation Capacity

The project applicant has indicated and demonstrated a willingness and ability to make financial provision for rehabilitation of the project area.

Recommendation

Period for which the environmental authorisation is required is 5 years.

g) Motivation for the overall preferred site, activities, and technology alternative

Koede Gold Mine will involve mining of Gold ore (Au) mineral deposits contained within the Barberton supergroup geological formation. According to Council for Geoscience (2009), most of the known occurrences of gold within the BGB have been found localised in the region to the north and north-east of the Barberton, known locally as the James and Sheba Hills, and in the area immediately south-west of Barberton, in the Moodies Hills. Apart from these areas, additional gold concentrations occur along and adjacent to the major strike and faults as well as in a few localities in Swaziland near the granite-greenstone contacts.

The site was selected as it contains good concentration of gold bearing soil material and is located in a convenient position in close proximity to transport routes. The layout and technology of this mining project has been determined by the shape, position and orientation of the mineral resource. Refer to the Site Plan above. The operational approach is practical and based on best practice to ensure a phased approach of mining followed by rehabilitation in sequential stages.

- The preferred and only location for gold ore mining activity is on the earmarked section of the application area- A portion of portion 2 of the farm Koede 218 JU;
- The preferred and only activity is the mining of gold ore;
- The preferred mining method and only technology for mineral processing is truck and shovel (excavators) opencast mining method and carbon in-leach processing plant (including vat leach gold recovery system), respectively.

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.

Siting or Site Selection

The proposed mining operation will not be conducted in the river bed or within a 500 m from any wetland, as these areas are considered to be more sensitive. There are no rivers, dams or any other water resources features on site.

Access Roads

The access criteria considered by the applicant include:

- The dirt road has to be less than 5 km of dirt / un-surfaced road to contend with; and
- A short access road was preferable.

Alternatives of Land Ownership

The alternatives considered were:

- Find useable land (a viable mineral resource) owned by another party (entering into a royalty agreement);
- Find useable land (a viable mineral resource) owned by another person/government or organisation and not living on the property for a long time (leasing the land)
- Find a suitable site (a viable mineral resource) on property owned by the applicant.
- During the operational phase of the mine, the landowners are unable to have free access across the property. This could continue for the duration of the permit and is not convenient to landowners.

Alternative considered

- The alternative considered was to find useable land (a viable mineral resources) owned by another entity and enter into a long-term lease agreement. Portion 2 of the farm Koedoe 218 JU is privately owned by Chamotte Holdings (Pty) Ltd (T89822/2007).

Alternative to Processing

When the applicant was asked to consider processing there were two options for consideration, a large scale expansive mining operation or a small mine with a small footprint. The alternatives that informed the final decision were:

- Do not establish a processing plant on the site and process the gold bearing soil material off-site.
- Develop a small carbon in-leach processing plant or vat leach system for gold recovery.
- Use a small fleet so that the impact on roads is smaller.

It was ultimately decided to use a small fleet to conduct mining and develop a small carbon in-leach processing plant or vat leach system for gold recovery.

No "go" Alternative or No to mine the site

The alternative of not establishing this project was considered by the applicant. There will be no impact on the noise levels and the dust generation will be limited to the land occupiers frequenting the property.

The business would need to look at opportunities to find gold ore reserves elsewhere. Employment opportunities will not be generated on the site. The land would remain fallow and not economically viable (as it is too small for crop farming or commercial animal husbandry). The national assets (in this case, gold ore), that will not be made available for economic benefit to the South African people, will remain on the property. The ecological services will not be temporarily altered by mining and the social benefits will not be obtained from the creation of 20 employment opportunities for 5 years.

h) Full description of the process followed to reach the proposed preferred alternatives within the site

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

i) Details of the development footprint alternatives considered

(With reference to the site plan provided as Appendix 4 and the location of the individual activities on site, provide details of the alternatives considered with respect to:)

(a) The property on which or location where it is proposed to undertake the activity;

The proposed Koede Gold Mine is located on portion 2 of the farm Koede 218 JU. This property falls within the Barberton supergroup (Barberton greenstone) geological formation. According to Council for Geoscience (2009), most of the known occurrences of gold within the BGB have been found localised in the region to the north and north-east of the Barberton, known locally as the James and Sheba Hills, and in the area immediately south-west of Barberton, in the Moodies Hills. Apart from these areas, additional gold concentrations occur along and adjacent to the major strike and faults as well as in a few localities in Swaziland near the granite-greenstone contacts.

The property (portion 2 of the farm Koede 218 JU) is owned and managed by Chamotte Holdings (Pty) Ltd (T89822/2007). No record of land claims has been made on this property at this stage. The property deed enquiry documents are attached as Annexure B.

Table 3—5: Property Details

Property Name	Property Number	Registration Division	Property Portion	Extent (Hectares)	21-SG Code
Koede	218	JU	2	5 Ha	T0JU000000000021800002

Please note: Mining will be limited to portion 2 of the farm Koede 218 JU.

The development of support infrastructure and mining activities take into consideration the following measures:

- Infrastructure such as houses (including lodges, fences, electricity pylons, gates) will be avoided;
- No mining activities will take place at horizontal distance of 500 m from a wetland;
- No mining activities will take place at horizontal distance of 100 m from any infrastructure or water bodies;
- Any boreholes, sewer pipelines, etc will be marked-off prior to site establishment and avoided during mining operation;
- New access and haul roads will be less than 5 km in extent.

(b) The type of activity to be undertaken

Mining will involve the use of mechanized earth moving equipment (an excavator and front-end loader) to move the unconsolidated material in bulk. The proposed mining area will be less than 5 hectares. Because of the small scale and size of the proposed mining area, no other mining method will be feasible.

(c) The design or layout of the activity

Koede Gold Mine will involve mining of Gold ore (Au) mineral deposits contained within the Barberton supergroup geological formation. According to Council for Geoscience (2009), most of the known occurrences of gold within the BGB have been found localised in the region to the north and north-east of the Barberton, known locally as the James and Sheba Hills, and in the area immediately south-west of Barberton, in the Moodies Hills. Apart from these areas, additional gold concentrations occur along and adjacent to the major strike and faults as well as in a few localities in Swaziland near the granite-greenstone contacts.

The site was selected as it contains good concentration of gold bearing soil material and is located in a convenient position in close proximity to transport routes. The layout

and technology of this mining project has been determined by the shape, position and orientation of the mineral resource. Refer to the Site Plan above. The operational approach is practical and based on best practice to ensure a phased approach of mining followed by rehabilitation in sequential stages.

- The preferred and only location for gold ore mining activity is on the earmarked section of the application area- A portion of portion 2 of the farm Koede 218 JU;
- The preferred and only activity is the mining of gold ore;
- The preferred mining method and only technology for mineral processing is truck and shovel (excavators) opencast mining method and carbon in-leach processing plant (including vat leach gold recovery system), respectively.

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.

(d) The technology to be used in the activity

Mining will involve the use of mechanized earth moving equipment (an excavator and front-end loader- truck and shovel opencast mining method) to move the unconsolidated Run of Mine material (RoM). Due to the small scale mining activity other technologies have not been considered as it is not feasible for the small scale of the proposed mine. The topsoil will be removed and stockpiled for rehabilitation.

(e) The operational aspects of the activity; and

Operational Phase

- Given the soil profile of the land, the topsoil layer is about 50 mm thick;
- The target gold, copper and iron ore material will be mined in a box cut method to ensure systematic mining in linear progression to allow for practical concurrent rehabilitation. The box cuts will be developed in phases of 20 m x 20 m each to ensure systematic progression. An excavator will be used to break hard matter and load it into a tipper truck;

- Mined material will be loaded into dump trucks directly from the excavations and hauled to the screening (sieving) plant, where the material will be screened into different mesh sizes and then to the carbon in-leach processing plant for gold recovery;
- The proposed mining operation will employment 20 full-time employees;
- The Run of Mine (RoM) is estimated at 29 000 tonnes per month;
- No industrial or mine waste is generated during the mining process;
- The depth of the mining operations will be an average depth of ±30 metres as only the top layer contains gold bearing soil material will be mined. The total area under excavation will be approximately 4 ha and gold, copper and iron ore will be removed over the total area. Backfilling of the mined-out areas will be conducted with both overburden material then followed by topsoil;
- Only minor repairs are done on site. A PVC lining and drip trays are used during maintenance and accidental spills are cleaned up immediately by removing of the contaminated soil. The small volume of contaminated soil will be disposed of in a registered hazardous landfill facility such as the Holfontein Hazardous Landfill Site.
- Mining and related activities will be conducted 7 days a week with shifts, operating during the week only between 7h30 and 17h00 during normal working hours;
- As part of this phase training of personnel in the implementation of the EMPr will be undertaken and the implementation of the environmental awareness plan as part of the EMPr will be an on-going process.

(f) The option of not implementing the activity.

If the mining permit is not approved, the opportunity to utilize these reserves will be lost as well as valuable economic and socio-economic opportunities. Employment opportunities for 20 people will be lost and illegal mining of gold ore (including other minerals) may be trigger due to lack of job opportunities.

ii) Details of the Public Participation Process Followed

(Describe the process undertaken to consult interested and affected parties including public meetings and one on one consultation. NB the affected parties must be specifically consulted regardless of whether or not they attended public meetings. (Information to be provided to affected parties must include sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land.)

The public participation process (PPP), also known as the Stakeholders Engagement Process (SEP) is a fundamental component of the Environmental Impact Regulation (2014). Not only is public participation a statutory requirement in terms of Section 56 of the NEMA, but a process which is designed to lead a joint effort by interested and affected parties to evaluate all aspects and issues of the proposed development, with the ultimate goal of improving the project by minimizing adverse effects and maximizing the benefits of the project. Public participation is designed to provide sufficient and accessible information to Interested and Affected Parties (I&APs) in an objective manner to assist them to:

- Be acquainted with the proposed mining permit application;
- Raise issues of concern and make suggestions for alternatives and enhanced benefits;
- Contribute local knowledge;
- To obtain stakeholder views and concerns;
- Verify and validate that their issues have been captured and considered in the Basic Assessment Report

Regulation 2(4)f under the principles of NEMA further states that: *the participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantage persons must be ensured.*

The following media of communication with interested and affected parties (I & APs) were used:

- A newspaper advert will be published on the 23rd of June 2021 in the local newspaper "Hazyview Herald Newspaper", giving notice to I & APs of the applicant`s intention to prospect the area as well as inviting all affected parties to a meeting where the applicant would provide full details of the project. **The Hazyview Herald** newspaper is one of the most popular newspapers in the Barberton, Mpumalanga area. The Barberton Times is published in English and Afrikaans and is distributed in areas including Malelani, Barberton, Kaapmuiden, Lows Creek, Nelspruit and Badplaas;
- Site notices written in English (A3 sized) were placed in strategic areas such as libraries, hospitals, municipality, community halls, police stations, local supermarkets, and on the farm Koede 218 JU;
- E-mail and telephonic communication with I & APs;
- Comment and registration sheet: I & APs were requested to provide written comments, concerns and inputs that would be consolidated into the BAR;
- Questionnaires: Property owners in particular were provided with an environmental aspect questionnaire to complete to assist in identifying features on their respective farms that may require protection or special attention;
- The public meeting with interested and affected parties will be held as follows:
  Venue: **Matsulu Community Hall, 45 Louis Matsulu Civic Centre, Madiba Drive, Matsulu**
  Date: **17th July 2021 (Saturday)** Time: **11:00 am to 13:00 pm**
- A register of I & APs was kept and as such the following information was distributed to them:
    - Background Information Document (BID). The BID is comprised of the following information:
        - The description of the land concerned;
        - The location of the project;
        - The minerals applied for;
        - Timeframes for submission of reports to the DMRE;
        - Request to target audience to register as I & APs;

- Contact details of the applicant and EAP

- Prospecting Works Programme
- The draft Basic Assessment Report and Environmental Management Plan (BAR & EMPr) for the proposed project was made available for public review and comment from the **1st of July 2021** to the **2nd August 2021** at the following places:

  -**Venue 1: Matsulu Community Library, 45 Louis Matsulu Civic Centre, Madiba Drive, Matsulu**

  -**Online at:** www.stenvironmnetal.co.za

Other Interested and Affected Parties

It is important that I & APs represent all relevant sectors of the society and various relevant organs of state who work together to make better decisions. A stakeholder database has been compiled for this project. The I & APs currently identified for the proposed project include the following categories (for full list of I & APs refer to **Appendix C**):

- Property/land owners- Chamotte Holdings (Pty) Ltd
  - Nkomazi Local Municipality (T15578/2015);
  - Kalanyandza Community Trust (T4515/2012);
- Relevant authority including the following:
  - Department of Water and Sanitation;
  - Department of Environmental Affairs;
  - Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs;
  - Mpumalanga Department of Public Works, Roads and Transport;
  - Nkomazi Local Municipality;
  - Ehlanzeni District Municipality;
  - Mpumalanga Department of Economic Development and Tourism;
  - Regional Land Claims Commissioner;

- South African Heritage Resources Agency (SAHRA);
- Eskom

iii) Summary of issues raised by I &APs

This section will be completed after the Stakeholder Consultation process *(Complete the table summarising comments and issues raised, and reaction to those responses)*

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
No comments, suggestions, or issues have been received to date.				
Landowner/s				
No comments, suggestions, or issues have been received to date.				
Lawful occupier/s of the land				
No comments, suggestions, or issues have been received to date.				
Landowners or lawful occupiers on adjacent proper ties				
No comments, suggestions, or issues have been received to date.				
Public Participation Meeting				
Public consultation meeting with interested and affected parties will be held on the 11th of December 2021 at the Refilwe Community Hall.				
Municipal Councillors				
No comments, suggestions, or issues have been received to date.				
Municipality				
No comments, suggestions, or issues have been received to date.				
Organs of state (Responsible for infrastructure that may be affected Roads Department)				
No comments, suggestions, or issues have been received to date.				
Eskom, Telkom,				
No comments, suggestions, or issues have been received to date.				
Communities				
No comments, suggestions, or issues have been received to date.				
Department of Land Affairs				
No comments, suggestions, or issues have been received to date.				

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
Traditional Leaders				
No comments, suggestions, or issues have been received to date.				
Department of Environmental Affairs				
No comments, suggestions, or issues have been received to date.				
Other Competent Authorities affected				
No comments, suggestions, or issues have been received to date.				
Other Affected Parties				
No comments, suggestions, or issues have been received to date.				
Interested Parties				
No comments, suggestions, or issues have been received to date.				

iv) The Environmental attributes associated with the alternatives.

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

1) Baseline Environment

As discussed in the previous section, gold mineralization has been known to occur within the Barberton Supergroup Geological Formation. The area applied for is located close to the historically known Consort Gold Mine located approximately 20 km north-east from the project area. Since the beginning of gold production in 1884, the New Consort Gold Mine has produced more than 2.1 million ounces of Au (Anhaeusser 1986; Roelf le Roux, 2005, personal communication). The mine workings are located in the immediate hanging wall of the basal granitoid– greenstone contact in the eastern part of the Jamestown schist belt. Gold mineralization is mainly structurally controlled and is closely associated with the so-called Consort Bar, a relatively thin (average thickness c. 4 m), highly silicified mylonitic shear zone that separates amphibolites and ultramafic schists of the Onverwacht Group from the overlying metapelites and metapsammites of the Fig Tree Group (Anhaeusser 1986; Voges 1986). Immediate gold mining operations in the vicinity of the project area include Sheba Gold Mine and Fairview Gold Mine.

Glittery Resources therefore applied for a Mining Permit on portion 2 of the farm Koede 218 JU in order to mine gold bearing material associated with the Barberton Supergroup Geological Formation. No alternatives are available that will have an impact on different settings than the environment discussed below.

a) Type of environment affected by the proposed activity.

(its current geographical, physical, biological, socio- economic, and cultural character).

1.1 Climate

The proposed project area lies within the summer rainfall region of South Africa and thus approximately 90 percent of the Mean Annual Precipitation (MAP) occurs within the six month period between October and March, with only five percent of the MAP occurring between April and September. The vicinity of the project area receives a mean annual precipitation of approximately 729 mm. The figure below indicates that

monthly rainfall trend is in line with the seasonal rainfall distribution with the summer months having the highest rainfall intensity (October to March).

The monthly distribution of average daily maximum temperatures shows that the average mid-day temperatures for Barberton range from 22°C in June and July to 29°C from December to February as shown in the figure below. The region is at its coolest during June and July when the mercury drops to 7°C. Relative humidity is lowest during autumn and winter and highest during spring and summer.

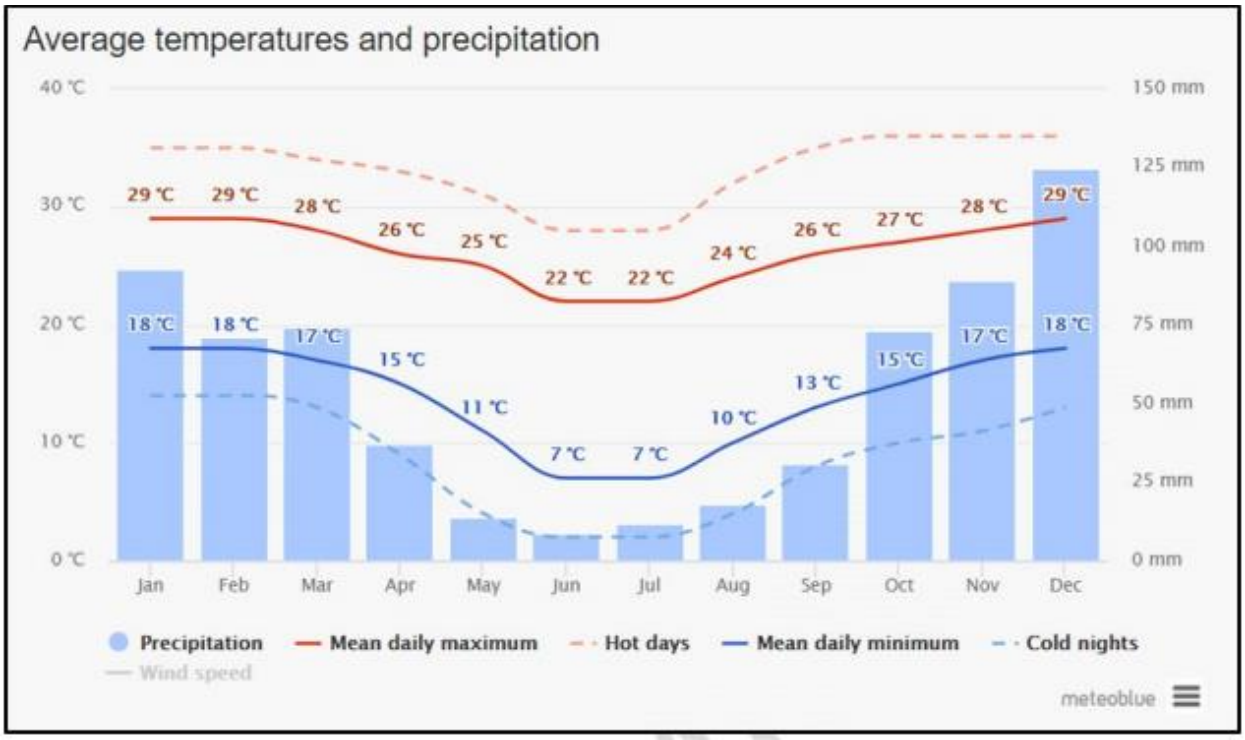


Table 3—6: Average Temperatures (°C) and MAP (mm) for Barberton

1.2 Evaporation

According to the Water Research Commission (WRC, 2005), the mean annual evaporation for X24D (Crocodile River Catchment) Quaternary Catchment ranges between 1300 mm to 1400 mm, measured from an S-Pan.

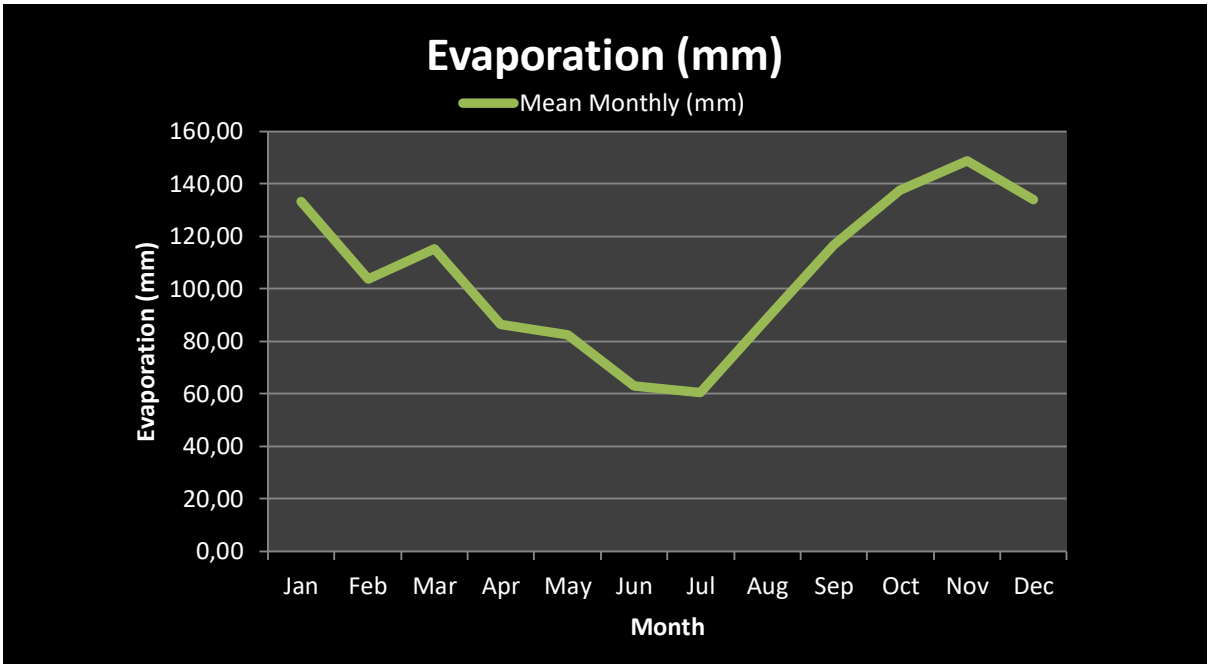


Figure 3-6: Average Monthly Evaporation

1.3 Topography and Geography

The project site lies on the eastern and north-eastern parts of Mpumalanga Province in the Magisterial District of Barberton. Mpumalanga Province is bordered by Limpopo Province to the north, Mozambique on the north-eastern parts, to the east and southeast by Swaziland, KwaZulu-Natal Province and Free State Province on the south and south-western boundary and lastly Gauteng Province to the west.

