MONTE CRISTO COMMERCIAL PARK (PTY) LTD

REMAINING EXTENT, REMAINDER (OF PORTION 1) AND 3 OF THE FARM WOODLANDS 407

PARYS MUNICIPAL DISTRICT

FREE STATE PROVINCE

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT & ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

DEPARTMENTAL REFERENCE NUMBER:

FS 30/5/1/2/2/10048 MR AND FS 30/5/1/2/3/2/1/10048 EM

MARCH 2021

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EXECUTIVE SUMMARY

Background

Goosebay Farm (Pty) Ltd submitted an application for a Mining Right and Environmental Authorisation to the Department of Mineral Resources and Energy (DMRE), Free State Regional Manager in November 2017. The abovementioned Application was submitted over the Portions of the Farm Woodlands set out elsewhere herein. This application was allocated the Mining Right reference number FS 30/5/1/2/2/10042 MR. This initial application was withdrawn by the Applicant.

A new Mining Right and Environmental Authorisation application under different company, Monte Cristo Commercial Park (Pty) Ltd (to be empowered according to BEE requirements) was submitted on the 24th August 2018 and has been allocated the Mining Right reference number FS 30/5/1/2/2/10048 MR and Environmental Authorisation reference number FS 30/5/1/2/3/2/1/10048 EM.

Goosebay Farm (Pty) Ltd is the owner of the subject Farm Portions described elsewhere herein. Monte Cristo Commercial Park (Pty) Ltd, the current Applicant for the Mining Right, shares common Directors and Shareholders with Goosebay Farm (Pty) Ltd.

The final scoping report for this application was submitted 14th December 2018 and accepted by the Department of Mineral Resources and Energy (DMRE), Free State on the 7th of February 2019.

Initial extension of time was provided to the applicant for the period from February 2019 to February 2020. Subsequent thereto, COVID-19 was declared a worldwide pandemic, which further delayed the process. Due to the nationwide lockdown, which was a result of the National State of Disaster due to the pandemic, the mining right application process could not proceed during 2020 in terms of prescribed timeframes. Final extension of time was approved by the DMRE until 26 April 2021 upon which the Final Environmental Impact Assessment Report will be submitted for decision-making.

Introduction

Monte Cristo Commercial Park (Pty) Ltd (hereafter referred to as “MCCP”, the Applicant) is proposing to establish an open pit mine which will involve the development of open pits and associated mine infrastructure. The project will be known as Pure Source Mine. Commodities to be mined include sand, aggregate/gravel and diamond (alluvial).

In order to undertake the proposed mining and associated activities, MCCP requires a Mining Right (MR) in terms of Section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002, as amended) (MPRDA). In accordance with the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) Environmental Impact Assessment (EIA) and Waste Regulations as well as the National Water Act, 1998 (Act 36 of 1998) (NWA), the following environmental permitting and licensing processes are required:

- Undertaking the Public Participation Process.
- Compilation of an Integrated Environmental Authorisation Application.
- Compilation of Scoping and Environmental Impact reports.
- Development of an Environmental Management Programme and an Integrated Water and Waste Management Plan.
- Submission of an Integrated Water Use License Application.
- Submission of an Air Emissions License Application.

The VLDC Group has appointed Shango Solutions as the Environmental Assessment Practitioner (EAP) to manage the required environmental process for the Mining Right Application, this was completed up to the Final Scoping Phase.

The VLDC Group has appointed Greenmined Environmental as the Environmental Assessment Practitioner (EAP) to manage the Mining Right Application from the Draft Environmental Impact Assessment Report onwards. All the information in this report will be based on the information and documentation that was completed to date as the scoping report with all its contents was approved by the Department of Mineral Resources and Energy (DMRE), Free State.

Legal Background and Requirements

This report has been compiled in accordance with Appendix 2 of the General Notice Regulations (GNR) 326 of the NEMA 2014 EIA Regulations (as amended on the 7th April 2017) and the Directive set out in the template prescribed by the DMRE.

Project Location

The proposed application area is located approximately 15 km northwest of the town of Sasolburg, in the Free State Province of South Africa and covers 858.5825 hectares (ha), of which only 363.5 ha is allocated for mining and associated infrastructure, over the following farm portions:

- Remaining Extent of the farm Woodlands 407.
- Remaining Extent of Portion 1 of the farm Woodlands 407.
- Portion 3 of the farm Woodlands 407

Land Owner

Goosebay Farm (Pty) Ltd is, as stated above, the Landowner of the 3 Farm Portions, which comprise Goosebay Farm. It should be noted that the Applicant (Monte Cristo Commercial Park (Pty) Ltd), shares common Shareholding and Directorship with the Landowner. Therefore notwithstanding, that the Mining Right Applicant is a different Legal Persona from the Landowner, the said Applicant obviously has a vested interest, to ensure that all mitigation measures and conditions set out in this document, as well as any authorisations that may follow, should be fully adhered to and complied with, in order to minimise any impact on themselves as a related party to the Landowner of this property. Both the Landowner and the Applicant (as related parties with common Shareholding and Directorships), will be directly affected by any impacts arising from the proposed Mining Activities. They will first and foremost be affected by any impacts arising from these activities.

Geological Formation and Mining Target

Quaternary age sands and aggregates represent the mining target. These sands are unconsolidated and unconformably overlie sediments of the Transvaal Supergroup. The secondary commodity of interest is the unconsolidated, quaternary gravels, which potentially contain alluvial diamonds.

Uses and demand for the sand products and aggregates can be summarised as follows:

- The South African refractory industry requires a very pure silica sand with very little impurities. The users of refractory sand have very stringent quality criteria and only specific sands can be upgraded to produce refractory sand.
- Plaster sand is sought-after in the building industry. This sand has a specific size distribution and requires the clay content to be removed.
- Building sand has the lowest quality requirements in terms of chemical make-up and sizing and is in high demand.
- A local market for screened silica sand exists throughout the country for recreational uses such as for equestrian and golf courses.
- Glass sand is very fine-grained sand with detailed specifications, which is supplied to the glass making industry.
- The aggregate mining aims to produce G4 to G7 materials. These are utilised in the local civil construction and building supply industries.

Industrial and jewellery (commercial) diamonds are in constant demand and will be sold in accordance with the South African diamond board regulations to domestic and international buyers.

Project Description and Scope of Proposed Activity

Mining under the Mining Right will be undertaken by a “truck and shovel” method utilising suitably sized diesel driven equipment. A 363.5 ha area will be demarcated for phased open pit mining and associated infrastructure. The area containing the sand deposit will be mined in portions of on average 6.8 ha each year, with continuous roll-over rehabilitation. The area containing the aggregate resource will be mined in portions of on average 4.6 ha, per year. The planned open pit mine will comprise three distinct areas for the silica sand (main pit, north pit and east pit) and four areas for the aggregate (northern pit, central pit, south eastern pit and south western pit). Each area considers an estimated maximum depth of 12 m but may exceed a depth of 12 m in certain areas. The entire application area could have potential for diamond bearing gravels. The anticipated life of the mine is 30 years. An overview of the mining method for the three commodities is described below.

Sand Mining

Prior to commencement of sand mining, topsoil will be removed from the area demarcated for mining and stockpiled next to the pit for the purpose of rehabilitation. The sand will be mined in benches and reject material will be backfilled into the void as mining advances. Opencast benches will be established with a maximum height between 1.5 m to 3 m. Sand will either be screened in the pit or transported by truck or conveyer to the washing plant.

Alluvial Diamond Mining

Once sand mining has commenced, the underlying gravel (potentially diamondiferous) will be exposed and Reverse Circulation boreholes will be drilled to ascertain gravel quality and the diamond potential. Where appropriate, the gravel will be excavated and screened. The oversize will be used as infill, the -2 mm will report to the sand mining operation and the +2-32 mm fraction will be processed near the pit, to extract diamonds. The diamond potential exists across the entire project area, but will initially be evaluated in the Main, Northern and East sand deposit area. Should diamond potential be established via the proposed drilling programme referred to above, the appropriate gravel fraction will be transported to an on-site processing plant to extract diamonds. The alluvial diamond mining process will commence as soon as the Mining Right is granted.

Aggregate Mining

In the absence of sand, topsoil will be stripped to expose aggregate and stockpiled prior to excavating the aggregate. The excavated aggregate will be crushed in the pit by a mobile crusher and reject material will be backfilled into the void as mining advances.

A total sand resource of 21 910 291 m^3 is estimated for the application area. The average depth of the sand deposit is 10.64 m. All of the outcropping and underlying sediments on this property could be used for aggregate. From test pits dug on the application area, the total volume of fresh aggregate to an average depth 6.98 m is calculated at 9 565 043 m^3 and approximately 7.67 m for oxidised aggregate with a total volume of 10 498 882 m^3.

Silica sand is present on the Farm Woodlands and has been mined historically on the property. The types of sand present on Portions 1, 3 and the Remaining Extent of the Farm Woodlands 407 vary from light yellow plaster, dark yellow plaster, white plaster, grey plaster, building to red sand. Oxidised aggregate is suitable for decorative purposes, but not for use in the civil construction industry.

The anticipated life of the mine is 30 years with an option to renew if the mining programme is not yet completed. The closure objective is to develop the farm portions as an eco-estate with residential and hospitality facilities on the banks of the Vaal River. The application area is currently utilised as a game farm and this will continue to remain the primary land use with other agricultural activities such as crop production. Mining is an interim land use and it will be conducted in a sensitive manner that will not have a negative impact on the game.

Proposed Mining Infrastructure

The following infrastructure components will be established for the mining process:

- Dams.
- Wash plant for sand mining.
- Rotary pan processing plant for alluvial diamond mining.
- Potential alluvial diamond X-ray and/or flow sorting facility.
- Clean and dirty water management infrastructure (pollution control dams, water recycling plan (part of
- the wash plant), settling ponds, storm water runoff structures, water pipeline network as well as pump stations).
- Drying and screening plants.
- Topsoil and run-of mine stockpiles.

Additional mining and processing infrastructure will include haul roads, workshop, weighbridge and offices, conveyor systems, power lines, change houses, staff accommodation and recreation facilities and portable chemical ablution facilities for employees during the construction and operational phases.

Need and Desirability of the Project

Mining is important for economic development, to construct durable, modern structures, employment creation and revenue collection. The proposed site has previous sand mining activities, known to provide good quality silica sand to the local and regional building industry. This type of sand is commonly utilised in concrete mixtures in the construction industry. Sand is also used for mortar and rendering of plastered walls. The project site is located in the Ngwathe Local Municipality, and according to the municipality's 2018/19 Local Economic Development Strategy, the identified economic sectors of the municipality are Tourism, Agriculture, Manufacturing and Mining.

Extensive investigations have revealed that there is a shortage of alluvial silica sand in the Pretoria Witwatersrand-Vaal industrial complex. Alluvial silica sand has a greater utility than silica sand that is created by means of crushing processes. Furthermore, many of the previously existing abundant alluvial silica sand mines located in the Vaal Triangle (such as Copper Sunset, Skysand and Mission Point mines) are on the verge of being exhausted, thus making the mining of the existing resource at the Pure Source Mine both necessary and desirable, with regards to economic considerations.

Alternatives:

The identification of alternatives is a key aspect of the success of the environmental impact assessment process. All reasonable and feasible alternatives must be identified and screened to determine the most suitable alternatives to consider in this application. There are however, some constraints that have to be taken into account when identifying alternatives for a project depending on the scope. Such constraints include financial, social and environment related constraints.

Alternatives can typically be identified according to:

- Activity alternatives.
- Location alternatives.
- Design or layout alternatives.
- Technology alternatives.
- Operational alternatives.
- No Action alternative (No Go).

Alternatives are typically distinguished into discrete or incremental alternatives. Discrete alternatives are overall development options, which are typically identified during the pre-feasibility, feasibility and/or environmental impact assessment process. Incremental alternatives typically arise during the environmental impact assessment process and are usually suggested by means of addressing/mitigating identified impacts (mining in low sensitivity areas). These alternatives are closely linked to the identification of mitigation measures and are therefore not specifically identified as distinct alternatives.

For any alternative to be considered feasible, such an alternative must meet the need and purpose of the proposed activity without presenting significantly high associated impacts. The proposed activity is mining. Three alternative sites are considered for the position of the supporting mining infrastructure within the application area. Site Alternative 1 (S1) was identified as the preferred alternative.

For the purpose of this project, the need and justification for alternatives was specifically guided by the relatively low sensitivity of the receiving socio-economic and biophysical environment as well as the geology. Three alternative sites are considered for the location of the supporting mining infrastructure within the application area.

Site Alternative 1

Site Alternative 1 (Site 1, Figure 12) is the preferred site for the project. Site 1 is located near the south eastern border of Remaining Extent of Portion 1 of Woodlands 407 on a disturbed area (Figure 11). The site is strategically placed to be in close proximity to the main sand resource, the S171 tar road and power supply. The footprint of the infrastructure (excluding roads, power line and water supply) is approximately 13.5 ha.

Site Alternative 2

Site Alternative 2 (Site 2, Figure 13) is located near the western border of Remaining Extent of Woodlands 407 adjacent to an abandoned gravel pit (Figure 11). The settling ponds and pollution control dam are proposed in the borrow pit to make use of the existing depression. The remainder of the infrastructure will be located on existing cultivated farmland. This site is approximately 1.3 km north of the S171 and east of the main sand deposit. The footprint of the infrastructure (excluding roads, power line and water supply) is approximately 13.5 ha.

Site Alternative 3

Site Alternative 3 (Site 3, Figure 14) is located on Remaining Extent of Portion 1 of Woodlands 407, near its eastern border and just north of the main sand deposit (Figure 11). It is approximately 1.2 km north of the S171. The existing vegetation cover is predominantly grassland. The footprint of the infrastructure (excluding roads, power line and water supply) is approximately 13.5 ha.

Environmental Specialist Studies

The compilation of the Scoping Report for the proposed mining project required the input and contribution from several specialists, namely:

- Soil, Land Capability and Agricultural Potential.
- Terrestrial Biodiversity (Fauna, Avifauna and Flora).
- Aquatics and Wetland Biodiversity.
- Hydrology including Floodlines and Buffer Zone Calculations.
- Financial Provision and Final Rehabilitation, Decommissioning and Closure Plan.
- Heritage.
- Palaeontology.
- Social.
- Economic.
- Visual.
- Noise and Air Quality.

- Traffic.
- Geohydrology and Waste Classification.

The specialist studies assisted in determining the baseline information on the receiving environment and in identifying environmental sensitivities on site. The studies also assisted in the assessment of impacts associated with the project activities and in providing mitigation measures for the identified impacts

Baseline Environment

The compilation of the baseline information is based on specialist studies undertaken in support of this application, as well as input from the public through the Public Participation Process. Based on the assessment of the specialist studies, which were conducted at scoping level, and constituted mainly desktop work, no major fatal flaws were identified for this project, provided that the mitigation measures recommended by the specialists are implemented by the Applicant.

Preliminary Impacts

Below is a preliminary list of negative impacts identified during the Scoping phase of this project. These impacts, and any others identified, will be further assessed during the EIA phase of the project in this report:

- Hazardous excavations causing safety risks to third parties.
- Interference with existing land uses.
- Sense of place.
- Perceptions and expectations.
- Loss of soil resources and related land capability.
- Physical loss of biodiversity.
- Disturbance of biodiversity.
- Loss or disturbance of aquatic ecosystems.
- Quantity and quality impacts on surface and underground water resources.
- Increase in air pollution.
- Increase in disturbing noise levels.
- Negative landscape and visual impacts.
- Increase in traffic and effects on road conditions and safety.
- Loss or disturbance of heritage/cultural/ palaeontological resources.
- Inward migration and associated social ills.
- Reduction of current economic activities.
- Impact on property values and tourism.
- Soil contamination.
- Soil compaction.

- Impact on human health.
- Impact on livelihoods.

The preliminary positive implications of the proposed Pure Source Mine project are as follows:

- Job creation.
- Generation of technical and general skills to low-skilled labourers.
- Increase in business opportunities for the construction, industrial and jewellery industries.
- Gross Domestic Product (GDP) improvement and wealth generation.
- Contribution to royalties and tax revenues.
- Increase in product supply, therefore lowering the equilibrium price in the diamond, sand, and gravel markets.

These impacts, and any others identified, will be further assessed during the EIA phase of the project.

Plan of Study for EIA Phase

The S&EIA process is being carried out in accordance with the NEMA 2014 EIA Regulations (as amended). Each of the specialists undertook a detailed EIA assessment. Included in this report is a detailed plan of study provided by each of the appointed specialists to be implemented during the EIA phase. Potential impacts identified during the Scoping and EIA was assessed by the specialists for each feasible development.

Public Participation Process:

The Public Participation Process (PPP) for the proposed project is being undertaken in accordance with the requirements of the MPRDA, and NEMA in line with the principles of Integrated Environmental Management (IEM). IEM implies an open and transparent participatory process, whereby stakeholders and other Interested and Affected Parties (I&APs) are afforded an opportunity to comment on the project. A joint PPP has been implemented to engage with I&APs and meet the requirements for Public Participation as stipulated by the relevant legislation. The PPP provides stakeholders with information about the proposed project, and several opportunities to comment throughout the EIA/EMPR process. This will ensure public involvement at each key step in the process and allow for comments, concerns, suggestions, and objections to the proposed project to be included in each of the submissions to the relevant Government Authorities.

The first phase of an EIA is the Scoping Phase. In terms of the MPRDA and the NEMA, I&APs must be given the opportunity to comment on the proposed project. The Scoping Report aims

to describe the proposed project, the environment in which the project is located, and the potential impacts that may result if the project goes ahead. The Draft Scoping Report was made available for public comment for a period of at least 30 days from the 8th October 2018 to the 9th November 2018. A public Open day was held on the 24th October 2018 to introduce I&APs to the project and discuss the results of the scoping phase. Following requests, an additional Scoping Phase Public Consultation meeting was held on the 10th November 2018. The comments received from I&AP's during this commenting period have been captured in an I&AP summary table attached as appendix E to this report as well as in the Notes for the Record for both public consultation events.

This Draft Environmental Impact Report (EIR) including an Environmental Management Programme Report (EMPR), will be presented for public comment as the next step of this EIA process during which time further stakeholder engagement will take place.

Conclusion

In order to comply with national legislation, the proposed Pure Source Mine Mining Right project will require authorisation in terms of the MPRDA and NEMA. As such the project is required to undertake and submit the following reports for adjudication by the Competent Authority (DMRE):

- Scoping Report and EMPR as per the requirements of the MPRDA.
- Scoping, EIR and EMPR as per the requirements of the NEMA.

Thus, in parallel to the application in terms of the MPRDA, an application in terms of NEMA was compiled and submitted to the DMRE for decision-making. The first phase of an EIA is the Scoping Phase. Specialists were appointed to undertake scoping level assessments to (i) describe the baseline receiving environment, (ii) identify environmental sensitivities on site, (iii) assist in the assessment of impacts associated with the project activities and (iv) to provide mitigation measures for the identified impacts. Included in this report is a detailed plan of study provided by each of the appointed specialists to be implemented during the EIA phase. Potential impacts identified during the EIA were assessed by the specialists for each development alternative and for each phase of the project. This EIR, including the EMPR, will be presented for public comment as the next step of this EIA process during which time further stakeholder engagement will take place.

Upon approval of the Final Scoping Report, this report the Draft Environmental Impact Assessment Report (DEIAR) and Environmental Management Programme (EMPR) was compiled that will be circulated for public comment for a 30-day commenting period ending

22nd April 2021. The comments received on the DEIAR & EMPR will be incorporated into the final EIA & EMPR to be submitted for decision making to DMRE.

Environmental Impact Assessment Report:

The environmental impact assessment report identifies the potential positive and negative impacts that the proposed activity will have on the environment and the community as well as the aspects that may impact on the socio-economic conditions of directly affected persons, and proposes possible mitigation measure that could be applied to modify / remedy / control / stop the identified impacts.

LIST OF ACRONYMS

%	Percent
AQA	Air Quality Impact Assessment
AQMP	Air Quality Management Plan
AEL	Atmospheric Emissions License
AP	Action Plan
BBBEE	Broad Based Black Economic Empowerment
BID	Background Information Document
Bgl	Below Ground Level
CA	Competent Authority
CARA	Conservation of Agricultural Resources Act (No. 43 of 1983)
CCE	Capex Capital Expenditure
CBA	Critical Biodiversity Area
CRR	Comments and Responses Report
DEA	Department of Environmental Affairs
DMRE	Department of Mineral Resources and Energy
DRDLR	Department Rural Development and Land Reform
DSR	Draft Scoping Report
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMF	Environmental Management Framework
EMPR	Environmental Management Programme

EP	Equator Principle
ESA	Ecological Sensitive Area
FP	Financial Provision
FSR	Final Scoping Report
GDP	Gross Domestic Product
Ha	Hectare
HDV	Heavy duty vehicle
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IUCN	International Union for Conservation of Nature
IWULA	Integrated Water Use Licence Application
IWWMP	Integrated Water and Waste Management Plan
Km	Kilometre
kV	Kilo Volt
LoM	Life of Mine
LDV	Light duty vehicle
M	Metre
Ma	Million years
MAMSL	Metres above sea level
MAP	Mean Annual Precipitation
MCCP	Monte Christo Commercial Park
Mg/m2/day	Milligram per cubic metre per day
Ml	Megalitre
mm/a	Millimetres per annum
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MRA	Mineral Right Application
MVA	Megavoltampere

MWP	Mine Work Programme
NDP	National Development Plan
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEM:AQA	National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)
NEM:BA	National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004)
NEM:PAA	National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
NEM:WA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NEMLAA	National Environmental Laws Amendment Act, 2014 (Act No. 25 of 2014)
NFA	National Forest Act, 1998 (Act No 84 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
Opex	Operational expenditure
PCD	Pollution control dam
PPP	Public Participation Process
PR	Prospecting Right
PS	Performance Standards
RoD	Record of Decision
RoM	Run-of-Mine
S&EIA Programme	Scoping, Environmental Impact Assessment and Environmental Management
SAHRA	South African Heritage Resources Agency
SDF	Spatial Development Plan
SLP	Social and Labour Plan
SOP	Standard Operating Procedures
SPLUMA	Spatial Planning and Land Use Management Act, 2013 (Act No. 16 of 2013)
SSC	Species of special concern

VLDC	Van Wyk Land Development Corporation
WMA	Water Management Area
TSF	Tailings Storage Facility
TMM	Trackless Mobile Machine
WML	Waste Management License
WRD	Waste Rock Dump

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Appendix M: Closure Plan

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mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

And

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

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

NAME OF APPLICANT:	Monte Cristo Commercial Park (Pty) Ltd
TEL NO:	011 913 1719
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FILE REFERENCE NUMBER SAMRAD:	FS 30/5/1/2/2/10048 MR and FS 30/5/1/2/3/2/1/10048 EM

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 Authorization 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 Regulation, 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 authorization 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 failure to meet the requirements of the Regulation and will lead to the Environmental Authorization 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 order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the Applicant.

OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The objective of the environmental impact assessment process is to, through a consultative process-

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

(b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location,

(c) identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment,

(d) determine the –

(i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives, and

(ii) degree to which these impacts-

(aa) can be reversed;

(bb) may cause irreplaceable loss of resources, and

(cc) can be avoided, managed or mitigated;

(e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;

(f) identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity;

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

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

PART A

SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

1. CONTACT PERSON AND CORRESPONDENCE ADDRESS

a) Details of Greenmined Environmental

In terms of the National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA) the proponent must appoint an independent Environmental Assessment Practitioner (EAP) to undertake the environmental impact assessment (EIA) of any activities regulated in terms of the aforementioned Act. The VLDC Group has appointed Greenmined Environmental (Pty) Ltd (hereafter referred to as "Greenmined") as the Environmental Assessment Practitioner (EAP) on behalf of Monte Cristo Commercial Park (Pty) Ltd (hereafter referred to as the "MR Applicant") to manage the Mining Right Application from the Draft Environmental Impact Assessment Report onwards. Greenmined has no vested interest in Monte Cristo Commercial Park (Pty) Ltd or the proposed project and declares its independence as required by the EIA Regulations, 2014 (as amended 2017).

i) Details of the EAP

Name of the Practitioner:	Ms Sonette Smit
Tel No:	021 851 2673 / 084 585 5706
Fax No:	086 546 0579
E-mail address:	sonette.s@greenmined.co.za

ii) Expertise of the EAP

(1) The qualifications of the EAP
(with evidence).

Mrs. S Smit has fifteen years of experience in environmental legal compliance audits, (GIS) geographic information system, mining right and permit applications and applications for environmental authorisations & Water use applications.. Please find full CV attached in Appendix C

(2) Summary of the EAP's past experience
(In carrying out the Environmental Impact Assessment Procedure)

Sonette Smit is an Environmental Consultant with 15 years' experience in the environmental sector. She specialized the last 9 years in the mining sector where she conducted the mining related report and programs. She has also been involved in a number of other environmental and water use application projects where she compiled environmental management plans, environmental impact assessments, environmental audits, IWULA's/IWWMP's.

b) Description of the property

Table 1: Description of the property.

Farm Name:	1- Remaining Extent of the farm Woodlands 407. 2- Remaining Extent of Portion 1 of the farm Woodlands 407. 3- Portion 3 of the farm Woodlands 407. Goosebay Farm (Pty) Ltd is the landowner of the three properties. This Company shares common Shareholding and Directorship with the Applicant (Monte Cristo Commercial Park (Pty) Ltd).		
Application area (Ha)	The application area extends over three farm portions with an actual extent of 858.5825ha However, the total area to be disturbed by the mining activities and the associated infrastructure is only approximately 365 ha.		
Magisterial district:	Parys Magisterial District.		
Distance and direction from nearest town	The Mining Right application area is located approximately 15 km northwest of Sasolburg and 21 km north east from the town of Parys. It can be accessed from the R42 or R59, onto Boundary Road (locally known as Barrage Road), travelling west on the S171 (locally know as Vaal Eden Road) for approximately 8 km.		
21 digit Surveyor General Code for each farm portion	Farm name	Portion:	SG Codes:
	1- Woodlands 407	RE	F02500000000040700000
	2- Woodlands 407	RE of 1	F02500000000040700001
	3- Woodlands 407	3	F02500000000040700003

c) Locality map

(show nearest town, scale not smaller than 1:250000)

The requested map is attached as Appendix D.

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

Mining will be undertaken by a “truck and shovel” method utilising suitably sized diesel driven equipment. A 363.5 ha area will be demarcated for phased open pit mining and associated infrastructure. The areas containing the sand deposit will be mined in portions of 6.8 ha each year in average, with continuous roll-over rehabilitation, over a 30-year period. The areas containing the aggregate resource will in average be mined in portions of 4.6 ha per year. The planned open pit mine will comprise three distinct areas for the silica sand (main pit, north pit and east pit) and four areas for the aggregate (northern pit, central pit, south eastern pit and south western pit). Each area considers an estimated maximum depth of 12 m but may exceed a depth of 12 m in certain areas (Figures 3 to 6).

A total sand resource of 21 910 291 m^3 is estimated for the application area. The average depth of the sand deposit is 10.64 m. All of the outcropping and underlying sediments on this property could be used for aggregate. From test pits dug on the application area, the total volume of fresh aggregate to an average depth 6.98 m is calculated at 9 565 043 m^3 and approximately 7.67 m for oxidised aggregate with a total volume of 10 498 882 m^3.

Silica sand is present on the Farm Woodlands and has been mined historically on the property. The types of sand present on Portions 1, 3 and the Remaining Extent of the Farm Woodlands 407 vary from light yellow plaster, dark yellow plaster, white plaster, grey plaster, building to red sand. Oxidised aggregate is suitable for decorative purposes, but not for use in the civil construction industry.

The entire Mining Right application area could have potential diamond bearing gravels. The anticipated life of the mine is 30 years with an option to renew if the mining programme is not yet completed.

Sand Mining

Prior to the commencement of sand mining, topsoil will be removed from the area demarcated for mining and stockpiled next to the pit for the purpose of rehabilitation. The sand will be mined in benches and reject material will be backfilled into the void as mining advances. Opencast benches will be established with a maximum height between 1.5 m and 3 m. Sand will either be screened in the pit or transported by truck or conveyer to the washing plant. The specialised sand processing methodology is illustrated in Figure 1. Silica sand is an important material utilised in the South African construction industry. It is also used in the manufacturing,

as refractory sand, and in the glass making sectors. There is also a demand for recreational sand for use on golf courses and sporting facilities.

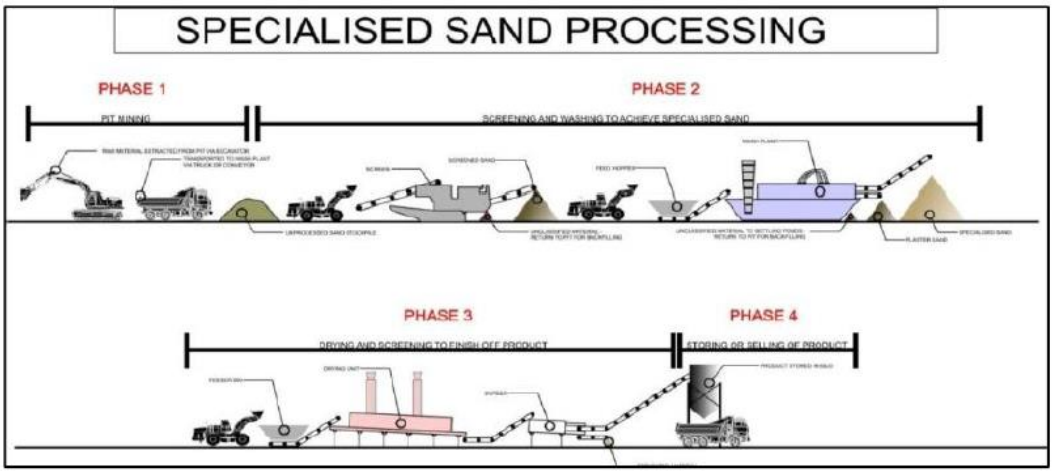

Figure 1: Specialised sand processing. (Image obtained from Final Scoping Report by Shango Solutions dated November 2018).