The study area falls within ward 30 of Nkomazi Local Municipality which is under Ehlanzeni District Municipality. The farm Koede 218 JU is located approximately 50 km north-east from the town of Barberton. The project site covers an aerial extent of approximately 5 hectares and lies at geographical coordinates -25.554575° south and 31.467531° east. Access to the site is via a dirt road (gravel) connected to the N4 national road, approximately 5 km north of the project area.

In terms of catchment basis, the application area falls within Quaternary Catchment X24D (Crocodile River Catchment) of the Inkomati water management area (WMA).

1.4 Land Uses

Portion 2 of the farm Koede 218 JU is comprised of open spaces characterized by concentric belts of rocky ridges and mountains interspersed with undulating valleys.

1.5 Wind

The prevailing wind field recorded for Barberton area are represented as wind rose plots indicating the predominant wind direction and the frequency distribution of wind velocities for the proposed project area. Wind fields observed are characterized with winds occurring predominantly from the east-north-easterly and north-easterly sectors as shown in the figure below. Wind speeds are generally slow to moderate and frequently remain within the range 1-5 m/s (World Weather Online, 2018).

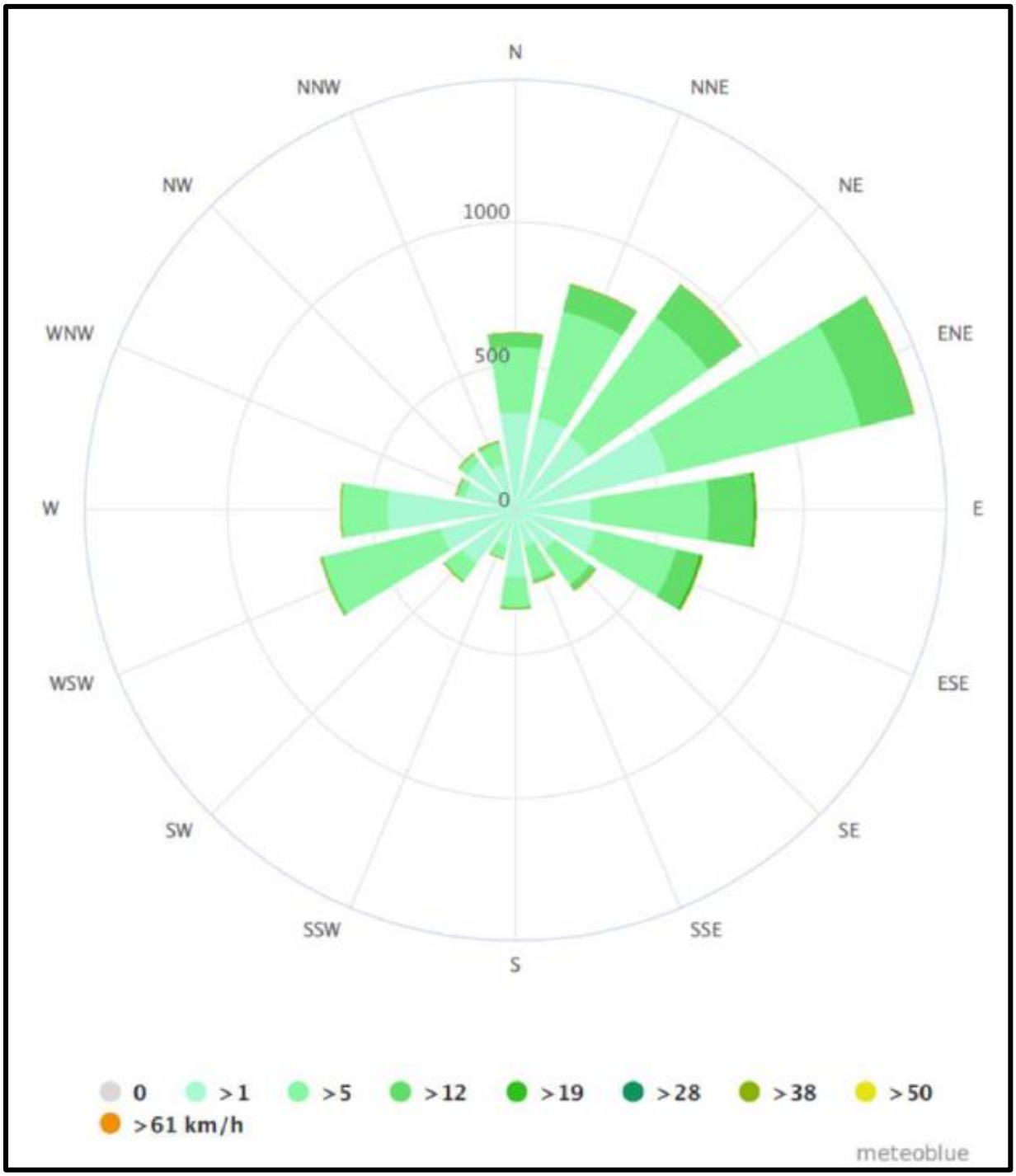


Figure 3-7: Wind Rose for Barberton Magisterial District

(**Source**: Meteoblue: Barberton, Mpumalanga Province 2018)

1.6 Biodiversity

1.6.1 Vegetation

The Barberton Montane Grasslands is the dominant vegetation type covering 90% of the project properties. It is distributed in the high elevation (760–1640m) within the application area and mountainous areas surrounding Barberton into the Mountainlands Nature Reserve, Songimvelo Nature Reserve and the Nkomazi Wilderness. The vegetation is characterised by short rocky grassland which gradually becomes woodland along the lower slopes. This vegetation type is a mosaic of short grassland and rocky shrubland with Burchellia bubalina, Helichrysum reflexum, Psychotria capensis and Aloe albida.

The Barberton Montane Grasslands is classified as Vulnerable by Mucina et al., 2006, as although it is relatively well conserved (26%) it has been heavily transformed by timber plantations (40%) (Mucina, et al., 2006).

Important Taxa within the Barberton Montane Grassland

- **Small Trees:** *Faurea galpinii, F. rochetiana, F. saligna, Rapanea melanophloeos.*
- **Tree Fern:** *Cyathea dregei;*
- **Tall Shrubs:** *Cephalanthus natalensis (d), Euryops brevipapposus, Gerrardina foliosa, Protea gaguedi. Low Shrubs: Phymaspermum athanasioides (d), Clutia pulchella, Erica cerinthoides, E. drakensbergensis, E. woodii, Helichrysum odoratissimum, Heteromorpha involucrata, Leucospermum gerrardii, Protea simplex, Psoralea glabra, Schistostephium rotundifolium, Siphonoglossa linifolia.*
- **Succulent Shrub:** *Aloe vryheidensis;*
- **Graminoids:** *Alloteropsis semialata subsp. eckloniana (d), Andropogon schirensis (d), Ctenium concinnum (d), Eragrostis racemosa (d), Eulalia villosa (d), Loudetia simplex (d), Monocymbium ceresiiforme (d), Rendlia altera (d), Themeda triandra (d), Brachiaria serrata, Brachypodium flexum, Digitaria monodactyla, Diheteropogon amplectens, Hyparrhenia hirta, Ischyrolepis schoenoides, Melinis nerviglumis, Panicum ecklonii, P. natalense, Pentaschistis natalensis, Setaria nigrirostris, Trachypogon spicatus, Tristachya leucothrix;*

- **Herbs:** Acalypha caperonioides, A. glandulifolia, Euryops laxus, Helichrysum adenocarpum, H. nudifolium var. oxyphyllum, H. pallidum, Selago procera, Xerophyta retinervis;
- **Geophytic Herbs:** *Agapanthus inapertus subsp. intermedius, Cheilanthes hirta, Eucomis montana, Haemanthus montanus, Ledebouria sandersonii, Merwilla natalensis, Satyrium cristatum.*

Biogeographically Important Taxa within the Barberton Montane Grassland

- **Small Trees:** *Encephalartos paucidentatus, Faurea galpinii, Protea comptonii.*
- **Tall Shrub:** *Tricalysia capensis var. galpinii;*
- **Low Shrubs:** *Asparagus rigidus, Helichrysum milleri, H. mimetes, H. reflexum, Hemizygia parvifolia, Heteromorpha pubescens, Kotschya parvifolia, Melhania randii, Protea parvula, Syncolostemon eriocephalus;*
- **Succulent Shrubs:** *Aloe chortolirioides var. chortolirioides, A. suprafoliata;*
- **Herbs:** *Senecio rhyncholaenus (d), Hemizygia foliosa, H. modesta, H. thorncroftii, H. transvaalensis, Inezia integrifolia, Monsonia transvaalensis, Pearsonia aristata, Phymaspermum argenteum, Selago stewartii, S. villosa, Streptocarpus galpinii, Thorncroftia longiflora;*
- **Geophytic Herbs:** *Agapanthus inapertus subsp. hollandii, Aspidonepsis shebae, Cyrtanthus thorncroftii, Gladiolus varius, Watsonia occulta, W. watsonioides;*
- **Succulent Herbs:** *Aloe craibii, Kleinia galpinii;*

Endemic Taxa Small Trees within the Barberton Montane Grassland

- **Small Trees:** *Encephalartos heenanii, Protea caffra subsp. falcata, P. roupelliae subsp. Hamiltonii;*
- **Tall Shrub:** *Tinnea barbata;*
- **Herbs:** *Euryops discoideus, Helichrysum calocephalum, Hemizygia stalmansii, Holothrix culveri, Streptocarpus pogonites, Thorncroftia thorncroftii;*
- **Geophytic Herb:** *Disa intermedia;*
- **Succulent Herb:** *Aloe albida.*

1.7 Soil Formation

Soils within the project area include red-yellow apedal, freely drained and yellow and red soils and lithocutanic, rocky soils. Soils are generally well drained and the texture ranges from sandy loam to clayey.

1.8 Fauna Species of Conservation Importance

The highly heterogeneous topography, geology, climate and vegetation provide a wide range of different habitats for both fauna and flora species to occur in. Popular field guides, red data species books and unpublished articles were consulted to estimate the number of potential species occurring within the Barberton Magisterial District within each of the major taxa groups, and to determine which species are listed as Red Data species. It is estimated that Barberton District holds more than 1500 plant species, 27 amphibian species, 415 bird species, 134 mammal species, 23 fish species and 106 reptile species. This does not include the invertebrate and fungal species which occur within the area. The following sections provide a list of the Red Data species found within each of the major taxonomic groups within the Barberton Magisterial District.

Amphibians

From the species distribution maps published in the "Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland" it is estimated that the Barberton area contains approximately 27 amphibian species (Minter *et al.*, 2004). Of these two, namely the Natal Ghost Frog (*Heleophryne natalensis*) and the Yellow-striped Reed Frog (*Hyperolius semidiscus*) have been listed as Vulnerable (VU A2c D2) by the MTPA (Emery *et al.*, 2002). They are not however listed as a conservation priority by Minter et.al. (2004).

Birds

It is estimated from the species distribution maps found in the "The Atlas of Southern African Birds" Vol 1 and 2 (Harrison *et al.*, 1997) that more than 415 bird species can be found within the Barberton Magisterial District. Of these 34 are Red Data species, one is

listed as Critically Endangered, two as Endangered, 18 as Vulnerable and 13 as Near Threatened (Barnes, 2000) as shown in the tabulation below.

Table 3—7: Red Data Bird Species found within the vicinity of the project area

Common Name	Scientific Name	Conservation Status
Blue Swallow	*Hirundo atrocaerulea*	Critically Endangered
Saddle-billed Stork	*Ephippiorhynchus senegalensis*	Endangered
Black-rumped Buttonquail	*Turnix nanus*	Endangered
White-backed Night-Heron	*Gorsachius leuconotus*	Vulnerable
Southern Bald Ibis	*Geronticus calvus*	Vulnerable
Cape Vulture	*Gyps coprotheres*	Vulnerable
White-backed Vulture	*Gyps africanus*	Vulnerable
Lappet-faced Vulture	*Aegypius tracheliotos*	Vulnerable
White-headed Vulture	*Aegypius occipitalis*	Vulnerable
Tawny Eagle	*Aquila rapax*	Vulnerable
Martial Eagle	*Polemaetus bellicosus*	Vulnerable
Bateleur	*Terathopius ecaudatus*	Vulnerable
African Marsh-Harrier	*Circus ranivorus*	Vulnerable
Lesser Kestrel	*Falco naumanni*	Vulnerable
Blue Crane	*Anthropoides paradiseus*	Vulnerable
African Finfoot	*Podica senegalensis*	Vulnerable
Denham"s Bustard	*Neotis denhami*	Vulnerable
White-bellied Korhaan	*Eupodotis senegalensis*	Vulnerable
African Grass-Owl	*Tyto capensis*	Vulnerable
Southern Ground-Hornbill	*Bucorvus leadbeateri*	Vulnerable
Yellow-breasted Pipit	*Anthus chloris*	Vulnerable
Black Stork	*Ciconia nigra*	Near Threatened
Yellowbilled Stork	*Mycteria ibis*	Near Threatened
Secretarybird	*Sagittarius serpentarius*	Near Threatened
Ayres"s Hawk-Eagle	*Aquila ayresii*	Near Threatened

Common Name	Scientific Name	Conservation Status
Half-collared Kingfisher	*Alcedo semitorquata*	Near Threatened
Bat Hawk	*Macheiramphus alcinus*	Near Threatened
Peregrine Falcon	*Falco peregrinus minor*	Near Threatened
Lanner Falcon	*Falco biarmicus*	Near Threatened
Black-bellied Bustard	*Lissotis melanogaster*	Near Threatened
Bush Blackcap	*Lioptilus nigricapillus*	Near Threatened
Orange Ground-Thrush	*Zoothera gurneyi*	Near Threatened
Broadtailed Warbler	*Schoenicola brevirostris*	Near Threatened
Red-billed Oxpecker	*Buphagus erythrorhynchus*	Near Threatened

Mammals

From the distribution maps published in the "Red Data book of the Mammals of South Africa: Conservation Assessment" (Friedmann and Daly, 2004) it was estimated that there are approximately 134 mammal species that may occur within the Barberton Magisterial District. Of these one is listed as Critically Endangered, three as Endangered, one as Vulnerable, 15 as Near Threatened and 20 as Data Deficient as shown in the tabulation below.

Table 3—8: Red Data Mammal species found within the vicinity of the project area

Common Name	Scientific Name	Conservation Status
Short-eared Trident Bat	*Cloetis percivali*	Critically Endangered
Tsessebe	*Damaliscus lunatus lunatus*	Endangered
Oribi	*Ourebia ourebi*	Endangered
Samango Monkey	*Cercopithecus mitis labiatus*	Endangered
Pangolin	*Manis temminckii*	Vulnerable
Serval	*Felis serval*	Near Threatened
Brown Hyaena	*Parahyaena brunnea*	Near Threatened
Highveld Golden Mole	*Amblysomus septentrionalis*	Near Threatened
Lesser Long-fingered Bat	*Miniopterus fraterculus*	Near Threatened

Common Name	Scientific Name	Conservation Status
Schreibers" Long-fingered Bat	*Minopterus schreibersii*	Near Threatened
Temminck"s Hairy Bat	*Myotis tricolor*	Near Threatened
Rusty Bat	*Pipistrellus rusticus*	Near Threatened
Peak-saddle Horseshoe Bat	*Rhinolophus blasii*	Near Threatened
Geoffroy"s Horseshoe Bat	*Rhinolophus clivosus*	Near Threatened
Darling"s Horseshoe Bat	*Rhinolophus darlingi*	Near Threatened
Lander"s Horseshoe Bat	*Rhinolophus landeri*	Near Threatened
Water Rat	*Dasymys incomtus*	Near Threatened
Side-striped Jackal	*Canis adustus*	Near Threatened
Spotted-necked Otter	*Lutra maculicollis*	Near Threatened
Honey Badger	*Mellivora capensis*	Near Threatened
Gambian Epauletted Fruit Bat	*Epomophorus gambianus crypturus*	Data Deficient
Sundevall"s Leaf-nosed Bat	*Hipposideros caffer*	Data Deficient
Hottentot"s Golden Mole	*Amblysomus hottertotus*	Data Deficient
Woodland Mouse	*Grammomys dolichurus*	Data Deficient
Rock Dormouse	*Graphiurus platyops*	Data Deficient
Single-striped Mouse	*Lemniscomys rosalia*	Data Deficient
Bushveld Gerbil	*Tatera leucogaster*	Data Deficient
African weasel	*Poecilogale albinucha*	Data Deficient
Meller"s Mongoose	*Rhynchogale melleri*	Data Deficient
Reddish-grey Musk Shrew	*Crocidura cyanea*	Data Deficient
Greater Musk Shrew	*Crocidura flavescens*	Data Deficient
Tiny Musk Shrew	*Crocidura fuscomurina*	Data Deficient
Lesser Red Musk Shrew	*Crocidura hirta*	Data Deficient
Swamp Musk Shrew	*Crocidura mariquensis*	Data Deficient
Lesser Grey-brown Musk	*Crocidura silacea*	Data Deficient

Common Name	Scientific Name	Conservation Status
Shrew		
Dark-footed Forest Shrew	*Myosorex cafer*	Data Deficient
Forest Shrew	*Myosorex varius*	Data Deficient
Least Dwarf Shrew	*Suncus infinitesimus*	Data Deficient
Greater Dwarf Shrew	*Suncus lixus*	Data Deficient
Lesser Dwarf Shrew	*Suncus varilla*	Data Deficient

Red Data Fish Species

A total of 23 fish species have been recorded within the nearby nature reserves such as Songimvelo Nature Reserve and Barberton Nature Reserve. Four of the fish species known to occur within the Barberton District are listed as Red Data species, one as Critically Endangered, one as Vulnerable and two as Near Threatened as shown in the tabulation below.

Table 3—9: Red Data Fish species found within the vicinity of the project area

Common Name	Scientific Name	Conservation Status
Rosefin Barb	*Barbus argenteus*	Near Threatened
Barred minnow	*Opsaridium peringeuyi*	Near Threatened
Incomati Rock Catlet	*Chiloglanis bifurcus*	Critically Endangered
Pongolo Suckermouth	*Chiloglanis emarginatus*	Vulnerable

Red Data Reptile Species

From the distribution maps in the "Field Guide to Snakes and other Reptiles of Southern Africa" (Branch, 1998) it was estimated that approximately 106 reptile species have potential distributions within the BMM WHS. Five of these species are listed as Vulnerable by the MTPA (Emery *et al.*, 2002) as shown the tabulation below.

Table 3—10: Red Data Reptile species found within the vicinity of the project area

Common Name	Scientific Name	Conservation Status
Natal purple-glossed snake	*Amblyodipsas concolor*	Vulnerable
Transvaal Dwarf Chameleon	*Bradypodion transvaalense*	Vulnerable
Swazi Rock Snake	*Lamprophis swazicus*	Vulnerable
Wilhelm"s Flat Lizard	*Platysaurus wilhelmi*	Vulnerable
Barberton Girdled Lizard	*Cordylus warreni barbertonensis*	Vulnerable

Invertebrates

There are three known Red Data invertebrate species within the Barberton district. All three are listed as Endangered by the MTPA (Emery, 2002):

- *Aloeides barbarae* (Endangered) found in the Barberton Montane Grassland within the Mountainlands Nature Reserve.
- *Lepidochrysops jefferyi* (Endangered) found in the Barberton Montane Grassland and Legogote Sour Bushveld within the Mountainlands Nature Reserve and surrounding areas
- *Lepidochrysops swanepoeli* (Endangered) found in the Barberton Montane Grassland and Legogote Sour Bushveld within the Mountainlands Nature Reserve and surrounding areas

1.8 Flora Species of Conservation Importance

It is estimated that there are over 1500 plant species within the BMM WHS, of these seven have been classified as Critically Endangered, 4 Endangered, 27 Vulnerable, 11 Near Threatened and 1 as Data Deficient by the MTPA Plant Red Data Database. A further 18 have been preliminarily classified as Rare, 13 as Declining, 1 as medicinal and 2 as muthi ("magic") plants by the MTPA as shown in the tabulation below.

Table 3—11: Red Data plant species found within the vicinity of the project area

Common Name	MTPA Status
Acacia ebutsiniorum	EN D
Acridocarpus natalitius var. natalitius	Declining
Adenia gummifera var. gummifera	Declining
Alepidea amatymbica	VU A2d
Aloe albida	NT B1ab(i,ii,iii,iv,v)+2ab(i,
Aloe chortolirioides var. chortolirioides	VU A2ce
Aloe craibii	CR C2a(i)
Aloe integra	VU B1ab(ii,iii,iv,v)
Aloe kniphofioides	VU A2c
Aloe modesta	VU B2ab(ii,iii,iv,v)
Aloe reitzii var. reitzii	NT B1ab(iii)
Aloe reitzii var. vernalis	CR B1ab(v)+2ab(v)
Aloe simii	CR
Aloe thorncroftii	NT D2
Aloe vryheidensis	VU D2
Ansellia africana	Declining
Argyrolobium campicola	NT A2c?
Asclepias velutina	VU D2
Aspidonepsis shebae	VU D2
Berkheya coddii	Rare
Boophane disticha	Declining
Brachystelma chlorozonum	NT B1ab(iii,v)
Brachystelma dyeri	VU D2
Calanthe sylvatica	Rare
Callilepis leptophylla	Declining
Clivia miniata	VU A2abcd
Cryptocarya transvaalensis	Declining

Common Name	MTPA Status
Curtisia dentata	NT A2d
Cyathea capensis	Declining
Cyphia bolusii	VU D2
Cyrtanthus eucallus	VU D2
Cyrtanthus thorncroftii	Rare
Dioscorea sylvatica	VU A2cd
Disa extinctoria	NT B1ab(iii,iv,v)
Drimia altissima (=Urginea altissima)	Declining
Drimia delagoensis (was Urginea delagoensis)	Medicinal
Drimia robusta (now Drimia elata)	Muthi
Encephalartos heenanii	CR B2ab(ii,iv,v)
Encephalartos laevifolius	CR A2acde
Encephalartos paucidentatus	VU A2acd
Eucomis autumnalis	Declining
Eucomis montana	Declining
Eulophia cooperi	Rare
Eulophia parvilabris	Rare
Eulophia speciosa	Declining
Faurea macnaughtonii	Rare
Gerbera aurantiaca	EN A2ac
Gerbera aurantiaca (new subspecies)	VU?
Gladiolus appendiculatus (Barberton form)	VU B
Gladiolus calcaratus	Rare
Gladiolus serpenticola	Rare
Gunnera perpense	Declining
Haworthia limifolia var. limifolia	VU A2d

Common Name	MTPA Status
Helichrysum calocephalum	Rare
Kniphofia triangularis subsp. obtusiloba	Rare
Leucospermum gerrardii	NT A2c
Merwilla plumbea (=Scilla natalensis)	NT A2bd
Moraea robusta	Rare
Nervilia kotschyi var. purpurata	Rare
Ocotea bullata	EN A2bd
Ocotea kenyensis	VU D1
Ozoroa barbertonensis	VU D2
Polygala nodiflora	DD T
Protea comptonii	NT A2c
Protea curvata	VU D2
Protea parvula	NT A2c
Protea roupelliae subsp. hamiltonii	CR A2ac; B1ab+2ab; C2a
Prunus africana	VU A4acd; C1+2a(i)
Rapanea melanophloeos (may be removed)	Declining
Rhynchosia rogersii	VU D2
Schizobasis intricata now Drimia intricata)	Muthi
Schizochilus cecilii subsp. culveri	Rare
Sclerochiton triacanthus	VU D2
Searsia pygmaea (was Rhus)	VU D2
Senecio triodontiphyllus	VU D2
Siphonochilus aethiopicus	CR A4acd
Streptocarpus cyaneus subsp. long-tommi	VU D2
Streptocarpus pogonites	Rare

Common Name	MTPA Status
Syncolostemon stalmansii (=Hemizygia stalmansii)	Rare
Thorncroftia longiflora	Rare
Thorncroftia thorncroftii	VU D2
Warburgia salutaris	EN A2acd
Watsonia latifolia	Rare
Watsonia occulta	Rare

1.9 General Hydrogeology

According to the Department of Water and Sanitation (DWS) Internal Strategic Perspective for Inkomati water management area (2004), the the greater portion of the area is underlain by crystalline igneous and metamorphic rocks, comprising granites and gneisses, with many diabase dyke intrusions in places. In the south of the WMA, in the Incomati and Crocodile River catchments around Barberton, a rugged mountainous region of more basic igneous and metamorphic rocks is present. Along the western margin of the WMA, uncomfortably overlying the older crystalline igneous and metamorphic rocks are the gently westerly dipping mainly sedimentary rocks of the Transvaal Supergroup, which form the "Great Escarpment". Towards its base, this includes the Malmani dolomite, but because of the prevailing and past geomorphic conditions in this region, this formation is not the generally extensive high-yielding groundwater aquifer that it is elsewhere in the country.

Primary porosity groundwater aquifers are only present in the WMA to a very limited extent, as sand of up to 5 and 6 m depth in major river beds in places do not represent very significant exploitable groundwater resources, except very locally. By far the greatest proportion of groundwater in the WMA occurs in the secondary porosity aquifers of the weathered and fractured classes, this being especially so in the very large area of crystalline igneous and metamorphic rocks that comprises most of the WMA.

1.10 Groundwater Yields and Quality

Depth to the water table in the region generally varies from about 10 to 20 m below ground level. Yields of boreholes drilled in the region generally varyfrom about 0,1ℓ/s to 3ℓ/s, higher yields ordinarily being obtained from boreholes scientifically sited in hydrogeologically favoured situations.

In addition, Groundwater quality in the WMA also deteriorates from west to east over the area, following the average annual rainfall. Thus in the west it usually has a TDS content of less than 300 mg/ℓ, while in the extreme east of the area it is much poorer, rising to 500 to 1000 mg/ℓ. Over the greater portion of the area, however, in that portion that is underlain by crystalline igneous and metamorphic rocks of the granite and gneiss type, the groundwater is of good to moderate quality, generally having a TDS value of less than 500 mg/ℓ.

1.11 Geology

The proposed project site is overlain by the Fig Tree Group geological formation in the Barberton Supergroup geological formations (also known as the "Barberton Greenston Belt"). The stratigraphy of the Barberton Greenstone Belt **(BGB)** has been classified into three groups on the basis of lithostratigraphic associations. The lowermost group is the Onverwacht Group, characterised by a lower unit dominated by ultramafic meta-volcanics, overlain by an upper unit consisting of mafic and felsic meta-volcanics. The Onverwacht Group is capped by the Swartkoppie Formation which consists of fuchsitic bearing carbonated ultramafic schists; this formation is particularly significant given the topic of this document and is the host of much of the gold mineralisation described in this document. The Onverwacht Group is overlain by the Fig Tree Group, a sequence of sedimentary rocks consisting of turbiditic greywackes, shales and banded iron-formations. Tuffs and volcaniclastics are also present within the Fig Tree Group, largely within the uppermost formation, which overlies the meta-sedimentary lower formations. The uppermost Group within the BGB is the Moodies Group, dominated by three upward fining sequences of continental terrigeno-clastic sedimentary rocks. The Group consists of arenites, shales, jasperlites and minor units of amygdaloidal andesites.

Radiometric dating of the rocks the Onverwacht Group indicate ages of the order of 3500 to 3470Ma (million years before present) for the commencement of the extrusion of the volcanic lavas.

The BGB is surrounded by a variety of granitic rock types that have been categorised into three magmatic cycles based on their distinctive geochemical, geochronological and field characteristics. The cycles reflect the stages in the formation and genetic evolution of the earliest sialic crust in the Barberton Mountain Land and they span a period of 600Ma commencing in about 3500Ma with the latest estimated to have occurred about 2900Ma.

The BGB is a large, triangular shaped remnant of metavolcanic and metasedimentary rocks surrounded and intruded by granitoid bodies. Internally the BGB has a complex structure, consisting predominantly of northeast trending shear zones separating upright to recumbent syncinal folds. Refolding of early fold zones is evident and exemplified by the Eureka Syncline, a northeast trending syncline that has been refolded about a northwest trending axis. This axis is broadly coincident with the Jamestown Schist belt, a northwest trending tongue of largely ultramafic meta-volcanic rocks that forms the eastern margin of the Kaap Valley Tonalite, one of the larger diapiric intrusions located on the northern margin of the BGB. The refolding of the Eureka Syncline has been interpreted to be a result of the intrusion of the Kaap Valley pluton.

The combined influence of granite emplacement structural deformation and thermal metamorphism has played a significant role in the distribution and localisation of the epigenetic gold occurrences in the BGB.

Most of the known occurrences of gold within the BGB have been found localised in the region to the north and north-east of the Barberton, known locally as the James and Sheba Hills, and in the area immediately south-west of Barberton, in the Moodies Hills. Apart from these areas, additional gold concentrations occur along and adjacent to the major strike and faults as well as in a few localities in Swaziland near the granite-greenstone contacts.

The ore bodies all occur in the vicinity of a complex, refolded, arcuate, south-dipping shear/fault system, the Sheba Fault Zone developed between the Ulundi and Eureka synclines (Figure 3.4). The locations and geometries of the ore bodies themselves are structurally controlled and, due to the complex deformational history of the host rocks, have variable strikes, dips and widths. Some are continuous for several hundreds of metres, along strike and down dip, whereas others are discontinuous and not traceable between adjacent crosscuts or drill holes.

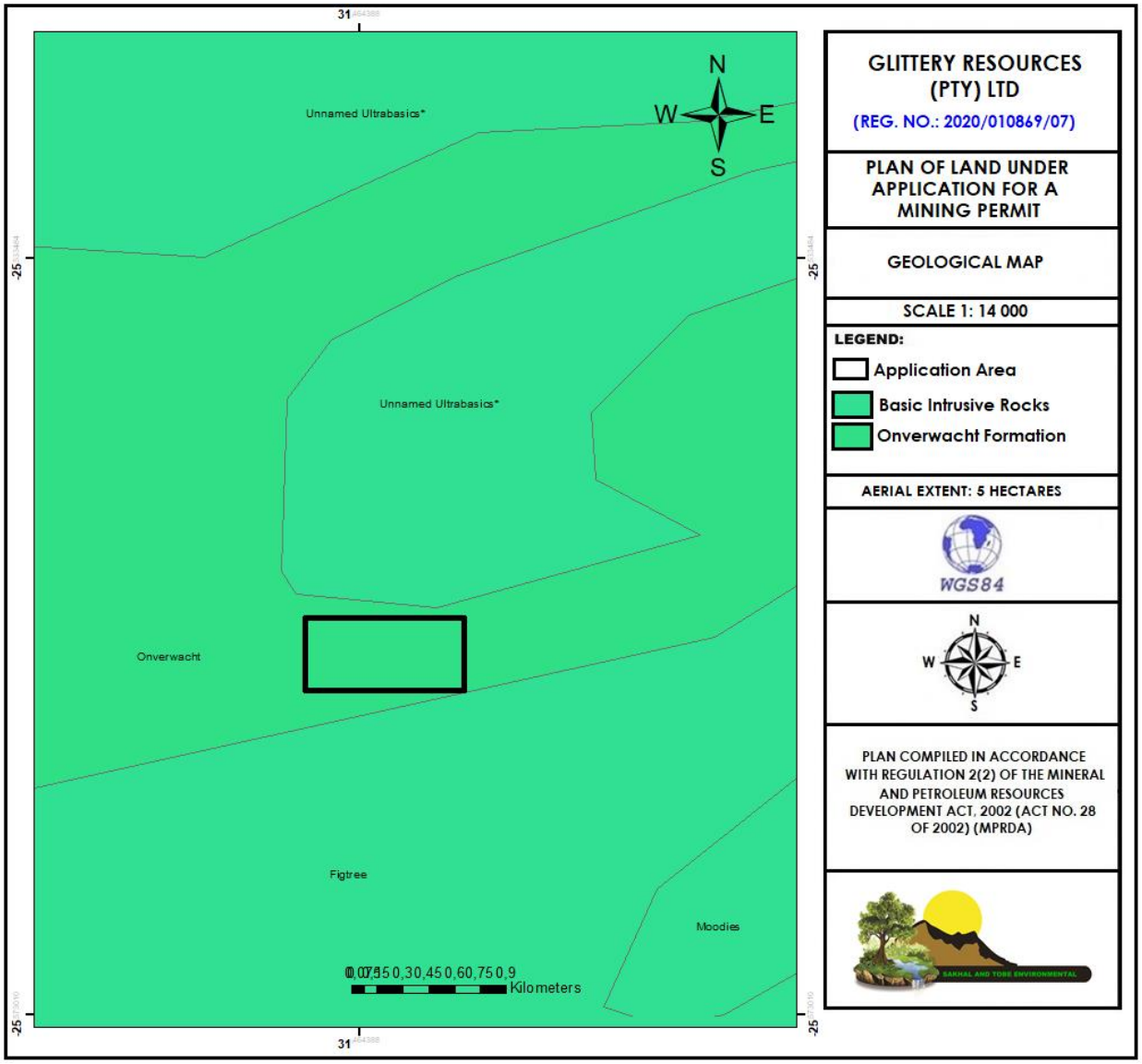


Figure 3-8: Geological Map of the Study Area

1.12 Inkomati Water Management Area

The farm Koede 218 JU falls within Quaternary Catchment X14F (Mhlambanyathi River Catchment) of the Inkomati water management area (WMA). The Inkomati Water Management Area (WMA) is situated in the north-eastern part of South Africa and borders on Mozambique and Swaziland. Its main rivers include the Sabie, the Crocodile (East) and Komati Rivers. The Komati River first flows into Swaziland and re-enters South Africa before flowing into Mozambique. All the rivers draining the WMA confluence to form the Incomati River in Mozambique, which flows to the Indian Ocean.

Several major dams have been constructed in the WMA. The Komati River is highly regulated, while the Crocodile and Sabie/Sand Rivers are less regulated by dams. The most significant dams in the WMA are the following:

- The Vygeboom and Nooitgedacht dams in the Upper Komati River, from which water is transferred to the Olifants WMA, mainly for use in the cooling of power stations.
- The Maguga Dam (in Swaziland) and Driekoppies Dam, which have both been completed recently to increase the assurance of supply to irrigators in the Komati and Lomati River sub-catchments to acceptable levels.
- The Kwena Dam in the upper Crocodile River, which augments water supplies to users along the Crocodile River.
- The recently completed Inyaka Dam on the Marite River, a tributary of the Sabie River, which was constructed mainly to supply the domestic and ecological water requirements along the lower Sabie River and the domestic water requirements in the Sand River sub-catchment by means of the Bosbokrand Transfer Pipeline (BTP) which will transfer up to 25 million m^3/annum to the Sand sub-catchment for this purpose. The full supply capacity of the Inyaka Dam is 123 million m^3, and the additional yield that becomes available as a result of the construction of this dam is estimated at 58 million m^3/annum.

Figure 3-9: Location of Inkomati WMA

(**Source:** DWS: ISP Inkomati WMA, 2004)

The biggest part of the Inkomati WMA falls in what is commonly known as the Lowveld. This is the area below the northern reaches of the Drakensberg escarpment, which has a warm sub-tropical climate suitable for growing many frost-sensitive crops and tropical fruit, including bananas, avocados, pawpaws and mangoes. Sugar cane, which is an irrigated crop in this area, is grown in the eastern parts, mostly in the lower Crocodile and Komati River valleys. Two large sugar mills are located here (the Malelane and Komati sugar mills). The higher mountainous areas are suitable for forestry, and large plantations of pine and eucalyptus supply the wood, pulp and paper industries. SAPPI Ngodwana, one of the largest paper mills in the country, is situated about 40 km west of Nelspruit. A large number of manufacturing activities are situated in and around Nelspruit, and industrial development is expanding rapidly. Development opportunities

have been identified, especially in steel, chemicals, food, wood products, paper and pulp. An international airport just outside Nelspruit has recently been completed, resulting in improved access to international markets and tourism.

1.13 Air Quality

Potential sources of dust may be caused by moving vehicles and earthworks during drilling. Major air emissions sources that may impact on the vicinity application area include the following:

- Smaller air emissions sources categories include:
    - Motor vehicles
    - Biomass burning (wood fires)
    - Gold mining operations

1.14 Sites of archaeological and cultural interest

Regional Context

The study area is located 200 m north of Barberton Makonjwa Mountain (BMM). BMM has been declared a World Heritage Site (WHS) by UNESCO. The Barberton Makhonjwa Mountains (BMM) World Heritage Site (WHS) is situated in the mountainous area surrounding the town of Barberton, stretching from the Barberton Nature Reserve, through the Mountainlands Nature Reserve into the Songimvelo Nature Reserve and through to the Nkomazi Wilderness near Badplaas (Map 1: Locality Map). The Barberton Makhonjwa Mountains World Heritage Site is not only situated in an area of geological interest, with some of the oldest rocks on earth aged at almost 3 500 million years (SACS 1980; Hurley *et al.* 1972), but is also situated in an area of biodiversity importance as it has been identified as a centre of plant endemism within southern Africa (Van Wyk and Smith, 2001), an important Bird Area (Barnes K., 1998) and has some areas identified as "Irreplaceable" according to the Mpumalanga Biodiversity Conservation Plan (Ferrar and Lötter, 2007).

The BMM WHS is strategically well positioned from both conservation and a tourism perspective as it forms an important ecological and conservation corridor linking the

Kruger National Park, in the Lowveld, to Conservancies in the Highveld and Nature Reserves in Swaziland. These ecological corridors are important for migratory species, altitudinal migrants and for species requiring large home ranges of areas of untransformed land.

From a tourism and development perspective the BMM WHS is situated on a development node of the Maputo Corridor, a development initiative linking Gauteng to Maputo and encouraging associated business and tourism development along the corridor. It also forms part of the Biodiversity and Tourism Corridor which is a private and public tourism initiative linking the Barberton Makhonjwa Mountains to conservation areas within Swaziland through to Mozambique and northern KwaZulu-Natal. The recent upgrading of the R40 from Nelspruit to Barberton and the surfacing of the Bulembu Road from Barberton to Swaziland have removed critical constraints to the development of these areas. These roads and the Biodiversity and Tourism Corridor also link the BMM WHS to the Lubombo Spatial Development Initiative, which includes the iSimangaliso World Heritage Site. The Songimvelo Nature Reserve (in South Africa) and the Malolotja Nature Reserves (in Swaziland) have been identified by the Peace Parks Foundation as a Transfrontier Conservation Area, which also includes the Ebhutsini Community in South Africa and the Maguga Dam, Phophonyane Nature Reserve and Makhonjwa in Swaziland.