Aggregate Mining

In the absence of sand, topsoil will be stripped to expose aggregate and stockpiled prior to excavating the aggregate. The excavated aggregate will be crushed in the pit by a mobile crusher and reject material will be backfilled into the void as mining advances. Figure 2 below depicts the steps followed during the mining and processing of aggregate. The aggregates produced will include G4-G7 material for civil construction. The aggregate in the oxidised zone can be sold for landscaping and decorative purposes, once a market is found. Any mining or mineral processing related material that cannot be sold will be used to backfill the mined out pits during rollover rehabilitation.

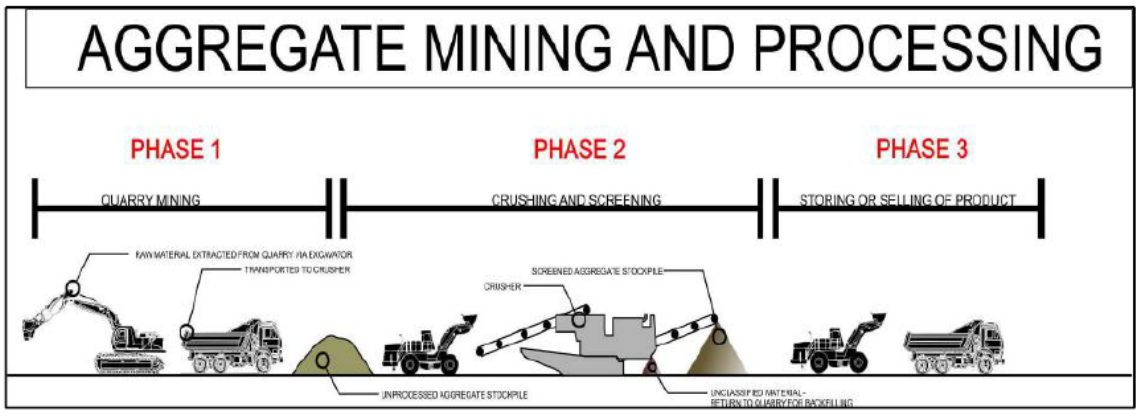

Figure 2: Aggregate mining and processing. (Image obtained from Final Scoping Report by Shango Solutions dated November 2018).

Alluvial Diamond Mining

Once sand mining has commenced, the underlying gravel (potentially diamondiferous) will be exposed and Reverse Circulation boreholes will be drilled to ascertain gravel quality and the diamond potential. Where appropriate, the gravel will be excavated and screened. The oversize will be used as infill, the -2 mm will report to the sand mining operation and the +2-32 mm fraction will be processed near the pit, to extract diamonds. The diamond potential exists across the entire project area, but will initially be evaluated in the Main, Northern and East sand deposit area. Should diamond potential be established, gravel will be transported to the plant for processing to extract diamonds utilising the methodology presented in the Figure 4 and outlined in the following steps:

- The overburden is removed – the topsoil will be stockpiled as per the current programme for the sand mining and the sand is excavated and diverted to the current sand mining operation.
- The basal gravel unit is screened – the oversize is sent back to any open excavation as rehabilitation infill, the -2 mm is forwarded to the sand mining operation and the +2-32 mm fraction is stockpiled as plant feed.

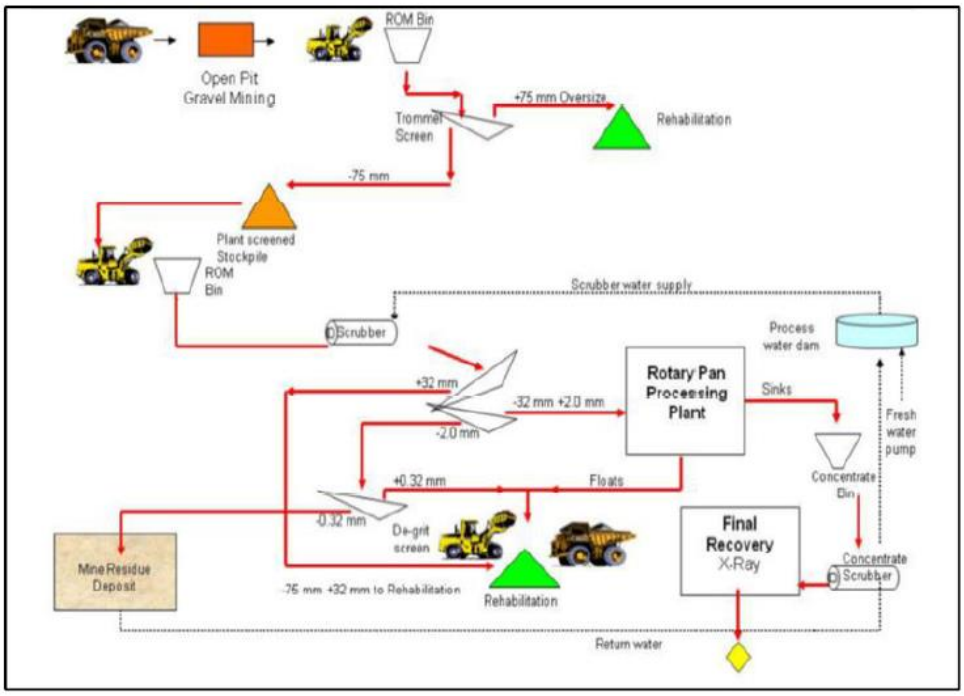

Figure 3: Diamond extraction methodology. (Image obtained from Final Scoping Report by Shango Solutions dated November 2018).

Industrial and jewellery (commercial) diamonds are in constant demand and will be sold in accordance with the South African diamond board regulations to domestic and international buyers.

Product Consumers

- Sand
  - Refractory Sand

The South African refractory industry uses a great deal of refractory sand per year. This grade of sand represents very pure silica sand with very little impurities. The users of refractory sand have very stringent quality criteria and only specific sands can be upgraded to produce refractory sand.

- Plaster Sand

Plaster sand is a highly sought after product in the building industry. This sand has a specific size distribution and requires the clay content to be removed.

- Building Sand

Building sand has the lowest quality requirements in terms of chemical make-up and sizing, and it is in high demand.

- Silica Sand for Equestrian and Golf Course Purposes

A local market for screened sand exists such as, for equestrian and golf courses, throughout the country. Due to the cost of transport, customers require nearby supply of the products. There are a number of golf courses and equestrian estates in close proximity to the Pure Source Mine project. Therefore, it is well situated to supply local needs. However, silica sand can further be utilised in various other Industries.

- Glass Sand

Glass sand considers very fine-grained sand with detailed specifications, which is supplied to the glass making industry. The sand products that are produced will be suitable for the following local consumers, including (but not limited to) the industries listed below:

- Scaw Metals – Refractory Sand
- Consol Glass – Glass Sand
- Builders Warehouse – Vanderbijlpark – Plaster Sand
- Regional and local Building Suppliers – Building Sand and Plaster Sand
- Local Golf Courses – Recreational Sand

- Diamonds

Diamonds will be sold to licensed diamond traders for use in industrial and jewellery (commercial) markets according to the prevailing rules and regulations in the diamond industry.

See attached as Appendix D a copy of the site layout plan of the proposed mining area area.

i) Listed and specified activities

Listed activities are activities identified in terms of Section 24 of NEMA which are likely to have a detrimental effect on the environment, and which may not commence without an EA from the Competent Authority. An EA required for a listed activity is subject to the completion of an environmental process, either a Basic Assessment (BA) or a S&EIA. In addition, this project may trigger certain National Environmental Management Waste Act, 2008 (Act 59 of 2008 - NEMWA) listed activities. The applicable NEMA and NEMWA listed activities anticipated to be triggered by this project are outlined in Table 2. The table also includes a description of those project activities which relate to the applicable listed activities. The DMRE will act as the Competent Authority on the project, with the Free State Department of Economic, Small Business Development, Tourism and Environmental Affairs (DESTEA) and the Department of Water and Sanitation (DWS) acting as the Commenting Authorities (CA).

Table 2: Listed and specified activities in terms of the NEMA EIA Regulations promulgated in December 2014 (as amended 2017)

Activity Number	Listed Activity
NEMA LISTING NOTICE 1 GNR 327	
GNR 327 of 7 April 2017, Activity 9	The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water – (i) with an internal diameter of 0.36 metres or more or; (ii) with a peak throughput of 120 litres per second or more
GNR 327 of 7 April 2017, Activity 12 (ii)(c)	The development of infrastructure or structures with a physical footprint of 100 metres or more where such development occurs if no development setback exists, within 32 metres of a watercourse measures from the edge of a watercourse.
GNR 327 of 7 April 2017, Activity 13	The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014.

GNR 327 of 7 April 2017, Activity 14	The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.
GNR 327 Listing Notice 1 Activity 22:	The decommissioning of any activity requiring – (i) a closure certificate in terms of section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002); or (ii) a prospecting right, mining right, mining permit, production right or exploration right, where the throughput of the activity has reduced by 90% or more over a period of 5 years excluding where the competent authority has in writing agreed that such reduction in throughput does not constitute closure; but excluding the decommissioning of an activity relating to the secondary processing of a – (a) mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource; or (b) petroleum resource, including the refining of gas, beneficiation, oil or petroleum products; – in which case activity 31 in this Notice applies.
GNR 327 of 7 April 2017, Activity 24 (ii)	The development of a road with a reserve wider than 13.5 metres, or where no reserve exists is wider than 8 metres
GNR 327 of 7 April 2017, Activity 28	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (i) will occur outside an urban area, where the total land to be used is bigger than 5 hectares or (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare.
NEMA LISTING NOTICE 2 GNR 325	
GNR 325 of 7 April 2017, Activity 17	Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002), including (a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource [,]; or (b) [including activities for which an exemption has been issued in terms of section 106 of the Mineral and

	Petroleum Resources Development Act, 2002 (Act 28 of 2002)] the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies.
GNR 325 of 7 April 2017, Activity 6	The development of facilities or infrastructure for any process which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding (i) activities which are identified and included in Listing Notice 1 of 2014; (ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008) in which case the National Environmental Management: Waste Act 2008 applies; (iii) the development of facilities or infrastructure for the treatment of effluent, polluted water, waste water or sewage where such facilities have a daily throughout capacity of 2 000 cubic metres or less; or (iv) where the development is directly related to aquaculture facilities or infrastructure where the waste water discharge capacity will not exceed 50 cubic metres per day.
GNR 325 of 7 April 2017, Activity 15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.
NEMA LISTING NOTICE 3 GNR 324	
GNR 324 of 7 April 2017, Activity 12(b)	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan - (i) within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; (ii) within critical biodiversity areas identified in bioregional plans; (iii) on land, where at the time of the coming into effect of this notice or thereafter such space was zoned open space, conservation or had an equivalent zoning; or (iv) areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland.

NEMWA GNR 921 OF 29 NOVEMBER 2013	
GNR 921, Activity 10 (Category B)	The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity).
GNR 633 OF 24 JULY 2015	
GNR 633, Activity 11 (Category B)	The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002).

In addition, it is anticipated that this project will trigger various water uses as defined in Section 21 of the National Water Act, 1998 (Act 36 of 1998 – NWA) and would subsequently require that an Integrated Water Use License Application (IWULA) be obtained from the Department of Water and Sanitation (DWS). Anticipated Water uses to be triggered are as detailed in Table 3. All water related specialist studies will be fully assessed during this process by DWS the competent authority.

Table 3: Anticipated Water uses to be triggered

Water Use	**Description**
Section 21 (a)	Taking water from a water resource.
Section 21 (b)	Storing of water.
Section 21 (c)	Impeding or diverting the flow of water in a watercourse.
Section 21 (e)	Engaging in a controlled activity.
Section 21 (f)	Discharging waste or water containing waste into a river resource through a pipe, canal, sewer or other conduit.
Section 21 (g)	Disposing of waste in a manner which may detrimentally impact on a water resource.
Section 21 (i)	Altering the bed, banks, course of characteristics of a watercourse.
Section 21 (j)	Removing, discharging or disposing of water found underground for the continuation of an activity or for the safety of persons.

Furthermore, an Air Emission License Application will be lodged (for the drying plant) with the Fezile Dabi District Municipality. It is anticipated that the Listed Activities (Category 5.2 of the NEM:AQA, GNR. 893, Gazette No. 37054 of 22 November 2013) detailed in Table 4, will be applicable to the Pure Source Mine Project.

Table 4: Anticipated Listed Activities (Category 5.2 of the NEM:AQA, GNR. 893, Gazette No. 37054 of 22 November 2013).

Description		**The drying of mineral solids including ore, using dedicated combustion installations**	
Application		Facilities with a capacity of more than 100 tons/month product	
Substance or mixture of substances		Plant status	Mg/NM^3 under normal conditions of 273 Kelvin and 101.3 kPa
Common name	Chemical symbol		
Particulate matter	N/A	New	50
Sulphur dioxide	$S0_2$	New	1 000
Sulphur dioxide	NO_x expressed as NO_2	New	5 000

Table 5: Listed and specified activities triggered by the proposed mining right application.

NAME OF ACTIVITY (E.g. For prospecting – drill site, site camp, ablution facilities, 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 m^2	**LISTED ACTIVITY** Mark with an X where applicable or affected	**APPLICABLE LISTING NOTICE** (GNR 324, GNR 325, GNR 326 OR GNR 327)
Application for a Mining Right MPRDA, 2002 amendment of the mining right.	858.5825 (ha)	X	GNR 325 LN 2 Activity, 17
GNR 325 of 7 April 2017, Activity 17 *Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002), including (a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource [,]; or (b) [including activities for which an exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002)] the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies.*			

NAME OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY	LISTED ACTIVITY	APPLICABLE LISTING NOTICE
NEMWA GNR 921 OF 29 NOVEMBER 2013			
GNR 921, Activity 10 (Category B) *The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity).*			
GNR 633 OF 24 JULY 2015			
GNR 633, Activity 11 (Category B) *The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002).*			
Demarcation of the mining area with visible beacons.	363.5 ha	N/A	Not listed
Stripping and stockpiling of topsoil of each mining block.	±7 ha/block for sand ±5 ha/block for aggregate	X	GNR 325 of 7 April 2017, Activity 15 GNR 324 of 7 April 2017, Activity 12(b) GNR 327 LN 1 Activity 28
GNR 325 of 7 April 2017, Activity 15 *The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.*			
GNR 324 of 7 April 2017, Activity 12(b) *The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan - (i) within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; (ii) within critical biodiversity areas identified in bioregional plans; (iii) on land, where at the time of the coming into effect of this notice or thereafter such space was zoned open space, conservation or had an equivalent zoning; or (iv) areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland.*			
GNR 327 of 7 April 2017, Activity 12 (ii)(c): *The development of infrastructure or structures with a physical footprint of 100 metres or more where such development occurs - if no development setback exists, within 32 metres of a watercourse measures from the edge of a watercourse.*			
GNR 327 of 7 April 2017, Activity 24 (ii) *The development of a road with a reserve wider than 13.5 metres, or where no reserve exists is wider than 8 metres.*			
Site Establishment.	±7 ha/block for sand ±5 ha/block for aggregate	X	GNR 325 LN 2 Activity 6, GNR 327 of 7 April 2017, Activity 9 GNR 327 of 7 April 2017, Activity 12 (ii)(c)

NAME OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY	LISTED ACTIVITY	APPLICABLE LISTING NOTICE
			GNR 327 of 7 April 2017, Activity 13 GNR 327 of 7 April 2017, Activity 14 GNR 327 of 7 April 2017, Activity 24 (ii): GNR 327 LN 1 Activity 28
GNR 325 of 7 April 2017, Activity 6 *The development of facilities or infrastructure for any process which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding (i) activities which are identified and included in Listing Notice 1 of 2014; (ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008) in which case the National Environmental Management: Waste Act 2008 applies; (iii) the development of facilities or infrastructure for the treatment of effluent, polluted water, waste water or sewage where such facilities have a daily throughout capacity of 2 000 cubic metres or less; or (iv) where the development is directly related to aquaculture facilities or infrastructure where the waste water discharge capacity will not exceed 50 cubic metres per day* GNR 327 of 7 April 2017, Activity 9 *The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water – (i) with an internal diameter of 0.36 metres or more or; (ii) with a peak throughput of 120 litres per second or more* GNR 327 of 7 April 2017, Activity 12 (ii)(c) The development of infrastructure or structures with a physical footprint of 100 metres or more where such development occurs if no development setback exists, within 32 metres of a watercourse measures from the edge of a watercourse. GNR 327 of 7 April 2017, Activity 13 *The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014.* GNR 327 of 7 April 2017, Activity 14 The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres. GNR 327 of 7 April 2017, Activity 24 (ii) The development of a road with a reserve wider than 13.5 metres, or where no reserve exists is wider than 8 metres GNR 327 of 7 April 2017 Activity 28: *Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:* *(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;* *excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes*			
Mining of sand / gravel and alluvial diamonds.	±7 ha/block for sand ±5 ha/block for aggregate	X	GNR 325 Listing Notice 2 Activity 17 GNR 325 of 7 April 2017, Activity 6 GNR 327 of 7 April 2017 Activity 28:
GNR 325 of 7 April 2017, Activity 6 *The development of facilities or infrastructure for any process which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding (i) activities which are identified and included in Listing Notice 1 of 2014; (ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008) in which case the National Environmental Management: Waste Act 2008 applies; (iii) the development of facilities or infrastructure for the treatment of*			

NAME OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY	LISTED ACTIVITY	APPLICABLE LISTING NOTICE
effluent, polluted water, waste water or sewage where such facilities have a daily throughout capacity of 2 000 cubic metres or less; or (iv) where the development is directly related to aquaculture facilities or infrastructure where the waste water discharge capacity will not exceed 50 cubic metres per day.			
GNR 325 Listing Notice 2 Activity 17: *Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including—* *(a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or* *(b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing;* *but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies.*			
GNR 327 of 7 April 2017 Activity 28: *Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:* *(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;* *excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.*			
Replacing the topsoil upon closure of a mined-out strip.	±28 ha (±7 ha / block for sand up to a maximum of 4 blocks open to be rehabilitated at any given time. ±20 ha (±5 ha / block for aggregate up to a maximum of 4 blocks open to be rehabilitated at any given time. Total rehabilitation area to be ±48 ha	X	GNR 327 Listing Notice 1 Activity 28:
GNR 327 Listing Notice 1 Activity 28: *Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:* *(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;* *excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.*			
Final rehabilitation and closure of the site.	858.5825 (ha)	X	GNR 327 LN 1 Activity 22
GNR 327 Listing Notice 1 Activity 22:			

NAME OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY	LISTED ACTIVITY	APPLICABLE LISTING NOTICE
The decommissioning of any activity requiring – *(i) a closure certificate in terms of section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002); or* *(ii) a prospecting right, mining right, mining permit, production right or exploration right, where the throughput of the activity has reduced by 90% or more over a period of 5 years excluding where the competent authority has in writing agreed that such reduction in throughput does not constitute closure;* *but excluding the decommissioning of an activity relating to the secondary processing of a –* *(a) mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource; or* *(b) petroleum resource, including the refining of gas, beneficiation, oil or petroleum products; –* *in which case activity 31 in this Notice applies*			

ii) Description of the activities to by undertaken

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

(Information obtained from the Accepted Final Scoping Report of Monte Cristo Mine, 2018 conducted by Shango Solutions on behalf of Monte Cristo Commercial Park (Pty) Ltd and other related specialist reports conducted for this application)

BACKGROUND INFORMATION (MONTE CRISTO MINE)

(Refer to Appendix F1: Mining Authorisations)

Goosebay Farm (Pty) Ltd submitted an application for a Mining Right and Environmental Authorisation to the Department of Mineral Resources and Energy (DMRE), Free State Regional Manager in November 2017. This application was allocated the Mining Right reference number FS 30/5/1/2/2/10042 MR. However, this initial application was withdrawn by the Applicant.

A new Mining Right and Environmental Authorisation application was submitted in the name of a new company, Monte Cristo Commercial Park (Pty) Ltd (which New Applicant shares a common Shareholding and directorship with the Landowner Goosebay Farm (Pty) Ltd - to be empowered according to BEE requirements) was submitted on the 24th of August 2018 and has been allocated the Mining Right reference number FS 30/5/1/2/2/10048 MR and Environmental Authorisation reference number FS 30/5/1/2/3/2/1/10048 EM.

Silica Sand, Diamond, Aggregate (and potentially other) mining operations, have in the past, taken place on the subject properties by other third parties, unrelated to the current Applicant.

Goosebay Farm (Pty) Ltd has been granted a Prospecting Right, over all three of the farm portions and three (3) Mining Permits, one permit over each of the three farm portions of which closure applications have been submitted to the Department of Mineral Resources and Energy as indicated below.

Table 6: Listed Mining Authorisations on the application area.

Mining Authorisations	**Property**	**Reference Number**	**Status**
Prospecting Right	❖ REMAINING EXTENT OF THE FARM WOODLANDS 407 ❖ REMAINING EXTENT OF PORTION 1 OF THE FARM WOODLANDS 407	FS 3015/1/1/2/608 PR	Closure submitted: 2 August 2019
Mining Permit	❖ REMAINING EXTENT OF THE FARM WOODLANDS 407	REF: FS30/5/1/3/2/304MP	Closure submitted 2 August 2019
Mining Permit	❖ REMAINING EXTENT OF PORTION 1 OF THE FARM WOODLANDS 407	REF: FS30/5/1/3/2/303MP	Closure submitted: 2 August 2019
Mining Permit	PORTION 3 OF THE FARM WOODLANDS 407	REF: FS30/5/1/3/2/302MP	Closure submitted: 2 August 2019

Figure 4: Historic mining authorisations within the application area. (Image obtained from Pure Source Mining Brochure).

PROJECT PROPOSAL (PURE SOURCE MINE)

The table below lists the GPS coordinates of the current mining footprint application area (858.5825ha).

Table 7: GPS coordinates of the mining right application area.

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
0	26°44'14.75"S	27°35'32.82"E	-26.737431	27.59245
1	26°44'20.92"S	27°35'55.00"E	-26.739145	27.59861
2	26°44'26.38"S	27°36'13.78"E	-26.740661	27.603828
3	26°44'28.43"S	27°36'26.40"E	-26.741231	27.607333
4	26°44'18.67"S	27°36'32.85"E	-26.73852	27.609124
5	26°44'22.15"S	27°36'42.94"E	-26.739487	27.611927
6	26°44'19.06"S	27°36'49.15"E	-26.738627	27.613653
7	26°44'8.21"S	27°36'39.75"E	-26.735613	27.611041
8	26°44'9.41"S	27°36'34.16"E	-26.735946	27.609488
9	26°44'2.93"S	27°36'32.27"E	-26.734147	27.608964
10	26°43'58.26"S	27°36'36.67"E	-26.73285	27.610187
11	26°43'56.74"S	27°36'50.80"E	-26.732428	27.614112
12	26°43'57.20"S	27°37'18.20"E	-26.732555	27,621,722
13	26°43'57.54"S	27°37'53.19"E	-26.732649	27.631442

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
14	26°43'59.37"S	27°38'1.03"E	26.733622	27.633619
15	26°44'7.86"S	27°38'3.55"E	-26.735518	27.634319
16	26°44'19.41"S	27°38'3.47"E	-26.738725	27.634298
17	26°44'45.59"S	27°37'56.41"E	-26.745997	27.632335
18	26°45'1.56"S	27°38'7.98"E	-26.750432	27.635551
19	26°45'25.68"S	27°37'57.28"E	-26.757133	27.632578
20	26°45'16.70"S	27°37'23.46"E	-26.754639	27.623184
21	26°45'17.92"S	27°36'24.78"E	-26.754978	27.606884
22	26°45'32.44"S	27°36'14.76"E	-26.75901	27.604101
23	26°45'30.34"S	27°35'58.88"E	-26.758428	27.59969
24	26°45'18.03"S	27°35'14.02"E	-26.755007	27.587227
25	26°45'11.67"S	27°35'14.35"E	-26.753242	27.587319
26	26°44'53.27"S	27°35'40.53"E	-26.748131	27.594591

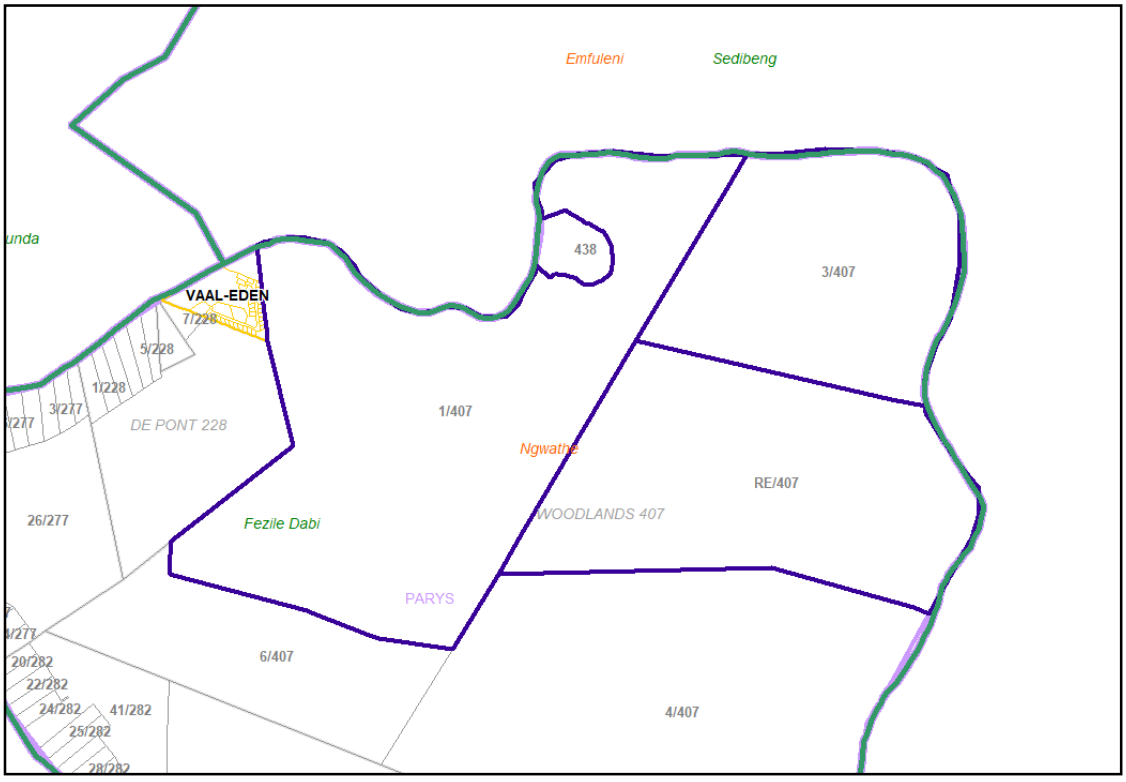

Figure 5: Cadastral map showing the mining right application area

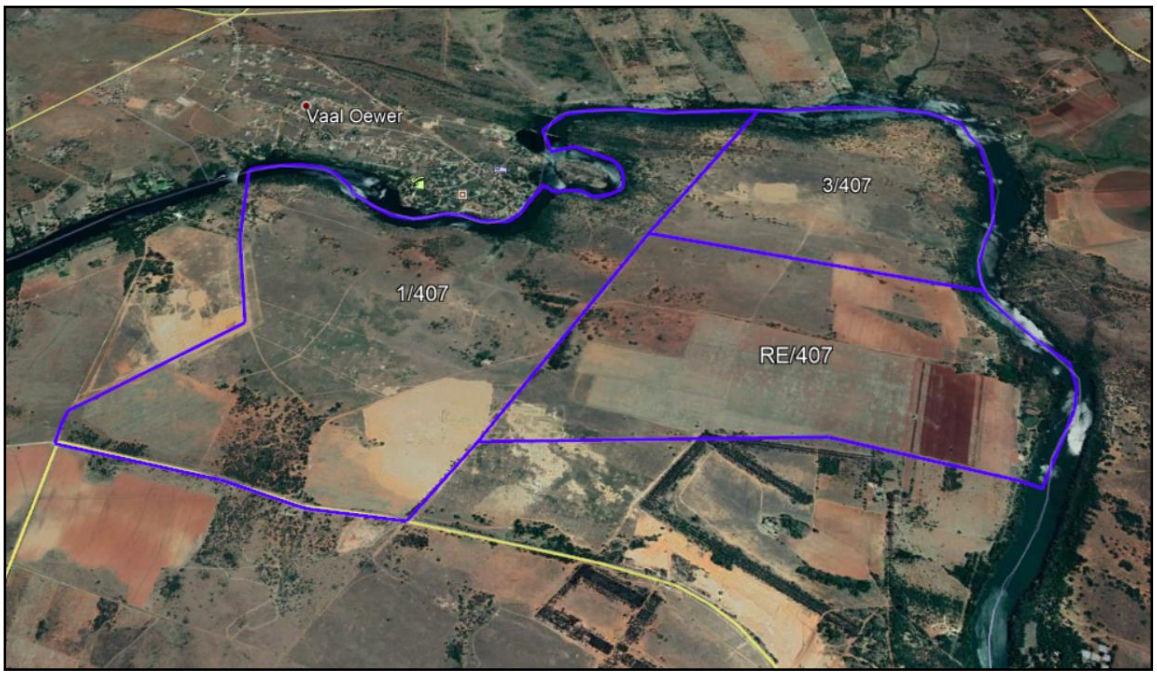

Figure 6: Satellite view showing the location of the MR application area. (Image obtained from Google Earth).