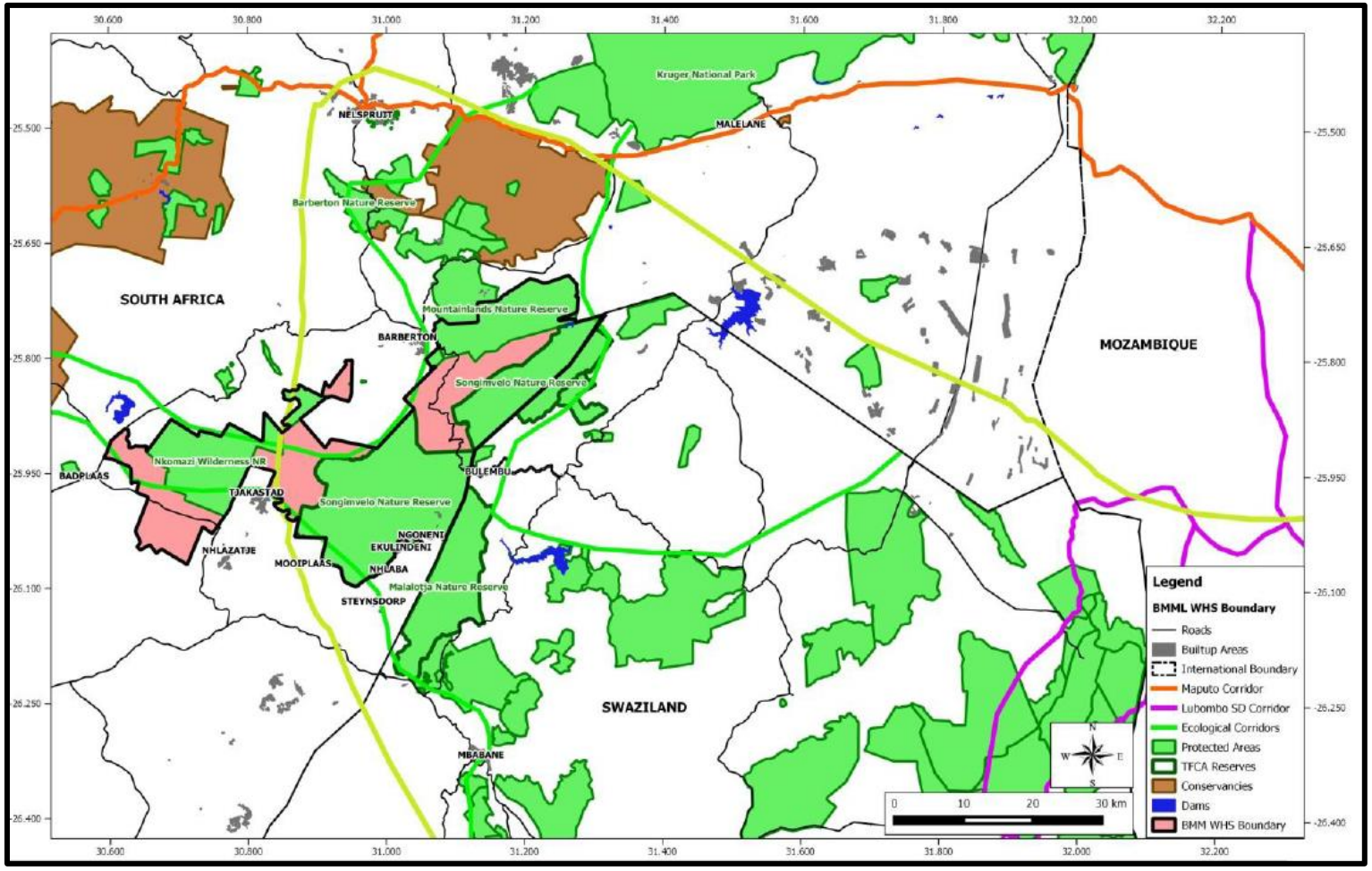


Figure 3-10: Locality Map for Barberton Makonjwa Mountain World Heritage Site

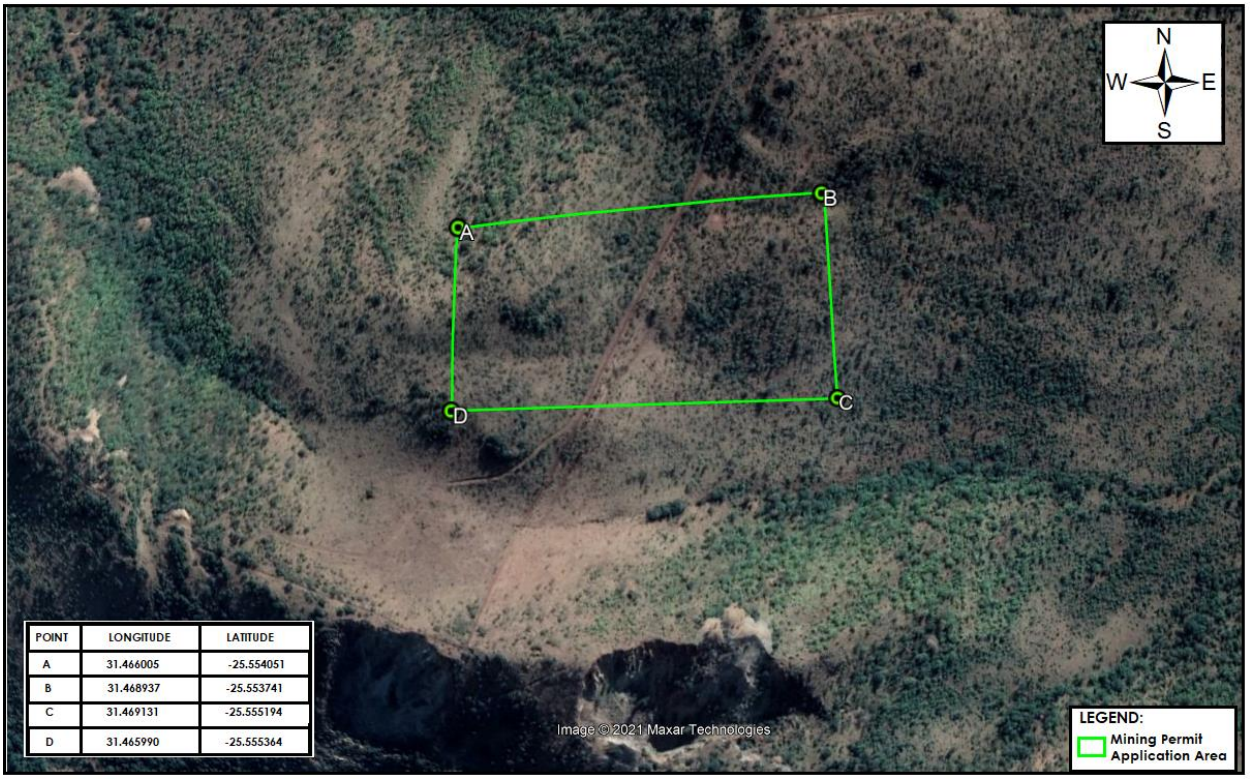
Site Specific Context

No sites of archaeological or cultural interested were identified on site during a site reconnaissance visit. Property owners will be provided with a registration and comment sheet in order to raise or highlighted cultural or archaeological features that may be occurring on site. The project area is comprised of open-spaces with mountainous landscape. As a matter precaution, should any further information confirm existence of such sites, steps will be taken to put measures in place for preservation thereof in line with the National Heritage Resources Act, 1999 (Act No. 25 of 1999). The South African Heritage Resources Agency (SAHRA) will also be notified of such findings,

(b) Description of the current land uses.

A portion of portion 2 of the farm Koede 218 JU

The entire project area is still natural and is comprised of open spaces. Approximately 10% percent of the project area is covered with dense vegetation (trees) and the remaining 80% is grassland. No wetland, river (watercourse), riparian and floodplain areas exist on site.



POINT	LONGITUDE	LATITUDE
A	31.466005	-25.554051
B	31.468937	-25.553741
C	31.469131	-25.555194
D	31.465990	-25.555364

Figure 3-11: A Portion of Portion 2 of the Farm Koede 218 JU

(c) Description of specific environmental features and infrastructure on the site.

The entire project area is still natural and is comprised of open spaces. Approximately 10% percent of the project area is covered with dense vegetation (trees) and the remaining 80% is grassland. No wetland, river (watercourse), riparian and floodplain areas exist on site.

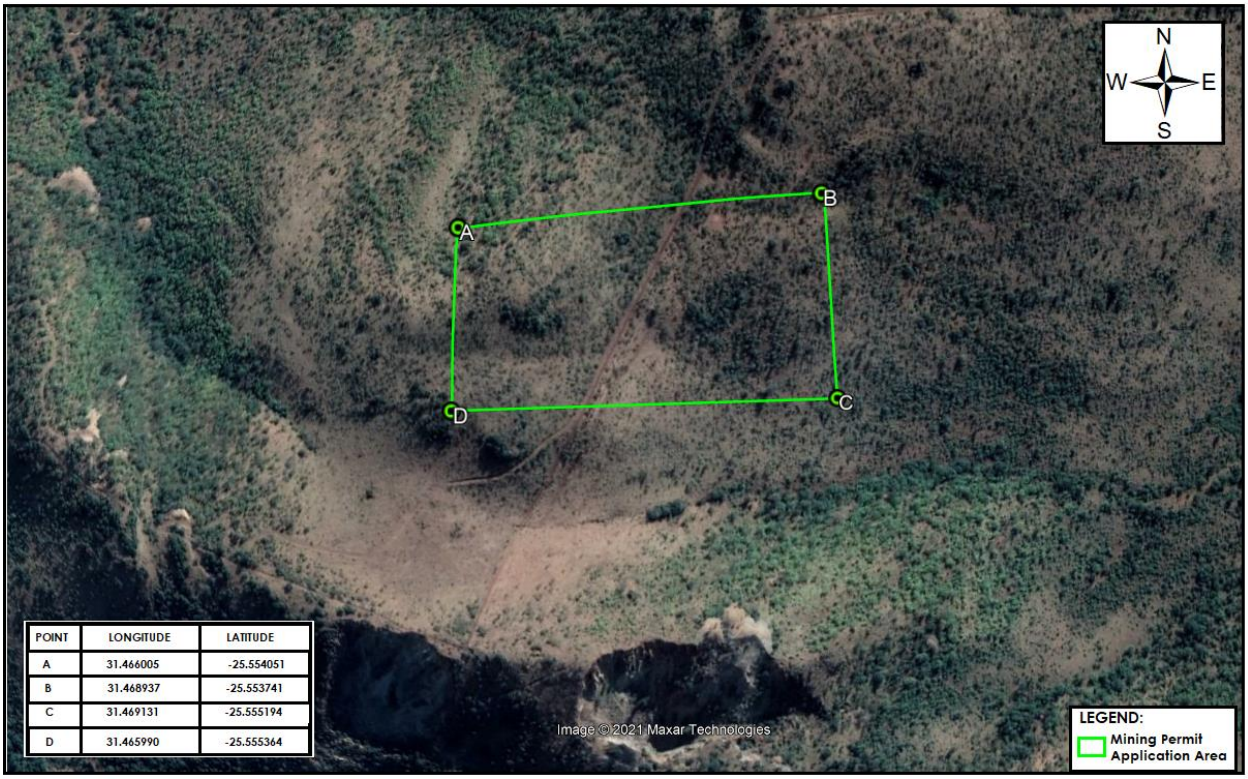


Figure 3-12: A Portion of Portion 2 of the Farm Koede 218 JU

Figure 3-13: Existing Farm Roads- Access to the mining site

(d) Environmental and current land use map.

(Show all environmental, and current land use features)

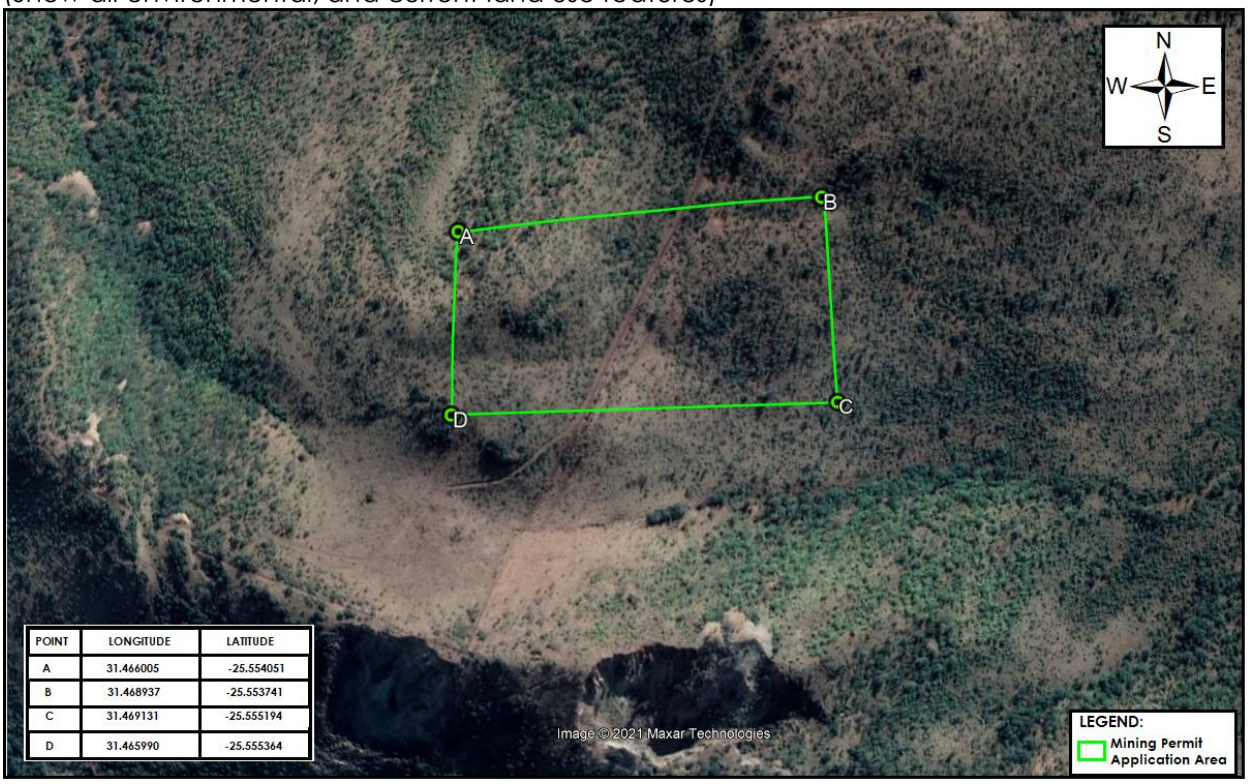


Figure 3-14: Land Use Map of the Project Area

v) Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impact.

(Provide a list of the potential impacts identified of the activities described in the initial site layout that will be undertaken, as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability, and duration of the impacts. Please indicate the extent to which they can be reversed, the extent to which they may cause irreplaceable loss of resources, and can be avoided, managed or mitigated).

The potential environmental and social impacts include:

- Noise caused by the trucks, excavators and other mine vehicles during mining activities;
- Dust generated by the mining operation and vehicles travelling gravel roads;
- Disturbance of soil from box-cut preparation and compaction;
- Disturbance of flora and fauna

- Disturbance or damage to cultural and heritage resources such as graves or historical features;
- Potential contamination of soil, surface water and groundwater with hydrocarbons (oil, diesel, grease, etc);
- Friction between local residents/landowners and the mine;
- Altering drainage patterns

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

(Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process was determined in order to decide the extent to which the initial site layout needs revision). Please refer to Impact Assessment Methodology described below in Section.

Please refer to Impact Assessment Methodology described below in Section I.

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

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

Table 3—12: List of Potential Impacts

Activity	Phase	Potential impacts (unmitigated)
Site preparation Bush clearing, removal of infrastructure, establishing construction area	Construction Operation Decommissioning	Physical destruction and disturbance of biodiversity Air pollution Disturbing noise Visual impacts
Earthworks (for all infrastructure)	Construction Operation Decommissioning	Hazardous excavations Loss of soil resources and land capability Physical destruction and disturbance of biodiversity Pollution of surface water resources Alteration of natural drainage patterns Contamination of groundwater

Activity	Phase	Potential impacts (unmitigated)
		Air pollution Disturbing noise Visual impacts
Civil works Building activities, erection of structures, concrete work, steel work, electrical installation, establishing pipelines	Construction Operation Decommissioning	Loss of mineral reserves Hazardous structures/excavations/surface subsidence Loss of soil resources and land capability Pollution of surface water resources Contamination of groundwater Air pollution Disturbing noise Visual impacts
Open-pit mining Mining, load, and hauling	Construction Operation	Loss of mineral resources Hazardous excavations Loss of soil resources and land capability Physical destruction and disturbance of biodiversity Pollution of surface water resources Contamination of groundwater Dewatering impacts Air pollution Disturbing noise Visual impact
Waste rock management Storage, final disposal	Operation Decommissioning Closure (final land form)	Hazardous excavations Loss of soil resources and land capability Disturbance of biodiversity Pollution of surface water resources Contamination of groundwater Air pollution Disturbing noise Negative landscape and visual impact
Power supply and use Internal site distribution	Construction Operation Decommissioning	Hazardous excavations Loss of soil resources and land capability Disturbance of biodiversity Pollution of surface water resources Alteration of natural drainage patterns Contamination of groundwater Visual impacts

Activity	Phase	Potential impacts (unmitigated)
Water supply and use Delivery on site, storage of clean water	Construction Operation Decommissioning	Hazardous excavations Loss of soil resources and land capability Disturbance of biodiversity Pollution of surface water resources Alteration of natural drainage patterns Contamination of groundwater Air pollution Visual impacts
Dirty water management Collection, storage of dirty water for re-use, recycling	Construction Operation Decommissioning	Hazardous excavations Loss of soil resources and land capability Pollution of surface water resources Contamination of groundwater Disturbing noise
Stormwater management Stormwater channels and berms, collection of dirty water, storage for re-use	Construction Operation Decommissioning	Hazardous excavations Loss of soil resources and land capability Alteration of drainage patterns Pollution of surface water resources Contamination of groundwater Disturbing noise
Transport systems Use of access points, road transport to and from site for employees and supplies, movement within site boundary (haul roads, conveyors, pipelines), taxi areas	Construction Operation Decommissioning	Loss of soil resources and land capability Disturbance of biodiversity Pollution of surface water resources Alteration of natural drainage patterns Contamination of groundwater Disturbing noise Traffic impacts Visual impacts
Non-mineralized waste management Transportation of waste materials to waste facility	Construction Operation Decommissioning Closure (limited)	Air pollution Disturbing noise Visual impacts
Site / contract management Appointment of workers/contractors, site management (monitoring, inspections, maintenance, security, access control),	Construction Operation Decommissioning Closure	Management of the site plays a significant role in all identified impacts

Activity	Phase	Potential impacts (unmitigated)
awareness training, emergency response, implementing and maintaining programmes		
Storage and maintenance services/ facilities Washing vehicles and machinery, storage and handling non-process materials	Construction Operation Decommissioning	Loss of soil resources and land capability Pollution of surface water resources Contamination of groundwater Disturbing noise
Site support services Operating offices, parking vehicles	Construction Operation Decommissioning	Loss of soil resources and land capability Disturbance of biodiversity Air pollution Visual impacts
Demolition Dismantling, demolition, removal of equipment	Operation (as part of maintenance) Decommissioning	Hazardous structures/excavations Loss of soil resources and land capability Disturbance of biodiversity Air pollution Disturbing noise Visual impacts
Rehabilitation Replacing soil, slope stabilization, landscaping, re-vegetation, restoration	Construction Operation Decommissioning Closure	Hazardous excavations Loss of soil resources and land capability Disturbance of biodiversity Pollution of surface water resources Alteration of natural drainage patterns Contamination of groundwater Air pollution Disturbing noise Visual impacts
Maintenance and aftercare Inspection and maintenance of remaining facilities and rehabilitated areas	Closure	Loss of soil resources and land capability Disturbance of biodiversity Pollution of surface water resources Air pollution Visual impacts

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

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

Table 3—13: Management Measures for Impact Mitigation

Potential Impact	Technical and Management Measures
Mineral sterilization	Mine workings will be developed and designed taking cognisance of potential mineral reserves; Extraction of all possible minerals prior to final disposal;
Hazardous structures	Establish and maintain site security measures; Control site and facility access; Backfill open pits; Appropriate design of stockpiles with the potential to fail (and by qualified person); Implement monitoring programme; Implement an emergency response.
Loss of soil resources and land capability through pollution	Implement hazardous waste, dirty water and mineralized and non-mineralized waste management procedures; Permanent infrastructure designs to take long-term soil prevention, land function and confirmatory monitoring into account.
Loss of soil resources and land capability through physical disturbance	Implementation of a soil management plan; Limit disturbance of soil to what is necessary; Stripping, storing, maintenance and replacement of topsoil in accordance with soil management procedures.
Physical destruction of biodiversity	Implement a biodiversity management plan; Restrict project footprint; Provide alternative habitat (where appropriate and necessary); Implement a monitoring programme; Rehabilitate disturbed areas.

Potential Impact	Technical and Management Measures
General disturbance of biodiversity	Prevention of the killing of animal species and harvesting of plant species; Implementation of dust control measures; Pollution prevention measures (water, soil etc.); Prevention of the disturbance of ecosystems;
Alternation of drainage patterns	Avoid alteration of watercourses as far as practically possible; Implement and maintain stormwater controls that meet regulatory requirements; Authorize all water uses as defined in the NWA; Compliance with relevant license requirements.
Surface water pollution	Appropriate design of polluting facilities and pollution prevention facilities (by qualified person); Implement and maintain stormwater controls that meet regulatory requirements; Implement site-specific soil management plan; Implement a monitoring programme (water use, process water quality, rainfall-related discharge quality); Implement emergency response; Authorize all water uses as defined in the NWA; Compliance with relevant license requirements.
Groundwater contamination	Appropriate design of polluting facilities (by qualified person) Correct handling of hazardous wastes, mineralized and non-mineralized wastes Compensation for loss; Implementation of a monitoring programme; Implement emergency response; Authorize all water uses as defined in the NWA; Compliance with relevant license requirements.
Dewatering	Compensation for loss;

Potential Impact	Technical and Management Measures
	Implementation of a monitoring programme; Authorize all water uses as defined in the NWA; Compliance with relevant license requirements.
Air pollution	Implementation of air quality management plan; Implementation of an air quality monitoring plan; Control dust plumes; Implementation of an air complaints procedure; Maintenance of abatement equipment; Implement an emergency response.
Noise pollution	Maintenance of equipment and machinery in good working order; Equip machinery with silencers; Construction of noise attenuation measures; Implementation of noise monitoring programme; Implementation of a noise complaints procedure; Reducing operational hours; Educate workers.
Visual impacts	Limit the clearing of vegetation; Limit the emissions of visual dust plumes; Use of screening berms; Concurrent rehabilitation; Painting infrastructure to compliment the surrounding environment; Implementation of a closure plan; Management through care and aftercare.
Traffic increases	Implementation of a traffic safety programme; Implement speed allaying measures where appropriate, e.g. speed humps where necessary; Education and awareness training of workers; Enforce strict speed limits on mine access roads; Ensure dust is effectively controlled on unpaved roads so as not to

Potential Impact	Technical and Management Measures
	reduce visibility; Placement of signage to create awareness; Maintenance of the transport systems; Implementation of traffic complaints procedure; Implement an emergency response;
Heritage (and cultural)	Limit project infrastructure, activities and related disturbances as far as practically possible; Avoid heritage and cultural resources as far as practically possible; Apply for the relevant permits to remove or destroy heritage sites (if applicable); Exhumation and relocation of graves according to legal requirements (if applicable); Mark remaining heritage sites on plan; Inspect sites for encroachment and/or damage; Education and awareness training of workers; Implement emergency response with respect to the chance find procedure for heritage, cultural and paleontological resources.
Economic impact	Hire people from closest communities as far as practically possible; Extend the formal bursary and skills development to closest communities; Implement a procurement mentorship programme; Local procurement of goods and services as far as practically possible; Compensation for loss of land use; Closure planning will consider skills, economic consideration and the needs of future farming.
Inward migration	Good communication in terms of recruitment, procurement and training; Number of temporary and permanent new job opportunities and procurement will be made public;

Potential Impact	Technical and Management Measures
	Employment and procurement opportunities provided to closest communities as far as practically possible ; No recruitment at the mine; Notify unsuccessful job seekers; Encourage formal housing of employees and implement contractual requirement for contractors to ensure formal housing for workers, both temporary and permanent; Maintain a skills profile for the nearest communities; Monitor and prevent the development of informal settlements through the interaction with neighbours, local authorities and law enforcement officials; Implement a health policy of HIV/AIDS and tuberculosis to promote awareness and training; Implement an emergency response.
Land uses	Implementation of EMP commitments that focus on environmental and social impacts; Take necessary steps to prevent negative impact on surrounding land; Compensation for loss; Closure planning to incorporate measures to achieve future land use plans .

ix) Motivation where no alternative sites were considered.

Koede Gold Mine will involve mining of Gold ore (Au) mineral deposits contained within the Barberton supergroup geological formation. According to Council for Geoscience (2009), most of the known occurrences of gold within the BGB have been found localised in the region to the north and north-east of the Barberton, known locally as the James and Sheba Hills, and in the area immediately south-west of Barberton, in the Moodies Hills. Apart from these areas, additional gold concentrations occur along and

adjacent to the major strike and faults as well as in a few localities in Swaziland near the granite-greenstone contacts.

The site was selected as it contains good concentration of gold bearing soil material and is located in a convenient position in close proximity to transport routes. The layout and technology of this mining project has been determined by the shape, position and orientation of the mineral resource. Refer to the Site Plan above. The operational approach is practical and based on best practice to ensure a phased approach of mining followed by rehabilitation in sequential stages.

- The preferred and only location for gold ore mining activity is on the earmarked section of the application area- A portion of portion 2 of the farm Koede 218 JU;
- The preferred and only activity is the mining of gold ore;
- The preferred mining method and only technology for mineral processing is truck and shovel (excavators) opencast mining method and carbon in-leach processing plant (including vat leach gold recovery system), respectively.

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.

Siting or Site Selection

The proposed mining operation will not be conducted in the river bed or within a 500 m from any wetland, as these areas are considered to be more sensitive. There are no rivers, dams or any other water resources features on site.

Access Roads

The access criteria considered by the applicant include:

- The dirt road has to be less than 5 km of dirt / un-surfaced road to contend with; and
- A short access road was preferable.

Alternatives of Land Ownership

The alternatives considered were:

- Find useable land (a viable mineral resource) owned by another party (entering into a royalty agreement);
- Find useable land (a viable mineral resource) owned by another person/government or organisation and not living on the property for a long time (leasing the land)
- Find a suitable site (a viable mineral resource) on property owned by the applicant.
- During the operational phase of the mine, the landowners are unable to have free access across the property. This could continue for the duration of the permit and is not convenient to landowners.

Alternative considered

- The alternative considered was to find useable land (a viable mineral resources) owned by another entity and enter into a long-term lease agreement. Portion 2 of the farm Koedoe 218 JU is privately owned by Chamotte Holdings (Pty) Ltd (T89822/2007).

Alternative to Processing

When the applicant was asked to consider processing there were two options for consideration, a large scale expansive mining operation or a small mine with a small footprint. The alternatives that informed the final decision were:

- Do not establish a processing plant on the site and process the gold bearing soil material off-site.
- Develop a small carbon in-leach processing plant or vat leach system for gold recovery.
- Use a small fleet so that the impact on roads is smaller.

It was ultimately decided to use a small fleet to conduct mining and develop a small carbon in-leach processing plant or vat leach system for gold recovery.

No "go" Alternative or No to mine the site

The alternative of not establishing this project was considered by the applicant. There will be no impact on the noise levels and the dust generation will be limited to the land occupiers frequenting the property.

The business would need to look at opportunities to find gold ore reserves elsewhere. Employment opportunities will not be generated on the site. The land would remain fallow and not economically viable (as it is too small for crop farming or commercial animal husbandry). The national assets (in this case, gold ore), that will not be made available for economic benefit to the South African people, will remain on the property. The ecological services will not be temporarily altered by mining and the social benefits will not be obtained from the creation of 20 employment opportunities for 5 years.

x) Statement motivating the alternative development location within the overall site. (Provide a statement motivating the final site layout that is proposed)

The site was selected as it contains good concentration of gold bearing soil material and is located in a convenient position in close proximity to transport routes. The layout and technology of this mining project has been determined by the shape, position and orientation of the mineral resource. Refer to the Site Plan above. The operational approach is practical and based on best practice to ensure a phased approach of mining followed by rehabilitation in sequential stages.

- The preferred and only location for gold ore mining activity is on the earmarked section of the application area- A portion of portion 2 of the farm Koede 218 JU;
- The preferred and only activity is the mining of gold ore;
- The preferred mining method and only technology for mineral processing is truck and shovel (excavators) opencast mining method and carbon in-leach processing plant (including vat leach gold recovery system), respectively.

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.

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

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

The impact assessment methodology is adopted from the Department of Environmental Affairs (DEA) Environmental Risk Assessment (ERA) approach. The ERA method assesses the significance of potential impacts in terms of Occurrence (Probability and Duration) and Severity (Magnitude/Intensity and Scale). The combined effect of these two aspects defines the Significance of each potential impact, as expressed below:

Significance Rating (SR) = (Magnitude + Duration + Scale) x Probability

Ratings for the other variables in the Significance Rating formula are determined from the tabulation below.

Table 3—14: Impact Rating Methodology

Probability (P)	**Duration (D)**
5 – Definite / don't know	5 – Permanent
4 – High probable	4–Long-term (ceases with operational life)
3 – Medium probability	3 – Medium-term (6 – 15 years)
2 – low probability	2 – Short-term (0 – 5 years)
1 – Improbable	1 – Immediate
0 – None	
Scale (S)	**Magnitude (M)**
5 – International	10 – Very high / Don't know
4 – National	8 – High
3 – Regional	6 – Moderate
2 – Local	4 – Low

Probability (P)	Duration (D)
1 – Site	2 – Minor
0 – None	

The significance of the impact is then categorised as Low, Medium or High depending on the Total Score for the Significance Rating. The categorisation is described in tabulation below.

Table 3—15: Impact Categorisation

Rating (SR)	Category
SR>60	High (A)
SR 30-60	Medium (B)
SR<30	Low (C)

The approach for identifying potential impacts is as follows:

- Review of the project description to understand operations, processes and activities, as well as services and infrastructure throughout the entire project lifecycle (i.e. Planning, Construction and Operation, Decommissioning);
- Study environmental context and possible exposure pathways;
- Identify possible impacts on water resources and other pertinent environmental media using Environmental Risk Assessment (ERA) approach;
- Determine significance of each impact

j) Assessment of each identified potentially significant impact and risk

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

Table 3—16: Impact Assessment for Construction Phase

Activity	Environmental Aspect	Impact	Scale (Extent)	Duration	Magnitude	Probability	Significance Rating
Box-cut development	Soil	Soil erosion	1	4	4	2	18 (Low)
	Groundwater quantity	Groundwater dewatering and lowering of groundwater levels	1	2	6	3	27 (Low)
	Groundwater quality	Groundwater contamination	1	2	6	2	18 (Low)
	Topography	Change in topography due to topsoil stockpiles	1	4	6	5	55 (Medium)
	Geology	Change in geological profile	1	5	8	5	70 (High)
	Soil	Soil pollution from hydrocarbon spills (petrol, diesel, and oil)	1	4	4	2	18 (Low)

Activity	Environmental Aspect	Impact	Scale (Extent)	Duration	Magnitude	Probability	Significance Rating
Clearing of vegetation cover	Surface water resources	Contamination of surface water resources silt-laden runoff	1	2	2	2	10 (Low)
	Surface runoff	Increase runoff volumes to due to the removal of vegetation cover	1	4	6	2	22 (Low)
	Soil	Soil erosion	1	4	4	2	18 (Low)
Stripping and stockpiling of topsoil	Topography	Change in topography through soil mounds	1	4	8	4	52 (Medium)
	Surface water resources	Contamination of surface water resources	1	2	4	1	7 (Low)
Site establishment	Soil	Soil pollution from hydrocarbon spills (petrol, diesel, and oil)	1	2	8	2	22 (Low)

Activity	Environmental Aspect	Impact	Scale (Extent)	Duration	Magnitude	Probability	Significance Rating
	Soil	Compaction of soil	1	4	6	4	44 (Medium)
Construction of package sewage treatment plant (septic tank)	Groundwater	Groundwater contamination	1	2	4	2	14 (Low)

Table 3—17: Impact Assessment for Operational Phase

Activity	Environmental Aspect	Impact	Scale (Extent)	Duration	Magnitude	Probability	Significance Rating
Opencast mining (truck and shovel)	Soil	Soil erosion	1	4	4	2	13 (Low)
	Groundwater quantity	Groundwater dewatering and lowering of groundwater levels	1	3	6	3	30 (Medium)
	Groundwater quality	Groundwater contamination	2	3	6	3	33 (Medium)
	Topography	Change in topography	1	4	6	5	55 (Medium)

Activity	Environmental Aspect	Impact	Scale (Extent)	Duration	Magnitude	Probability	Significance Rating
		due to topsoil stockpiles					
	Geology	Change in geological profile	1	5	8	5	70 (High)
	Soil	Soil pollution from hydrocarbon spills (petrol, diesel, and oil)	1	4	6	3	33 (Medium)
	Water supply	Shortage of water supply to other groundwater users	2	4	6	3	36 (Medium)
Movement of mine vehicles, transportation of minerals to the crushing plant	Soil	Compaction of soil	1	4	6	4	44 (Medium)
	Groundwater quantity	Reduced groundwater recharge	1	4	6	3	33 (Medium)

Activity	Environmental Aspect	Impact	Scale (Extent)	Duration	Magnitude	Probability	Significance Rating
	Groundwater quality	Groundwater contamination from hydrocarbon spills (petrol, diesel, and oil)	1	4	4	2	18 (Low)
Topsoil stockpiles	Surface water resources	Contamination of surface water resources	2	4	8	5	70 (High)
	Topography	Change in topography due to waste rock and topsoil stockpiles	1	4	6	5	55 (Medium)
	Soil	Loss of topsoil soil due to erosion	1	4	4	2	18 (Low)

k) Summary of specialist reports.

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

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
No specialist studies have been undertaken. A desktop analysis has been followed that informs the compilation of this assessment.	**N/A**	**N/A**	**N/A**

l) Environmental impact statement

(i) Summary of the key findings of the environmental impact assessment;

The possible environmental impacts associated with the proposed mining operation are considered low. Mining will involve the use of mechanized earth moving equipment (excavator and front-end loader) to move the unconsolidated material in bulk. Support infrastructure such as ablution facility, mine office complex, package sewage treatment (septic tank), workshop, and security office will be required at the mine.

The proposed mine will create 20 full-time jobs and the gold, copper and iron ore mined will be an important resource for the jewellery industry and steel manufacturing industry. Excavations will be shaped and the perimeter of the mine site will be rehabilitated to support the future land use activities.

The assessed impact ratings for both construction and operational phase are as follows:

Table 3—18: Summary of Impact Rating for the Construction Phase

Activity	Environmental Aspect	Significance Rating
Box-cut development	Soil	18 (Low)
	Groundwater quantity	27 (Low)
	Groundwater quality	18 (Low)
	Topography	55 (Medium)
	Geology	70 (High)
	Soil	18 (Low)

Activity	Environmental Aspect	Significance Rating
Clearing of vegetation cover	Surface water resources	10 (Low)
	Surface runoff	22 (Low)
	Soil	18 (Low)
Stripping and stockpiling of topsoil	Topography	52 (Medium)
	Surface water resources	7 (Low)
Site establishment	Soil	22 (Low)
	Soil	44 (Medium)
Construction of package sewage treatment plant	Groundwater	14 (Low)

Table 3—19: Summary of Impact Rating for the Operational Phase

Activity	Environmental Aspect	Significance Rating
Opencast mining (truck and shovel)	Soil	13 (Low)
	Groundwater quantity	30 (Medium)
	Groundwater quality	33 (Medium)
	Topography	55 (Medium)
	Geology	70 (High)
	Soil	33 (Medium)
	Water supply	36 (Medium)
Movement of mine vehicles, transportation of minerals to the crushing plant	Soil	44 (Medium)
	Groundwater quantity	33 (Medium)
	Groundwater quality	18 (Low)
Topsoil stockpiles	Surface water resources	70 (High)

Activity	Environmental Aspect	Significance Rating
	Topography	55 (Medium)
	Soil	18 (Low)

(ii) Final Site Map

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

Refer to baseline environmental situation. Glittery Resources will comply with the following commitments:

- Infrastructure such as houses (including lodges, fences, electricity pylons, gates) will be avoided;
- No mining activities will take place water bodies or water resource (rivers and wetlands);
- Any boreholes, sewer pipelines, etc will be marked-off prior to site establishment and avoided during operations;
- Glittery Resources will implement a low speed limit at the mine to ensure that the traffic risk is minimised. A speed limit of between 10-20 km/h will generally be enforced at the proposed mining area especially in areas of high levels of interaction between vehicles and pedestrians.
- Existing access roads will be utilized to access the potential mining site.

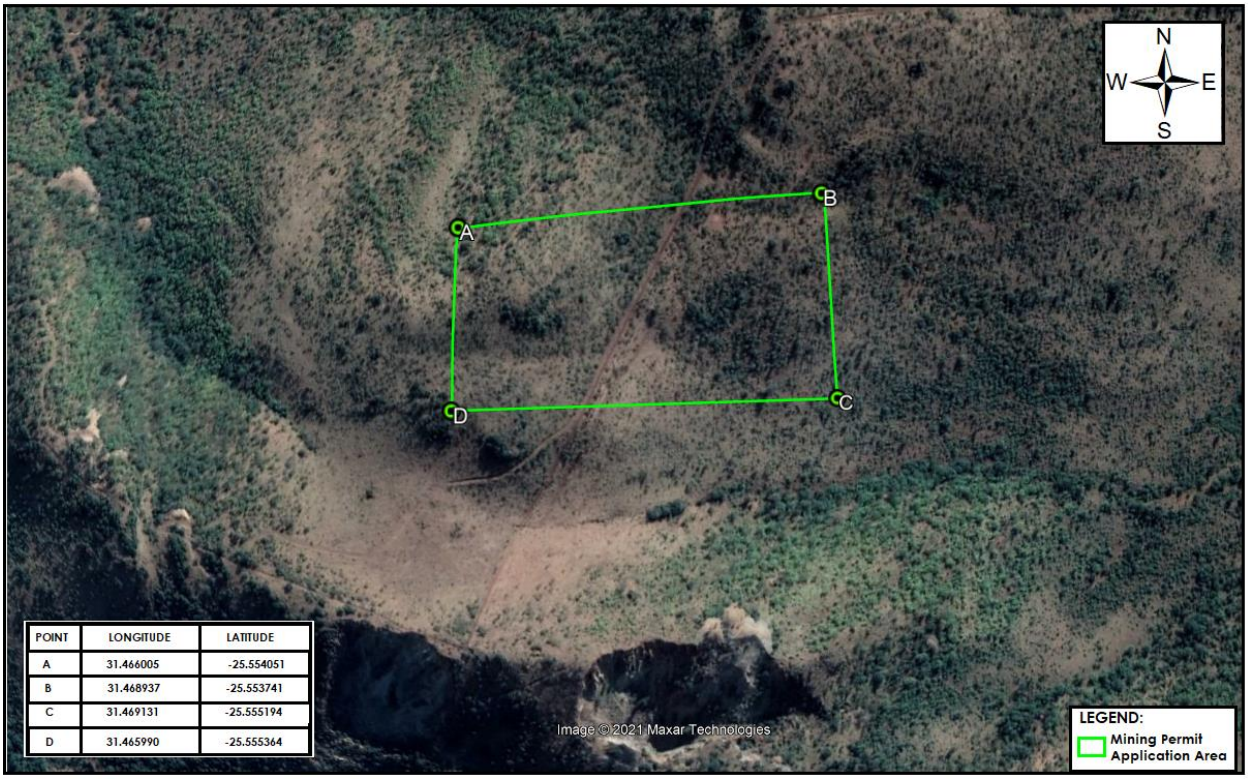


Figure 3-15: Proposed Mining Area

(iii) Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.

Positive Impact associated with the proposed Mining Permit:

- Creating 20 full-time permanent jobs
- Job creation
- Development of skills
- Potential for business opportunities
- Establishment of bursaries and scholarships
- Stimulate economic activities in the local vicinity
- Gold, ore will be used for jewellery and steel manufacturing industry.

Construction Phase

- Generation of fugitive dust
- Removal of existing vegetation
- Potential negative impact on top soil seed bank if not stockpiled correctly.

Operational Phase: Excavation of Pits

- Generation of fugitive dust
- Potential hydrocarbon spillage through leaking equipment
- Change of current land use, 2-5 year mining permit period

Preparation of vehicle maintenance concrete padding

- Fugitive dust generation
- Spillage of carbonaceous material on roads or other areas

Decommission and Closure Phases

- Fugitive dust generation
- Mixing of sub soils with topsoil
- Poor compaction

Other identified negative environmental impacts

- Increased ambient noise levels resulting from the mining activities;
- Loss or destruction of heritage and cultural resources (features)
- Increased vehicle movements within the area resulting in possible destruction and disturbance of flora and fauna;
- Potential visual impacts caused by mining activities;
- Influx of persons (job seekers) to site as a result of the proposed project and the possible resultant increase in opportunistic crime;
- Potential water (surface and groundwater) and soil pollution impacts resulting from hydrocarbon spillages;

m) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr;

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

The objectives of the EMPr will be to:

- Provide sufficient information to strategically plan mining activities as to avoid unnecessary social and environmental impacts.

- Provide sufficient information and guidance to plan for mining activities in a manner that would reduce impacts (both social and environmental) as far as practically possible.
- Ensure an approach that will provide the necessary confidence in terms of environmental compliance.
- Provide a management 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. Through the implementation of the mitigation and management measures it is expected that:

- To ensure that the mining activities do not have an adverse impact on the current biodiversity. Areas of ecological significance will be avoided and if disturbance is required, it will be undertaken in accordance with legislation.
- Glittery Resources will implement a low speed limit at the mine to ensure that the traffic risk is minimised. A speed limit of between 10-20 km/h will generally be enforced at the proposed mining area especially in areas of high levels of interaction between vehicles and pedestrians.
- Heritage/cultural resources can be managed by avoidance of known resources and though consultation with landowners/stakeholders. Contractor personnel will also be briefed of these sensitivities and consequences of any damage/removal of such features;
- Noise generation can be managed through consultation and restriction of operating hours and by maintaining equipment and applying noise abatement equipment if necessary;
- Visual intrusion can be managed through consultation with landowners/stakeholders;
- To limit the visual impact of the mining activities. Concurrent rehabilitation to be implemented
- Dust fall can be managed by application of wet suppression on exposed surfaces;

- Soil, surface water and groundwater contamination by hydrocarbons can be managed by conducting proper vehicle maintenance, refuelling with care to minimise the chance of spillages and by having a spill kit available on each site where mining activities are in progress;
- To ensure that the proposed mining operation adopts and implements waste management principles that are environmentally responsible. Ensure compliance with relevant waste legislation and regulations and municipal requirements.
- Social friction with landowners can be managed by employing strong, experienced personnel with proven skills in public consultation and conflict resolution during stakeholder consultation phases.

n) Aspects for inclusion as conditions of Authorisation.

Any aspects which must be made conditions of the Environmental Authorisation

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

- Mining activities must be conducted outside the 1:50 and 1:100 year floodlines;
- Maintain a minimum 50 m (preferably 1000m) buffer from any infrastructure or dwelling;
- Landowners should be engaged (re-consulted) at least 1 month prior to any site activities being undertaken. In this care, the applicant is the landowner/property owner.
- Vegetation clearance limited to the mining area
- Indigenous plant species must be removed and kept for rehabilitation before commencement
- No employees will be permitted to stay on the site.
- Glittery Resources will implement a low speed limit at the mine to ensure that the traffic risk is minimised. A speed limit of between 10-20 km/h will generally be enforced at the proposed mining area especially in areas of high levels of interaction between vehicles and pedestrians.

- Collection of firewood will not be allowed.
- Existing gravel roads will be used
- Dust-fall monitoring programme to be implemented
- Mine are will be fenced to prevent animal access to the mine area

o) Description of any assumptions, uncertainties and gaps in knowledge.

Which relate to the assessment and mitigation measures proposed.

The following assumptions, uncertainties and gaps are applicable to this proposed project:

- 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 to be reasonable and must be implemented in order for the outcome of the assessment to be accurate.
- Details regarding the presence and status of land claims from the Land Claims Commissioner are not yet available.

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

i) Reasons why the activity should be authorized or not.

It is the opinion of the EAP that the proposed gold 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. There are no significant environmental impacts associated with the proposed activity;
- A mining permit will ensure that gold is mined legally and provisions will be made for the rehabilitation of the disturbed area after mining has been completed. The applicant is applying for a mining permit and it will be a small scale operation.