1.1 CONSTRUCTION PHASE

During the site establishment phase the applicant has to fence the footprint area and clear the topsoil from the applied area.

Upon stripping, the topsoil will be stockpiled along the boundaries of the mining area to be used during the rehabilitation phase. Topsoil stripping will be restricted to the areas to be used for mineral stockpiling and mining. The complete A-horizon (topsoil – the top 100 – 200 mm of soil, which is generally darker coloured due to high organic matter content) will be removed. If it is unclear where the topsoil layer ends the top 300 mm of soil has to be stripped.

The topsoil will be stockpiled in the form of a berm alongside the boundary of the mining area where it will not be driven over, contaminated, flooded or moved during the operational phase. The topsoil berm will measure a maximum of 1.5 m high and must be planted with indigenous grass species if vegetation does not naturally establish within 6 months of stockpiling to prevent soil erosion and to discourage growth of weeds. The roots of the grass will also improve the viability of the soil for rehabilitation purposes.

The mine area does not need any specific or extra work to prepare the area for the recovery of sand / gravel.

The mining activities will consist of the following:

- Stripping and stockpiling of topsoil;
- Site establishment
- Excavating;
- Mobile Crushing and Screening Plants;
- Stockpiling and transporting;
- Sloping, landscaping,Replacing the topsoil and vegetation the disturbed area of each mining block.
- Final site rehabilitation

The mining site will contain the following:

- Excavating Equipment;
- Earthmoving Equipment;
- Mobile Crushing and Screening Plants;
- Offices;
- Weigh Bridge;
- Storage Yard for storing of equipment.
- Dams.
- Wash plant for sand mining.
- Rotary pan processing plant for alluvial diamond mining.
- Potential alluvial diamond X-ray and/or flow sorting facility.

- Clean and dirty water management infrastructure (pollution control dams, water recycling plan (part of the wash plant, settling ponds, storm water runoff structures, water pipeline network as well as pump stations).
- Drying and screening plants.
- Topsoil and run-of mine stockpiles.
- Additional mining and processing infrastructure will include haul roads, conveyor systems, power lines, change houses, staff accommodation and recreation facilities and portable chemical ablution facilities for employees during the construction and operational phases.

1.2 OPERATIONAL PHASE

Mining will be undertaken by a “truck and shovel” method utilising suitably sized diesel driven equipment. A 363.5 ha area will be demarcated for phased open pit mining and associated infrastructure. The areas containing the sand deposit will be mined in portions of 6.8 ha each year in, with continuous roll-over rehabilitation, over a 30-year period. The areas containing the aggregate resource will in average be mined in portions of 4.6 ha per. The planned open pit mine will comprise three distinct areas for the silica sand (main pit, north pit and east pit) and four areas for the aggregate (northern pit, central pit, south eastern pit and south western pit). Each area considers an estimated maximum depth of 12 m but may exceed a depth of 12 m in certain areas (Figures 2 to 4). A total sand resource of 21 910 291 m^3 is estimated for the application area. The average depth of the sand deposit is 10.64 m. All of the outcropping and underlying sediments on this property could be used for aggregate. From test pits dug on the application area, the total volume of fresh aggregate to an average depth 6.98 m is calculated at 9 565 043 m^3 and approximately 7.67 m for oxidised aggregate with a total volume of 10 498 882 m^3. Silica sand is present on the Farm Woodlands and has been mined historically on the property. The types of sand present on Portions 1, 3 and the Remaining Extent of the Farm Woodlands 407 vary from light yellow plaster, dark yellow plaster, white plaster, grey plaster, building to red sand. Oxidised aggregate is suitable for decorative purposes, but not for use in the civil construction industry. The entire Mining Right application area could have potential diamond bearing gravels. The anticipated life of the mine is 30 years

with an option to renew if the mining programme is not yet completed. Active blocks will be marked out and topsoil removed and stored for later use in rehabilitation. Four active blocks per comodity will be open at any given time. Rehabilitation will be conducted concurrently and the open block will be kept as small as practically possible.

Sand Mining

Prior to the commencement of sand mining, topsoil will be removed from the area demarcated for mining and stockpiled next to the pit for the purpose of rehabilitation. The sand will be mined in benches and reject material will be backfilled into the void as mining advances. Opencast benches will be established with a maximum height between 1.5 m and 3 m. Sand will either be screened in the pit or transported by truck or conveyer to the washing plant. The specialised sand processing methodology is illustrated in Figure 1 above. Silica sand is an important material utilised in the South African construction industry. It is also used in the manufacturing, as refractory sand, and in the glass making sectors. There is also a demand for recreational sand for use on golf courses and sporting facilities.

Alluvial Diamond Mining

Once sand mining has commenced, the underlying gravel (potentially diamondiferous) will be exposed and Reverse Circulation boreholes will be drilled to ascertain gravel quality and the diamond potential. Where appropriate, the gravel will be excavated and screened. The oversize will be used as infill, the -2 mm will report to the sand mining operation and the +2-32 mm fraction will be processed near the pit, to extract diamonds. The diamond potential exists across the entire project area, but will initially be evaluated in the Main, Northern and East sand deposit area. Should diamond potential be established, gravel will be transported to the plant for processing to extract diamonds utilising the methodology presented in the Figure 3 and outlined in the following steps:

- The overburden is removed – the topsoil will be stockpiled as per the current programme for the sand mining and the sand is excavated and diverted to the current sand mining operation.

- The basal gravel unit is screened – the oversize is sent back to any open excavation as rehabilitation infill, the -2 mm is forwarded to the sand mining operation and the +2-32 mm fraction is stockpiled as plant feed.

±28 ha (±7 ha / block for sand up to a maximum of 4 blocks open to be rehabilitated at any given time.

Aggregate Mining

In the absence of sand, topsoil will be stripped to expose aggregate and stockpiled prior to excavating the aggregate. The excavated aggregate will be crushed in the pit by a mobile crusher and reject material will be backfilled into the void as mining advances. Figure 2 depicts the steps followed during the mining and processing of aggregate. The aggregates produced will include G4-G7 material for civil construction. The aggregate in the oxidised zone can be sold for landscaping and decorative purposes, once a market is found. Any mining or mineral processing related material that cannot be sold will be used to backfill the mined out pits during rollover rehabilitation.

±20 ha (±5 ha / block for aggregate up to a maximum of 4 blocks open to be rehabilitated at any given time.

Total rehabilitation area to be ±48 ha

Ablution in the form of chemical toilets will be established on site to be used by the employees. The existing farm and provincial roads currently used to gain access to the property will be used to transport the aggregate from the mining site to the client. Haul trucks will travel along the existing farm road up to the Vaal Eden road.

1.2.1 Zoning

As per legal opinion for Weavind and Weavind Attorneys dated 17 May 2018 persented at RMDEC 25 April 2019, the Ngwathe Local Municipality, has yet to adopt a Land Use Scheme as contemplated in Section 24(1) of The Spatial Planning and Land Use Management Act of 2013 (“SPLUMA”), nor does said Municipality’s current Land Use Scheme make provision for the zoning of farmland. Consequently the

property in question falls squarely within the ambit of Section 26(3) of SPLUMA, which is quoted hereunder for your ease of reference:

"Where no town planning or land use scheme applies to a piece of land before a land use scheme is approved in terms of this Act, such land may be used only for the purposes listed in Schedule 2 of this Act and for which such land was lawfully used or could lawfully have been used immediately prior to the commencement of the Act."

Schedule 2 of SPLUMA, in turn includes "mining purposes". In the premises, the Mining Activities (as set out herein), conducted on the property in question are, and were not, in contravention of any Law.

1.2.2 Existing Infrastructure

The following infrastructure exists within the application area and surroundings:

- Historical opencast diamond mining and sand mining activities, other sand mining activities are on-going on neighbouring farms by Sweet Sensations 168 (Pty) Ltd to the west and Tja Naledi Beafase Investment Holdings (Pty) Ltd) to the east of Pure Source Mine.
- Certain portions of the project area are currently being utilised for agriculture, maize monocultures at present.
- Game farming – the majority of the central and northern portions of the property are currently being used for large game farming and a number of species are currently stocked including (but not limited to) Ostrich, Springbok, Waterbuck and Zebra, Eland, Impala, Redhaartebees, Blesbuck and Kudu.
- A number of farm dams have been constructed on the property.
- Farm housing/dwellings.
- Various secondary gravel access roads.
- A small resort and campsite.

- Electrical infrastructure, specifically a major Eskom transmission line which bisects the application area.
- Vehicle access from and to the proposed mining development is suggested from Road S171 (Figure 12) by means of an existing farm access road.

1.2.3 Mine Plan

During Years 1 and 2, mining will consist only of excavating sand and aggregate at the locations as set out in the 30 year mining plan (Figure 7). The processes will include screening and crushing. Prospecting of diamonds will also occur during this time. The only infrastructure that will be constructed in the beginning of Year 1 will be roads, weighbridge, offices and a security check point. During this time other preparations may include the installation of the water supply line, electrical supply and cut-off trenches. The wash plant, drying plant, workshop, settling ponds and Pollution Control Dams (PCDs) will be finalised for use in Year 3. Between Years 3 to 27, full production of sand and aggregate/gravel is expected during which the wash plant and drying plant will be in use. Depending on the outcome of the diamond prospecting, diamondiferous gravel may also be processed. During Years 27 to 30, production will decrease to meet closure targets at the end of Year 30. As such, Years 1 and 2 can be classified as the construction phase for specialised sand, in conjunction with mining activities for screened products only. Years 3 to 30 will be the operational phase with the last three years involving the lowering of production to achieve closure objectives.

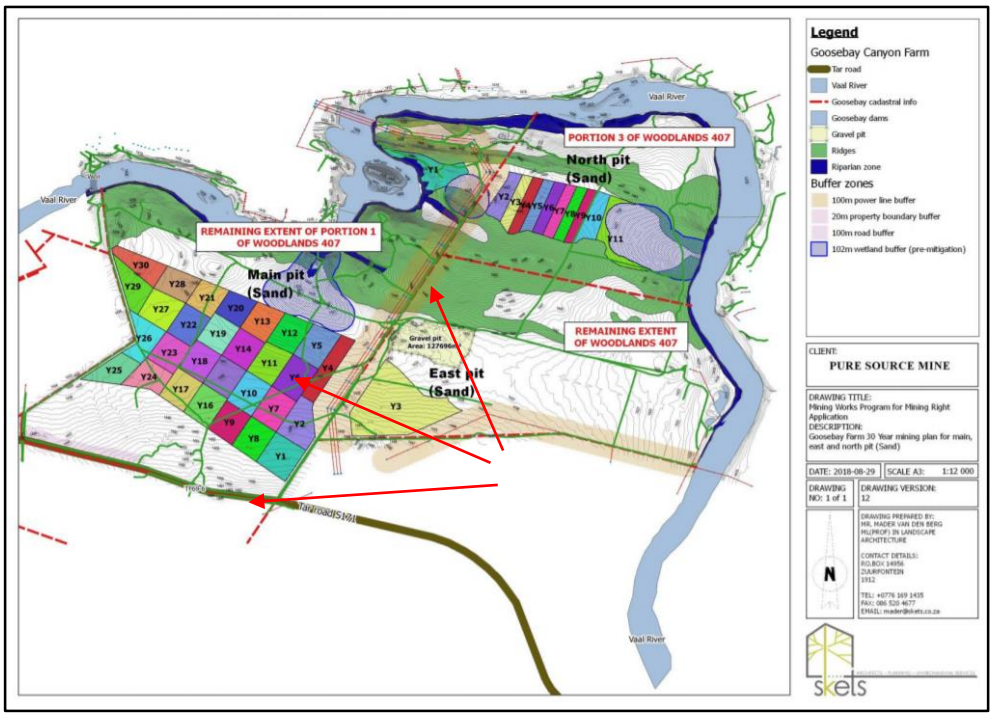

Figure 7: 30 Year Silica Sand mine plan indicating blocks to be mined each year. (Image obtained from Pure Source Mining Brochure).

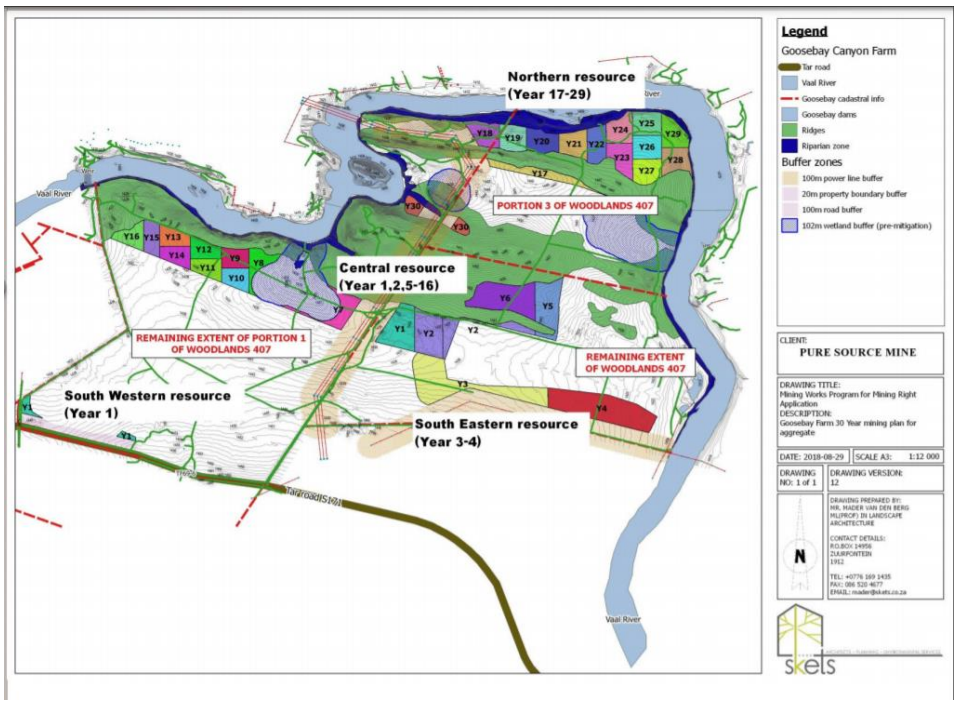

Figure 8: 30 Year Aggregate mine plan indicating blocks to be mined each year. (Image obtained from Pure Source Mining Brochure).

1.2.4 Topsoil Management

The topsoil stripped from the area to be mined is stockpiled at the edge of the block where it is protected until it is replaced over the mined-out

area during the rehabilitation phase (medium term). Depending on market demand and the depth of the mineral resource in the opened strip, topsoil is typically stored for a period of ±12 months.

The MR Applicant, makes use of a rehabilitation contractor that re-spreads the topsoil to an approximate depth of 300 mm upon which the reinstated area is planted with a cover crop.

1.2.5 Waste Management Programme

General and hazardous industrial waste will be temporarily stored on-site in designated areas (waste/salvage yard), and disposed of at off-site permitted waste disposal facilities. Portable chemical toilets will be utilised and serviced regularly by external services providers during the construction and operational phases of the project.

Hazardous waste could potentially result from accidental spillages or breakdowns. Such contaminated areas (when applicable) will then immediately (within first hour of the occurrence) be cleaned and the contaminated soil contained in a designated hazardous waste container that will immediately be removed to the off-site workshop. The hazardous waste will either be disposed of at a registered hazardous waste handling facility, or be collected by a registered waste handling contractor. All safe disposal certificates will be filed for auditing purposes.

Chemical toilets will be serviced by a registered sub-contractor and the proof of the services are kept on file for auditing purposes.

The mine does not store any waste within the boundaries of the site, and no mining related waste is buried/burned on the farm.

1.2.6 Water Management

(Refer to Appendix N: Water Use Application as well as Appendix F: Water related Assessment Reports)

Water for mining and beneficiation will be sourced from ground water, or extracted from the Vaal River, pursuant to the obtaining of the relevant Water Use License. The estimated annual water requirements are:

- 500 000 m^3 for sand mining.
- 300 000 m^3 for aggregate and diamond mining
- 10 000 m^3 for dust suppression.

It is estimated that the supply of water required for the plant and wash-down operations would be approximately 800 - 1 000 m^3/hr, therefore a water recycling plant (part of the wash plant) will be required to reduce the water consumption to 80 – 100 m^3/hr. A small volume of water will also be required for the workshops, offices and change house. It will be necessary to undertake an Integrated Water Use License Application (IWULA) process and associated Water and Waste Water Management Plan (IWWMP) in order to obtain a Water Use License from the Department of Water and Sanitation (DWS).

In 2021, the MR Applicant applied for water use authorisation for activities that trigger the NWA, 1998. During this application all water related reports will be fully assessed and may be further amended upon request by the compatant authority

(Also refer to Part A(1)(g)(iv)(1)(c) *Descripton of specific environemntal features and infrastructure on the site – Site Specific Hydrology and Geohydrology*)

1.2.7 Progressive Rehabilitation

Progressive rehabilitation will follow the mining activity. Rehabilitation will start the year after the extraction of the resource is completed in the block of that year (as illustrated in Figures 1 to 3. Four basic phases usually accompany rehabilitation, namely:

- Bulk earthworks.
- Topsoil spreading and fine grading.
- Re-vegetation either by seeding or planting by hand depending on the post-closure vision
- requirements, i.e. establishing grazing or an artificial wetland.
- Monitoring.

As mentioned earlier, once a block is mined-out the MR Applicant contracts the services of a rehabilitation contractor to level the footprint and reinstate the

stockpiled topsoil over the area in question (refer to 1.2.4 Topsoil Management above).

2. MINING RIGHT APPLICATION

2.1 PROJECT PROPOSAL

The MR Applicant submitted an application for a mining right over an area of 858.5825 ha, in terms of Section 22 of the MPRDA, 2002. The table below lists the GPS coordinates of the proposed application area as shown on the Regulation 2(2) Mine Plan attached as Appendix E.

Table 8: GPS coordinates of the proposed mining right application area.

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
0	26°44'14.75"S	27°35'32.82"E	-26.737431	27.59245
1	26°44'20.92"S	27°35'55.00"E	-26.739145	27.59861
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11	26°43'56.74"S	27°36'50.80"E	-26.732428	27.614112
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24	26°45'18.03"S	27°35'14.02"E	-26.755007	27.587227

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
25	26°45'11.67"S	27°35'14.35"E	-26.753242	27.587319
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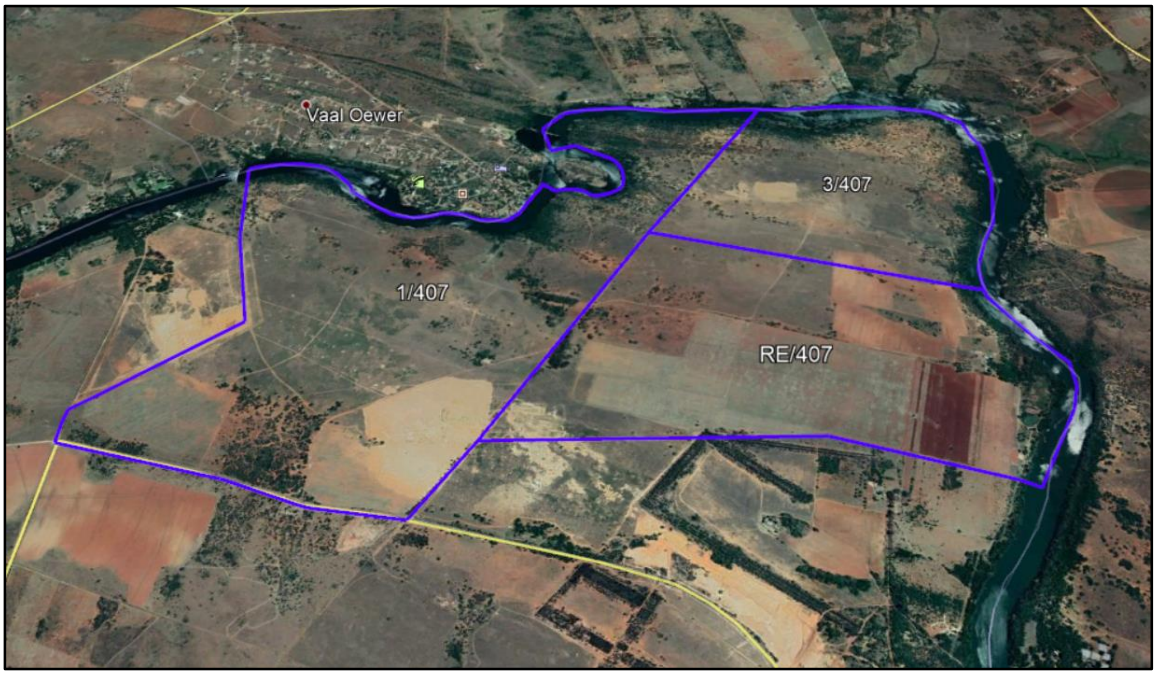

Figure 9: Satellite view showing the location of the proposed mining right application area. (Image obtained from Google Earth).

The proposed application area will be developed over a section of the property that is used for agricultural as well as historical mining purposes with a natural vegetation cover. Should the mining right application be granted and the mining of sand / aggregate and alluvial diamonds from the application area be allowed, the proposed project will comprise of activities that can be divided into four key phases (discussed in more detail below) namely the:

(1) *Planning and design phase,*

(2) Site establishment phase

(3) Operational phase which will involve the following:.

(4) Decommissioning phase and Closure phase,

2.2 Planning and design phase

Planning and design phase entails the Employment of workers and contractors,human resource management Interaction with local community, vehicle and foot traffic on-site and drilling.

2.3 SITE ESTABLISHMENT PHASE / CONSTRUCTION PHASE

Site establishment / construction phase entails the demarcation of the mining right area boundaries and identified sensitive areas, as detailed below:

2.3.1 Demarcation of Mining Boundaries

(Refer to Part A(1)(g)(i) Details of the development footprint alternatives considered – Layout Alternatives & Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on site – Site Specific Vegetation.)

Pursuant to receipt of an Environmental Authorisation (EA) and the Mining Right (MR), and prior to mining, the boundary of the mining footprint has to be demarcated.

Pursuant to receipt of an Environmental Authorisation (EA) and the Mining Right (MR), and prior to mining, the boundary of the mining footprint has to be demarcated.

Buffer zones as well as no go areas will be clearly demarcated during this phase.

2.4 OPERATIONAL PHASE

Mining will be undertaken by a “truck and shovel” method utilising suitably sized diesel driven equipment. A 363.5 ha area will be demarcated for phased open pit mining and associated infrastructure. The areas containing the sand deposit will be mined in portions of 6.8 ha each year in average, with continuous roll-over rehabilitation, over a 30-year period. The areas containing the aggregate resource will in average be mined in portions of 4.6 ha per year. The planned open pit mine will comprise three distinct areas for the silica sand (main pit, north pit and east pit) and four areas for the aggregate (northern pit, central pit, south eastern pit and south western pit). Each area considers an estimated maximum depth of 12 m but may exceed a depth of 12 m in certain areas (Figures 3 to 6). A total sand resource of 21 910 291 m^3 is estimated for the application area. The average depth of the

sand deposit is 10.64 m. All of the outcropping and underlying sediments on this property could be used for aggregate. From test pits dug on the application area, the total volume of fresh aggregate to an average depth 6.98 m is calculated at 9 565 043 m^3 and approximately 7.67 m for oxidised aggregate with a total volume of 10 498 882 m^3. Silica sand is present on the Farm Woodlands and has been mined historically on the property. The types of sand present on Portions 1, 3 and the Remaining Extent of the Farm Woodlands 407 vary from light yellow plaster, dark yellow plaster, white plaster, grey plaster, building to red sand. Oxidised aggregate is suitable for decorative purposes, but not for use in the civil construction industry. The entire Mining Right application area could have potential diamond bearing gravels. The anticipated life of the mine is 30 years with an option to renew if the mining programme is not yet completed.

Sand Mining

Prior to the commencement of sand mining, topsoil will be removed from the area demarcated for mining and stockpiled next to the pit for the purpose of rehabilitation. The sand will be mined in benches and reject material will be backfilled into the void as mining advances. Opencast benches will be established with a maximum height between 1.5 m and 3 m. Sand will either be screened in the pit or transported by truck or conveyer to the washing plant. The specialised sand processing methodology is illustrated in Figure 1. Silica sand is an important material utilised in the South African construction industry. It is also used in the manufacturing, as refractory sand, and in the glass making sectors. There is also a demand for recreational sand for use on golf courses and sporting facilities.

Aggregate Mining

In the absence of sand, topsoil will be stripped to expose aggregate and stockpiled prior to excavating the aggregate. The excavated aggregate will be crushed in the pit by a mobile crusher and reject material will be backfilled into the void as mining advances. Figure 2 depicts the steps followed during the mining and processing of aggregate. The aggregates produced will include G4-G7 material for civil construction. The aggregate in the oxidised zone can be sold for landscaping and decorative purposes, once a market

is found. Any mining or mineral processing related material that cannot be sold will be used to backfill the mined out pits during rollover rehabilitation.

Alluvial Diamond Mining

Once sand mining has commenced, the underlying gravel (potentially diamondiferous) will be exposed and Reverse Circulation boreholes will be drilled to ascertain gravel quality and the diamond potential. Where appropriate, the gravel will be excavated and screened. The oversize will be used as infill, the -2 mm will report to the sand mining operation and the +2-32 mm fraction will be processed near the pit, to extract diamonds. The diamond potential exists across the entire project area, but will initially be evaluated in the Main, Northern and East sand deposit area. Should diamond potential be established, gravel will be transported to the plant for processing to extract diamonds utilising the methodology presented in the Figure 4 and outlined in the following steps:

- The overburden is removed – the topsoil will be stockpiled as per the current programme for the sand mining and the sand is excavated and diverted to the current sand mining operation.
- The basal gravel unit is screened – the oversize is sent back to any open excavation as rehabilitation infill, the -2 mm is forwarded to the sand mining operation and the +2-32 mm fraction is stockpiled as plant feed.

See Figure 2-3 for a schematic representation of the proposed mining activities and the Site Activities Map attached as Appendix C.

See Figure 7 -8 for a Schematic representation showing the proposed mining blocks

2.4.1 Clearing of Vegetation

(Also refer to Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Vegetation)

The application area is situated within a single vegetation type, namely the Soweto Highveld Grassland (Gs4) vegetation type according to Mucina and Rutherford (2006)

Should the mining right be approved, the vegetation of the earmarked area will be removed with the topsoil and will therefore act as mulch to be replaced on the mined-out strips.

2.4.2 Topsoil Management

As mentioned earlier, the topsoil will be removed from a ±7 ha/block for sand ±5 ha/block for aggregate. The topsoil will be stockpiled along the edge of the strip to be replaced during the rehabilitation of the mined-out section. Topsoil stripping will entail the removal of the upper 300 mm of the soil, whether it contains sand (commodity) or not. The topsoil berms will not be driven over, contaminated, flooded or moved during the operational phase. The topsoil berm will measure a maximum of 1.5 m in height to prevent compaction and preserve micro-organisms within the topsoil.

2.4.3 Access Road

Vehicle access from and to the proposed mining development is suggested from Road S171 (Figure 10) by means of an existing farm access road.

Figure 10: Proposed mining development and relevant intersections.

A visual investigation of the relevant section of the Road S171 was conducted. It was noted that the road surface is in a poor condition with multiple potholes and it is possibly deteriorating. The traffic specialist concedes that if the recommended mitigation measures are implemented, impacts of the mining activities on the road could be minimised from a high sensitivity to a low sensitivity.

The MR Applicant will continue to makes use of the existing gravel road that leads into the current mining area, and if needed be extended into the mining area as mining progresses. Should haul roads be needed where no farm roads exist the footprint of the haul roads will be contained to the approved mining area, specifically to areas where mining still needs to be done. No haul roads will be allowed over rehabilitated areas or no-go areas, and upon closure of the site all haul roads, no longer needed by the landowner, will be ripped and rehabilitated. As mentioned earlier, the MR Applicant will only commence with the opening of a block once the mineral resource in the mining area block is depleted. In light of this, the proposed activity will not increase the current traffic demand on the area, but merely ensure the continuation of it.

2.4.4 Water Use

Water for mining and beneficiation will be sourced from ground water, or extracted from the Vaal River, pursuant to the obtaining of the relevant Water Use License. The estimated annual water requirements are:

- 500 000 m^3 for sand mining.
- 300 000 m^3 for aggregate and diamond mining.
- 10 000 m^3 for dust suppression.