The area of application does not exceed 5 hectares. A mining permit means that the approval is granted for a period of two years but not exceeding five years. Since the scale of this operation is small and the commodity of interest (gold);

- No 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;
- Provided the recommended mitigation measures are implemented and mining activities are managed in accordance with the stipulations of the EMPr, and Rehabilitation, Decommissioning and Closure Plan.

ii) Conditions that must be included in the authorisation

Any aspects which must be made conditions of the Environmental Authorisation

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

- Maintain a buffer of 100 m from a water course;
- Maintain a minimum 50 m (preferably 100m) buffer from any infrastructure or dwelling;
- Glittery Resources will implement a low speed limit at the mine to ensure that the traffic risk is minimised. A speed limit of between 10-20 km/h will generally be enforced at the proposed mining area especially in areas of high levels of interaction between vehicles and pedestrians.
- Landowner should be engaged (re-consulted) at least 1 month prior to any site activities being undertaken- in this case the landowner is the applicant.
- Vegetation clearance limited to the mining area
- Indigenous plant species must be removed and kept for rehabilitation before commencement
- No employees will be permitted to stay on the site.
- Collection of firewood will not be allowed.

- Existing gravel roads will be used
- Dust-fall monitoring programme to be implemented
- Mine are will be fenced to prevent animal access to the mine area

q) Period for which the Environmental Authorisation is required.

The Environmental Authorisation is required for a **period of 5 years.**

r) Undertaking

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

Glittery Resources herewith confirms both its capacity and willingness to make the financial provision required should the mining permit be granted. .

s) Financial Provision

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

A financial provision of approximately **R63 850.5415** has been budgeted for rehabilitation of negative environmental impacts associated with the planned mining operation as shown in the tabulation below.

Table 3—20: Budgetary Costing for the Financial Provision for Rehabilitation of Negative Environmental Impacts

CALCULATION OF THE QUANTUM							
Applicant:	Glittery Resources (Pty) Ltd				Ref No.:	MP 30/5/1/3/2/(12478) MP	
Evaluators:	Sakhal and Tobe Environmental (Pty) Ltd				Date:	July 2021	
No.	Description	Unit	A Quantity	B Master Rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	0	11,57	1	1	0
2 (A)	Demolition of steel buildings and structures	m2	0	161,17	1	1	0
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	237,51	1	1	0
3	Rehabilitation of access roads	m2		28,84	1	1	0
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	279,92	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	152,68	1	1	0
5	Demolition of housing and/or administration facilities	m2	0	322,33	1	1	0
6	Opencast rehabilitation including final voids and ramps	ha	0	164050,47	1	1	0
7	Sealing of shafts adits and inclines	m3	0	86,52	1	1	0
8 (A)	Rehabilitation of overburden and spoils	ha	0	112646,86	1	1	0
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0	140299,62	1	1	0
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	407496,61	1	1	0
9	Rehabilitation of subsided areas	ha	0	94324,78	1	1	0
10	General surface rehabilitation	ha	0,52	89235,31	1	1	45510,0081
11	River diversions	ha	0	89235,31	1	1	0
12	Fencing	m	0	101,79	1	1	0
13	Water management	ha	0	33929,78	1	1	0
14	2 to 3 years of maintenance and aftercare	ha	0	11875,42	1	1	0
15 (A)	Specialist study	Sum	0			1	0
15 (B)	Specialist study	Sum				1	0
					Sub Total 1		45510,0081

1	Preliminary and General		5461,200972		weighting factor 2	1	5461,200972	
2	Contingencies		4551,00081				4551,00081	
					Subtotal 2		55522,21	
					VAT (15%)		8328,3315	
					Grand Total		**63850,5415**	

i) Explain how the aforesaid amount was derived.

The financial provision for the execution of the EMPr is **R 63 850. 5415** as determined by the quantum calculation. The financial provision includes cost for premature mission and financial closure and post closure management of the environmental impacts. The financial guarantee was calculated using the DMRE official **Financial Quantum Calculator**.

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

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

It is hereby undertaken that the amount of **R 63 850. 5415** in the form of a bank guarantee for rehabilitation purposes as required in terms of section 41 of the MPRDA as read with regulation 53 and 54 of the said Act, will be provided to the DMRE upon granting of the requested mining permit.

t) Specific Information required by the competent Authority

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

(1) Impact on the socio-economic conditions of any directly affected person.

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as an **Appendix** .

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. As part of the consultation process the land claims commissioner will be contacted to identify if there are any claims on land covered by this application.

Concerns raised will be captured and addressed within the public participation section of this report once finalised and submitted to the authorities.

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

Not applicable. No sites of archeological or cultural interested were identified on site during a site reconnaissance visit. The project area is an open space and is largely natural. However, as a matter precaution, should any further information confirm existence of such sites, steps will be taken to put measures in place for preservation thereof in line with the National Heritage Resources Act, 1999 (Act No. 25 of 1999). The South African Heritage Resources Agency (SAHRA) will also be notified of such findings.

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

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

The applicant had considered several alternatives and these criteria are captured below: Alternatives in terms of;

- Siting
- Access Roads
- Land Ownership
- Processing
- No mine

Koede Gold Mine will involve mining of Gold ore (Au) mineral deposits contained within the Barberton supergroup geological formation. According to Council for Geoscience (2009), most of the known occurrences of gold within the BGB have been found localised in the region to the north and north-east of the Barberton, known locally as the James and Sheba Hills, and in the area immediately south-west of Barberton, in the Moodies Hills. Apart from these areas, additional gold concentrations occur along and adjacent to the major strike and faults as well as in a few localities in Swaziland near the granite-greenstone contacts.

The site was selected as it contains good concentration of gold bearing soil material and is located in a convenient position in close proximity to transport routes. The layout and technology of this mining project has been determined by the shape, position and orientation of the mineral resource. Refer to the Site Plan above. The operational approach is practical and based on best practice to ensure a phased approach of mining followed by rehabilitation in sequential stages.

- The preferred and only location for gold ore mining activity is on the earmarked section of the application area- A portion of portion 2 of the farm Koede 218 JU;
- The preferred and only activity is the mining of gold ore;
- The preferred mining method and only technology for mineral processing is truck and shovel (excavators) opencast mining method and carbon in-leach processing plant (including vat leach gold recovery system), respectively.

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.

Siting or Site Selection

The proposed mining operation will not be conducted in the river bed or within a 500 m from any wetland, as these areas are considered to be more sensitive. There are no rivers, dams or any other water resources features on site.

Access Roads

The access criteria considered by the applicant include:

- The dirt road has to be less than 5 km of dirt / un-surfaced road to contend with; and
- A short access road was preferable.

Alternatives of Land Ownership

The alternatives considered were:

- Find useable land (a viable mineral resource) owned by another party (entering into a royalty agreement);
- Find useable land (a viable mineral resource) owned by another person/government or organisation and not living on the property for a long time (leasing the land)
- Find a suitable site (a viable mineral resource) on property owned by the applicant.
- During the operational phase of the mine, the landowners are unable to have free access across the property. This could continue for the duration of the permit and is not convenient to landowners.

Alternative considered

- The alternative considered was to find useable land (a viable mineral resources) owned by another entity and enter into a long-term lease agreement. Portion 2 of the farm Koedoe 218 JU is privately owned by Chamotte Holdings (Pty) Ltd (T89822/2007).

Alternative to Processing

When the applicant was asked to consider processing there were two options for consideration, a large scale expansive mining operation or a small mine with a small footprint. The alternatives that informed the final decision were:

- Do not establish a processing plant on the site and process the gold bearing soil material off-site.

- Develop a small carbon in-leach processing plant or vat leach system for gold recovery.
- Use a small fleet so that the impact on roads is smaller.

It was ultimately decided to use a small fleet to conduct mining and develop a small carbon in-leach processing plant or vat leach system for gold recovery.

No "go" Alternative or No to mine the site

The alternative of not establishing this project was considered by the applicant. There will be no impact on the noise levels and the dust generation will be limited to the land occupiers frequenting the property.

The business would need to look at opportunities to find gold ore reserves elsewhere. Employment opportunities will not be generated on the site. The land would remain fallow and not economically viable (as it is too small for crop farming or commercial animal husbandry). The national assets (in this case, gold ore), that will not be made available for economic benefit to the South African people, will remain on the property. The ecological services will not be temporarily altered by mining and the social benefits will not be obtained from the creation of 20 employment opportunities for 5 years.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1. Final Environmental Management Programme

a) Details of the EAP

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

The requirements for the provision of the details and expertise of the EAP are included in Part A as section 1(a)

b) Description of the Aspect of the Activity

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

Refer to Part A, Section 1(h) of this Basic Assessment Report.

c) Composite Map

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

This has already been covered. Refer to Part A as well as **Appendix D** of this document.

d) Description of impact management objectives including management statements

The overall goal for closure of the 5 ha gold mining site is to shape the excavations to avoid damming of water, ensuring that the land is stable and safe in the long-term. For post closure, the pit will be shaped and rehabilitated and proposed future use after mining will be grazing. Closure objectives relate to the following:

Physical stability: To level and shape excavations.

Environmental quality: To ensure that local environmental quality is not adversely affected by possible physical effects and chemical contaminants arising from the mining after completion of mining activities.

Health and safety: To limit the possible health and safety threats to humans and animals. Level and shape excavations to avoid damming of water.

Land capability/land-use: To ensure continuation or to the re-instate a suitable land capability over as large as possible area affected during mining.

Aesthetic quality: To leave behind a rehabilitated site that is neat and tidy, giving an acceptable overall aesthetic appearance.

Biodiversity: To encourage the re-establishment of indigenous and/ or appropriate vegetation on the rehabilitated mining site such that the biodiversity is largely re-instated over time, as well as protect the undisturbed areas to maintain/enhance the biodiversity of these areas. Mining area rehabilitated to limit impact on current land use.

i. Determination of closure objectives

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

Closure objectives relate to the following:

Physical stability: To level and shape excavations.

Environmental quality: To ensure that local environmental quality is not adversely affected by possible physical effects and chemical contaminants arising from the mining after completion of mining activities.

Health and safety: To limit the possible health and safety threats to humans and animals. Level and shape excavations to avoid damming of water.

Land capability/land-use: To ensure continuation or to the re-instate a suitable land capability over as large as possible area affected during mining.

Aesthetic quality: To leave behind a rehabilitated site that is neat and tidy, giving an acceptable overall aesthetic appearance.

Biodiversity: To encourage the re-establishment of indigenous and/ or appropriate vegetation on the rehabilitated mining site such that the biodiversity is largely re-instated over time, as well as protect the undisturbed areas to maintain/enhance the biodiversity of these areas. Mining area rehabilitated to limit impact on current land use.

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

Water Supply

Process water supply for the operation will sourced from new boreholes to be drilled on-site and will be pumped into a process water reservoir with a capacity of approximately 1 400 m^3 to allow for seven (7) days retention. The water will be used in the carbon in-leach processing plant for gold recovery and dust suppression as well as ablution facilities. However, dust suppression will be conducted as and when necessary.

Potable Water Supply

Potable water required for the proposed mining operation is approximately 40 litres per day (ℓ/day). The water will be used for drinking purposes and will be sourced from local water vendors within Matsulu, Malelane and Nelspruit. The water will be supplied in cooled water dispensers.

Ablution

Ablution facility at the mine will utilize a package sewage treatment plant. All raw sewage from these mobile toilets will be disposed of into the nearest wastewater treatment works within the Magisterial District of Barberton.

iii. Has a water use licence has been applied for?

The proposed mining activities falls within the ambit of section 21 water uses in terms of the National Water Act, 1998 (Act No. 36 of 1998). Therefore, a water use licence application will be lodged with the Department of Water and Sanitation. The following water use activities will take place on site:

- Section 21 (a): Abstraction of water from a borehole
- Section 21 (b): Storage of water
- Section 21 (g): Septic tank and dust suppression.

iv. Impacts to be mitigated in their respective phases

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

Table 3—16: Impacts to be Mitigated

ACTIVITIES **(E.g. For prospecting -** drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route **etc…etc…etc** **E.g. For mining**,- excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)	**PHASE** (of operation in which activity will take place. State; Planning and design, Pre-Construction' Construction, Operational, Rehabilitation, Closure, Post closure).	**SIZE AND SCALE of disturbance** (volumes, tonnages and hectares or m²)	**MITIGATION MEASURES** (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
Establishment / construction of camp site	Construction Phase	0.16 ha	Dust suppression Speed limits. Glittery Resources will implement a low speed limit at the mine to ensure that the traffic risk is minimised. A speed	NEMA Air Quality Act Mine Health & Safety Act	Concurrently with the completion of mining activities in an area.

ACTIVITIES **(E.g. For prospecting -** drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route **etc…etc…etc** **E.g. For mining**,- excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)	**PHASE** (of operation in which activity will take place. State; Planning and design, Pre-Construction' Construction, Operational, Rehabilitation, Closure, Post closure).	**SIZE AND SCALE of disturbance** (volumes, tonnages and hectares or m²)	**MITIGATION MEASURES** (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
			limit of between 10-20 km/h will generally be enforced at the proposed mining area especially in areas of high levels of interaction between vehicles and pedestrians. Service equipment regularly		
Food preparation	All phases	100 cubic meter	•Restrict open fires *Maintain firebreaks	Mine Health and Safety Act National Veld and	Concurrently with the completion of mining

ACTIVITIES **(E.g. For prospecting -** drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route **etc…etc…etc** **E.g. For mining**,- excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)	**PHASE** (of operation in which activity will take place. State; Planning and design, Pre-Construction' Construction, Operational, Rehabilitation, Closure, Post closure).	**SIZE AND SCALE of disturbance** (volumes, tonnages and hectares or m²)	**MITIGATION MEASURES** (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
		space required to prepares 0.01 ton of food		Forest Fires Act MPRDA Reg 65	activities in an area.
Maintenance of vehicles	All phases	200 cubic meters	Use oil trays	MPRDA Reg 68 NEMA Waste Act	Concurrently with the completion of mining activities in an area.
Disposal of Waste	All phases	200 litre bins	Use waste Receptacles	NEMA Waste Act MPRDA Reg 68	Concurrently with the completion of mining activities in an area.
Preparation of vehicle maintenance concrete padding	Operational Phase	0.25 ha	Concurrent rehabilitation	MPRDA Regulations 61 & 62	Concurrently with the completion of mining activities in an area.

ACTIVITIES **(E.g. For prospecting -** drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route **etc…etc…etc** **E.g. For mining**,- excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)	**PHASE** (of operation in which activity will take place. State; Planning and design, Pre-Construction' Construction, Operational, Rehabilitation, Closure, Post closure).	**SIZE AND SCALE of disturbance** (volumes, tonnages and hectares or m²)	**MITIGATION MEASURES** (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
Excavation of Pits	Operational Phase	0.5-1 ha per time	Concurrent rehabilitation	Procedures for Managing Significant Impacts Related to Mining.	Concurrently with the completion of mining activities in an area.
De-establishment and removal of infrastructure/rehabilitation	Decommissioning and Closure Phases	2 - 5 ha	Systematic rehabilitation	Procedure for Emergency Preparedness and Response Procedure	Concurrently with the completion of mining activities in an area.

Impact Management Outcome

Table 3-17: Management Outcomes

ACTIVITY (whether listed or not listed). **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, , storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** • **Remedy through rehabilitation..**	**STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
Establishment / construction of camp site	Dust, Noise	Loss soil resources	Construction Phase	Dust suppression •Speed limits • Service equipment regularly	NEMA Air Quality Act Mine Health & Safety Act
Food preparation	Air pollution	Loss soil resources	All phases	•Restrict open fires *Maintain firebreaks	Mine Health and Safety Act National Veld and Forest Fires Act MPRDA Reg 65
Maintenance of vehicles	water contamination	Loss soil Resources	All phases	Use oil trays	MPRDA Reg 68 NEMA Waste Act
Disposal of Waste	dust, water contamination	Loss of Fauna and Flora	All phases	Use waste Receptacles	NEMA Waste Act MPRDA Reg 68

ACTIVITY (whether listed or not listed). **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, , storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** • **Remedy through rehabilitation..**	**STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
Preparation of vehicle maintenance concrete padding	noise, dust	Loss soil resources	Operational Phase	Concurrent rehabilitation	MPRDA Regulations 61 & 62
Excavation of Pits	Dust, Noise, water contamination	Dust emissions	Operational Phase	Concurrent rehabilitation	Procedures for Managing Significant Impacts Related to Mining.
De-establishment and removal of infrastructure/rehabilitation	Noise, air pollution	None	Decommissiong and Closure Phases	Systematic rehabilitation	Procedure for Emergency Preparedness and Response Procedure

f) Impact Management Actions

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

Table 3—18: Impact Management Actions

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, , storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** **Remedy through rehabilitation..**	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or.Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)
Establishment / construction of camp site	Dust, Noise	Dust suppression Glittery Resources will implement a low speed	Construction Phase	NEMA Air Quality Act Mine Health & Safety Act

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, , storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through** **(e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** **Remedy through rehabilitation..**	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or.Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)
		limit at the mine to ensure that the traffic risk is minimised. A speed limit of between 10-20 km/h will generally be enforced at the proposed mining area especially in areas of high levels of interaction between vehicles and pedestrians.		

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, , storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** **Remedy through rehabilitation..**	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or.Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)
		•Speed limits •Service equipment regularly		
Food preparation	Air pollution	•Restrict open fires *Maintain firebreaks	All phases	Mine Health and Safety Act National Veld and Forest Fires Act MPRDA Reg 65
Maintenance of vehicles	water contamination	Use oil trays	All phases	MPRDA Reg 68 NEMA Waste Act
Disposal of Waste	dust, water contamination	Use waste Receptacles	All phases	NEMA Waste Act MPRDA Reg 68
Preparation of vehicle maintenance concrete	noise, dust	Concurrent rehabilitation	Operational Phase	MPRDA Regulations 61 & 62

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, , storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through** **(e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** **Remedy through rehabilitation..**	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or.Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)
padding				
Excavation of Pits	Dust, Noise, water contamination	Concurrent rehabilitation	Operational Phase	Procedures for Managing Significant Impacts Related to Mining.
De-establishment and removal of infrastructure/rehabilitation	Noise, air pollution	Systematic rehabilitation	Decommissioning and Closure Phases	Procedure for Emergency Preparedness and Response Procedure
Specific Mitigation Measures				

Maintenance of Road	• Dust pollution	• Control through dust suppression • Control through minimisation of vehicle movement • Control through monitoring of dust fall to determine if measures are effective	All phases	Conduct dust suppression techniques to ensure that applicable standards for PM10 and PM2.5 are not exceeded
	Soil erosion, compaction and contamination	• Prevent through restricting the disturbed area • Prevent through restricting spillage from haulage vehicles • Control through removal of all utilizable soil and storage of the same class • Control through implementation of storm water management measures • Remedy through treatment of contaminated soils		Rehabilitation standards/objectives
	• Loss of vegetation • Invasion by alien invasive species	• Modify by vegetating soil stockpiles • Control though alien invasive eradication programme	All phases	Rehabilitation standards/objectives
	• Visual impact	• Avoid/prevent leaving any building material or waste on site		Rehabilitation standards/objectives
	• Heritage	• Prevent through reporting and evaluation of any archaeological or heritage features found		Impact avoided

	• Social impact	• Control through appropriate management measures; • Prevent through HSEC		Objectives of Labour and safety laws
Clearing of vegetation within the footprint of the topsoil stockpile and the proposed mining area	• Dust pollution	• Control through dust suppression • Control through minimization of vehicle movement • Control through monitoring of dust fall to determine if measures are effective	All phases	Conduct dust suppression techniques to ensure that applicable standards for PM10 and PM2.5 are not exceeded
	• Soil erosion, compaction and contamination	• Prevent through restricting the disturbed area • Prevent through restricting spillage from haulage vehicles • Control through removal of all utilizable soil and storage of the same class • Control through implementation of storm • water management measures • Remedy through treatment of contaminated soils		Rehabilitation standards/objectives
	• Loss of vegetation • Invasion by alien invasive species	• Control through restricting the footprint to be cleared • Control though alien invasive eradication	All phases	Rehabilitation standards/objectives
	• Visual impact	• Avoid/prevent leaving any building material or waste on site		Rehabilitation standards/objectives

	• Heritage	• Prevent through reporting and evaluation of any archaeological or heritage features found		Impact avoided
	• Social impact	• Control through appropriate management measures; • Prevent through HSEC		Objectives of Labour and safety laws
Hauling and transport of ROM during operations	• Dust pollution	• Control through dust suppression • Control through minimisation of vehicle movement • Control through monitoring of dustfall to determine if measures are effective	All phases	Conduct dust suppression techniques to ensure that applicable standards for PM10 and PM2.5 are not exceeded
	• Soil erosion, compaction and contamination	• Prevent through restricting the disturbed area • Prevent through restricting spillage from haulage vehicles • Control through removal of all utilisable soil and storage of the same class • Control through implementation of storm water management measures • Remedy through treatment of		Rehabilitation standards/objectives

a) Financial Provision

(1) Determination of the amount of Financial Provision.

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

The overall goal for closure of the 5 ha mining site is to shape the excavations to avoid damming of water, ensuring that the land is stable and safe in the long-term. For post closure, the pit will be shaped and rehabilitated and proposed future use after mining will be grazing. Closure objectives relate to the following:

Physical stability: To level and shape excavations.

Environmental quality: To ensure that local environmental quality is not adversely affected by possible physical effects and chemical contaminants arising from the mining after completion of mining activities.