It is estimated that the supply of water required for the plant and wash-down operations would be approximately 800 - 1 000 m^3/hr, therefore a water recycling plant (part of the wash plant) will be required to reduce the water consumption to 80 – 100 m^3/hr. A small volume of water will also be required for the workshops, offices and change house.

It will be necessary to undertake an Integrated Water Use License Application (IWULA) process and associated Water and Waste Water Management Plan (IWWMP) in order to obtain a Water Use License from the Department of Water and Sanitation (DWS).

Dust generated on the access road will as far as possible be managed through alternative dust suppression methods to prevent the use of water for dust suppression. These measures will include a combination of the following:

- The speed of all mining equipment/vehicles will be restrictions to 20 km/h on the internal farm roads/haul roads to minimize dust generation;
- The removal of vegetation will only be done immediately prior to the mining of an area in an attempt to lessen denuded areas (acting as dust source) to the absolute minimum.

2.4.5 Waste Management

General and hazardous industrial waste will be temporarily stored on-site in designated areas (waste/salvage yard), and disposed of at off-site permitted waste disposal facilities. Portable chemical toilets will

be utilised and serviced regularly by external services providers during the construction and operational phases of the project.

The MR Applicant will continue to manage any waste that might be generated at the mine as described earlier under 1.2.5 *Waste Management.*

2.4.6 Servicing and Maintenance

Offices, Workshop and Change House

The offices, workshop, change house and dormitories will be established adjacent to the plant infrastructure, and as per industry standard will be of a portable nature. The mine offices, workshops and change house will initially be in the form of portable containers or “Kwikspace” type facilities. If emergency repairs are needed on equipment not able to move to the workshop, drip trays will be used under the machinery and all waste will be contained and removed from the emergency service area to the workshop to ensure proper disposal. Limited quantities of diesel, fuel, oil storage tanks will have an impermeable bund wall and lubricants maybase within which the tanks sit, raised above the floor, on plinths. The bund capacity will be stored on-site. Asufficient to contain 110% of the tank’s maximum amount of 60 m^3 of diesel fuel may be stored in above ground diesel storage tanks with elevated bunded wallscapacity.

2.4.7 Progressive Rehabilitation

Progressive rehabilitation will follow the mining activity. Rehabilitation will start the year after the extraction of the resource is completed in the block of that year (as illustrated in Figures 2 to 4). Four basic phases usually accompany rehabilitation, namely:

- Bulk earthworks.
- Topsoil spreading and fine grading.
- Re-vegetation either by seeding or planting by hand depending on the post-closure visionrequirements, i.e. establishing grazing or an artificial wetland.
- Monitoring.

The progressive rehabilitation (medium term), currently implemented at the mine, will also be applicable to the mining area once a strip is mined-out.

Also refer to Part B(1)(d)(i) Determination of closure objectives.

2.5 DECOMMISSIONING AND CLOSURE PHASE

Rehabilitation will include activities to be divided into medium- and long term categories. In the medium term, rehabilitation will entail the continuous reinstatement and seeding of mined-out blocks, and the management of weeds and invasive plant species. In the long term, rehabilitation will involve final landscaping of the site, the replacement of the topsoil on the final block and the removal all temporary infrastructures, equipment, plant, and other items used during the mining period will be removed from the site prior to the submission of a closure application to the Department of Mineral Resources and Energy (DMRE). The MR Applicant will further be responsible for the seeding of all rehabilitated areas.

Rehabilitation from the mining industry perspective means the disturbed areas will adhere to a pre-determined plan or fulfil a function that is sustainable and usable. It recognises that extraction of a resource will occur and that the original topography will be altered. The basic requirements for rehabilitation are to construct a stable, safe and functioning environment, post mining. The intention is not to restore the original topography, but to sculpt the mined areas to facilitate various ecological habitats.

The MR Applicant proposed the following regarding the rehabilitation of the mined-out blocks (also refer to the Closure Plan attached as Appendix M):

- The mining plan will be such that topsoil is stockpiled for the minimum possible time through rehabilitating different mining blocks progressively as mining continues.
- To ensure minimum impact on drainage, the MR Applicant will take care not to leave any depressions in the mining floor. A surface slope (even if minimal) will be maintained across the mining floor in the drainage direction, so that all excavations are free draining.
- After mining, any steep slopes at the edges of excavations will be reduced to a minimum and profiled to blend with the surrounding topography.

- The stockpiled topsoil will then be evenly spread over the entire mining area, so that there is a depth of 300 mm of sandy topsoil above the underlying soil. The depth will be monitored during spreading to ensure that coverage is adequate and even.
- The MR Applicant will strive to (when possible) spread topsoil at a time of the year when vegetation cover can be established as quickly as possible afterwards, so that erosion of returned topsoil by both rain and wind, is minimized.
- A cover crop will be planted and established immediately after spreading of topsoil to stabilize the soil and protect it from erosion.
- The rehabilitated area as well as the land down slope of it will monthly be monitored for erosion, and appropriately stabilized if any erosion occurs.
- The MR Applicant will ensure monthly monitoring of weeds/invader plants that may germinated within the rehabilitated areas. The invasive plant species management plan (Appendix K) will be implemented on site.

The application area is currently utilised as a game farm and this will continue to remain the primary land use with other agricultural zoning. activities such as crop production. Mining is an interim land use and it will be conducted in a sensitive manner that will not have a negative impact on the game.

Upon the replacement of the topsoil, the area will once again be available for use by the landowner, and the planting of the cover crop (to protect the topsoil) will tie in with the proposed end use of the mine.

Progressive rehabilitation will follow the mining activity. Rehabilitation will start the year after the extraction of the resource is completed in the block of that year (as illustrated in Figures 1 to 3). Four basic phases usually accompany rehabilitation, namely.

- Bulk earthworks.
- Topsoil spreading and fine grading.
- Re-vegetation either by seeding or planting by hand depending on the post-closure vision requirements, i.e. establishing grazing or an artificial wetland.
- Monitoring

The right Applicant will comply with the minimum closure objectives as prescribed by the DMRE and detailed below:

Rehabilitation of the excavated area:

No waste may be permitted to be deposited in the mining area.

The topsoil previously stored must be returned to its original depth over the area.

The area must be fertilized if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local or adapted seed mix in order to propagate the locally or regionally occurring flora, should natural vegetation not re-establish within six months from closure of the site.

If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager (DMRE) may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a vegetation seed mix to his or her specification.

Final rehabilitation:

Rehabilitation of the surface area shall entail landscaping, levelling, top dressing, land preparation, seeding (if required) and maintenance, and invasive plant species clearing.

All mining equipment, and other items used during the mining period must be removed from the site (section 44 of the MPRDA).

Waste material of any description, including receptacles, scrap, rubble and tyres, must be removed entirely from the mining area and disposed of at a recognized landfill facility. It will not be permitted to be buried or burned on the site.

The management of invasive plant species must be done in a sporadic manner during the life of the mining activities. Species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto) will be eradicated from the site.

Final rehabilitation shall be completed within a period specified by the Regional Manager.

Once the entire mining area was rehabilitated the MR Applicant is required to submit a closure application to the Department of Mineral Resources in accordance with section 43(4) of the MPRDA, 2002 that states: *"An application for a closure certificate must be made to the Regional Manager in whose region the land in question is situated within 180 days of the occurrence of the lapsing, abandonment, cancellation, cessation, relinquishment or completion contemplated in subsection (3) and must be accompanied by the prescribed environmental risk report".* The Closure Application will also be submitted in terms of Regulation 62 of the MPRDA, 2002, and Government Notice 940 of NEMA, 1998 (as amended).

The end land use is proposed to be an Eco-Estate for which an Environmental Authorisation was obtained, with residential, resort and conservation land uses. The mined area will ultimately leave behind a void that, with careful planning, will be converted into artificial wetlands or water courses. These watercourses will be beneficial within the estate's vision. In addition, the conversion of the mine voids into artificial wetlands or water courses will result into a nett gain in biodiversity that should have a positive impact.

Also refer to *Part B(1)(d)(i) Determination of closure objectives.*

e) Policy and Legislative Context

Pure Source Mine requires authorisation in terms of the following interlinked pieces of legislation:

- The Mineral and Petroleum Resources Development Act, 2002 (MPRDA, Act 28 of 2002 - amended).
- The National Environmental Management Act, 1998 (NEMA, Act 107 of 1998 – as amended).
- The National Environmental Management Waste Act, 2008 (NEMWA, Act 59 of 2008).'
- The National Environmental Management Air Quality Act, 2008 (NEMAQA, Act 39 of 2004).
- The National Water Act, 1998 (NWA, Act 36 of 1998).

These pieces of core legislation stipulate the required studies, reports and legal processes to be conducted and the results thereof submitted to the relevant authorities for approval prior to commencement. In addition to the above, there are various pieces of legislation which govern certain aspects of the mining operations and these are summarised in Table 9 together with the main legislative requirements mentioned above.

Table 9: Policy and legislative context.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process);	REFERENCE WHERE APPLIED (i.e. Where in this document has it been explained how the development complies with and responds to the legislation and policy context)	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT (E.g. in terms of the National Water Act: Water use license has/has not been applied for).
Constitution of the Republic of South Africa, 1996 (Act 108 of 1996) The constitution of any country is the supreme law of that country. The Bill of Rights in Chapter 2 Section 24 of the Constitution of South Africa Act, 1996 (Act 108 of 1996) makes provisions for environmental issues and declares that: "Everyone has the right - (a) To an environment that is not harmful to their health or well-being. (b) To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that: i. Prevent pollution and ecological degradation. ii. Promote conservation. iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development".	Throughout the SR and EIR process.	EIA is conducted to fulfil the requirement of the Bill of Rights
Minerals and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (as amended) The MPRDA (2002) requires an Applicant who wishes to proceed with a mining project to obtain a Mining Right, part of which requires the applicant to obtain Environmental Authorisation in terms of the NEMA (1998).	Throughout the SR and EIR Process.	In terms of the Mineral and Petroleum Resources Development Act a Mining Right Application has been applied for

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT
National Environmental Management Act, 1998 (Act 107 of 1998) (as amended) The NEMA (1998) requires that a project of this nature (inclusive of a Mining Right) must undergo a Scoping and Environmental Impact Assessment; an Environmental Management Programme must also be compiled. Regulations applicable to this project include the following: • EIA Regulations 326 (2017) in terms of NEMA. • Listing Notice 1: 327 (2017) in terms of NEMA. • Listing Notice 2: 325 (2017) in terms of NEMA • Listing Notice 3: 324 (2014) in terms of NEMA.	Throughout the SR and EIR Process	In terms of the National Environmental Management Act an Application for Integrated Environmental Authorisation subject to a Scoping and Environmental Impact Assessment process has been applied for.
National Water Act, 1998 (Act 36 of 1998) The NWA recognizes that water is a scarce and unevenly distributed national resource which must managed encompassing all aspects of water resources. In terms of Chapter 4 of the NWA, activities and processes associated with the proposed mine and associated infrastructure, are required to be licensed by the Department of Water and Sanitation (DWS). An Integrated Use Licence Application (IWULA) will be lodged with the DWS in terms of Section 21 of the NWA, which lists several water uses requiring authorisation. Furthermore, an Integrated Water and Waste Management Plan (IWWMP) will be compiled and submitted in support of the IWULA.	Throughout the process – all water related aspects	In terms of the National Water Act, an Integrated Water Use License will be applied for.
National Heritage Resources Act, 1999 (Act 25 of 1999) The National Heritage Resources Act aims to promote good management of cultural heritage resources and encourages the nurturing and conservation of cultural legacy so that it may be bestowed to future generations. Due to the nature and extent of the project, it is likely that some heritage resources and palaeontological features are likely to occur within the project boundary area.	Throughout the process.	Specialist heritage and palaeontology impact studies have been undertaken in support of this application.
Specific Environmental Management Acts (SEMAs)	Throughout the process.	Relevant specialist studies have been undertaken in support of this application. In terms of the \National Environmental

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT
The SEMAs refer to specific portions of the environment where additional legislation over and above the NEMA (1998) is applicable. SEMAs relevant to this application include the following: • National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004). • National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004). • National Environmental Management Waste Act, 2004 (Act 26 of 2014).		Management: Air Quality Act, 2004 (Act 39 of 2004) an Air Emissions License will be applied for.
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983).	Part A(1)(g)(iv)(1)(b) Description of the current land uses. Part A(iv)(1)(viii) The possible mitigation measures that could be applied on the level of risk – *Management of Invasive Plant Species.*	The mitigation measures proposed for the site includes specifications of the CARA, 1983.
Guideline on Need and Desirability	Part A(1)(f) Need and desirability of the proposed activities.	The need and desirability of the project was assessed in accordance with these guidelines.
Ngwathe Local Authority Integrated Development Plan (IDP)	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed acidity – Socio-Economic Environment.	The IDP was used in the assessment of the socio economic profile of the receiving community.
Mine Health and Safety Act, 1996 (Act No 29 of 1996) read together with applicable amendments and regulations thereto including relevant OHSA regulations.	Part A(1)(g)(viii) The possible mitigation measures that could be applied on the level of risk – *Management of Health and Safety Risks.*	The mitigation measures proposed for the site includes specifications of the MHSA, 1996.
National Environmental Management: Air Quality Control Act, 39 (Act No 39 of 2004) read together with applicable amendments and regulations thereto specifically the National Dust Control Regulations, GN No R827	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity – *Air and Noise Quality.* Part A(1)(g)(viii) The possible mitigation measures that could be applied on the level of	The mitigation measures proposed for the site take into account the NEM:AQA, 2004 and the National Dust Control Regulations.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT
	risk – *Air and Noise Quality*.	
National Environmental Management Act: Biodiversity Act, 2004 (Act No. 10 of 2004) read together with applicable amendments and regulations thereto.	Part A1(g)(iv)(1)(a) Type of environment affected by the proposed activity - *Biological Environment* Part A(1)(g)(viii) The possible mitigation measures that could be applied on the level of risk – *Mining, Biodiversity Conservation Areas, and Vegetation.*	Should Layout Alternative 1 be approved and the proposed mitigation measures be implemented no aspects of the project could be identified that triggers the NEM:BA, 2004. The mitigation measures proposed for the site includes specifications of the NEM:BA, 2004.
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) read together with applicable amendments and regulations thereto. NEM:WA, 2008: National norms and standards for the storage of waste (GN 9260).	Part A(ii) Description of the activities to be undertaken: *Operational phase – 2.3.5 Waste Management.* Part A(1)(g)(viii) The possible mitigation measures that could be applied on the level of risk – *Waste Management*.	The mitigation measures proposed for the site take into account the NEM:WA, 2008.
National Heritage Resources Act No 25 of 1999.	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity – *Human Environment.* Part A(1)(g)(viii) The possible mitigation measures that could be applied on the level of risk – *Cultural and Heritage Environment.*	According to the South African Heritage Resources Agency (SAHRA) website and the South African Heritage Information System (SAHRIS) Fossil Sensitivity Map, the application area is depicted having very high (red), high (orange/yellow) and moderate (green) fossil sensitivity and therefore, warrants careful scrutiny This desktop study has revealed that the palaeontological sensitivity of the Goosebay property is very low The HIA found that the earmarked area is not a sensitive heritage environment. The mitigation measures proposed for the site includes specifications of the NHRA, 1999.
National Road Traffic Act, 1996 (Act No. 93 of 1996)	Part A(ii) Description of the activities to be undertaken: *Operational*	The mitigation measures proposed for the project take into account the NRTA, 1996.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT
	phase – 2.3.3 Access Road. Part A(1)(g)(viii) The possible mitigation measures that could be applied on the level of risk –.	
National Water Act, 1998 (Act No. 36 of 1998) read together with applicable amendments and regulations thereto. Department of Water Affairs and Forestry Best Practice Guideline Series (2007).	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity – *Hydrology and Geohydrology.* Part B(1)(d)(viii) Has a water use licence been applied for?	The MR Applicant has applied for a water use license by DWS in 2021 (see Appendix N). Water for mining and beneficiation will be sourced from ground water, or extracted from the Vaal River, pursuant to the obtaining of the relevant Water Use License. The mitigation measures proposed for the site take into account the NWA, 1998.
Public Participation Guideline in terms of the NEMA EIA Regulations.	Part A(1)(g)(ii) Details of the Public Participation Process Followed.	Public participation was conducted in accordance with the public participation guidelines.
Spatial Planning and Land Use Management Act, 2013 (Act No 16 of 2013)	Part A(1)(g)(iv)(1)(b) Description of current land uses.	As per legal opinion for Weavind and Weavind Attorneys dated 17 May 2018 persented at RMDEC 25 April 2019, the Ngwathe Local Municipality, has yet to adopt a Land Use Scheme as contemplated in Section 24(1) of The Spatial Planning and Land Use Management Act of 2013 ("SPLUMA"), nor does said Municipality's current Land Use Scheme make provision for the zoning of farmland. Consequently, the property in question falls squarely within the ambit of Section 26(3) of SPLUMA, which is quoted hereunder for your ease of reference: *"Where no town planning or land use scheme applies to a piece of land before a land use scheme is approved in terms of this Act, such land may be used only for the purposes listed in Schedule 2 of this Act and for which such land was lawfully used or could lawfully have been used immediately prior to the commencement of the Act."*

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT
		Schedule 2 of SPLUMA, in turn includes "mining purposes". In the premises, the Mining Activities (as set out herein), conducted on the property in question are, and were not, in contravention of any Law. The proposed project requires a land development application to Provincial Government (DEA&DP). A town and regional planner was appointed to handle this application.
The South African Constitution.	Implied throughout the document.	To be upheld throughout the EIA assessment, planning-, construction-, operational- and decommissioning phases.
Noise Control Regulation for the Free State Province(PN 242/1970) 7 November 1997	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity – *Air and Noise Quality.*	The mitigation measures proposed for the site take into account the Noise Control Regulation for the Free State Province, 1997.
Free State Nature Conservation Ordinance, 1969 (No 8 of 1969)	Part A1(g)(iv)(1)(a) Type of environment affected by the proposed activity - *Biological Environment* Part A(1)(g)(viii) The possible mitigation measures that could be applied on the level of risk – *Mining, Biodiversity Conservation Area, and Vegetation*.	Should Layout Alternative 1 be approved and the proposed mitigation measures be implemented no aspects of the project could be identified that triggers this Ordinance. The mitigation measures proposed for the site considers the FSNCO 1969.

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).

MCCP Mine:

MCCP is proposing to optimise resource extraction through applying for a Mining Right. The anticipated market prices in the medium and long-term are considered to be favourable for project development. The project is likely to contribute greatly to the socio-economic status quo in the form of increased income, employment and other benefits that would cascade through the local, regional and national levels.

Mining is important for economic development, to construct durable, modern structures, employment creation and revenue collection. The proposed site has previous sand mining activities, known to provide good quality silica sand to the local and regional building industry. This type of sand is commonly utilised in concrete mixtures in the construction industry. Sand is also used for mortar and rendering of plastered walls. The project site is located in the Ngwathe Local Municipality, and according to the municipality's 2018/19 Local Economic Development Strategy, the identified economic sectors of the municipality are Tourism, Agriculture, Manufacturing and Mining.

Extensive investigations have revealed that there is a shortage of alluvial silica sand in the PWV industrial complex. Alluvial silica sand has a greater utility than silica sand that is created by means of crushing processes. Furthermore, many of the previously existing abundant alluvial silica sand mines located in the Vaal Triangle (such as Copper Sunset, Skysand and Mission Point mines) are on the verge of being exhausted, thus making the mining of the existing resource at the Pure Source Mine both necessary and desirable, with regards to economic considerations.

The need and desirability of the proposed mining operation was assessed in terms of the National Department of Environmental Affairs' Guideline on Need and Desirability (first version published in terms of section 24J of the NEMA in 2014, and second version in 2017)). The following table shows the questions that were considered in this regard.

Table 10: Need and desirability determination.

1. SECURING ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES		
How will this development impact on the ecological integrity of the area?		
Question	**Response**	**Level of Desirability**
How were ecological integrity considerations taken into account?	Ecological studies were completed to determine the baseline condition of terrestrial and aquatic fauna and flora. The extent of the sensitive areas from an ecological perspective were delineated and an impact assessment completed based on the proposed project activities. Buffer zones were prescribed and avoidance of sensitive areas was recommended. Where this was not possible it was recommended that mitigation and rehabilitation was implemented. • Also refer to: • Part A(1)(g)(i) Details of the development footprint alternatives considered; • Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Vegetation; • Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk.	Desirable
How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity?	The proposed project will directly modify the terrestrial ecosystems associated with the various infrastructure and open cast mining activities. The proposed project will take place in a threatened vegetation type, the Soweto Highveld Grassland. The development will therefore cumulatively impact on this vegetation type. The proposed development was also associated with Critical Biodiversity Areas, Ecological Support Areas and sensitive ridge areas. Specialist studies were completed and recommendations were made to avoid the sensitive landscapes.	Desirable
How will this development pollute and/or degrade the biophysical environment?	The proposed development will directly modify the terrestrial ecosystems. Following the mining activities, the terrestrial ecosystems will be rehabilitated. The proposed project has the potential to pollute surface water however this can be effectively mitigated.	Desirable
What waste will be generated by this development?	Domestic waste, including sewerage will be produced during the proposed project. This waste will be treated and poses limited threats to the environment. No discard or overburden material will be produced from the mining activities with all materials (product) being exported from the mining site or utilised for backfilling as part of the rollover mining process.	Desirable

1. SECURING ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES		
How will this development impact on the ecological integrity of the area?		
Question	**Response**	**Level of Desirability**
	Stockpiles of materials from the aggregate deposits were derived to be classified as a type 3 waste. Mitigation actions will therefore be implemented to minimise the impact of this waste.	
How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage?	A palaeontological and heritage assessment was completed for this project; the sensitive sites have been delineated. The sensitive cultural heritage sites will be completely avoided. It is noted that the Vredefort Dome UNESCO site is located downstream of the proposed development, no impacts to the Vredefort Dome site are anticipated.	Desirable
How will this development use and/or impact on non-renewable natural resources?	The proposed development plans to mine a sand/aggregate resource. The associated natural landscapes were not considered to be non-renewable resources.	Desirable
How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part?	The proposed development will directly alter natural renewable resources. The proposed project will make use of rollover mining methods which will limit the impact to small areas of direct development over a period of 30 years.	Desirable
How were a risk-averse and cautious approach applied in terms of ecological impacts?	Detailed fauna and flora studies were completed for the proposed development. These studies delineated sensitive habitats and recommended that these are to be avoided by mining activities. This was found to significantly reduce potential risks to these habitats. Where avoidance was not achieved mitigation actions and rehabilitation was recommended which further reduced the risks to these habitats. Three site alternatives for infrastructure layout were considered and the layouts rated according to their potential impacts to the local ecology. The implementation of monitoring during the operational phase was noted to further reduce potential impacts and will be utilised to derive any impacts that may arise.	Desirable

1. SECURING ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES		
How will this development impact on the ecological integrity of the area?		
Question	**Response**	**Level of Desirability**
How will the ecological impacts resulting from this development impact on people's environmental right?	The proposed project will have a temporary impact on the sense of place due to the visual aspects. However this will be improved during closure. The proposed development is unlikely to have an impact on human health as determined by a community health assessment.	Desirable
Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts.	The ecosystem services were assessed by two specialist studies included in the wetland and pedology studies. The wetland areas were noted to provide the following services: • Streamflow regulation • Sediment trapping • Erosion control • Tourism and recreation • Education and research • Assimilation of toxicants, nitrates and phosphates. The results of the pedology studies indicated that the presence of 9 soil types with limited agricultural potential. Considering the ecosystem services that may be rendered from the wetland areas, it was recommended that these were avoided.	Desirable

1. SECURING ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES		
How will this development impact on the ecological integrity of the area?		
Question	**Response**	**Level of Desirability**
	Based on the socio-economic specialist studies the region has a high tourism value. The proposed development will temporarily alter the natural landscape and will therefore likely have a negative impact on local tourism activities. This was further confirmed through the visual impact assessment which indicates that the nearby town of Vaal Oewer will be impacted upon visually.	
Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?	. The proposed development will negatively impact on the ecological integrity of the area via direct disturbance. The impact will however be temporary with concurrent rehabilitation occurring. Moreover, it is important to note that the final landuse of the area will be for an already approved housing development. Also refer to: • Part A(1)(g)(i) Details of the development footprint alternatives considered; • Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Vegetation; • Part A(1)(g)(vii) The positive and negative impacts that the proposed activity and alternatives will have on the environmental and the community that may be affected.	Highly Desirable
Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified, resulted in the selection of the "best practicable environmental option" in terms of ecological considerations	Three alternative layouts for the processing infrastructure were assessed using relevant criteria in all the biophysical studies. The alternative layouts were initially selected based on engineering and cost factors and then subject to the above biophysical considerations. The most suitable layout was then selected to achieve the best practicable environmental option, this included visual and air quality considerations. Moreover, the open cast pit layouts were also considered from an environmental perspective, whereby avoidance was recommended and will be implemented.	

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT		
What is the socio-economic context of the area?		
Question	**Response**	**Level of Desirability**
What is the socio-economic context of the area?	Please refer to Heading 2(h)(iv)(1)(a) Socio-economic Environment.	Highly Desirable
Considering the socio-economic context, what will the socio-economic impacts be of the development, and specifically also on the socio-economic objectives of the area?		
How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?		
Will the development result in equitable impact distribution, in the short- and long-term?		
In terms of location, describe how the placement of the proposed development will contribute to the area.		
How were a risk-averse and cautious approach applied in terms of socio-economic impacts?		

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT		
What is the socio-economic context of the area?		
Question	**Response**	**Level of Desirability**
How will the socio-economic impacts resulting from this development impact on people's environmental right?		
Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socio-economic impacts will result in ecological impacts?		
What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?	Also refer to: • Part A(1)(g)(vii) The positive and negative impacts that the proposed activity and alternatives will have on the environmental and the community that may be affected.	
What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons?		

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT		
What is the socio-economic context of the area?		
Question	**Response**	**Level of Desirability**
What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?	The mine operates in accordance with, amongst others, the following: ⁎ CARA, 1983 – to ensure agriculture related compliance; ⁎ Financial Provision Regulations, 2015 – to ensure compliance in terms of rehabilitation; ⁎ Mine Health and Safety Act, 1996 (as amended) – to ensure employee safety; ⁎ MPRDA, 2002 (as amended) – to ensure mining related compliance; ⁎ NEM:AQA, 2004 – to ensure air quality related compliance; ⁎ NEM:BA, 2004 – to ensure biodiversity related compliance; ⁎ NEM:WA, 2008 – to ensure waste related compliance; ⁎ NEMA, 1998 (as amended) – to ensure environmental related compliance; Should the Mining Right application be approved the mining area will also be subject to compliance with the above listed.	Highly Desirable
What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?		
Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community that is consistent with the priority needs of the local area.		
What measures have been taken to ensure that current and/or future workers will be informed of	.	

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT		
What is the socio-economic context of the area?		
Question	**Response**	**Level of Desirability**
work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected.		
Describe how the development will impact on job creation in terms of, amongst other aspects?		Highly Desirable
What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage.		Highly Desirable
Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left.		Highly Desirable
What measures were taken to ensure that the costs of remedying pollution, environmental	In terms of Section 41 of the MPRDA, 2002 a mining right Applicant must submit a financial provision to the DMRE that is sufficient to rehabilitate or manage the negative environmental impacts related to the mining activity. The applicant will submit	Highly Desirable

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT		
What is the socio-economic context of the area?		
Question	**Response**	**Level of Desirability**
degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution environmental damage or adverse health effects will be paid for by those responsible for harming the environment.	a guarantee to with the DMRE that is deemed sufficient to cover the financial provision amount needed to rehabilitate the mining footprint.	
Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified, resulted in the selection of the best practicable environmental option in terms of socio-economic considerations	Also refer to: • Part A(1)(g)(i) Details of the development footprint alternatives considered; • Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Socio-Economic Environment; • Part A(1)(g)(vii) The positive and negative impacts that the proposed activity and alternatives will have on the environmental and the community that may be affected.	Highly Desirable
Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area.		

g) Motivation for the preferred development footprint within the approved site including a full description of the process followed to reach the proposed development footprint within the approved 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.

CONSIDERATION OF ALTERNATIVES

The identification of alternatives is a key aspect of the success of the environmental impact assessment process. All reasonable and feasible alternatives must be identified and screened to determine the most suitable alternatives to consider in this application. There are however, some constraints that have to be taken into account when identifying alternatives for a project depending on the scope. Such constraints include financial, social and environment related constraints. Alternatives can typically be identified according to:

Activity alternatives.

Location alternatives.

Design or layout alternatives.

Technology alternatives.

Operational alternatives.

No-Action alternative (No-Go). Alternatives are typically distinguished into discrete or incremental alternatives. Discrete alternatives are overall development options, which are typically identified during the pre-feasibility, feasibility and/or environmental impact assessment process. Incremental alternatives typically arise during the environmental impact assessment process and are usually suggested as a means of addressing/mitigating identified impacts (mining in low sensitivity areas). These alternatives are closely linked to the identification of mitigation measures and are therefore not specifically identified as distinct alternatives.

For any alternative to be considered feasible, such an alternative must meet the need and purpose of the proposed activity without presenting significantly high associated impacts. The proposed activity is mining. The geology is the primary driver in determining the location for mining. The application area has been selected based on historical and active mining operations in the immediate

surroundings of the application area (there are two operational sand mines adjacent to the application area), along with historical and current data that indicate the economic viability of the sand, aggregate/gravel and alluvial diamond minerals to occur. As such, no activity alternative was considered. The “No Go” or “No Action” alternative refers to the alternative of not embarking on the proposed project at all. This alternative would denote the current status quo without the proposed project. It is important to note that the No Go alternative is the baseline against which all other alternatives and the development proposal are assessed.

When considering the No Go alternative, the impacts (both positive and negative) associated with any other specific alternative or the current project proposal would not occur and in effect the impacts of the No Go alternative are therefore inadvertently assessed by assessing the other alternatives. In addition to the direct implications of retaining the status quo there are certain other indirect impacts, which may occur should the No Go alternative be followed. The No Go alternative as a specific alternative is not considered feasible for the following reasons:

- The Applicant holds an Environmental Authorisation for the establishment of an Eco-Estate with residential, resort and conservation land uses. Certain areas of the application area are currently utilised for agricultural purposes (in the form of game farming and maize crop production) and ecotourism. These two functions will continue to remain the primary land uses during the mining activities. If the project is rejected, the Applicant will progress with the establishment of the Eco- Estate (with some agriculture). As such, the status quo of the properties under application will ultimately change, irrespective of the mining activities.
- Mining is important for economic development, to construct durable, modern structures, employment creation and revenue collection. The proposed site has previous sand mining activities, known to provide good quality silica sand to the regional and local building industry.
- Extensive investigations have revealed that there is a shortage of alluvial silica sand in the PWV industrial complex. Alluvial silica sand has a greater utility than silica sand that is created by means of crushing processes. Furthermore, many of the previously existing abundant alluvial silica sand deposits located in the Vaal Triangle are on the verge of being exhausted, thus making the mining of the existing resource at the Pure Source Mine both necessary and desirable, with regards to economic considerations

- Furthermore, if this project is approved, it will ensure that no economically viable mineral resources will be sterilised and that the benefits of the resources available in the area will be maximised.

The No Go alternative, as a specific alternative will not be considered further.

For the purpose of this project, the need and justification for alternatives was specifically guided by the relatively low sensitivity of the receiving socio-economic and biophysical environment as well as the geology. Three alternative sites are considered for the location of the supporting mining infrastructure within the application area.

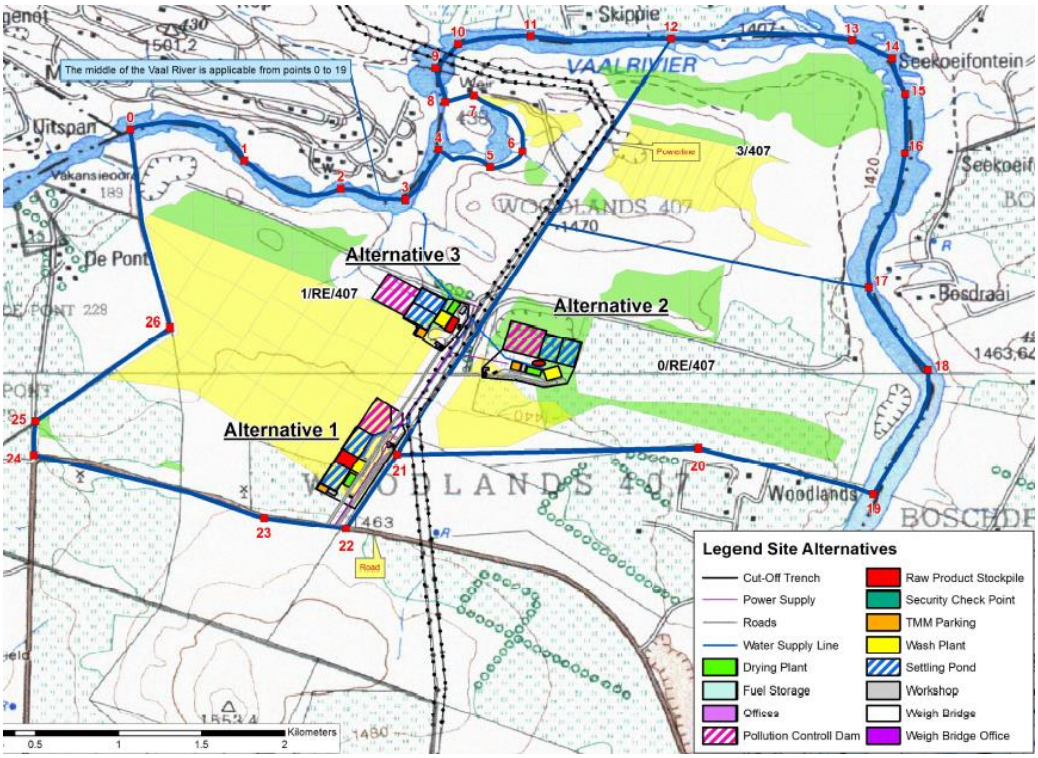

Figure 11: Site Alternative 1. ((Image obtained from Final Scoping Report by Shango Solutions dated November 2018).

Site Alternative 1

Site Alternative 1 (Site 1, Figure 12) is the preferred site for the project. Site 1 is located near the south eastern border of Remaining Extent of Portion 1 of Woodlands 407 on a disturbed area (Figure 11). The site is strategically placed to be in close proximity to the main sand resource, the S171 tar road and power supply. The footprint of the infrastructure (excluding roads, power line and water supply) is approximately 13.5 ha.

Advantages:

- The site is currently disturbed and no additional encroachment on natural vegetation will be required.
- This location will have the least impact on the migration patterns of the game that roam on the farm
- Due to the fact that previous mining occurred in this area. It is also near the perimeter of the farm, bordered by fenced agricultural fields on two sides.
- It is in close proximity to existing infrastructure such as a public road network and power supply, therefore minimising construction and operational impacts.
- It is in close proximity to the main sand and aggregate deposits which in turn requires the least distance for transporting material.
- The site and proposed mine layout, provides a safe separation between active mining in the pit, and vehicle circulation for product collection.
- The site is furthest away from the nearest residential development.

Disadvantages:

- The site is fairly exposed and visible from potential sensitive viewpoints.

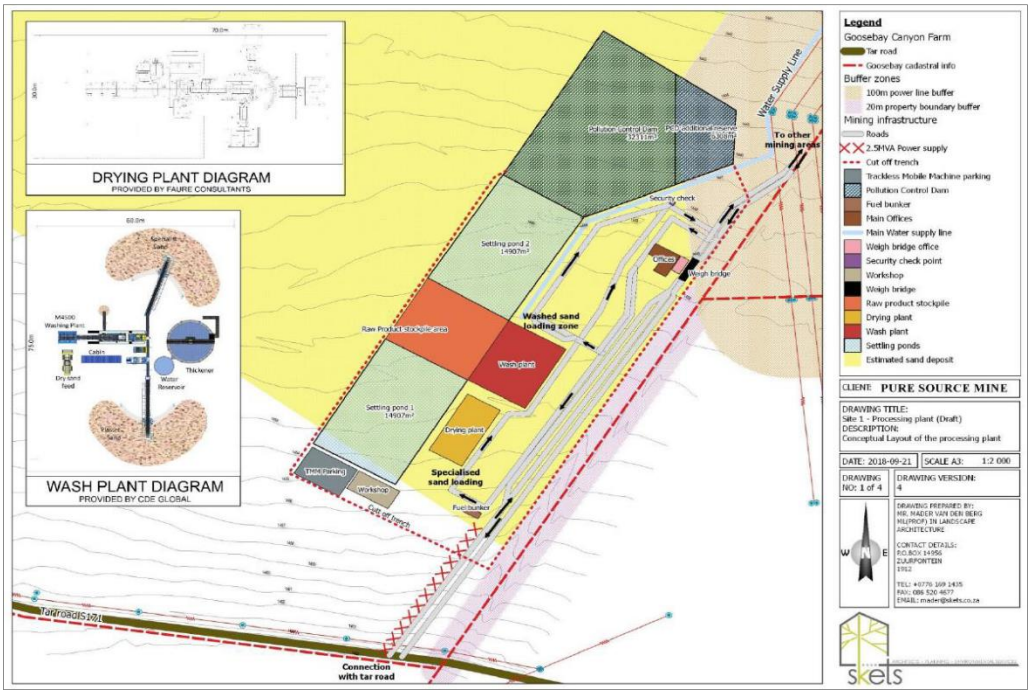

Figure 12: Site Alternative 1. (Image obtained from Final Scoping Report by Shango Solutions dated November 2018).

Site Alternative 2

Site Alternative 2 (Site 2, Figure 13) is located near the western border of Remaining Extent of Woodlands 407 adjacent to an abandoned gravel pit (Figure 11). The settling ponds and pollution control dam are proposed in the borrow pit to make use of the existing depression. The remainder of the infrastructure will be located on existing cultivated farmland. This site is approximately 1.3 km north of the S171 and east of the main sand deposit. The footprint of the infrastructure (excluding roads, power line and water supply) is approximately 13.5 ha.

Advantages:

- The site is fairly well concealed from potential sensitive viewpoints.
- It makes use of an abandoned borrow pit for the settling and pollution control dams thereby minimising the disturbance footprint.

Disadvantages:

- Part of the site will encroach on actively cultivated agricultural fields.
- An existing transmission line separates the site from the main sand deposit which will create difficulties in transporting the material to and from the processing plant.
- General requirements for mining activities at or near Eskom infrastructure include restrictions of certain activities (such as truck circulation) that may not occur under their powerlines or within their servitude.
- The site is further away from the public road and power supply, therefore requiring greater infrastructure development which may increase construction and operational impacts.

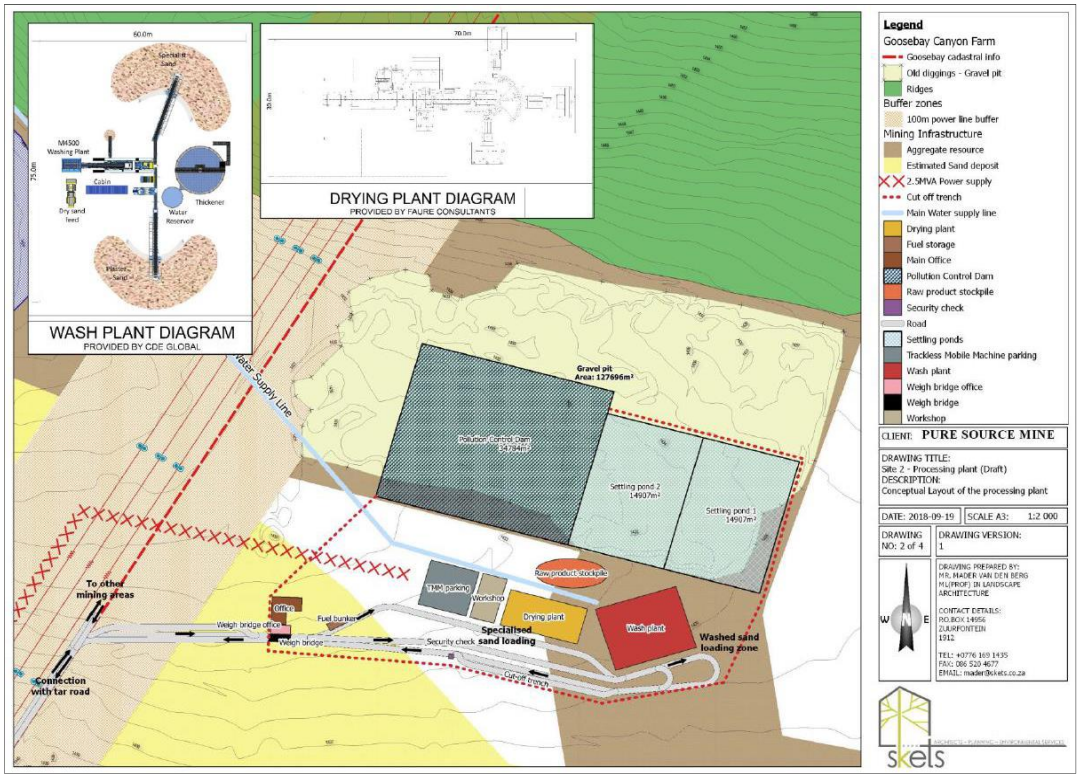

Figure 13: Site Alternative 2. (Image obtained from Final Scoping Report by Shango Solutions dated November 2018).

12.3 Site Alternative 3

Site Alternative 3 (Site 3, Figure 14) is located on Remaining Extent of Portion 1 of Woodlands 407, near its eastern border and just north of the main sand deposit (Figure 11). It is approximately 1.2 km north of the S171. The existing vegetation cover is predominantly grassland. The footprint of the infrastructure (excluding roads, power line and water supply) is approximately 13.5 ha.

Advantages:

- The site is fairly well concealed from potential sensitive viewpoints.

Disadvantages:

- The entire site will encroach on natural grassland which is utilised by the game for grazing.
- The site will most probably interfere with the game's migration patterns as it is fairly close to the centre of the 3 farm portions.
- A part of the site will fall within a preliminary wetland buffer.
- The site is closest to the nearest residential development and may increase impacts such as noise, etc.

- The site is further away from the public road and power supply, therefore requiring greater infrastructure development which may increase construction and operational impacts.

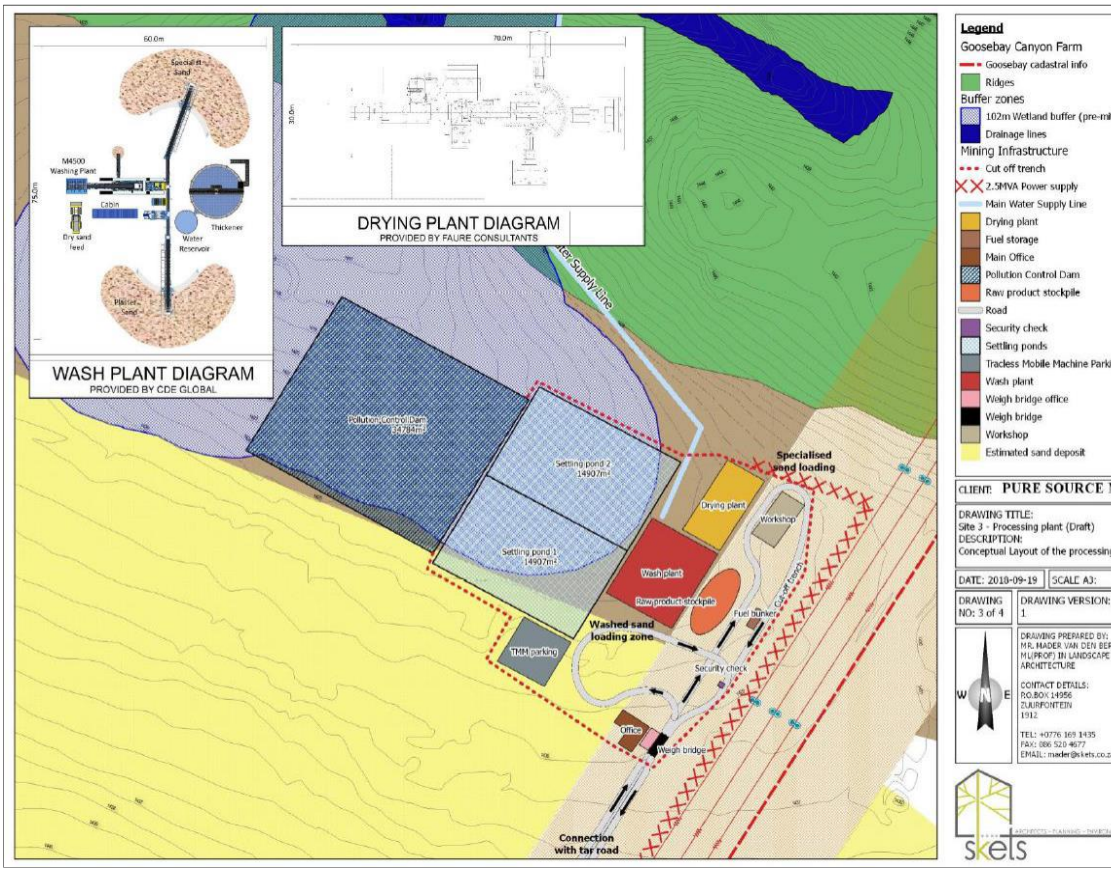

Figure 14: Site Alternative 3. (Image obtained from Final Scoping Report by Shango Solutions dated November 2018).

i) Details of the development footprint alternatives considered.

With reference to the site plan provided as Appendix D 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;
(b) the type of activity to be undertaken;
(c) the design or layout of the activity;
(d) the technology to be used in the activity;
(e) the operational aspects of the activity; and
(f) the option of not implementing the activity.

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 attend 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).

South Africa, being one of the countries with the most progressive constitutions, enshrined the public's right to be involved in decisions. Section 57(1) of the new Constitution that provides: "The National Assembly may (b) make rules and orders

concerning its business, with due regard to representative and participatory democracy, accountability, transparency and public involvement". This provision, along with several others gave rise to many new trends in South African legislation. In environmental legislation, the idea of public participation (or stakeholder engagement) features strongly and especially the National Environmental Management Act, 1998 (Act 107 of 1998, NEMA – as amended) and the recent regulations passed under the auspices of this Act make very strict provisions for public participation in environmental decision-making.

Public participation can be defined as "a process leading to a joint effort by stakeholders, technical specialists, the authorities and the proponent who work together to produce better decisions than if they had acted independently" (Greyling, 1999). From this definition, it can be seen that the input of the public is regarded as very important indeed.

The Public Participation Process (PPP) is designed to provide sufficient and accessible information to Interested and Affected Parties (I&APs) in an objective manner to assist them to:

During the Scoping Phase:

- Raise issues of concern and suggestions for enhanced benefits.
- Verify that their issues have been recorded.
- Assist in identifying reasonable alternatives.
- Provide relevant local information and knowledge to the environmental assessment.

During the Environmental Impact Assessment (EIA) Phase:

- Contribute relevant local information and knowledge to the environmental assessment.
- Verify that their issues have been considered in the EIA process.
- Comment on the findings of the environmental assessments.

During the decision-making phase:

- Obtain information on the outcome, i.e. the competent authority's decision, and how and by when the decision can be appealed.

Refer to Appendix E for proof of the PPP undertaken to date.

The following table provides a list of the I&AP's and stakeholders that were informed of the project:

Table 11: List of the landowners, I&AP's and stakeholders that registered on this project.

LANDOWNERS & INTERESTED AND AFFECTED PARTIES	STAKEHOLDERS
Landowner: • Mark van Wyk/Goosebay Farm (Pty) **Surrounding Landowners and I&AP's:** • Temlett Hugh William/Leafy Glade Props 4 (Pty) Ltd/Goose Bay Canyon Golf Estate (Pty) Ltd/ Goosebay Canyon Country Club (Pty) Limited. • Zeekoefontein Family Trust. • Fourie Antionetta Maryna/Modans Inv CC. • Strydom Johannes Rudolph. • Theron Gertruida/Theron Paulus Stephanus. • Cronk William Arthur. • Human Petro Johanna/ Nonyana River Estate (Pty) Ltd. • Greyling Johanna Susanna/ Rainbow Place Prop 168 (Pty) Ltd. • Streetwise Shopping Centre CC. • Plaas Seekoeifontein Beleggings CC. • Daniel Van Zyl/Daniel Van Zyl Familie Trust. • Mull Emmerentia/Mull Manfred Hermann/Themuells Enterprises CC. • Jackson Demi Megan. • Kuchenbecker Anna Susanna. • Kajee Mohammed Ameen/ Amroz Inv CC. • Rieple Heinz-Joachim. • Tille Kurt/ Zebra Pond CC. • Van Nugteren Cornelius/Van Nugteren Carlette. • Pistorius Family Trust. • Dadabhay Yusuf/Noldick Prop CC. • Vaal Eiendomme (Pty) Ltd. • Abdullah Ismail Ebrahim. • Kruger Anita Michaela. • C J Terblanche Beleggings (Pty) Ltd. • Elizabeth Jacoba Muller. • Petrus Johannes Koekemoer/Sakha Indlu Development and Construction (Pty) Ltd. • Dennis Clive Rogers/Sakha Indlu Development and Construction (Pty) Ltd. • Daniel Jacobus Basch/Sakha Indlu Development and Construction (Pty) Ltd. • Christiaan Johann Gerber/Sakha Indlu Development and Construction (Pty) Ltd. • Johnny Kasimatis/ Sakha Indlu Development and Construction (Pty) Ltd. • Davendranath Maharaj/ Sakha Indlu Development and Construction (Pty) Ltd. • Hellenis Gerhardus Rens/ Sakha Indlu Development and Construction (Pty) Ltd. • Athos Phytides. • Simone Santana/Mark Allan Santana. • Rudolff Wilhelm Hendrik Gersteling/Madelein Gersteling. • Pierre van Renen. • Deon Nico Strydom. • Abrie Hannekom/Hanekom Trust. • Jonathan van Aswegen/Van Aswegen Testamentere Trust.	**List of Authorities Identified and Notified** • Ngwathe Local Municipality. • Fezile Dabi District Municipality. • Emfuleni Local Municiaplity. • Sedibeng District Municipality. • JB Marks Local Municipality. • Dr Kenneth Kaunda District Municipality. • Free State Department of Economic Development, Tourism, Environmental Affairs and Small Business. • Free State Department of Agriculture, Rural Development, Land and Environmental Affairs. • Free State Department of Rural Development and Land Reform. • Free State Department of Mineral Resources. • Free State Department of Agriculture and Rural Development. • Free State Department of Human Settlements. • Free State Department of Cooperative Governance, Traditional Affairs and Human Settlements. • Free State Department of Police, Roads and Transport. • Free State Department of Public Works. • Free State Department of Water and Sanitation. • Gauteng Department of Economic Development. • Gauteng Department of Agriculture and Rural Development. • Gauteng Department of Cooperative Governance and Traditional Affairs. • Gauteng Department of Human Settlements. • Gauteng Department of Roads and Transport. • North West Department of Economic Development, Environment, Conservation and Tourism. • North West Department of Rural, Environmental and Agricultural Development. • North West Department of Rural, Environmental and Agricultural Development. • North West Department of Rural, Environmental and Agricultural Development. • North West Department of Water and Sanitation. • North West Department of Rural Development and Land Reform. • North West Department of Public Works, Roads and Transport. • North West Department of Agriculture. • Northwest Provincial Heritage Resources Authority - NWPHRA. • . North West Department of Agriculture, Forestry and Fisheries. • North West Department of Agriculture and Environmental Affairs. • North West Parks Board.

LANDOWNERS & INTERESTED AND AFFECTED PARTIES	STAKEHOLDERS
• Stephen Jacobs. • P J van Rensburg. • Johanna Getruida Terblanche/Noord Vrystaat Graan and Vee (Pty) Ltd. • Christiaan Strauss. • Ananias Bernardus Buys/Vidimax Investments (Pty) Ltd. • Kim Beverley Muller/Little Swift Investments Four Six Eight (Pty) Ltd. • Petronella Jacoba De Beer/ Encibrite Ltd. • Johannes Christiaan de Beer. • Johan George Wassermann. • Johannes Ernst Helmbold. • Leeupoort Trust. • Luis Miguel De Azevedo Ferreira. • L D C Family Trust. • Christian Gouws/ Ilifu Trading 325 CC. • Arnoldus Stephanus de Beer/Erf 32 Welbedacht (Pty) Ltd. • Louisa Johanna Wolmarans/Erf 33 Welbedacht (Pty Ltd. • Louisa Johanna De Beer/Biz Afrika 1646 (Pty) Ltd. • Peter Trevor Norman van Heerden. • Mohamed Farhad Areff. • Salmoen Everhardus van Rooyen/Manswario Property (Pty) Ltd. • Gail Burger/Freddie Burger. • Vela Mngwengwe/ Republic of South Africa /Department of Rural Development and Land Reform. • Merlin Trust. •	• South African Water Research Commission. • South African Heritage Resources Agency. • National Department of Rural Development and Land Reform. • National Department of Mineral Resources. • National Department of Agriculture, Forestry and Fisheries. • National Department of Environmental Affairs. • The Council for Scientific and Industrial Research - CSIR. • South African National Roads Agency Ltd – SANRAL. • Eskom. • Transnet. **List of Key Stakeholders Identified and Notified** • BirdLife SA. • Federation for a Sustainable Environment. • Endangered Wildlife Trust – EWT. • Wildlife and Environment Society of South Africa – WESSA. • Protect Vaal Eden Committee. • Friends of Vredefort Dome World Heritage Site. • Save the Vaal Environment. • Goose Bay Canyon Recreation and Power Boat Club. • Goose Bay Canyon Share Block (Pty) Ltd. • Porcupine Ridge Eco Estate Homeowners' Association. • The Save Committee. • Free State Dome Landowners Association/Vredefort Dome Landowners Association. • North West Dome Landowners Association.

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Sampie van Rooyen Gavin Aboud Renee De Jong Hartsfield Abrie Hanekom Vaaloewer Arnold de Beer Pa Bob Chris Dina Tertius Warrin Liz Schalk Burger	Environmental Management Group	
Registered	Luchaans Shreiner		
Registered	Derrick Cronje		
Registered	Gert Janse van Vuuren		
Registered	Brain Andrew de Scally		
Registered	Change Mvalo		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Marie van Waveren		
Registered	Piet van Waveren		
Registered	Deon Kolbe		
Registered	Hannelie Kolbe		
Registered	Charmaine Volschenk		
Registered	Mrs. Charmaine Volschenk		
Registered	H.T. Oosthuizen		
Registered	Chrissie le Roux		
Registered	Gert van Niekerk		
Registered	Ilze van Niekerk		
Registered	Amanda Grove		
Registered	Jaques Grove		
Registered	Jacobus van Vuuren		
Registered	Jacobs		
Registered	A.M.M. van Vuuren		
Registered	P.J van Vuuren		
Registered	Petrus J.J. van Vuuren		
Registered	M Coetzee		
Registered	R.A. Coetzee		
Registered	Lynnette Pepler		
Registered	Peter H. Stuttard		
Registered	Veronica Stuttard		
Registered	Aletta c. Gouws		
Registered	Paul Gouws		
Registered	Armand Pretorius		
Registered	Corne Bauermeister		
Registered	Michelle Avice le Roux		
Registered	Pieter Gerhardus le Roux		
Registered	Anton Wessels		
Registered	Lezelle Wessels		
Registered	J.J Venter		
Registered	A.S. Henstock		
Registered	Dina Elizabeth Henstock		
Registered	Ilze Henstock Charles Park		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Riette Kraucamp		
Registered	Sidney Kraucamp		
Registered	Emmarenthia Cecilia Strydom		
Registered	Jozua Francois Strydom		
Registered	Brain Knott		
Registered	Lentie Knott		
Registered	Andrew Manchishi		
Registered	Matilda van Aswegen		
Registered	Jacomiena van Vuuren		
Registered	L.D. (Dot) Vorster		
Registered	P.L. Vorster		
Registered	Nico Sibyloane		
Registered	Aloma van der Merwe		
Registered	J.G. van der Merwe		
Registered	W.H. Cockeran		
Registered	Ian Ross McDonald		
Registered	Sylvia McDonald		
Registered	Riette v Heerden		
Registered	Izak van Heerden		
Registered	Annette Pieterse		
Registered	A.J. Spamers		
Registered	Joey Spamers		
Registered	Thys van der Mescht		
Registered	Izette van Heerden		
Registered	Liz Blignaut		
Registered	Nico Blignaut		
Registered	F.W. du Toit		
Registered	Stella du Toit		
Registered	Ken Evans		
Registered	Charles Roets		
Registered	Liz Roets		
Registered	Annie Sophia de Villiers		
Registered	Desire Dhliwayo		
Registered	Christian Figenshou		
Registered	Memory Ndaba		
Registered	Gisela Seidel		
Registered	Charmaine Storm		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Elsa Storm		
Registered	Hennie Storm		
Registered	Hennie Storm (Sr)		
Registered	Duan Jacobs		
Registered	Lidia Jacobs		
Registered	Erwin Soontiens		
Registered	H.E.W.M. Soontiens		
Registered	Lizette Soontiens		
Registered	Wim Soontiens		
Registered	Koos Hlongwana		
Registered	Maria Maile		
Registered	M.M. V.d. Merwe		
Registered	Elias Motase		
Registered	Anri Steyn		
Registered	Jurie Ferreira		
Registered	Adele Begue		
Registered	Bruce Withers		
Registered	Tarryn Withers		
Registered	Veronica Withers		Keraweb Investments Home and Rental Cottages
Registered	Anna Goosen		
Registered	Maud van der Walt		
Registered	Willem van der Walt		
Registered	Clive Versfeld		
Registered	Sharon Versfeld		
Registered	J.D. Griessel		
Registered	L Griessel		
Registered	J. van den Berg		
Registered	R Van den Berg		
Registered	Ismael Adams		
Registered	Shamila Johann		
Registered	Donald Hanneman		
Registered	Jutta Hanneman		
Registered	M.K. Mota		
Registered	Rayhana Mota		
Registered	Saood Mota		
Registered	Dennis Holler		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Roelf Pretorius		
Registered	Franscois Viljoen		
Registered	Tertius Wehmeyer		
Registered	Mario Miuller		
Registered	Christopher Lang		
Registered	Stefan Tolmay		
Registered	Diederik du Plessis		
Registered	Violet Disebo Leche		
Registered	Thembi Mokwena		
Registered	Teboho Ben Mtetwa		
Registered	Leonora Louise Human		
Registered	A.L. Fourie		
Registered	J.W. Fourie		
Registered	Annette Mathilda v Schalkwyk		
Registered	Leon van Schalkwyk		
Registered	Leonie van Schalkwyk		
Registered	Lionel van Schalkwyk		
Registered	Chantel Steyn		
Registered	Charlet Steyn		
Registered	Cornelius Johannes Steyn		
Registered	Mark Thornhill		
Registered	Sheila Thornhill		
Registered	Sue Blom		
Registered	J.H.B. Botha		
Registered	Bric Jevis		
Registered	Fanie Lombard		
Registered	K Ludike		
Registered	M.J. Skellern		
Registered	Petro van Rooyen		
Registered	Izak Nel		
Registered	Yolanda Blignaut		
Registered	D Rautenbach		
Registered	Pieter de Bruyn		
Registered	Zandria de Bruyn		
Registered	Kapt. Kgori		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Robert de Witt		
Registered	Johannes Pienaar		
Registered	Cobus Crafford		
Registered	Elizna Crafford		
Registered	Robert van Reenen		
Registered	Nico van Vuuren		
Registered	Leon Potgieter		
Registered	Jake Bezuidenhout		
Registered	C.P.J. Botha		
Registered	Rika Botha		
Registered	Corne de Jager		
Registered	B Human		
Registered	Mathilda Jackson		
Registered	Richard Jackson		
Registered	Filla Jordaan		
Registered	Johan J Kock		
Registered	Morne Lombard		
Registered	Janine Pretorius		
Registered	Leonie Steyn		
Registered	Johannes Pieter Trollip		
Registered	Andrew van Rooyen		
Registered	Baron van Schalkwyk		
Registered	Charmaine van Zyl		
Registered	Teneal van Zyl		
Registered	Bates Wendy		
Registered	Graig		
Registered	Jacques Jacobs		
Registered	George Karrani		
Registered	Paula Reed		
Registered	Wesley van Bentum		
Registered	Lee Bailey		
Registered	Veronica Bailey		
Registered	Christopher Baker		
Registered	Sean Baker		
Registered	Hennie Binneman		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Franc Brugman		
Registered	Danie Coetzee		
Registered	Helena de Koker		
Registered	Paul Dedlow		
Registered	Ilecia du Toit		
Registered	J du Toit		
Registered	Pierre Eksteen		
Registered	Marinda Engelbrecht		
Registered	Greg Esterhuizen		
Registered	J.C. Fourie		
Registered	Quintin Germanus		
Registered	Sharne Germanus		
Registered	Victor Germanus		
Registered	Kevi Govender		
Registered	Trishana Govender		
Registered	Sheldom Hall		
Registered	Leonie Hamman		
Registered	Renier Wynand Hamman		
Registered	Ghatiem Herukas		
Registered	Brain Clifford Hingley		
Registered	Brett Hingley		
Registered	Willie Jacobs		
Registered	K Johnstone		
Registered	Lance Johnstone		
Registered	Sebastian Johnstone		
Registered	Chene-Elaine Lawrence		
Registered	Deon Allan Lawrence		
Registered	Anton Lubbe		
Registered	Rashaad Mayet		
Registered	Ronnie Maytham		
Registered	Mohammed Mayzi		
Registered	Rene Minnaar		
Registered	Tylon Mostert		
Registered	Retsch Muller		
Registered	Benjamin Pefur		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Minette Pretorius		
Registered	Natascha Prinsloo		
Registered	Tarryn Rae		
Registered	Walter Raubenheimer		
Registered	Deon Rigney		
Registered	Tar Scoombee		
Registered	Neil Scorer		
Registered	Bernard Seaman		
Registered	Bianca Seaman		
Registered	Raadil Shaik		
Registered	Anna-Marie Slavon		
Registered	Stefan Slavon		
Registered	Caroline Surett		
Registered	Neil Surett		
Registered	J.W. Swarts		
Registered	Andrew Swartz		
Registered	J.C. van der Berg		
Registered	Ernst van der Toorn		
Registered	Heinrich van der Watt		
Registered	Anton van Deventer		
Registered	Juwhan van Deventer		
Registered	Lynette van Deventer		
Registered	F van Heerden		
Registered	Dirkie van Pletzen		
Registered	Estie van Pletzen		
Registered	Al-Johndro van Wyk		
Registered	Elsabe van Zyl		
Registered	Hennie van Zyl		
Registered	Loezy-Marie Visser		
Registered	Jason Ward		
Registered	Katherine Withers		
Registered	Gary		
Registered	E.M. de Witt		
Registered	L Nel		
Registered	Adri Meintjes		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Angs Meintjes		
Registered	Ben Meintjes		
Registered	Elizabeth Meintjes		
Registered	Ruan Meintjes		
Registered	Daniel Cornelius		
Registered	M Cornelius		
Registered	Petrus J.J. Cornelius		
Registered	Francois Phillipus du Plessis		
Registered	Ina Froneman		
Registered	Hannelie Nassif		
Registered	Aletta Cronje		
Registered	Jonathan Renee		
Registered	Sampie van Rooyen van Rooyen		
Registered	Sampie van Rooyen		
Registered	Piet Cilliers		
Registered	Schalk Burger		
Registered	Martin Estruizene		
Registered	Henry Inocco		
Registered	Elaine Lombard		
Registered	Mike Lombard		
Registered	Veronica Mocke		
Registered	A. Mocke		
Registered	Kobus Nagel		
Registered	Karen Oberholzer		
Registered	Andre Pienaar		
Registered	Jan Smit		
Registered	Erich Smith	Lapa Manzi	
Registered	Dawid Speier		
Registered	Damon Speier		
Registered	G.C. van der Merwe		
Registered	Jacobus Frans van der Merwe		
Registered	Terrance van Renen		
Registered	Maryna van Heerden		
Registered	Juan van Tonder		
Registered	Juanita van Tonder		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Andre Pienaar		
Registered	B.J.J. van Dyk		
Registered	Eloise Greyling		
Registered	Louise Petro Cockeran		
Registered	J. Dekocker		
Registered	G Carlitz		
Registered	Riaan Beukes		
Registered	Sophia Johanna Swanepoel		
Registered	Albertus Petrus Kotze		
Registered	Armin Kotze		
Registered	Annelien Kotze		
Registered	Sheree Labuschagne		
Registered	Jenny Vlok		
Registered	Jo athindreis		
Registered	Christopher Badenhorst		
Registered	Clinton Buitendag		
Registered	Bartina de Meyer		
Registered	Reese Jacobs		
Registered	Amelia Jordaan		
Registered	G.E. Gomes		
Registered	Karika Gomes		
Registered	Caroline Hughes		
Registered	Petra Koortzen		
Registered	Gert Diederick Kruger		
Registered	Rina Lessing		
Registered	Dencia Maria Meti		
Registered	Egon Soontiens		
Registered	Gabriel Trollip		
Registered	Marnes van der Linde		
Registered	Jan van der Merwe		
Registered	Jacques van der Merwe		
Registered	Stephan Botha		
Registered	Edwin Bronehast		
Registered	Drikus Bubb		
Registered	Adriaan Davidson		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Gideon de Beer		
Registered	Rochelle de Beer		
Registered	Arno Engelbrecht		
Registered	David Ferrier		
Registered	Clinton Hattingh		
Registered	Chantelle Hattingh		
Registered	Christopher Liebenberg		
Registered	Marshall Gericke		
Registered	Hentrik Otto		
Registered	Amanda Otto		
Registered	Peyper Magriet		
Registered	Casper Fouche Peyper		
Registered	Jolene Piek		
Registered	Tommy Piek		
Registered	Coene Piek		
Registered	Jacobus Frans Piek		
Registered	Ina Piek		
Registered	Hermanus Pool		
Registered	Barend Simon		
Registered	Madelein Simon		
Registered	Matthew Simon		
Registered	Jhonny Simon		
Registered	Corne van den Dool		
Registered	Gertina vd Westhuizen		
Registered	Monique van der Skhuff		
Registered	Chantelle van Staden		
Registered	Janette van Zyl		
Registered	Anton van Zyl		
Registered	Nina Vermaak		
Registered	Dirkie Visser		
Registered	Martin Smit		
Registered	A.S. Henstock		
Registered	Abrie Struwig		
Registered	Du toit		
Registered	Adriane and Susan Classen		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Alco Beton		
Registered	Alex Madonsela		
Registered	Allister Cousins		
Registered	Aloma van der Merwe		
Registered	Aloma vdm		
Registered	Andre and Madelyn Kok		
Registered	Andre and Marietta Visagie		
Registered	Andre Pienaar		
Registered	Andrew And Caitlin Wilson		
Registered	Andrew Connold		
Registered	Andrew Manchishi		
Registered	Andrew Swartz		
Registered	Anna and Andries van Jaarsveld		
Registered	Anna-Marie Slavon		
Registered	Annalise and Nico Coetzee		
Registered	Annalise Scholtz		
Registered	Anne and Dennis Wilson	Candy's Lodge	
Registered	Antoinette Diedericks		
Registered	Anton and Lynet van Deventer		
Registered	Anton Lubbe		
Registered	Ashley and Iola Stephens		
Registered	St 589 Basie du Plessis		
Registered	Bauermeistercorne		
Registered	Ben and Joey Koen		
Registered	Benjamin Pefur		
Registered	Benjamin Pefir		
Registered	Bennie and Christa Jordaan		
Registered	Benny Ramasedi		
Registered	Bernard Coins		
Registered	Birdhaven Clifton And Elma Piek		
Registered		Bbmvaal	
Registered	Boat Club Cathy Lee		
Registered	Boat Club Chris van Eeden		
Registered	Boat Club Deon Elsworth		
Registered	Boat Club Des Marais		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Boat Club Eddie van der Riet		
Registered	Boat Club Eric Lourens		
Registered	Boat club Fred Waite		
Registered	Boat Club Giles Palmer		
Registered	Boat Club Hannes Venter		
Registered	Boat Club Hansie and Hermien Pretorius		
Registered	Boat Club Ivan Leach		
Registered	Boat club Jan Taljaard		
Registered	Boat Club John Koen		
Registered	Boat Club Ken Brown		
Registered	Boat Club Krizelle Fourie		
Registered	Boat Club Mark Brijder		
Registered	Boat club Phillip Austin		
Registered	Boat club Pierre Pienaar		
Registered	Boatclub Teresa Cook		
Registered	Bob & Brigette Lavery		
Registered	Braam and Linda Du Toit		
Registered	Brain Andrew de Scally		
Registered	Brain Clifford Hingley		
Registered	Brian James Knott		
Registered		Brain	
Registered		Brains 4X4	
Registered	Brian and Lentie Knott		
Registered	Brian and Wendy Moodie		
Registered	Bruce and Arenell Robinson		
Registered	Bruce and Tarryn Withers		
Registered	Bulewa Skepu		
Registered	Cedric Begue		
Registered	C.P.J. Botha		
Registered	Carl and sue Malcomess		
Registered	Carl Gmail		
Registered	St 187 Carl Scholtz		
Registered	Carl Scholtz		
Registered	Carlo and Rocky Booyzen		
Registered	St 369 Catherina Greyvenstein		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Cathy Dwyer		
Registered	C Botha		
Registered	CD and Maria Decina		
Registered	Charile Hall		
Registered	Charles Roets		
Registered	Charlet Steyn		
Registered	Charmaine and Ricky Mileham		
Registered	Charmaine Storm		
Registered	Charne G		
Registered	Chris and Bertha Bothma		
Registered	St 664 Chris Campbell		
Registered	Christo and Marike Greyling		
Registered	Cindy Aboud		
Registered	Clang 1		
Registered	Claude and Ragel Horne		
Registered	Clifton And Elma Piek		
Registered	Clinton and Marina De Triou		
Registered	Clive Versfeld		
Registered	Corne Bauermeister		
Registered	Cornelius & Sanet Koen		
Registered	Cornelius Johannes Steyn		
Registered	Corrie Van der Merwe		
Registered	Costa Souris		
Registered	Craig and Renay Johnson		
Registered	Craig Richardson		
Registered	Craig Van der Merwe		
Registered	Damon Speier		
Registered	Danie and Carol Jacobs		
Registered	Danie and Charmaine de Lange		
Registered	Danie and Katryn Nel		
Registered	Danie and Monica Du Toit		
Registered	Danie Coetzee		
Registered	Daniel and Beauty Kgomo		
Registered	Dave and Jean Berry		
Registered	Dave and Vanessa Boucher		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	David Jordaan		
Registered	DD Lottering		
Registered	debbie.potgieter		
Registered	Lindeq 90 Dennis Holler		
Registered	Deon Deon Gericke		
Registered	Deon Rigney		
Registered	Des and Henna Naude		
Registered	Des Naude		
Registered	Dev Devan		
Registered	Diamond Cove 78 Peter & Sandy Drew		
Registered	Diamond Cove Dennis Beech		
Registered	Diamond Cove Deon Kaps		
Registered	Diamond cove Elru Meyer		
Registered	Diamond Cove Leon Strava		
Registered	Diamond cove Lynette Rall		
Registered	Diamond Cove Lynne Temlett		
Registered	Diamond Cove Martin Struwig		
Registered	Dianne and Geoff Stevens		
Registered	Dick and Riana Beuken		
Registered	Diederik du Plessis		
Registered	Dina Elizabeth Henstock		
Registered	Dina Henstock		
Registered	Dina Micpc		
Registered	Dirk and Hannlie Bezuidenhout		
Registered	Donald and Jutta Hanneman		
Registered	Donald Coetzee		
Registered	Donald Hanneman		
Registered	Dudley Warne		
Registered	Elaine Lombard 39		
Registered	Elizna Crafford		
Registered	Elsa Storm		
Registered	Elsimari Gloy		
Registered	Els van Zyl		
Registered	Eric Smith		
Registered	Ernst van der Toorn		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Esme And Paul Schoeman		
Registered	Estelle Badenhorst		
Registered	F.W. du Toit		
Registered	Faadil Shaik		
Registered	Fanie and Maria Bezuidenhout		
Registered	Fanie		
Registered	Franc Brugman		
Registered	Francois Phillipus du Plessis		
Registered	Frans Lubbe		
Registered	Frans Van der Walt		
Registered	Fred Hoogendyk		
Registered	Fred Madjarevic		
Registered	Fredan And Yvonne Kirsten		
Registered	Freddy and Landi Van Vuuren		
Registered	Frikkie Botha		
Registered	G Jansen van Vuuren		
Registered	Gavin and Cindy Aboud		
Registered	Gavin gmail		
Registered	Geoff and Debbie Caplin		
Registered	Geoff and Debby Caplin		
Registered	George Karrani		
Registered	Gerald and Chanel Van Staden		
Registered	Gerdileen Taylor		
Registered	Gerhardt and Jendelene Oosthuizen		
Registered	Gert and Catharina van Eeden		
Registered	Gert and Dawn Schepers		
Registered	Ghatiem Herukas		
Registered	G Karrani		
Registered	Goggas		
Registered	Goose Bay Boat Club Kim & Kevin Robertson		
Registered	Goosebay Boat Club Andre Jacobs		
Registered	GooseBay boat club Mark Cronje		
Registered	Graham and Sandra Perkins		
Registered	H Budia		
Registered	Hannes and Theresa Burger		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Hans & Freida Oosthuizen		
Registered	Hansie and Hermien Pretorius		
Registered	Hansie and Nadia Barkhuizen		
Registered	Hantie Louisecockeran		
Registered	Heinrich		
Registered	Helena de Koker		
Registered	Helena Dekoker		
Registered	Hendrien Fouche		
Registered	Henk and Valerie de Bruyn Tyler de Bruyn		
Registered	Hennie and Estelle Harmse		
Registered	Hennie and Joan Den Blanken		
Registered	Hennie and Karen Roets		
Registered	Hennie and Mavis Jacobs		
Registered	Hennie Kotze		
Registered	Hennie Storm (Sr)		
Registered	Hennie Van der Walt		
Registered	Hugh Temlett		
Registered			
Registered	Ian Ross McDonald		
Registered	Ilecia du Toit		
Registered	Ilze Henstock		
Registered	Ilze van Niekerk		
Registered	Inkosi Med		
Registered	Iri Macd		
Registered	Izak Nel		
Registered	J.C. Fourie		
Registered	J Stander		
Registered	Jaco and Valerie Smit		
Registered	Jacques De Villiers		
Registered	Jacques Jacobs		
Registered	Jan A. Smith 39		
Registered	Jan and Christene Briederhann		
Registered	Jan and Magda Leonard		
Registered	Jan and Wilma Wepener		
Registered	Janine Pretorius		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Jat Du Toit		
Registered	Jayesh Nana and Diane Bhaga		
Registered	Jerome Bagley		
Registered	JH Diedericks		
Registered	Johan and Alet Pretorius		
Registered	Johan and Catharina Schutte		
Registered	Johan and Jolandi van Vuuren		
Registered	Johan and Lechelle Jordaan		
Registered	Johan and Lourika Griessel		
Registered	Johan J Kock		
Registered	Johann and Melane Rudman		
Registered	Johannes Van Heerden		
Registered	John and Petruska Annandale		
Registered	John Simpson		
Registered	Gail Simpson		
Registered	Johnathan and Annietjie Nel		
Registered	Johnny and Rene Oberholtzer		
Registered	John Stonekerron		
Registered	JP van Devente		
Registered	Juan van Tonder 244		
Registered	Juanita Brooks		
Registered	Juanita Van Tonder 244		
Registered	Jurie Ferreira		
Registered	Jutta Hanneman		
Registered	J Ward		
Registered	Karin Oberholzer 244		
Registered	Ken Evans		
Registered	Kenneth and Tebogo Netshandama		
Registered	Kera Klebba and Andries Du Plessis		
Registered	Kera Klebba		
Registered	Kevi Govender		
Registered	Kgomotso Mile		
Registered	Khusego Trading & Projects		
Registered	Kingfisher 10 Danie and Charmaine de Lange		
Registered	Kingfisher 10 Danie de Lange		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Kingfisher 105 Deon Gericke		
Registered	Kingfisher 12 Daleen Temlett		
Registered	Kingfisher 13 Hans & Frieda Oosthuizen		
Registered	Kingfisher 14 Bob & Brigettte Lavery		
Registered	Kingfisher 15 Steve 7 Tanya Moorley		
Registered	Kingfisher 17 Vanessa & Dave Boucher		
Registered	Kingfisher 20A Dave Prinsloo		
Registered	Kingfisher 20B Chantel Griffen		
Registered	Kingfisher 21 Danie van der Merwe		
Registered	Kingfisher 58A Mias & Daleen van Zyl		
Registered	Kingfisher 59 Paul Myburgh		
Registered	Kingfisher Craig & Renay johnson		
Registered	Kingfisher Hanlie stander		
Registered	Kingfisher Jaco and Racene		
Registered	Kingfisher Marianne Bilsland		
Registered	Kingfisher Robbie Roberts		
Registered	Kokkie and Dulcie Makoka		
Registered	Koos and Kotie Schoeman		
Registered	Lance Johnstone		
Registered	Leon Potgieter		
Registered	Leonie Hamman		
Registered	Leonie Steyn		
Registered	Leonora Louise Human		
Registered	Lerato and Mathinkane Thebe		
Registered	Lidia Jacobs		
Registered	Linda De Goueiva		
Registered	Lionel van Schalkwyk		
Registered	Liz Blignaut		
Registered	CJ Hugill		
Registered	Liz Charles		
Registered	Liz Roets		
Registered	St 612 Lizette Van Rooyen		
Registered		Lmvs	
Registered		logcabincomf	
Registered	Loudewyk and Elsie Bothma		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Louis and Johanna Hansen		
Registered	Louis Supra		
Registered	Luchaan And Monique Schreiner		
Registered	Luchaans Shreiner		
Registered	Luke Bruzzard		
Registered	Lynette Temlett		
Registered	Lynette		
Registered	Lynnette Pepler		
Registered	M & F Ribeiro		
Registered	M Cornelius		
Registered	St 023 M van Blerk		
Registered	M.J. Skellern		
Registered	Mammuso Tau		
Registered	Mari Brown		
Registered	Marinda and Phillip Smith		
Registered	Mario Miuller		
Registered	Marius and Petra Ferreira		
Registered	Marius Nel		
Registered	Mark and Chalice Baker		
Registered	Mark Livanos		
Registered	Mark Thornhill		
Registered	Mark Wakeford		
Registered	Marlyn Van Blerck		
Registered	Martie And Pieter Prinsloo		
Registered	Martie And Willem Neethling		
Registered	Martienus and Sonja Nel		
Registered	martin		
Registered	Mathilda Jackson		
Registered	Matilda van Aswegen		
Registered	Messrs Swanepoel and other		
Registered	Mias and Daleen Van Zyl		
Registered	Michael and Ying King		
Registered	Michele Jansen van Rensburg		
Registered	Michelle Avice le Roux		
Registered	Mike and Joey Pote		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Mike and Sandra Jeffrey		
Registered	Mike Lombard 41		
Registered	Minette Pretorius		
Registered	St 599 Mokhaneli Marumo		
Registered	Mpume and Cenza Mthembu		
Registered	Muhamed and Tauhera Rojan		
Registered	Nadjezchda and Jacques Van der Westhuizen		
Registered	Natanang Nke		
Registered	Natascha Prinsloo		
Registered	Neal Robertson 32		
Registered	Nicholas Dawson		
Registered	Nico and Joyce Botha		
Registered	Nico And Lenette Du Plooy		
Registered	Nico Coetzee		
Registered	Nicolette and Warren van Buuren		
Registered	Nolan Vernon		
Registered	Ockert Van Schalkwyk		
Registered	Oupa Lehulere		
Registered	Paisley And Judy Monke		
Registered	Parys		
Registered	Paul and ansie Smit		
Registered	Paul and Ansie Smith		
Registered	Paul and Dianne Foulkes		
Registered	Paul Dedlow		
Registered	Peet Fouche		
Registered	Penny Ludorff		
Registered	Peter and E Mendönidis		
Registered	Peter and Sandy Peter & Sandy Drew		
Registered	Peter Drew		
Registered	Peter Tolmay		
Registered	Peter Van Vuuren		
Registered	Petrus J.J. Cornelius		
Registered	PG PG & S Catalo		
Registered	Philip and Annie Voight		
Registered	Pierre Eksteen		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Piet and Koekie De Beer		
Registered	Piet Boshoff		
Registered	Pieter and Mariette Van Dyk		
Registered	Pieter Gerhardus le Roux		
Registered	PJ Dedlow		
Registered	Porcupine De Ru BM (louis)barney Second No		
Registered		Welwyn	
Registered	Pottie And Debbie Potgieter		
Registered	pottiefrederik		
Registered	Protect Vaal Eden		
Registered	Quintin Germanus		
Registered	Quinton and Alta Cox		
Registered	Raadil Shaik		
Registered	Racene Jordaan		
Registered	Jaco Jordaan		
Registered	Rashaad Mayet		
Registered	Rayhana Mota		
Registered	Reggie Manye		
Registered	Rene Minnaar		
Registered	St 568 Rene van zwel (Rowan Tree 1023)		
Registered	Renee Hartslief	The Savannah Africa	
Registered	Renier Wynand Hamman		
Registered	Retha Jannasch		
Registered	Retsch Muller		
Registered	St 358 Ria Burger		
Registered	Riaan Van der Berg		
Registered	Riaan Wagenaar		
Registered	Richard and Deborah Scott		
Registered	Richard Jackson		
Registered	Riette Kraucamp		
Registered	R Minaar		
Registered	Robert de Witt		
Registered	Rone Erasmus		
Registered	Ronnie Maytham		
Registered	R van Heerden		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Sam Preuss		
Registered	Sampie van Rooyen (Jr)		
Registered	Sand Mine Hennie Storm		
Registered	Sand Mine Leon van Schalkwyk		
Registered	Sand Mine Louis Kruger		
Registered	Sand Mine Tertuis		
Registered	Sandmining Geoff Caplin		
Registered	Sandra Joubert		
Registered	The Savannah Africa		
Registered	Sean Teubes		
Registered	Sebastian Johnstone		
Registered	Sharne Germanus		
Registered	Sheila Thornhill		
Registered	Sheldom Hall		
Registered	Shuresh and Rajashree Kanji		
Registered	Soggo Duval		
Registered	SR and YM Fridey		
Registered	St 002 Anne and Dennis Wilson		
Registered	St 004 Graham and Sandra 1st No		
Registered	St 007 Bennie and Christa Jordaan		
Registered	St 007 Ian van Niekerk		
Registered	St 008 Joey and Ben koen		
Registered	St 009 Albertus van Tonder		
Registered	St 014 Davel H/A Syfrets Trust		
Registered	St 017 Alf Roberts		
Registered	St 017 Sam Preuss and Alf Roberts		
Registered	St 021 Johan And alet Pretorius		
Registered	St 025 koekie And Piet de Beer		
Registered	St 026 DVG Devan		
Registered	St 027 Vallerie Smit		
Registered	St 037 hennie pelser		
Registered	St 040 Mark livanos and George (last No)		
Registered	St 041 piet van rensburg		
Registered	St 043 johnny a betty Nortjie		
Registered	St 044 Taan and Marne Roesch		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	St 047 Jacques de Beer		
Registered	St 048 Gerald and Chanel Van Staden		
Registered	St 051 Derek Crandon		
Registered	St 052 Paul Afonso		
Registered	St 054 Linda Gouveia		
Registered	St 055 Muhamed and Tauhera Rojan		
Registered	St 058 Dennis Mcbeath C Kuhhirt		
Registered	St 059 Jason Ball		
Registered	St 060 Nke HSRR		
Registered	St 061 D Naude (Des)		
Registered	St 069 Goosebay Canyon Shareblock		
Registered	St 072 Roy Campbell		
Registered	St 073 jacques van rensburg		
Registered	St 075 Chantel de beer		
Registered	St 076 tumi mateya		
Registered	St 078 Victor motsa		
Registered	St 079 Des and Henna Naude		
Registered	St 080 H Jacobs (Hennie)		
Registered	St 081 Carl a Sue Malcolness		
Registered	St 086 Zager (leonid)		
Registered	St 086 Zager Tanya		
Registered	St 087 KF Brown (mari)		
Registered	St 088 Russel Theron		
Registered	St 089 R Sonntag		
Registered	St 089 R Sonntag (Riaan) and Sandy van der Berg		
Registered	St 093 Smit jaco a valerie		
Registered	St 094 Johan van der Walt		
Registered	St 097 Leon van der Walt		
Registered	St 098 S A Slabbert		
Registered	St 099 Frans Vd walt		
Registered	St 102 Linda Bouwer		
Registered	St 105 Angie Booyse		
Registered	St 108 ursula wearing		
Registered	St 109 Errol white		
Registered	St 114 Danie du Plessis		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	St 117 Adnan Qutob		
Registered	St 118 hannes a theresa Burger		
Registered	St 119 Hennie van der Westhuizen		
Registered	St 012 Struwig		
Registered	St 120 GE Oosthuizen (jendelene and gerhardt)		
Registered	St 121 Q du Preez (quinton)		
Registered	St 122 Estienne Fourie		
Registered	St 125 Chaney van der Merwe		
Registered	St 127 Dr Marumo		
Registered	St 127 Vernon Thomas		
Registered	St 128 betty chapman		
Registered	St 130 SR and YM Fridey		
Registered	St 131 Pottie And Debbie Potgieter		
Registered	St 131 Willie en Heleen de Lange		
Registered	St 133 juan smal		
Registered	St 135 JJ Schoeman (koos en kotie)		
Registered	St 136 Oupa Makhoba		
Registered	St 137 HJ Harmse Hennie Estelle		
Registered	St 139 adrianne a susan classen		
Registered	St 141 Midnight Express		
Registered	St 143 leonie labuschagne		
Registered	St 146 Danie and Katryn Nel		
Registered	St 147 Henriette Mercer		
Registered	St 148 Danie And Monica		
Registered	St 150 ML Vernon (Nolan)		
Registered	St 151 Quinton du Preez		
Registered	St 152 Alfred john verster		
Registered	St 153 George Plakas		
Registered	St 154 George Petrou		
Registered	St 157 Tienie Struwig		
Registered	St 159 Quinton and Alta Cox		
Registered	St 160 mike horne		
Registered	St 162 Danie harmse		
Registered	St 164 F Madjarevic		
Registered	St 168 CF Hoogendyk (Fred and Mariette)		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	St 169 WJ Klosta (walter)and wilfred dad		
Registered	St 171 PG & S Catalo		
Registered	St 172 Cat Leisure (andrew,theo and costa souris)		
Registered	St 173 Pieter and Mariette Van Dyk		
Registered	St 176 SE Duval (Siggi)		
Registered	St 179 Gavin and Cindy Aboud		
Registered	St 180 G Taylor (gerdileen)		
Registered	St 181 Coet Boshoff		
Registered	St 182 DD Connold (andrew)		
Registered	St 183 Roets JH (hennie and Karen)		
Registered	St 184 J Oberholtzer (rene and johnny)		
Registered	St 186 Carl scholtz		
Registered	St 188 DJ Teubes		
Registered	St 190 MJ Mile		
Registered	St 191 Volker Eggert		
Registered	St 193 Peter Gloy		
Registered	St 194 CA van der Merwe		
Registered	St 196 FJ Lubbe (frans)		
Registered	St 197 Thabo Sebolai		
Registered	St 198 Ewan and Elsimarie Gloy		
Registered	St 201 Noni Sithole		
Registered	St 211 Japie Richter		
Registered	St 212 Peter and E Mendönidis		
Registered	St 213 Marius a elise Nel		
Registered	St 214 Dirk and Hannlie Bezuidenhout		
Registered	St 216 johannes a annamari v heerden		
Registered	St 217 Phillip Stoltz		
Registered	St 220 Wakeford		
Registered	St 221 JF de Villiers (jacques)		
Registered	St 222 Neville Lee		
Registered	St 225 Charlotte Lovett		
Registered	St 227 JPH van Heerden (johannes)		
Registered	St 228 Michele A Rossouw		
Registered	St 233 Riaan Wagenaar and Ymeri 2nd No Riaan		
Registered	St 248 Kgoke		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	St 250 Z Moosa (zane)		
Registered	St 261 PJ van Vuuren		
Registered	St 267 Anna Thlape		
Registered	St 269 BS Erasmus (steven)		
Registered	St 271 Terblanche		
Registered	St 273 W Coetzer Wouter And Adriaan		
Registered	St 280 Gerhard Brits		
Registered	St 283 G Kaps		
Registered	St 284 charmaine and Ricky Mileham		
Registered	St 287 Luchaan And Monique Luch 2nd No		
Registered	St 292 B Skepu (bulewa)		
Registered	St 293 linda de goueiva & D Nel		
Registered	St 295 Sue Pretorius & Hannes Senekal		
Registered	St 297 Budia H		
Registered	St 300 Crawshaw NJ		
Registered	St 302 EE Badenhorst (estelle)		
Registered	St 305 TF Oosthuizen (Theuns)		
Registered	St 310 GPN Coetzee (nico)		
Registered	St 314 Isobel pienaar		
Registered	St 315 Lynette Klebba		
Registered	St 320 Ian Jacobs		
Registered	St 321 Lerato and MathinkaneThebe		
Registered	St 332 Glenda Hill		
Registered	St 336 Arthur Sengens		
Registered	St 342 Mzwandile Gxakwe		
Registered	St 346 jacky mabuza		
Registered	St 348 Martha 2nd Marianne 1st Ronnie 3rd		
Registered	St 351 Tsidi mphahlele		
Registered	St 358 Aubrey Burger		
Registered	St 358 Wayne van Heerden		
Registered	St 362 Kokkie and Dulcie Makoka		
Registered	St 362 Shima and Dulcie Makoka		
Registered	St 363 Daniel and Beauty Kgomo		
Registered	St 364 CJ vd Merwe (gerhardt)		
Registered	St 370 Fredan And Yvonne Kirsten		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	St 376 FJ Botha		
Registered	St 382 Khusego Trading & Projects		
Registered	St 384 Lulu Nkuna		
Registered	St 398 Salomie Pienaar		
Registered	St 408 Anna and Andries van Jaarsveld		
Registered	St 411 Naidoo (scotty)		
Registered	St 417 Elmar Wentzel		
Registered	St 433 PJ Tolmay		
Registered	St 437 Paul and Ansie Smith		
Registered	St 439 Ezekiel Ralebona		
Registered	St 445 LJ Supra (louis)		
Registered	St 449 Charlie Hall		
Registered	St 451 Johan van Eden		
Registered	St 457 Barend peetrus Jones		
Registered	St 460 Peyper PG		
Registered	St 461 Danie Wessels		
Registered	St 465 Kevin Peyper		
Registered	St 466 SL Warne (dudley)		
Registered	St 467 Thys Smith		
Registered	St 475 GC Jannasch (retha)		
Registered	St 476 Bruce and Arenell Robinson		
Registered	St 486 Louis and Johanna Hansen		
Registered	St 491 Andre And Madelyn		
Registered	St 492 I Viljoen		
Registered	St 495 Sagren Pillay		
Registered	St 496 Kenneth and Tebogo Netshandama		
Registered	St 497 paul and dianne		
Registered	St 499 Christo and Marike Greyling		
Registered	St 503 Martie And Willem 2nd No Willem		
Registered	St 506 Braam and Linda du Toit		
Registered	St 507 Roger a Dinkie Reeve		
Registered	St 511 johan conradie		
Registered	St 513 Peyper AJ		
Registered	St 515 Fanie and Maria Bezuidenhout		
Registered	St 517 Fouche hendrien en Piet		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	St 520 Manye reginald		
Registered	St 521 SR Manye		
Registered	St 533 Hans brunsen		
Registered	St 535 Rapid dawn (alex teixiera)		
Registered	St 536 Wallace Barnard		
Registered	St 540 pearl Sebolao		
Registered	St 542 Claude and Ragel Horne		
Registered	St 545 Hennie Nel		
Registered	St 549 Clinton and Marina De Triou		
Registered	St 550 Abel and Marjorie Mawela		
Registered	St 552 Fouche hendrien & Peet		
Registered	St 554 tom And Buddy ludick		
Registered	St 557 Johan and Lourika Griessel		
Registered	St 558 Chris Venter		
Registered	St 559 Tersia Fouche		
Registered	St 560 Roodepoort bearing (luke & jeanette bruzzard)		
Registered	St 561 Philip and Annie Voight		
Registered	St 563 Martie And Pieter Prinsloo		
Registered	St 564 Yunus and Naseem Modan		
Registered	St 566 Nicolaas Pienaar		
Registered	St 567 Ashley and Iola Stephens		
Registered	St 569 Jeffrey M (mike and sandra)		
Registered	St 569 Johnathan and Annietjie Nel		
Registered	St 571 Kera Klebba and Andries du Plessis		
Registered	St 574 Erna Venter		
Registered	St 576 Fay le Roux		
Registered	St 585 Hilary Sibanda		
Registered	St 587 Ana Vasconcelos		
Registered	St 588 Chris & Bertha Bothma		
Registered	St 590 Johan Homan		
Registered	St 592 A Madonsela		
Registered	St 596 Theo and Thalita Bothma		
Registered	St 598 Martin Steyn		
Registered	St 600 Dries Peyper		
Registered	St 601 Drew SJ (peter)		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	St 605 Nico And Lenette Du Plooy		
Registered	St 610 Mpume and Cenza Mthembu		
Registered	St 616 Dawson NJ (nicholas)		
Registered	St 617 Loudewyk and Elsie Bothma		
Registered	St 623 Andrew And Caitlin Wilson		
Registered	St 623 Andrew Wilson		
Registered	St 624 MammusoTau		
Registered	St 625 Johan van vuuren		
Registered	St 626 Johann and Melane Rudman		
Registered	St 628 Brian and Wendy Moodie		
Registered	St 630 Steven and Sonja Supra		
Registered	St 630 Steven Supra		
Registered	St 631 JH Kotze		
Registered	St 632 Wilma Struwig		
Registered	St 635 Andre and Marietta Visagie		
Registered	St 637 Vivienne Temlett		
Registered	ST 642 Marius and Petra Ferreira		
Registered	St 644 Tshwanelo Molefi		
Registered	St 648 Johan and Jolandi van Vuuren		
Registered	St 649 Brandon Gess		
Registered	ST 657 Marna Briel		
Registered	St 066 Vaalkant (Dave human)		
Registered	St 661 Shuresh and Rajashree Kanji		
Registered	St 663 Marinda and Phillip SA number		
Registered	St 665 sandra barbosa		
Registered	St 667 Mark Dent		
Registered	St 668 Francois van der Merwe		
Registered	St 669 Oosthuizen TFJ (theuns)		
Registered	St 671 tom and gerda Bester		
Registered	St 673 Lehulere KP (Oupa & Marie)		
Registered	St 679 Brian Moodie		
Registered	St 681 Fouche hendrien & Peet		
Registered	St 685 DJ Jordaan (david)		
Registered	St 686 Tobie and Elsje V Tec		
Registered	St 690 R Booyzen (carlo & rocky)		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	ST 692 Loonat SYA		
Registered	St 698 Petrushka a john		
Registered	St 700 Dick and Riana Beuken. Diek Second Number		
Registered	St 704 Borman du toit		
Registered	St 706 Andre Barnard		
Registered	St 707 Richard and Deborah Scott		
Registered	ST 709 Johan and Catharina Schutte		
Registered	St 710 Connie Khumalo		
Registered	St 711 Koos Snyman		
Registered	St 719 Ofentso Tiro		
Registered	St 720 David Mkwanazi		
Registered	St 721 Patrick Mazibuko		
Registered	St 722 Martienus and Sonja Nel		
Registered	St 726 Hennie Den Blanken		
Registered	St 728 Craig Sparks		
Registered	St 729 Manuel Ribiero		
Registered	St 730 Esme And Paul Schoeman		
Registered	St 734 Henk and Valerie de Bruyn		
Registered	St 738 Jan and Wilma Wepener		
Registered	St 739 Juan pretorius		
Registered	St 740 Burton Shinners		
Registered	St 743 Msimanga Teddy		
Registered	St 744 Danie & Carol Jacobs		
Registered	St 745 Warren and Nicky van Buuren		
Registered	St 747 Allison Maseko		
Registered	St 752 Tjaart and lezel Prinsloo		
Registered	St 754 CD and Maria Decina		
Registered	St 758 Gina & steve Fouche		
Registered	St 759 Ashley smith		
Registered	St 760 Dr de Lange		
Registered	St 761 Gert and Catharina van Eeden		
Registered	St 762 Peyper Piet		
Registered	St 763 Scotty Naidoo		
Registered	St 764 Nicolette and Warren van Buuren		
Registered	St 766 Michele jansen v rens		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	St 767 Van Blerck M (marlyn)		
Registered	St 768 david lovell		
Registered	St 777 Dave perryer		
Registered	St 783 Piet & sonja Boshoff		
Registered	St 785 Celia Ribiero		
Registered	St 787 Paul Nyoni		
Registered	St 790 Swanepoel en ander		
Registered	St 794 Du Toit MH		
Registered	St 795 MH du Toit (jat)		
Registered	St 817 Nadjezchda and Jacques Van der Westhuizen		
Registered	St 827 Petrus and Nozuko Mofokeng7809270436089		
Registered	St 830 Van Schalkwyk OG (ockert) (Van Schalkwyk Kinder Trust)		
Registered	St 831 Fouche hendrien & Peet		
Registered	St 832 Gail Roberts		
Registered	St 834 Geoff and Debby Caplin		
Registered	St 835 Paul and ansie Smit (ansie no second)		
Registered	St 838 Berry Dave And Jean		
Registered	St 844 Jayesh Nana and Diane Bhaga (also Erf 843)		
Registered	St 844 Jayesh Nana and Diane Bhaga (also Erf 843)		
Registered	St 845 Tommy and Susan Bishop		
Registered	St 848 Reotshepile Tlaphane		
Registered	St 858 Paisley And Judy Monke		
Registered	St 861 Sonja Kruger		
Registered	St 877 Anne Rodger		
Registered	St 885 Roelf and Elsabe van Aswegen		
Registered	St 886 Ferouz gani		
Registered	St 888 Hansie and Nadia Barkhuizen		
Registered	St 889 Kole		
Registered	ST 892 WA Black		
Registered	St 900 Van Vuuren PJ		
Registered	St 901 Isobel		
Registered	St 911 Mateya Tumi		
Registered	St 917 Ntha Mgalela Moah		
Registered	St 920 Dennis Wilson		
Registered	St 948 Val de Bruyn		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Stefan Slavon		
Registered	Stella du Toit		
Registered	Steve & Tanya Moorley		
Registered	Steve and Gina Fouche		
Registered	Steven and Sonja Supra		
Registered	Steven Erasmus		
Registered			
Registered	Sue Pretorius		
Registered	Sylvia McDonald		
Registered	Taan and Marne Roesch		
Registered	Tanya Zager		
Registered	Teneal van Zyl		
Registered	Tertius		
Registered	Theo and Thalita Bothma		
Registered	St 304 Theuns Oosthuizen		
Registered	Tienie and Davie Struwig and Shelton		
Registered	St 824 Tiisetso Pertunia Motloung		
Registered	Tjaart and Lezel Prinsloo		
Registered	Tobie and Elsje Venter		
Registered	Tom and Buddy Ludick		
Registered	Tom and Gerda Bester		
Registered	Tommy and Susan Bishop		
Registered	Tranquility 85 Rowan Jacobon		
Registered	Tranquility 91 Donald		
Registered	Tranquility 99 Harold Nienaber		
Registered	Tranquility Corne struwig		
Registered	Tranquility Ephraim Patel		
Registered	Tranquility Harry Sello		
Registered	Tranquility Petro vd Westhuizen		
Registered	Tranquility Tabello Matloga		
Registered	Trishana Govender		
Registered	Tuscany 50 Lechelle And Johan		
Registered	Tuscany 52/2 Erna Broom		
Registered	Tuscany Derek Crandon		
Registered	Tuscany Martin Venter		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	PS van Rooyen		
Registered	Renier van Vuuren		
Registered	St 789 Victoria Chabangu		
Registered	W.H. Cockeran		
Registered	Walter and Elaine Klosta		
Registered	Warren and Nicky van Buuren		
Registered	St 205 Werner Visagie		
Registered	WH van Wyk		
Registered	Wouter Coetzer		
Registered	Yunus and Naseem Modan		
Registered	Zane Moosa		
Registered	Dina		
Registered	B.J.J		
Registered	Albertus P		
Registered	Sonia		
Registered	Louise		
Registered	Eloise		
Registered	Chris		
Registered	Angelique		
Registered	Nico		
Registered	Karika		
Registered	Karika		
Registered	G.E.		
Registered	Cheanne		
Registered	Carol		
Registered	Armin		
Registered	Gert Diederik		
Registered	Elaine		
Registered	Mike		
Registered	Dencia Maria		
Registered	Karen		
Registered	Andre		
Registered	Liz		
Registered	Gawie		
Registered	Leon		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	St 117 Adnan		
Registered	St 021 Aletta		
Registered	Karen		
Registered	St 481 Nico		
Registered	Chris		
Registered	Parys Plumbing		
Registered	Cecilia		
Registered	Richard		
Registered	Louise		
Registered	Annabella		
Registered	Annika		
Registered	Henk		
Registered	Marietjie		
Registered	Hennie		
Registered	Chantell		
Registered	Johann		
Registered	St 686 Elsje		
Registered	Hennie and Trix		
Registered	Glaudi		
Registered	Helen		
Registered	P		
Registered	Johan		
Registered	Pieter		
Registered	Ansie Juul Grobler		Heaven on Vaal
Registered	Lanie		
Registered	Zelda		
Registered	Andries		
Registered	Lidia		
Registered	Willie		
Registered	Jurie		
Registered	Annetjie		
Registered	Bianca		
Registered	Chris		
Registered	Cindy		
Registered	Danie		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR			
Status	**Name and Surname**	**Company/Trust**	**Farm Name and Portion or Department**
Registered	Dirchelle		
Registered	Elaine		
Registered	Ella		
Registered	Estelle		
Registered	Fanie		
Registered	Irma		
Registered	Izak		
Registered	Janet		
Registered	Joey		
Registered	Jurie		
Registered	Kitty		
Registered	Linda		
Registered	Lizel		
Registered	Louise		
Registered	Ludwig		
Registered	Lukas		
Registered	Manie		
Registered	Mari en Johan		
Registered	Marion		
Registered	Maureen		
Registered	Monique		
Registered	Quinton		
Registered	Rasheed		
Registered	Retha		
Registered	Ria		
Registered	Sakkie		
Registered	Sarel		
Registered	Sheree		
Registered	Sias		
Registered	Tina		
Registered	Tyron		
Registered	Vicky		
Registered	Vincent		
Registered	Willem		
Registered	Yolanda		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Yolandi		
Registered	Zelda		
Registered	Anton		
Registered	Chanette		
Registered	Dries		
Registered	Gert		
Registered	Hantie		
Registered	Hector		
Registered	Henk		
Registered	Ismail		
Registered	Koos		
Registered	Koos		
Registered	Robert		
Registered	Steven		
Registered	Theresa		
Registered	Egon		
Registered	Jo		
Registered	Rina		
Registered	Amelia		
Registered	Reese		
Registered	Petra		
Registered	Andre		
Registered	Barkie		
Registered	Clinton		
Registered	Petra		
Registered	St 004 Sandra Perkins		
Registered	St 008 Barry Koen		
Registered	St 063 Heleen and Willie		
Registered	St 044 Marne Roesch		
Registered	St 075 Willie de Beer		
Registered	St 089 Riaan Sonntag		
Registered	St 102 Brahm Strydom		
Registered	St 100 Hennie van der Walt		
Registered	St 102 Desire Bouwer		
Registered	St 118 Theresa Burger		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	St 127 Juan Breytenbach		
Registered	St 146 Katryn Nel		
Registered	St 179 Cindy Aboud		
Registered	St 212 Erna		
Registered	St 295 Alicia Joubert		
Registered	St 295 Herman Joubert		
Registered	St 305 SJ Oosthuizen		
Registered	St 351 Zoa Bagley		
Registered	St 507 Maureen Reeve		
Registered	St 507 Donavan Reeve		
Registered	St 626 Johan Rudman		
Registered	St 630 Delene Supra		
Registered	St 630 Wynand Smit		
Registered	St 630 Steven Supra		
Registered	St 635 Mariette Visagie		
Registered	St 648 Jolandi van Vuuren		
Registered	St 649 JP van Vuuren		
Registered	St 730 Paul Schoeman		
Registered	St 734 Michelle de Bruyn		
Registered	Piage Cloete		
Registered	St 738 Wilma Wepener		
Registered	St 748 William Wepener		
Registered	St 745 Nicholette van Buuren		
Registered	St 752 Tjaart Prinsloo Jnr		
Registered	St 752 Lezel Prinsloo		
Registered	St 765 Kevin Peyper		
Registered	St 831 Annalie Malherbe		
Registered	St 831 Peet Malherbe		
Registered	St 888 Alta Barkhuizen		
Registered	Birdhaven Leonardo		
Registered	Birdhaven Clinton		
Registered	Birdhaven Dennis		
Registered	Birdhaven Gizele		
Registered	Diamond Cove Lynne Temlett		
Registered	Diamond Cove Harry van Straten		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Diamond Cove Mari van Straaten		
Registered	Diamond Cove Elru Meyer		
Registered	Kingfisher Tracy Kleynhans		
Registered	Kingfisher Theodorus Kleynhans		
Registered	Kingfisher Kobus Erasmus		
Registered	Kingfisher Steve Moorley		
Registered	Roxanna de Bruyn		
Registered	Tyler de Bruyn		
Registered	Karen du Toit		
Registered	Maureen Botes		
Registered	JD van der Riet		
Registered	Thea Pearson		
Registered	Andrea Bako		
Registered	Lindie van Rensburg		
Registered	Ashley Smith		
Registered	Christo Olivier		
Registered	St 491 Madelyn Kok		
Registered	St 130 M Fridey		
Registered	Thomas Ludick Jnr		
Registered	Nicolien Ludick		
Registered	Thomas Ludick		
Registered	St 642P S Ferreira		
Registered	Alex Plakas		
Registered	St 835 Debbie Caplin		
Registered	St 186 Janha Scholtz		
Registered	St 186 Carla-Mari Scholtz		
Registered	Giles Palmer		
Registered	St 057 Sue Malcomess		
Registered	JohanTheron		
Registered	Hugh Temlett		
Registered	Judise Enslin		
Registered	St 093 Jaco Smit		
Registered	Kera Klebba		
Registered	Tranquility Paul Afonso		
Registered	Paul Theron		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	St 834 Shaun Caplin		
Registered	St 834 Sunette Caplin		
Registered	St 520 Thabo Ramasedi		
Registered	St 172 Theo Souris		
Registered	Birdhaven Clifton Piek		
Registered	Bertha Bothma		
Registered	St 080 Hennie Jacobs		
Registered	Mrs Govender		
Registered	Siggie Duval		
Registered	Stephani Monique		
Registered	Abigail		
Registered	David		
Registered	Hanlie		
Registered	Michelle		
Registered	Chantelle		
Registered	Genevieve		
Registered	Jackie		
Registered	Chris		
Registered	Poppie		
Registered	Martin		
Registered	Corne		
Registered	Janette		
Registered	Anton		
Registered	Michelle		
Registered	Dirk		
Registered	Edwin		
Registered	Coenie		
Registered	Jaco		
Registered	Ina		
Registered	Barend		
Registered	Wayne		
Registered	Paul		
Registered	Elise		
Registered	St 092 Pieter and Esmari		
Registered	Graham Rogers	Sweet Sensations Vaal Sand (Pty) Ltd	Farm Depont 228 (Portion 0 RE)
Registered	Renee Hartslief		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered		Vredefort Dome Tourism Association	
Registered		The Savannah Africa	
Registered		Wild Water Conservancy	
Registered		LGV	
Registered	Henk Bannard	SPH Kundalita	
Registered	Sello David Malinga	Goosebay Farm	
Registered	Khathatso Piet Ntholeng	Goosebay Farm	
Registered	Tlhoriso Daniel Selema	Goosebay Farm	
Registered	Simone Santana	Du Pont 2	
Registered	Allan Santana	Du Pont 2	
Registered	Maria Malinga	Goosebay Farm	
Registered	Solane Ismale	Goosebay Farm	
Registered	Jackie Schimpers	Goosebay Farm	
Registered	J.A van Rooyen	Monshario	
Registered	Gert Reus	Lien Grow Building Supplies	
Registered	Arnold de Beer	Vintage Yard	
Registered	Moloi Joseph	Goosebay Farm	
Registered	Renee de Long Hartslief	The Savannah Africa	
Registered	Selina Malinga	Goosebay Farm	
Registered	Thabisang Mochesame	Goosebay Farm	
Registered	Ismail Majolo	Goosebay Farm	
Registered	Steven Makwa	Goosebay Farm	
Registered	Margaret Makwa	Goosebay Farm	
Registered	Andries Setsetse	Goosebay Farm	
Registered	Salmon van Rooyen	Damlaagte	
Pre-Identified Organ of State	Mr Martinus Wilhelmus Struwig	Republic of South Africa Department of Rural Development and Land Reform	
Registered	Paul Kgole		
Registered	Johan Smit		
Registered	LT Matshadi		
Registered	Shereen Heyns		
Registered	Bruce Strong	Lapa Manzi	Registered
Registered	Tseki Lucky		Registered
Registered	Molebogeng Tseki		Registered
Registered	Sandra Mostert	Small Holdings	
Registered	P S Mostert	Small Holdings	