Health and safety: To limit the possible health and safety threats to humans and animals. Level and shape excavations to avoid damming of water.

Land capability/land-use: To ensure continuation or to the re-instate a suitable land capability over as large as possible area affected during mining.

Aesthetic quality: To leave behind a rehabilitated site that is neat and tidy, giving an acceptable overall aesthetic appearance.

Biodiversity: To encourage the re-establishment of indigenous and/ or appropriate vegetation on the rehabilitated mining site such that the biodiversity is largely re-instated over time, as well as protect the undisturbed areas to maintain/enhance the biodiversity of these areas. Mining area rehabilitated to limit impact on current land use.

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

It is confirmed that the objectives have been compiled in taking into cognizance the inputs of the landowners and I & APs. The following media of communication with interested and affected parties (I & APs) were used:

- A newspaper advert will be published on the 23rd of June 2021 in the local newspaper "Hazyview Herald Newspaper", giving notice to I & APs of the applicant`s intention to prospect the area as well as inviting all affected parties to a meeting where the applicant would provide full details of the project. **The Hazyview Herald** newspaper is one of the most popular newspapers in the Barberton, Mpumalanga area. The Barberton Times is published in English and Afrikaans and is distributed in areas including Malelani, Barberton, Kaapmuiden, Lows Creek, Nelspruit and Badplaas;
- Site notices written in English (A3 sized) were placed in strategic areas such as libraries, hospitals, municipality, community halls, police stations, local supermarkets, and on the farm Koede 218 JU;
- E-mail and telephonic communication with I & APs;
- Comment and registration sheet: I & APs were requested to provide written comments, concerns and inputs that would be consolidated into the BAR;
- Questionnaires: Property owners in particular were provided with an environmental aspect questionnaire to complete to assist in identifying features on their respective farms that may require protection or special attention;
- The public meeting with interested and affected parties will be held as follows:
  Venue: **Matsulu Community Hall, 45 Louis Matsulu Civic Centre, Madiba Drive, Matsulu**
  Date: **17th July 2021 (Saturday)** Time: **11:00 am to 13:00 pm**
- A register of I & APs was kept and as such the following information was distributed to them:
  - Background Information Document (BID). The BID is comprised of the following information:

- The description of the land concerned;
- The location of the project;
- The minerals applied for;
- Timeframes for submission of reports to the DMRE;
- Request to target audience to register as I & APs;
- Contact details of the applicant and EAP

- Prospecting Works Programme
- The draft Basic Assessment Report and Environmental Management Plan (BAR & EMPr) for the proposed project was made available for public review and comment from the **1st of July 2021** to the **2nd August 2021** at the following places:

  -**Venue 1: Matsulu Community Library, 45 Louis Matsulu Civic Centre, Madiba Drive, Matsulu**

  -**Online at:** www.stenvironmnetal.co.za

Other Interested and Affected Parties

It is important that I & APs represent all relevant sectors of the society and various relevant organs of state who work together to make better decisions. A stakeholder database has been compiled for this project. The I & APs currently identified for the proposed project include the following categories (for full list of I & APs refer to **Appendix C**):

- Property/land owners- Chamotte Holdings (Pty) Ltd
  - Nkomazi Local Municipality (T15578/2015);
- Relevant authority including the following:
  - Department of Water and Sanitation;
  - Department of Environmental Affairs;
  - Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs;
  - Mpumalanga Department of Public Works, Roads and Transport;
  - Nkomazi Local Municipality;

- Ehlanzeni District Municipality;
- Mpumalanga Department of Economic Development and Tourism;
- Regional Land Claims Commissioner;
- South African Heritage Resources Agency (SAHRA);
- Eskom

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

- The removal, decommissioning and disposal of all mining infrastructure, will comply with all conditions contained in the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).
- To this end the decommissioning and rehabilitation of all infrastructure areas will follow the following principles:
    - All vehicles, plant (crusher and screening plant) and workshop equipment will be removed for salvage or resale;
    - All fixed assets that can be profitably removed will be removed for salvage or resale;
    - Any item that has no salvage value to the mine but could be of value to individuals will be treated as waste;
    - All structures will be demolished and terracing and foundations removed to the lesser of 500 mm below the original ground level;
    - The excavations will be filled in with soil, the top 100 mm being topsoil (from stockpiles);
    - Paved roads will be ripped up, the wearing course treated as waste and the sub-base ripped or ploughed and covered with 100 mm topsoil;
    - Inert ceramic waste with a salvage value to individuals such as scrap metal, building materials, etc. will be removed and disposed of at a proper facility;
    - All disturbed and exposed surfaces will be covered with at least 100 mm of topsoil and re-vegetation must be allowed to take place naturally;

- Water quality will be monitored until it reaches a steady state or for two years after closure;
- Dismantle and remove redundant fence for salvage;
- Demolish all concrete fence foundations to 500 mm below the original ground level;
- Cover the fence line with topsoil; and
- All services such as the water supply line and the power line will be demolished only for the section on the mine's property.

SUBMISSION OF INFORMATION

- All facilities that become redundant during the life of the mine must be rehabilitated concurrently to lighten the rehabilitation process at the end of the mine's life;
- Attention must be paid to the latest developments in the mine rehabilitation sciences;
- The mine closure plan must always keep pace with the current best practices so it must be reviewed every five years; and
- All information as required by the various government departments should be captured and be readily available for submission when required.

MAINTENANCE

The necessary agreements and arrangement will be made by Glittery Resources to ensure that all natural physical, chemical and biological processes for which a closure condition have been specified are monitored until they reach a steady state or for two years after closure or as long as deemed necessary at the time; and

- All rehabilitated areas will be monitored and maintained until such time as required to enable the mine to apply for closure of these different areas.

CLOSURE GOALS AND TARGETS

"That all residual environmental impacts associated with the mining method employed, including possible final voids, infrastructure, and stockpile will be neutralized or minimised such that the post-mining environment is able to function in a manner which

conforms to the concept of sustainable development." Implement operational control measures as indicated and required by the EMP:

- Ensure post mining provision (financial) is documented and available;
- Initiate first stage rehabilitation with the aim of establishing low yield graze land, simultaneous acknowledgement of structural and service related factors for the later residential development objectives;
- Establish a close working relationship with adjacent operational institutions and facilitate a common long term closure objective;
- Address post mining objectives as stipulated in the section below; and
- Establish and conform to a frequent monitoring and reporting programme, such that liability assessments as well as legal compliance is tested and screened for improvements.

PERFORMANCE ASSESSMENTS

The proposed mining activities are only temporary on the land, so it is vital that rehabilitation of land takes place once mining operations have stopped. However, concurrent rehabilitation should take place where applicable. Mine reclamation activities are undertaken gradually;

- with the shaping and contouring of excavated areas,
- removal of infrastructure,
- replacement of topsoil,
- seeding with grasses and planting of trees taking place on the mined-out areas, and
- Care is taken to relocate wildlife, and other valuable resources.

The above is largely achieved through bulldozers and scrapers which is used to reshape the disturbed area. Drainage within and off the site should be designed to make the new land surface as stable and resistant to soil erosion as the local environment allows.

INFRASTRUCTURE AREA

The removal, decommissioning and disposal of all mining infrastructure, will comply with all conditions contained in the MPRDA, 2002 (Act No. 28 of 2002). To this end, decommissioning and rehabilitation of all infrastructure areas will follow the following principles:

- Dismantle project related infrastructure. Load and remove from site for re-sale or disposal at an approved waste site;
- Any item that has no salvage value to the mine but could be of value to individuals will be treated as waste;
- Demolish and remove concrete foundations and slabs to an approved waste disposal facility, also to opencast voids;
- Dismantle and remove redundant fence for salvage;
- Cover the fence line with topsoil;
- The company contracted to supply fuel will be requested to remove all fuel storage and reticulation facilities;
- All structures will be demolished and terracing and foundations removed to the lesser of 500 mm below the original ground level;
- Rip and grade the above areas for placement of topsoil;
- Rip and grade mine roads for placement of topsoil;
- Maintenance of roads required for maintenance and monitoring;
- Load from stockpile, haul, place and spread a layer of topsoil on all areas on which vegetation will be established;
- Establish vegetation on topsoiled surfaces, including analysis of topsoil, application of fertilisers, application of seed and hand planting as necessary;
- Active maintenance of planted areas for a period of at least a year, including re-seeding and replanting, weed and alien vegetation control as required;
- Passive maintenance of planted areas, including re-seeding and re-planting, weed and alien vegetation control as required;

- Undertake complete groundwater quality and water level monitoring in order to establish long-term groundwater levels and quality trends;
- Haul roads will have consolidated basement materials lifted and disposed in to pit. Footprint of haul roads will be ripped to a depth of 1.0 meters. Topsoil will be spread over the ripped haul road footprint to a depth of 300 mm and reseeded; and
- Piping and water treatment infrastructure will be maintained on site until water quality monitoring data proves that the water quality is acceptable for direct release to the receiving environment. The detailed closure plan that will be developed at end of mine life will address Long water monitoring and maintenance requirements.

MINE RESIDUE

Topsoil deposit will be capped where necessary and vegetated with the seed mix proposed above. *Stoloniferous* grasses are included to bind the topsoil and soils and prevent erosion. The following basic principles of rehabilitation form the basis of the truck and shovel mining method:

- Prepare a rehabilitation plan prior to the commencement of mining;
- Agree on the long-term post - mining land use objective for the area with the relevant government departments, local government councils and nearby community members. The land use must be compatible with the climate, soil, topography of the final landform and the degree of the management available after rehabilitation;
- Progressively rehabilitate the site, where possible, so that the rate of rehabilitation is similar to the rate of mining;
- Prevent the introduction of noxious weeds and pests;
- Minimise the area cleared for mining and associated facilities to that absolutely necessary for the safe operation of the mine;

LEADING CLOSURE OBJECTIVES

Socio Economic

Closure Management Objectives

The retrenchment processes will be followed as per requirements of the applicable legal process.

Specific Performance Criteria

- The rehabilitated mining environment shall be made safe and deemed safe;
- Where possible infrastructure will remain for social investment opportunities, this will be decided in conjunction with the Integrated Development Plan (IDP) of the area and the local authorities (i.e. municipality). The soils and land capability will be rehabilitated.
- The location and details of any buried hazards will be clearly defined and robust markers will be installed and maintained.
- All fences erected around the mine will be dismantled and either disposed of at a permitted disposal site or sold as scrap (provided these structures will no longer be required by the post-mining landowner). Fences erected to cordon-off dangerous excavations will remain in place and will be maintained as required.

Monitoring and Reporting

- Commitments made by the mine to I&APs in the issues register will be followed up on a regular basis.
- PPP reports and meeting minutes will be made available to all who attended and copies kept on site. This will include an issues and response register.
- The stakeholder engagement manager will be responsible for keeping all records and following up on commitments made to affected parties.

Action Required

- Any commitments made to I & APs will be attended to the relevant I&AP satisfaction as agreed upon between the I & APs and the mine.

Traffic and Safety

Closure Management Objective

- Ensure that all roads rehabilitated and or left behind is safe in good working condition, ensuring public safety and access to site and monitoring points.

Monitoring and reporting

- The site manager will inspect the roads for degradation and spillages.
- Speed limits will be enforced on site where appropriate and feasible.
- All incidences and issues will be recorded, as will the actions taken to address issues and records of such actions kept on site.

Action required

- Any degradation to roads will be repaired with consultation of the roads department.

Topography and erosion control

Closure Management Objectives

- Former Digital Terrain Measurements (DTM) will be used to establish what contours were present prior to topsoil dumps and these will be used to help shape the area according to the final topographical plan.
- The area will have contours constructed to prevent soil erosion.

Specific Performance Criteria

- Surface water bodies shall not be left in any mining voids unless the operations manager demonstrates there will be no significant environmental impact (such as salinization, reduction in water availability, toxicity, algal problems, attraction to pest species or a local safety hazard).
- All slopes which may incur erosion will be profiled in such a way that a preferential down drain can be installed.
- Rehabilitated profiles must ensure free drainage of water and should be contoured to fit in with the catchment dynamics.
- Erosion control measures such as contour banks and cut off berms should be constructed and soil vegetated in rehabilitated areas. On gentle slopes, water

will be encouraged to flow off the rehabilitated surface as surface flow, as quickly as possible without causing erosion.

- Where areas of potential ponding is noted, is to be re-profiled to be free draining thereby minimising the potential for ponding.
- All other slopes will have contour drains installed to prevent erosion at intervals of no more than 5 m vertical and have a slope of no steeper that 1:250. These contour drains will have an upslope basin with down slope berms.
- Batter board positions at 50m intervals will be set out with the desired slope; these batter boards are to ensure that rehabilitation is completed to within 10% of the final landform. Grid pegs will be set out using the detailed 10m grid in the final profiling to achieve compliance.
- On achieving the profile to within 10% of the final elevation, the fill areas can be pegged out with stakes and these cut off on the elevation of the final profile. The final fill material will be placed around these until the stakes are covered.
- Erosion control measures such as contour banks and cut off berms should be constructed and soil vegetated in rehabilitated areas. On gentle slopes, water will be encouraged to flow off the rehabilitated surface as surface flow, as quickly as possible without causing erosion.

Monitoring and Proposed Actions

- During decommissioning, the environmental site manager together with the site manager will monitor construction activities at least weekly to ensure the trenches and dams are in accordance with the specification as per design.
- After rehabilitation the site will be monitored for any pooling or erosion on site, especially after rainfall. This will be the responsibility of the environmental site manager.
- The area needs to be surveyed every two months to monitor differential settlement.
- The environmental site manager will ensure annual soil assessments be conducted by specialist pedologists after rehabilitation of the site.

- Weekly inspections will be conducted by the environmental site manager for any erosion which must be addressed immediately if observed, and together with the site manager will inspect all pipelines and associated dirty water channels/compartments to ensure no leaks or damage to these.
- All dirty water separation and containment facilities will also be inspected at least weekly (and after each rainfall event), to ensure adequate functioning of all systems to prevent leaks into the environment which will negatively impact on the soils.
- The environmental site manager will ensure monthly inspection of surrounding areas for soil compaction.
- Ensure surface water monitoring and action plans are implemented.
- Rehabilitated sites will be inspected for soil erosion on a monthly basis, together with the visual inspection regards to the vegetation cover abundance.
- The rehabilitated areas must be monitored for the type and depth of soil cover used.
- Monitoring of any ecologically sensitive species should they be observed on site will be done as and when required.
- The site will be monitored for alien invasive species at least every 6 months. This will, however, be dependent on the species of alien invasive species on site.
- Floral surveys will be conducted on rehabilitated areas on an annual basis, together with the soil quality and depth monitoring.
- All reports will be kept at the mining offices. All incidences and issues will be recorded, as will the actions taken to address issues. The environmental site manager will be responsible for inspection of sites and keeping records of all monitoring activities.
- The site manager is responsible for ensuring that all vehicles, remaining on site during the decommission phase, are serviced on a regular basis in terms of the maintenance plans.

Action Required

- Any pooling will be addressed by filling depression and / or grading areas and re-vegetating such sites.
- Any erosion will also be addressed utilising contour berms, gabion structures if necessary or a specialist will be consulted if necessary. Any eroded soils will be lifted and returned to the affected area.
- Any deficiencies will be corrected by placing material in these areas as per the rehabilitation plan.
- Additional material or soil will be brought in if required.
- Where topographical areas are exceeded and create storm water drainage issues, excess material will be removed and area rehabilitated as per the rehabilitation plan.
- Any recommendations made by specialist pedologist after annual surveys of rehabilitated areas will be considered for implementation as proposed.
- Any eroded soil will be lifted and replaced to the area which has been eroded.
- The area will be rehabilitated as per the rehabilitation plan.
- Erosion control measures, such as gabion structures, will be considered at areas where erosion is persistent.
- Records of soil placement and package thickness will be kept on a monthly basis during the mining phase.
- Where the soil depth is compromised the areas will be filled with topsoil.
- Material will be brought in if necessary.
- Silt build-up in water management facilities will be cleared and deposited in residue deposits if dirty.
- Any compacted soils will be ripped and re-vegetated with indigenous flora. Vegetation will then be monitored in these areas.
- Should any erosion be observed on site, it will be reported to the site manager and environmental site manager. The issue will be addressed and consideration given to:
- Increasing vegetative cover in problem areas through manual seeding/planting.

- Implementing erosion control measures such as contour berms or gabion baskets.
- Consulting specialists.
    - Should soil depth be inadequate in the rehabilitated areas, then more soil will be brought in and deposited on the site.
    - The area will also be inspected for erosion to determine the reason for soil loss. This will be addressed immediately.
    - All recommendations made by the specialists will be implemented where deemed appropriate.
    - Manual seeding or planting should vegetative cover be inadequate.
    - An alien invasive management program will be implemented for the control and eradication of alien invasive species on site. This plan will give preference to mechanical control methods. Any chemicals utilised will be used responsibly. Where required Department of Water and Sanitation (DWS) will be consulted with regards to the use of certain chemicals.

Surface Water Control

Closure Management Objectives

- Surface water will be managed as per GN704 and all clean water will be diverted around the rehabilitated area.
- All water that falls on the rehabilitated area will be managed in such a way that no erosion will occur through the use of contour drains.
- Potential dirty water will be directed to containment dams or silt dams.
- The filled and rehabilitated area will be shaped to facilitate run-off towards the catchment area.
- There shall be no long term reduction in the availability of water to meet local environmental values.

Specific Performance Criteria

- Actions shall be taken during rehabilitation to ensure that surface and groundwater hydrological patterns/flows will not be adversely affected by the rehabilitation.
- Surface and groundwater levels and quality will reflect original levels and water chemistry;
- Clean water diversion drains are to be installed around the area. Once the final re-profiling has been completed and the clean water diversions are constructed on the rehabilitated ground.
- Run-off from un-rehabilitated areas will be directed away from any rehabilitated areas. Runoff from rehabilitated areas will be channelled to sedimentation structures so that eroded soil does not leave the property.
- Where seepage/decant may occur deep cut off trenches will be created to intercept the ground water where it daylights downstream and directed or pumped to the containment dam upslope of the void.
- Natural drainage lines will be followed to reduce loss of water in the natural catchments.

Monitoring and Proposed Actions

- The environmental site manager will ensure that surface water quality is monitored on a monthly basis during the closure phase.
- A water quality report will be compiled on a quarterly basis and will show all the high risk areas and areas deviating from current background water quality.
- Specialists recommendations with regard to water quality issues observed, will be implemented as appropriate.
- Water management features will be upgraded as necessary if water quality issues arise from these structures.
- The rehabilitated area will be monitored for ponding.
- Any areas where ponding occurs will be filled and reshaped as per the rehabilitation plan to ensure surface water runoff from the area and discourage ponding.

Water Quality Monitoring and Reporting

- This monitoring program will include various upstream and downstream monitoring points and various sources on site.
- Database of results will be maintained by the environmental site manager and quarterly and annual reports will be compiled and submitted to the mine management and will be submitted to DWA.
- All samples will be submitted to an accredited laboratory for analysis.
- The following water quality parameters are recommended for the closure phase analysis:
    - ✓ Total Dissolved Solids;
    - ✓ Electrical Conductivity;
    - ✓ pH level;
    - ✓ Alkalinity;
    - ✓ Carbonates;
    - ✓ Magnesium;
    - ✓ Calcium;
    - ✓ Sodium;
    - ✓ Potassium;
    - ✓ Sulphate;
    - ✓ Chloride;
    - ✓ Fluoride;
    - ✓ Iron;
    - ✓ Manganese;
    - ✓ Aluminum
    - ✓ Water use and consumption on site must be monitored at various strategic locations on site.

Ecology

Closure Management Objectives

- Areas will be fenced off once seeded to prevent surface disturbance to the site and allow for vegetation to establish and stabilise.

Specific Performance criteria

- Vegetation in rehabilitated areas will have equivalent values as surrounding natural ecosystems.
- The rehabilitated ecosystem will have equivalent functions and resilience as the target ecosystem.
- Soil properties will be appropriate to support the target ecosystem.
- The rehabilitated areas will provide appropriate habitat for fauna
- Fauna utilisation, abundance and diversity appropriate to specified post mining land use.
- Berms will be maintained. This will be undertaken by vegetating all berms to ensure that they are stable. The berms will also be inspected to ensure that there are no cracks, which could cause leakage. The berms will only be demolished should the area prove to be free draining with no pollution potential after rehabilitation.

Monitoring and Proposed Actions

- Services of a qualified person will be used to monitor the re-vegetation of the rehabilitated areas.
- Records of the monitoring will be kept on site.
- The environmental site manager will ensure that an alien invasive monitoring, eradication and control programme is established during closure and the area will be inspected at least every 3 months and more frequently in areas where alien species were observed.
- The environmental site manager will be responsible for inspecting and managing any protected flora that may be identified by specialists. Specialists will be consulted regarding relocation of these species if necessary during rehabilitation or closure.
- All incidences and issues during closure will be recorded, as will the actions taken to address issues. These will be filed and kept at the mine offices.

- Rehabilitation will be visually inspected at least monthly with regards to vegetation cover abundance.
- The rehabilitated area will be inspected monthly for general erosion and vegetative cover.
- Rehabilitated areas will be monitored for soil quality and depth annually.