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Alinah Molefe		
Registered	Joseph Ramonanu		
Registered	Anna-Marie Strauss		
Registered	Lydia Matsaneng		
Registered	Eva Matsaneng		
Registered	M B Kabe		
Registered	Rosinah Magugudi		
Registered	James Ludick	Lapa Manzi Home Owner's Association	
Registered	Frazer Quinn		
Registered	Bertie de Wal		
Registered	Rudi Liebenberg		
Registered	Erich Smith		
Registered	Pieter Nortje		
Registered	Andre Pienaar		
Registered	Stephan Fick		
Registered	Egbert Okkely		
Registered	Debbie Seinch		
Registered	Jacek Fastyn		
Registered	Piet Uys		
Registered	Rory Gallocher		
Registered	Kenneth Hayes		
Registered	Harko Mulder		
Registered	Wayne Botes		
Registered	DJ Vosloo		
Registered	Joseph Keywood		
Registered	Eugene Keys		
Registered	Wim		
Registered	Ian Hunter		
Registered	Sete Mgeina		
Registered	Maria Mkhwanazi		
Registered	Elize de jong		
Registered	Heidi Naude		
Registered	Riyadh Jardine		
Registered	TB Stevens		
Registered	Ndumiso Nkosi		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR

Status	Name and Surname	Company/Trust	Farm Name and Portion or Department
Registered	Warrren Joubert		
Registered	Gugu Dube		
Registered	Thabo Moloi		
Registered	Werner Stander		
Registered	Rodrique Naude		
Registered	M Boshoff		
Registered	C Boshoff		
Registered	Graham		
Registered	Bennie		
Registered	Elize van Rensburg		
Registered	A Holland		
Registered	Amanda Kroezen		
Registered	Machiel Kroezen		
Registered	Nico Fourie		
Registered	JW du Toit		
Registered	Jonathan		
Registered	E Jansen van Rensburg		
Registered	Conrad van der Merwe		
Registered	Marie Foser		
Registered	Quinton Burger		
Registered	J De Jong		
Registered	Rober Schimpers		
Registered	Relebohile Polisane		
Registered	Steven de Bruyn		
Registered	Anton van Biljon		
Registered	SL van Vuuren		
Registered	G van Rensburg		
Registered	Elmarie Fourie		
Registered	Michiel Bester		
Registered	Herman Bear		
Registered	Thea Bear		
Registered	Buddy Jardine		
Registered	Chris Schepers		
Registered	Fay Fredericks		
Registered	Monica and Wouter		

I&AP'S AND STAKEHOLDERS THAT REGISTERED ON THE DSR			
Status	**Name and Surname**	**Company/Trust**	**Farm Name and Portion or Department**
Registered	Thewns Brooks		
Registered	Herman van der Walt		
Registered	Naene Mienie		
Registered	Dennis Bird		
Registered	Leonardo		
Registered	MP van der Walt		
Registered	Heindrich Mienie		
Registered	Zubair Dadabhay		
Registered	Clinton Thorpe		
Registered	Desmond Naude		
Registered	Nthaleng Piet		
Registered	Alex Ismale		
Registered	Susan Rothmann		
Registered	Micheal Ramonana		
Registered	BJ van Niekerk		
Registered	Loraine Coetzee		
Registered	David Buti Qhindi		
Registered	Ronny		
Registered	Heidi Aarde		
Registered	Tony Fiontzi		
Registered	Kobus de Walt		
Registered	Anna M van Deventer Lucas Swanepoel Eugene Swanepoel	Gallie Janse van Rensburg (Representative)	

Prior to commencement of the PPP, pre-notification letters were distributed to I&APs on the 05th September 2018. The pre-notification letters were sent via e-mail, fax and registered mail. The purpose of the letters was to notify I&APs of the change in the EAP and to make I&APs aware of the new Mining Right application lodged under a new company, Monte Cristo Commercial Park (Pty) Ltd. Please refer to Appendix E3 for proof of pre-notification.

I&Aps were notified via email, fax and/posts and newspaper advertisement was placed in the The Star on Newspaper advertisements (in English, Afrikaans and Sesotho) describing the proposed project were placed in The Star which is a national newspaper with adequate circulation in the area. The newspaper advertisements included the following information:

- Project name.
- Applicant name.
- Project location.
- Nature of the activity.
- Details of the MPRDA, NEMA and NWA Regulations that must be adhered.
- Information on document review.

Newspaper advertisements specifying where the Draft Scoping Report is located were placed in The Star, which is a national newspaper with adequate circulation in the area, on the 5th October 2018.

Twenty (20) A1 correx board site notices (in English, Afrikaans and Sesotho) were placed on 08 October 2018 within and around the perimeter of the proposed project area as well as A3 posters were places at ket public places within and around the application area. The on-site notices included the following information:

- Applicant name and background information document (BID) was distributed to I&Apson the Applicant.
- Project description and associated infrastructure.
- Details of the MPRDA, NEMA and made available on the Shango Solutions website (http://www.shango.co.za/public-documents). The advertisement, posters document (BID)NWA Regulations that must be adhered.
- Project location and on-site notices invited the recipients to register/comment on the project on/before 9th November 2018. A public Open day was held on the 24th October 2018 to introduce I&APs to thea map of proposed project area.
- Information on document review.
- Relevant contact person for the project.

A3 posters (in English, Afrikaans and discuss Sesotho) were placed at local public gathering places within and around the application area. The notices and

written notification afforded all pre-identified I&APs the results of opportunity to register for the scoping phase. Following requests, an additional Scoping Phase Public Consultation meeting was held on the 10th November 2018. project as well as to submit their issues/queries/concerns and indicate the contact details of any other potential I&APs that should be contacted

In accordance with the timeframes stipulated in the EIA Regulations, 2014 (as amended by GNR 326 effective 7 April 2017) the Draft Scoping Report (DSR) was compiled to allow perusal of the report by the I&AP's and stakeholders listed above. A 30-day commenting period, ending 9th November 2018 was allowed for perusal of the documentation and submission of comments.

The comments received from I&AP's during this commenting period have been captured in an I&AP summary table included in this Scoping Report as well as in the Notes for the Record for both public consultation events.

The comments and responses received on the DSR were incorporated into the Final Scoping Report that was submitted to DMRE on 14 December 2018 for decision making. DMRE accepted the FSR on 7 February 2019.

The Draft Scoping Report was made available for public review and comment for a period of at least 30 days, from the 8th October 2018 to 9th November 2018. All I&APs (pre-identified I&APs, I&APs registered during the pre-notification period, as well as adjacent and surrounding landowners) were notified on the 5th October 2018 of the availability of the Draft Scoping Report and where to locate it. I&APs were also informed of the timeframes for comments/concerns and queries to be submitted to Shango Solutions.

The Draft Scoping Report was made available at the Vintage Yard Wedding Venue in the Free State Province for perusal and comment by all I&APs. Furthermore, the report was made available on the Shango Solutions website for download. Comments received from I&APs during the Draft Scoping Report review period are included in the Final Issues and Responses Report that is submitted to the DMRE as part of this Final Scoping Report.

Notification letters (in English, Afrikaans and Sesotho) were distributed to I&APs (pre-identified I&APs, I&APs registered during the pre-notification period, as well as adjacent and surrounding landowners) via fax, e-mail and/or registered mail on the 5th October 2018.

SMS notification was sent out to all I&APs with a cellphone number on the I&AP Database.

During the 30 day Draft Scoping Report review period, an Open Day was held to present the findings of the Scoping Phase. The Open Day took place on the 24th October 2018. Notification documents regarding the Open Day were sent out to all pre-identified and registered I&APs. The documents included details on the venue, date as well as the duration of the Open Day.

During the Open Day session, 32 informative posters were displayed on the walls by Shango Solutions (the EAP) prior to the open session. A4 versions of the Open Day posters were provided to I&APs. The EAP as well as relevant project specialists were available during the public Open Day for one on one discussions and questions from the public.

Audio recordings of the Open Day taken by Renee de Jong Hartslief were presented in the CD back pocket of the Final Scoping Report.

As stated above, the Stakeholder Open Day took place on the 24th October 2018. Following further requests from I&APs, an additional public consultation meeting was scheduled and it took place on the 10th November 2018. Invitations to attend the additional public consultation were distributed via e-mails, faxes on the 26th October 2018 and SMSes on the 29th October 2018. Twenty (20) A3 correx board site notices were placed within and around the application area informing the public on the date, time and venue for the additional public meeting. In addition, A3 posters were placed at local public gathering places surrounding application area on the 6th November 2018.

During the additional public consultation, various aspects regarding the proposed project were discussed and concerns, queries, comments and suggestions raised by the meeting attendees were recorded. The Notes for the Record (Version 1) were distributed to attendees of the additional public consultation on the 22nd November 2018, for review and comment. In addition, video recordings of the meeting were made available on the Shango Solutions website. The recordings form part of the CD back pocket of the Final Scoping Report and were also available on the Shango website. I&APs were advised to provide comment by no later than the 30th November 2018. Comments received during the review period were utilised to compile the revised Notes for the Record (Version 2),

which were distributed to attendees on the 30th November 2018, for their review and comment. I&APs were advised to provide comment by no later than the 7th December 2018. The Notes for the Record provided as an appendix (Appendix E) to this Report.

How Issues Raised Were Addressed

Issues raised during the draft Scoping Report review period, including oral and written comments submitted by I&APS during the Open Day and the Additional Public Consultation event, are included in this Report for submission to the DMRE.

Upon approval of the Final Scoping Report, this report the Draft Environmental Impact Assessment Report was compiled that will be circulated for public comment for a 30-day commenting period ending on 9 March 2019. The comments received on the draft EIA & EMPR will be incorporated into the final EIA & EMPR to be submitted for decision making to DMRE.

See attached as Appendix E proof that the I&AP's and stakeholders were contacted.

iii) Summary of issues raised by I&AP's

(Complete the table summarizing comments and issues raised, and reaction to those responses)

Table 12: Summary of issues raised by I&AP's.

PLEASE REFER TO APPENDIX E FOR A COMPLETE SUMMARY OF RESPONSES RECEIVED UP TO THE FINAL SCOPING REPORT

iv) The Environmental attributes associated with the development footprint alternatives.

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

(1) Baseline Environment

(a) Type of environment affected by the proposed activity / Description of specific environmental features and infrastructure on the site.

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

This section describes the pre-mining (in terms of the proposed mining area) biophysical-, cultural- and socio-economic environment of the larger study area. *The information in this section has been updated to current information available as information from the scoping report was based on 2017-2018 data.*

PHYSICAL ENVIRONMENT

CLIMATE

According to climate-data.org website, Sasolburg is 1478m above sea level. The climate here is classified as Cwb by the Köppen-Geiger system. The climate here is mild, and generally warm and temperate. In winter, there is much less rainfall than in summer. It receives the lowest rainfall (0.8 mm) in July and the highest (296.5 mm) in January.

Precipitation here is about 776 mm | 30.6 inch per year. The average annual temperature is 16.9 °C | 62.5 °F in Sasolburg. The monthly distribution of average daily maximum temperatures shows that the average midday temperatures for Beaufort West range from 17°C in August to 24°C in January. The region is the coldest during June when the mercury drops to 8°C on average during the night the maximum temperatures are usually experienced in January when temperatures rises to 28°C.

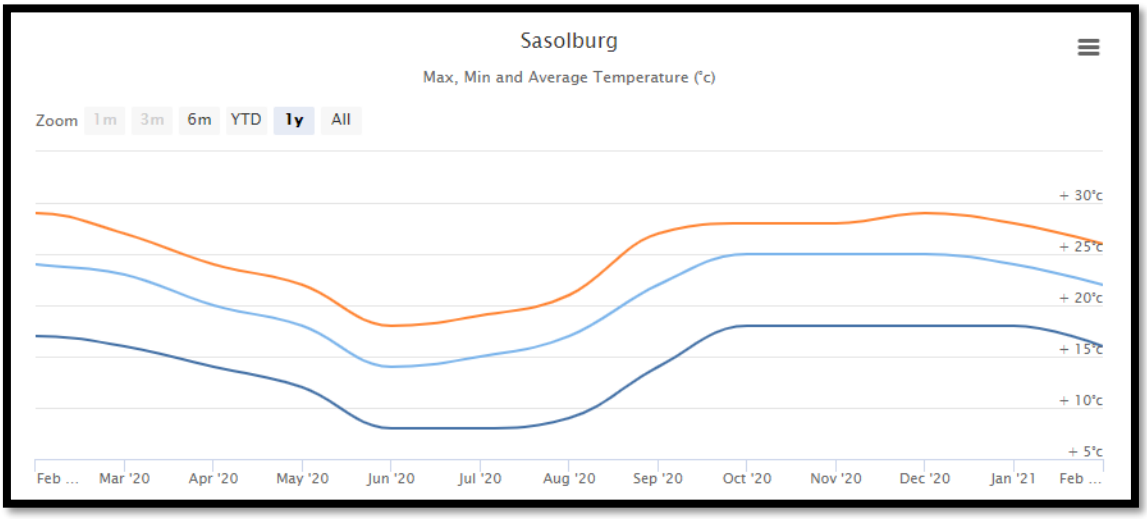

Figure 15: Statistical representation of the temperatures for the Sasolburg region (Chart obtained from http://www.worldweatheronline.com.

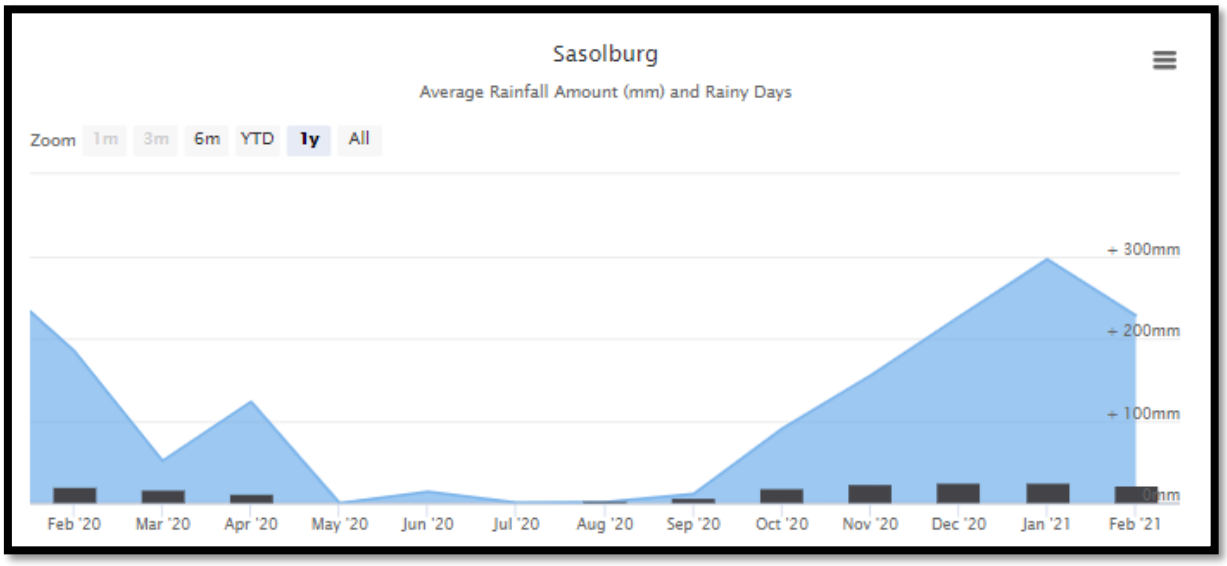

Figure 16: Statistical representation of the precipitation for the Sasolburg region (Chart obtained from http://www.worldweatheronline.com

During the summer/spring months the south to south-eastern wind dominates in the Sasolburg area (blowing in a northern direction), whilst during the winter/autumn months the west-north-western wind is dominant as presented in the figure below. According to the data of windfinder.com the average wind speeds range is 6 kts during the year.

Figure 17: Dominant wind direction of the Sasolburg area (information obtained from windfinder.com).

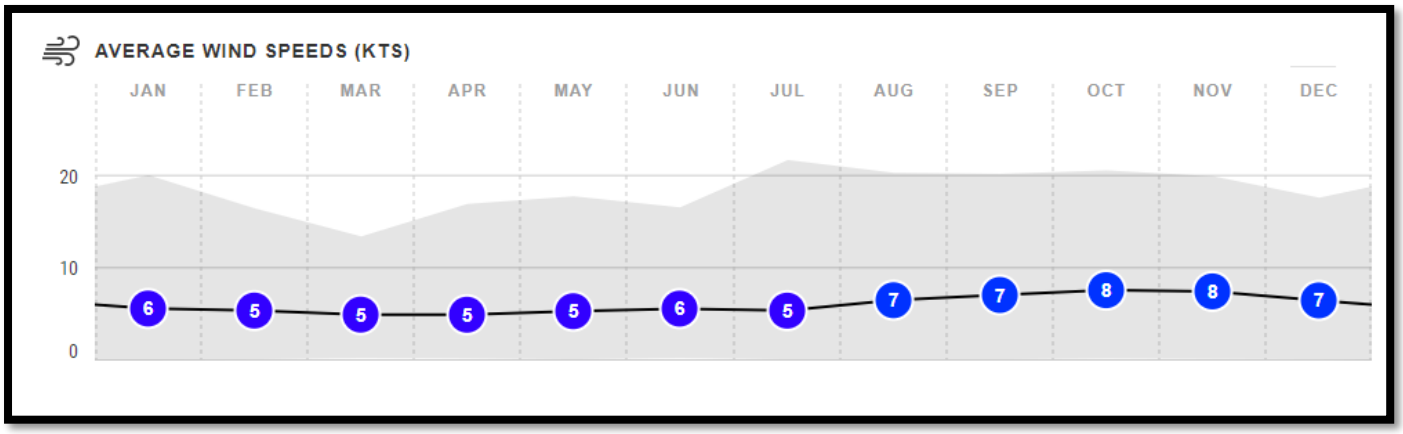

Figure 18: Average wind speeds of the Sasolburg area (information obtained from windfinder.com).

TOPOGRAPHY

The topography of the region can be described as undulating. Elevation within the application area varies from 1 471 Metres Above Mean Sea Level (MAMSL), along an elevated ridge which runs in a north-west to south-east direction through the site, to 1 420 MAMSL along the banks of the Vaal River. A smaller ridge that is approximately 5 m in height, is located directly north and runs in the same direction as the above mentioned ridge.

The project area was assessed by using 5m contour terrain data. The contours were used to create a digital elevation model (DEM). The DEM was then used to create a relief map (Figure 19), a slope percentage map (Figure 20), and a slope aspect map (Figure 21). The southern portion of the project area is relatively flat with slopes less than 4%. The northern portion has slopes ranging from 3% to greater than 35%.

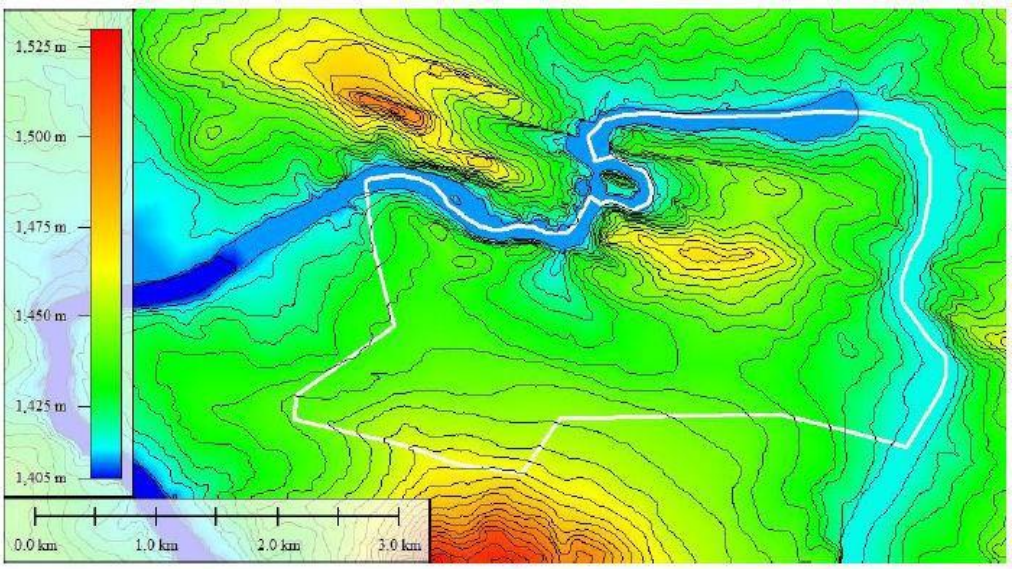

Figure 19: The relief map for the project area (Image obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

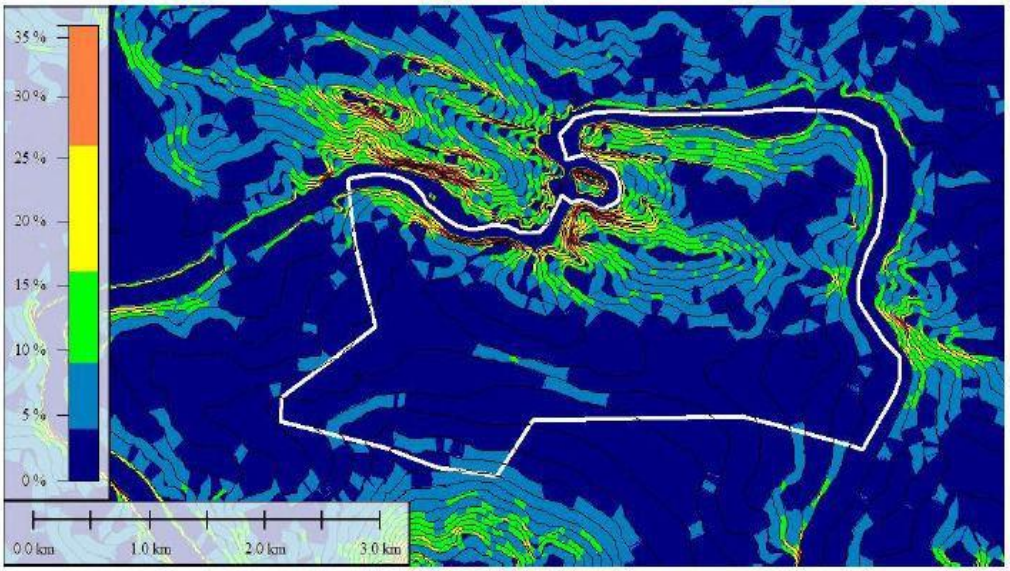

Figure 20: The slope percentage map for project area (Image obtained from Pure Source Mine Final Scoping Report done by Shango Solutions).

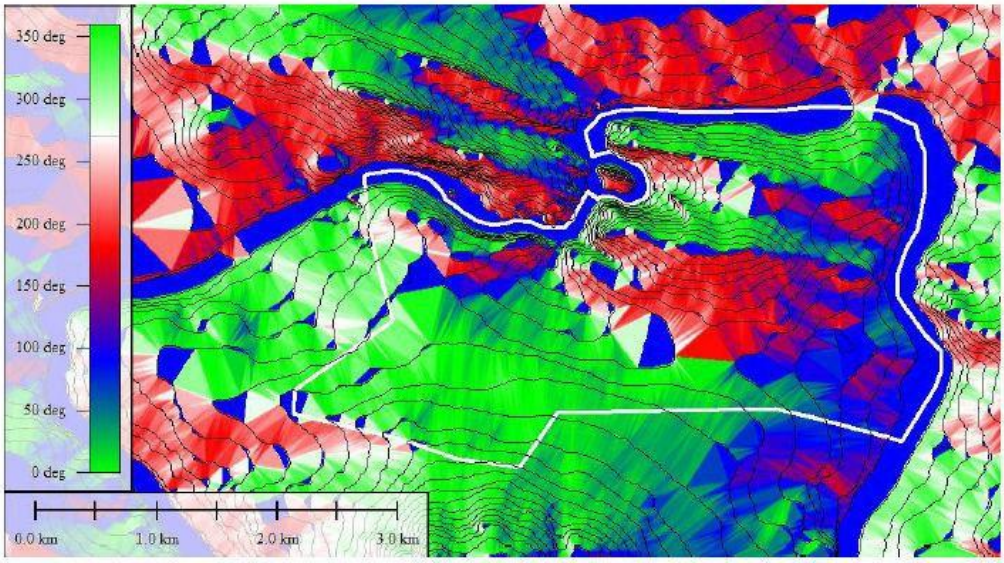

Figure 21: The slope aspect map for project area (Image obtained from Pure Source Mine Final Scoping Report done by Shango Solutions).

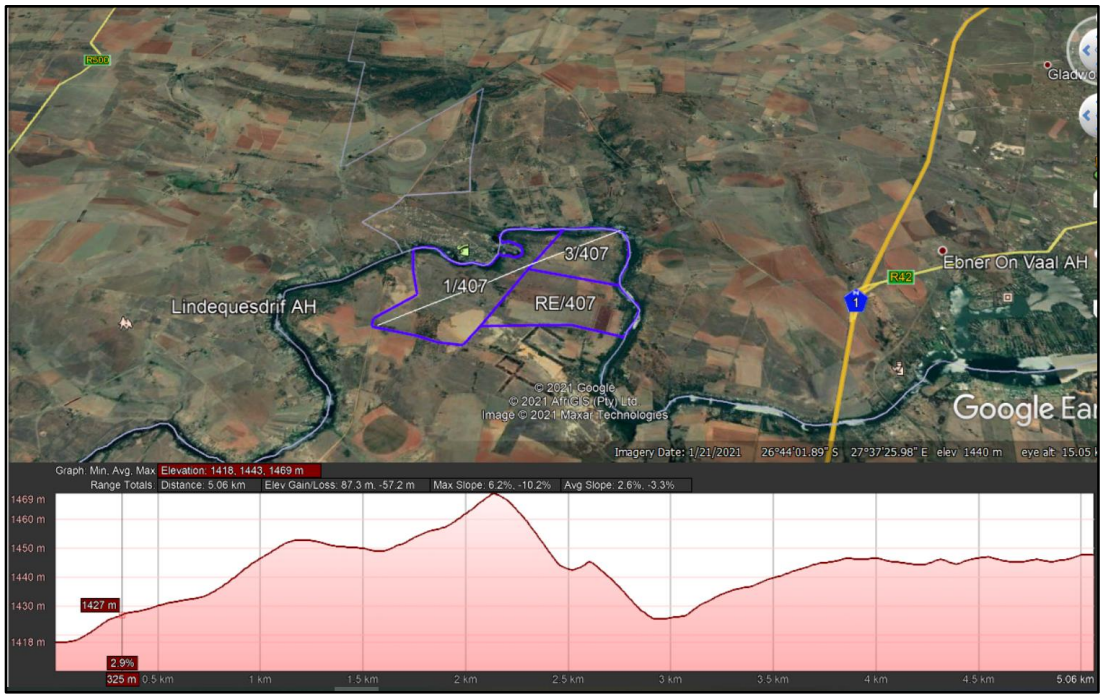

Figure 22: Elevation profile of the area (image obtained from Google Earth).

VISUAL CHARACTERISTICS

The topography of the study area can be described as undulating. The land cover of the study area consists mostly of grassland and cultivated land. Thicker riverine vegetation occurs along the banks of the Vaal River. The Project area is currently used for crop and game farming. Directly to the north of the Project, a housing development is located at Vaal Oewer on an elevated ridge. A number of further housing developments are located along the Vaal River towards the north-west and west of the Project near Lindequesdrif. Guesthouses, lodges and resorts are fairly common in the area, as the Vaal River is a popular weekend and holiday destination, offering recreational activities such as boat cruisers, water sports and angling. Sand mining activities are evident directly south, south-east and west of the Project. Active sand mines occur on the adjacent properties to the Project and include Sweet Sensations Vaal Sand mine to the west, and Tja Naledi Beafase Investment Holdings to the south.

Within a 5 km radius of the application area, the region can be broadly divided into three categories:

- Agricultural areas: crop and livestock agriculture are the dominant land use in the area.
- Residential areas: housing developments occur mostly along the Vaal River. Many of these houses are weekend and holiday homes.

- Sand mining activities.

(Information extracted from the Visual Assessment – see Appendix F6)

Viewshed analysis modelling was undertaken to determine the visibility of the three mine infrastructure alternatives on the surrounding landscape. For all three alternatives, the Project will have a high visual exposure on visual receptors located at Vaal Oewer and Lindequesdrif, as well for other receptors located within a 2 km buffer. This includes a campsite, conference centre, resorts, lodges, and a number of houses.

The visual quality of the area was determined to be high along the Vaal River, and medium further back from the river, where grassland and cultivated land dominate the landscape. The inactive and active sand mining areas have a low visual quality.

The Visual Absorption Capacity (VAC) of the landscape in which the Project area is located, has a moderate potential to conceal the Project. This is due to the mine infrastructure and pits being mostly located in grassland and moderately undulating topography.

The proposed Project will partially fit in with the existing active sand mines in the area. However, open pit mining is likely to take place on a bigger scale than what is currently being undertaken, and will result in a clearly noticeable mining area. For these reasons, the Project will exert a moderate visual intrusion on the existing landscape.

The viewer sensitivity was determined to be high for the houses, resorts, lodges, conference centres and campsites that will have a line of site of the proposed mine.

Impact Assessment

Although the Project is located in a historical and active sand mining area, the scale of the Project in comparison to other sand mining in the area, moderate VAC of the landscape to conceal the Project, high visual quality along the Vaal River, and high viewer sensitivity of houses and places of accommodation within a 2 km buffer of the Project, will result in an overall high visual impact. The main sources of visual impact will be the transformation of grassland and agricultural land to open barren areas through open pit mining, generation of dust from exposed areas, increased heavy machinery and vehicular movement, and the erection of mine infrastructure. This, however, can be mitigated to an overall medium visual impact, by ensuring that dust suppression measures are strictly and timeously adhered to, concurrent rehabilitation takes place through re-shaping and re-vegetation, down lighting and shielding is used,

and ensuring that mine infrastructure blends into the surrounding landscape through careful positioning and painting.

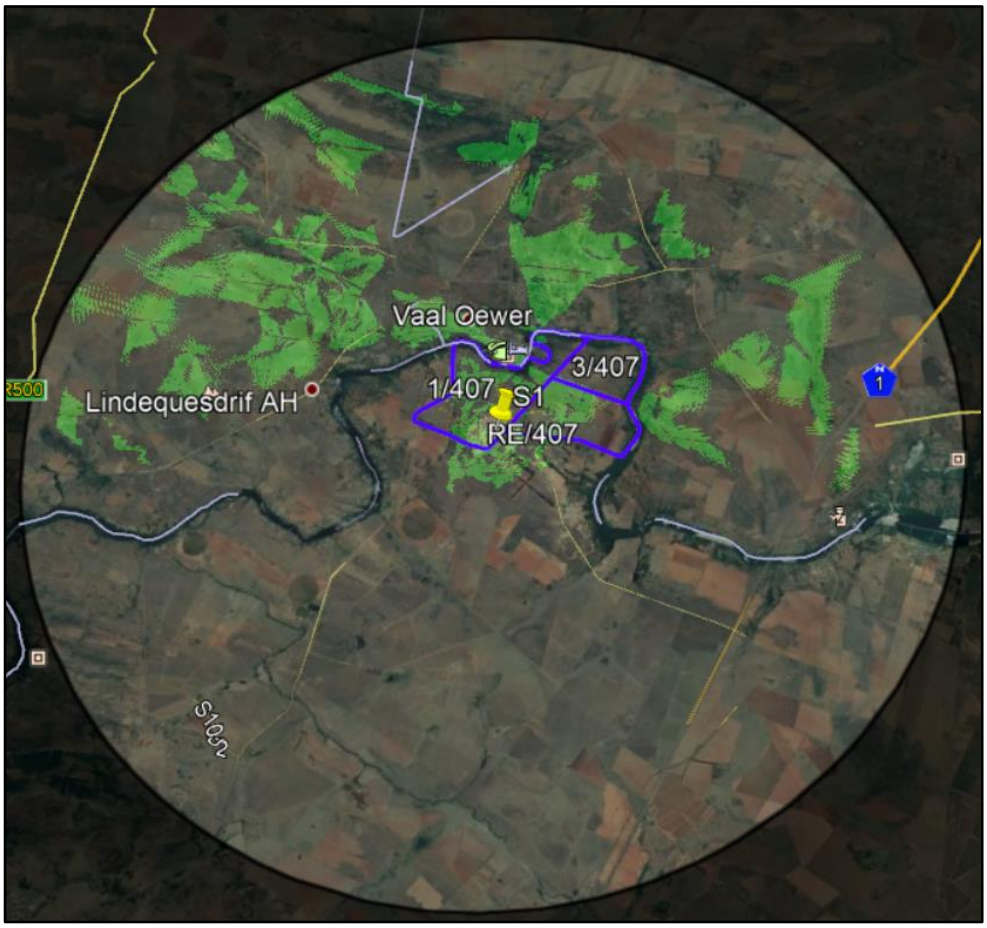

Figure 23: Viewshed analysis of S1) where the green shaded areas show the positions from where the operations will be visible (image obtained from Google Earth).

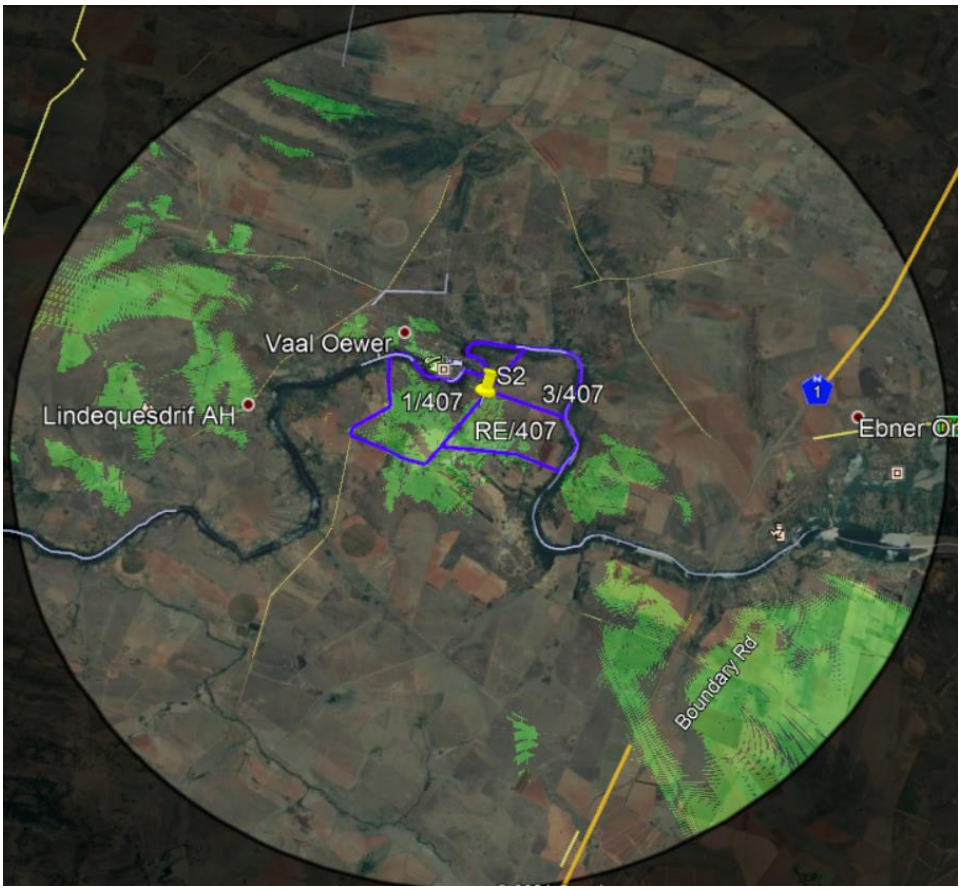

Figure 24: Viewshed analysis of LA2 where the green shaded areas show the positions from where the operation will be visible (image obtained from Google Earth).