Action Required

- Should it be noted that designs are not being followed, rehabilitation activities will be amended to ensure corrective measures will be taken to ensure design specifications are achieved. Specialists will be consulted if necessary.
- The specialist's recommendations from bio-monitoring and from annual floral surveys of rehabilitated areas will be implemented as soon as possible.
- Should any erosion be observed on site, it will be reported to the site manager and environmental site manager. The issue will be addressed and consideration given to:
    - Increasing vegetative cover in problem areas through manual seeding/planting.
    - Implementing erosion control measures such as contour berms or gabion baskets.
    - Consulting specialists.
    - Should soil depth be inadequate in the rehabilitated areas, more soil will be brought in and deposited on the site.
    - The area will also be inspected for erosion to determine the reason for soil loss.
    - All recommendations made by the specialists will be followed.
    - Manual seeding or planting should vegetative cover be inadequate.
    - An alien invasive management programme will be implemented for the control and eradication of alien invasive species on site. This plan will give preference to mechanical control methods. Any chemicals utilised must be used responsibly.

Land use

Closure Management objectives

- To ensure that rehabilitation (physical and chemical) is done to such an extent that land use potential is regained.

Specific Performance Criteria

- Soil samples will be taken from rehabilitated areas annually over the full period of closure to determine soil fertility, depth compaction, acidity and mine related pollution. This should be conducted by qualified specialist who will also recommend actions and remedial measures to correct any issues observed on site.
- Only after the levelled areas have been inspected and approved by the Mine Manager/Site Manager will topsoil be placed to a depth of 0.5 m (where possible the original topsoil types should be placed back into the area where it was found). The topsoil layer must be as even as possible, i.e. it must be smooth and the depth must remain consistent throughout.
- Once the topsoil has been replaced, vehicle movement will be restricted to prevent compaction of the topsoil. All runoff from freshly top soiled areas will be channelled to pollution control structures so that eroded soil does no leave the property.
- Rehabilitated areas will be vegetated within the same growing season (before or during the rainy season). A suitable seed bed will be prepared to enhance the penetration and absorption of water, thereby giving the seed the best possible chance to germinate. The seeding depth should be very shallow to provide better germination. For most grass species seeding depth is approximately 5-15mm.
- Rehabilitated areas will be re-vegetated with local indigenous flora as far as possible.
- Once the seed mixture has been sown the land must be rolled using to ensure consolidation around the seeds and effective moisture retention. Access to seeded areas will be restricted to protect the newly established pasture.

Monitoring and Measurement

- A detailed monitoring and reporting programme will be established and followed.
- Rehabilitated areas will be monitored for vegetation cover and alien invasive encroachment at least monthly by visual means.
- Areas of failed growth will be fertilised if necessary and re-seeded or planted with seedling plugs. All exotic and invasive vegetation should be removed.

Ground water

Closure Management Objective

- A cut-off intercept drain will be constructed to capture any seepage.
- Monitoring will continue to detect and report on changes in round water regime

Groundwater Quality and Quantity Monitoring and Reporting

- Up slope and down slope groundwater monitoring will be conducted on a quarterly basis during the closure phase;
- Water management features will be upgraded as necessary if water quality issues arise from these structures.
- The environmental site manager will be responsible for the implementation and maintenance of the groundwater monitoring and results obtained.
- The groundwater quality and levels will be monitored on a quarterly basis.
- All monitoring boreholes must be demarcated and protected to prevent damage or tampering.
- All samples will be submitted to an accredited laboratory for analysis.
- The following chemical parameters are recommended for the analysis during the closure phase:

  Total Dissolved Solids / Electrical Conductivity;

  - ✓ pH level;
  - ✓ Alkalinity;
  - ✓ Carbonates;
  - ✓ Magnesium;
  - ✓ Calcium;

- ✓ Sodium;
- ✓ Potassium;
- ✓ Sulphate;
- ✓ Chloride;
- ✓ Fluoride;
- ✓ Iron;
- ✓ Nitrate;
- ✓ Manganese; and
- ✓ Aluminium
- ✓ Water use and water consumption on site will be monitored at various strategic areas on site.

General Monitoring and Reporting

- The environmental site manager and site manager will inspect all water management facilities and associated pipelines at least weekly to ensure there are no leaks which would result in loss of water and that they are functioning optimally.
- The environmental site manager will be responsible for inspection of sites and keeping records of all monitoring activities.
- All incidences and issues will be recorded, as will the actions taken to address issues. These will be kept at the mine offices.

Action Required

- Should significant changes in qualities or levels be observed then:
- All high risk facilities will be inspected to ensure no severe problems occur in these areas which have resulted in poor quality leachate.
- Any issues observed will be reported to the environmental site manager and respective site manager.
- A geo-hydrologist will be consulted with regards to any additional mitigation or management activities which can assist in resolving potential pollution, such as cut-off drains.

- Should substantial decreases in groundwater levels or quality be observed in boreholes utilised by surrounding community then the applicant will need to find solutions in conjunction with affected parties.
- Should spikes be observed in water consumption then these will be investigated immediately and sources identified.
- All leaks identified will be repaired.
- Silt build-up in water management facilities / dams will be cleared and deposited in soil stockpiles if clean or in residue deposits if dirty.

Air Quality and Noise

Closure Management Objectives

- Dust suppression should be undertaken at site especially during the dry season and during windy conditions.

Monitoring and proposed actions

- Dust suppression techniques and/or frequency will be altered as necessary should dust levels become excessive and exceed target values during rehabilitation.
- Air quality monitoring and reporting will be conducted according to the GNR 827 –Dust control regulations;
- The environmental site manager will be responsible for managing the air quality database and implementing actions, should target levels and frequencies be exceeded. PM10 and PM2.5 monitoring will be conducted if required as per the air quality act and also fall within the responsibility of the environmental site manager.
- Ambient noise will be monitored bi-annually on the mine boundary in at least four compass directions.
- Occupational noise will be monitored on a monthly basis as part of Safety, Health and Environment.
- The environmental site manager will be responsible for managing noise level database and implement actions should acceptable noise levels be exceeded.

- The site manager will be responsible for ensuring that all vehicles, including those of contractors, are maintained as per their maintenance plan.
- All incidences and issues will be recorded, as will the actions taken to address issues. These will be kept at the mine offices.
- Specialists will be consulted where necessary.

Action required

- Should ambient dust levels exceed recommended standards and frequencies as per the Air Quality Act, then the management plan for dust will be re-evaluated and assessed to improve dust control on site. Actions could include:
- Use of dust binding agents in areas of high dust generation.
- Consideration of sprinkler systems in areas of high dust generation.
- More frequent spraying.
- Should ambient noise levels exceed target levels:
- Additional noise measurements will be taken at all sensitive receptors beyond the mine boundary in question, initially those nearest to the mine and working further away until levels are within acceptable levels.
- Should levels at sensitive receptors still exceed target levels, and it is due to mining activities, then the noise management plan will be re-evaluated to reduce noise at these sensitive receptors to within acceptable limits.
- Additional actions can include:
    - ✓ Utilisation of sound buffers or screens around noise sources.
    - ✓ Enclosing point sources in sound-proof enclosures if possible.
    - ✓ Utilising silencers on equipment.
    - ✓ Considering quieter equipment.

DOMAIN SPECIFIC CLOSURE CRITERIA

The following is a list of domain specific criteria which can be tested and quantified. These closure criteria include post-closure environmental outcomes which must be linked to the monitoring and measurement schedule and program. Please refer to the financial provision for mine closure for the cost associated with these domains.

Domain 1: Mobile Office

The contractor will provide a mobile office (4 x 10 m), the price of which has been included in the contractor's site establishment costing. A mobile office for the weighbridge will be established by the contractor and is included in the site establishment costing.

Domain 2: Screening and Crushing Plant and Associated Infrastructure

- Clean water trenches must remain where necessary and should be maintained by continuous inspections. The cut off trenches should be clean at all times, ensuring that they contain no obstructions. The cut off trenches will only be demolished should the area prove to be free draining with no pollution potential after rehabilitation.
- All pollution control structures will remain on site during closure to ensure the protection of the surrounding environment. These will only be rehabilitated once water runoff quality is of adequate quality to release into the environment.

Domain 3: Waste and Water Related Infrastructure

- All pollution control structures will remain on site during closure to ensure the protection of the surrounding environment. These will only be rehabilitated once water runoff quality is of adequate quality to release into the environment.
- The storm water diversion trench will remain in place after decommissions to reduce run-off over the rehabilitated area and reduce erosion.

Domain 4: Mine and Mine Associated Infrastructure

- Any excavations will be filled where appropriate unless demonstrated as necessary to support future land use.
- During rehabilitation it is imperative that the material placed against the high wall is compacted so as to prevent differential settlement, cracking and water ingress. Compaction can be achieved by redirecting the flow of traffic using either marker poles or drums to ensure proper tyre coverage and thus tyre compaction.
- All voids to be closed and rehabilitated at final closure of the mine.

- Ensuring water does not infiltrate too quickly and come into contact with carbonaceous material.
- Where areas of potential ponding are noted, these are to be re-profiled to be free draining thereby minimising the potential for ponding. Where seepage /decant may occur deep cut off trenches will be created to intercept the ground water where it daylights and this water will be diverted to dirty water containment areas.

Domain 5: Traffic Impact Assessment

The proposed development of the mine can be supported from a traffic flow point of view. It is further recommended that:

- Provision must be made on site to accommodate the safe loading and off-loading of staff using public transport.
- Since the proposed development will generate less than 100 vehicles per hour during the peak hours, only a Traffic Impact Statement (TIS) is required.
- Analyses of existing traffic conditions on the external road network and intersections surrounding the proposed residential development showed that generally the traffic conditions during typical weekday AM and PM peak hours are good with very little congestion during peak hours.
- The analyses of the existing plus development generated traffic showed that the additional traffic generated by the proposed development will not have an impact on the surrounding road network. The surrounding road network is currently operating well below its capacity. Therefore, the generated traffic volumes will easily be accommodated by the existing road network without reducing the levels of service on the surrounding road network. These additional trips will have little or no effect on public transport or pedestrian activities in the area.

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

Due to the nature of the activities, the impacts will be very limited and of short duration. The management plan is provided in such a manner as to ensure concurrent rehabilitation. The areas for mining purposes will be the main area experiencing impacts. In this event the activities will be temporary in nature, and a detailed management plan has been provided to address potential impacts associated with these activities.

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

The quantum of financial provision for the rehabilitation of negative environmental impact was determined in accordance with the National Environmental Management Act, 1998 (Act No. 107 of 1998): Regulation (GNR 940) pertaining to the financial provision for the rehabilitation, closure and post closure of prospecting, exploration, mining or production operations (DEA, 2014). A total amount of **R 63 850.5415** will be set aside for rehabilitation purposes.

(f) Confirm that the financial provision will be provided as determined.

Refer to section (s) (ii) of part A and section (j) (1) (e) of part B of this report.

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

Table 3-19: Monitoring of Impact Management Actions

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Establishment / construction of camp site	Visual inspect of soil erosion and compaction	▪ Dust suppression ▪ Speed limits ▪ Service equipment regularly	Mine Manager	▪ Once-off upfront consultation with affected parties. ▪ Consultation to be signed off by Environmental Management. ▪ All grievances to be signed-off by Environmental Management
Food preparation		▪ Restrict open fires ▪ Maintain fire breaks	Mine Manager	▪ Weekly and after rain events
Maintenance of vehicles		▪ Use oil trays	Mine Manager	▪ Weekly and after rain events
Disposal of Waste	Visual inspection of soil erosion and compaction	▪ Use waste receptacles	Mine Manager	▪ Weekly and after rain events

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Preparation of vehicle maintenance concrete padding	Visual inspect ion of soil erosion and / or compaction	▪ Concurrent rehabilitation	Mine Manager	▪ Weekly and after rainfall events
Excavation of box-cuts or open-pits	Visual inspection of soil erosion and compaction	▪ Concurrent rehabilitation	Mine Manager	▪ Once-off upfront consultation with affected parties. ▪ Consultation to be signed off by Environmental Management. All grievances to be signed-off by Environmental Management
De-establishment and removal of infrastructure (rehabilitation)	Follow up inspections and monitoring of rehabilitation	▪ Systematic rehabilitation	Mine Manager	▪ Monthly for a period of 6 months after rehabilitation activities are concluded. ▪ Monthly monitoring reports to be signed-off by the Environmental Manager. ▪ Corrective action to be confirmed and signed-off by the Environmental

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
				Manager. ▪ Consolidated monthly monitoring reports (including the corrective action taken) to be submitted to the Department of Mineral Resources. Assessment report for site closure to be submitted to the Department of Mineral Resources for approval.

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

High level monitoring:

- Bi-annual performance assessment must be conducted in line with the MPRDA (Regulation 55).
- Establish a structured system of internal and external communication of incidents.
- Any changes to the approved EMP which have an impact on interested and affected parties to be communicated to them and the EMP amended accordingly.
- Complaints register to be established and kept up to date.
- Interested and affected parties concerns to be incorporated into the project implementation.

Operational Level monitoring:

- On a regular basis all registers, procedures and records are checked against the prescripts of the EMP. Corrective action must be taken in cases of transgress where necessary.
- Internal audits to be conducted by an environmentalist when deemed necessary.
- Employees assigned to specific tasks.
- Should the mitigation measure not be in line with the prescripts, amendments will be made and the employees will be made aware of the changes and encouraged to adhere to such.
- On commencement of the project, all site personnel will be inducted at the site and will be taken through the EMP and other relevant legal requirements to familiarize them with same.
- Simplified signalling will be placed on site to sensitize the workers of the legal requirements attached to this EMP.

Noise:

- The Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) – Section 7.

- The Mine Health and Safety Act, 1996 (Act No. 39 of 1996) as amended.
- The Road Traffic Act, 1997 (Act No. 93 of 1997);
- The National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) – Section 34. and
- Regulations of the Mineral and Petroleum Resources
- Development Act, 2002 (Act No. 28 of 2002) – Regulation 66.

Air quality:

- The National Environment Management: Air Quality Act, 2004 (Act No.39 of 2004) (All Sections of this Act, except Section 21,22,36 to 49, 51 (1)(e), 51(1)(f), 51(3), 60 and 61 have taken effect on 11 September 2005);
- The Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965) (This Act will be repealed by the national Environment management: Air Quality Act, 2004 (Act No. 39 of 2004);
- Regulations to the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) – Regulation 64.
- The Mining Health and Safety Act, 1996 (Act No. 29 of 1996) as amended; and
- The Occupational Diseases in Mines and Works Act, 1973 (Act No 78 of 1973)

m) Environmental Awareness Plan

Glittery Resources Environmental Awareness Training will be 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;
- Comprehensive training – on emergency response, spill management, etc;
- Training verification and record keeping.

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

- Communication channels will be made and will cascade from the Site Manager through to the general workers.
- On a regular basis, all aspects of the operation will be checked against the prescripts of the EMP and its supporting procedures and, if established that certain of the aspects are not addressed or impacts on the environment are not mitigated properly, it will be immediately communicated to the operational team by management.
- Should the mitigation measure not be in line with the prescripts, amendments will be made and the employees will be made aware of the changes and encouraged to adhere to such.
- All site personnel will be inducted at the site and will be taken through the EMP and other relevant legal requirements to familiarize them with same.
- Simplified signage will be placed on site to sensitize the workers of the legal requirements attached to this EMP.

All personnel will undergo environmental awareness training programme as shown in the tabulation below.

Type of training	Training Targets	Standards
• Induction programme – legal aspects • Specific environmental aspects: waste, water, hydro carbons, dust, material handling rehabilitation • Competency • Health and safety – dust management, emergency preparedness, first aid. • Fauna and flora protection	• Management • Supervisors • Operators • Visitors • Contractors	• Records • Standard operating procedures • Signage • Personal Protection Equipment

(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 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 Department of Mineral Resources 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:

- Mine office complex and
- Vehicles, machinery 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 mining activities will take place and in the vehicles.

In addition to the above negative impact and risk management strategies, Glittery Resources will further enforce the following management options.

Table 3-20: Technical and Management Options

Potential impact	Technical and management options
Mineral sterilization	▪ Mine workings will be developed and designed taking cognisance of potential gold reserves.
Hazardous structures	▪ Establish and maintain site security measures ▪ Control site and facility access ▪ Appropriate design of stockpiles with the potential to fail (and by qualified person) ▪ Implement monitoring programme ▪ Implement an emergency response
Loss of soil resources and land capability through pollution	▪ Implement hazardous waste, dirty water and mineralised and non-mineralized waste management procedures
Loss of soil resources and land capability through physical disturbance	▪ Implementation of a soil management plan ▪ Limit disturbance of soil to what is necessary ▪ Stripping, storing, maintenance and replacement of topsoil in accordance with soil management procedures
Physical destruction of biodiversity	▪ Implement a biodiversity management plan ▪ Restrict mining activities to the authorized footprint (5 hectares) ▪ Provide alternative habitat (where appropriate and necessary)

Potential impact	Technical and management options
	▪ Implement a monitoring programme ▪ Rehabilitate disturbed areas
General disturbance of biodiversity	▪ Prevention of the killing of animal species and harvesting of plant species ▪ Implementation of dust control measures ▪ Pollution prevention measures (water, soil etc.) ▪ Prevention of the disturbance of ecosystems
Alternation of drainage patterns	▪ Avoid alteration of watercourses as far as practically possible ▪ Implement and maintain stormwater controls that meet regulatory requirements
Surface water pollution	▪ Appropriate design of polluting facilities and pollution prevention facilities (by qualified person) ▪ Implement and maintain stormwater controls that meet regulatory requirements ▪ Implement site-specific soil management plan ▪ Implement a groundwater and surface water monitoring programme ▪ Implement emergency response
Groundwater contamination	▪ Appropriate design of polluting facilities (by qualified person) ▪ Correct handling of hazardous wastes, mineralized and non-mineralized wastes ▪ Compensation for loss ▪ Implementation of a monitoring programme ▪ Implement emergency response
Dewatering	▪ Compensation for loss ▪ Implementation of a monitoring programme
Air pollution	▪ Implementation of air quality management plan

Potential impact	Technical and management options
	▪ Implementation of an air quality monitoring plan ▪ Control dust plumes ▪ Implementation of an air complaints procedure ▪ Maintenance of abatement equipment ▪ Implement an emergency response
Noise pollution	▪ Maintenance of equipment and machinery in good working order ▪ Equip machinery with silencers ▪ Construction of noise attenuation measures ▪ Implementation of noise monitoring programme ▪ Implementation of a noise complaints procedure ▪ Reducing operational hours ▪ Educate workers
Visual impacts	▪ Limit the clearing of vegetation ▪ Limit the emissions of visual dust plumes ▪ Use of screening berms ▪ Concurrent rehabilitation ▪ Painting infrastructure to compliment the surrounding environment ▪ Implementation of a closure plan ▪ Management through care and aftercare
Traffic increases	▪ Implementation of a traffic safety programme ▪ Implement speed allaying measures where appropriate, e.g. speed humps where necessary ▪ Education and awareness training of workers ▪ Enforce strict speed limits on mine access roads ▪ Ensure dust is effectively controlled on unpaved roads so as not to reduce visibility ▪ Placement of signage to create awareness

Potential impact	Technical and management options
	▪ Maintenance of the transport systems ▪ Implementation of traffic complaints procedure ▪ Implement an emergency response
Heritage (and cultural)	▪ Limit project infrastructure, activities and related disturbances as far as practically possible ▪ Avoid heritage and cultural resources as far as practically possible ▪ Inspect sites for encroachment and/or damage ▪ Education and awareness training of workers ▪ Implement emergency response with respect to the chance find procedure for heritage, cultural and paleontological resources
Economic impact	▪ Hire people from closest communities (Ekangala) as far as practically possible ▪ Extend the formal bursary and skills development to closest communities ▪ Implement a procurement mentorship programme ▪ Local procurement of goods and services as far as practically possible ▪ Compensation for loss of land use ▪ Closure planning will consider skills, economic consideration and the needs of future farming
Inward migration	▪ Good communication in terms of recruitment, procurement and training ▪ Number of temporary and permanent new job opportunities and procurement will be made public ▪ Employment and procurement opportunities provided to closest communities as far as practically possible ▪ No recruitment at the mine

Potential impact	Technical and management options
	▪ Notify unsuccessful job seekers ▪ Encourage formal housing of employees and implement contractual requirement for contractors to ensure formal housing for workers, both temporary and permanent ▪ Maintain a skills profile for the nearest communities ▪ Monitor and prevent the development of informal settlements through the interaction with neighbours, local authorities and law enforcement officials ▪ Implement a health policy of HIV/AIDS and tuberculosis to promote awareness and training ▪ Implement an emergency response
Land uses	▪ Implementation of EMP commitments that focus on environmental and social impacts ▪ Take necessary steps to prevent negative impact on surrounding land ▪ Compensation for loss ▪ Closure planning to incorporate measures to achieve future land use plans

n) Specific information required by the Competent Authority
(Among others, confirm that the financial provision will be reviewed annually).

Glittery Resources will annually declare financial statements to the Department of Mineral Resources and Energy (DMRE).

2) UNDERTAKING

The EAP herewith confirms

a) **the correctness of the information provided in the reports** [X]
b) **the inclusion of comments and inputs from stakeholders and I&APs;** [X]
c) **the inclusion of inputs and recommendations from the specialist reports where relevant;** [X] **and**
d) **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.** [X]

Signature of the environmental assessment practitioner:

Sakhal and Tobe Environmental (Pty) Ltd
Name of company:

3 August 2021
Date: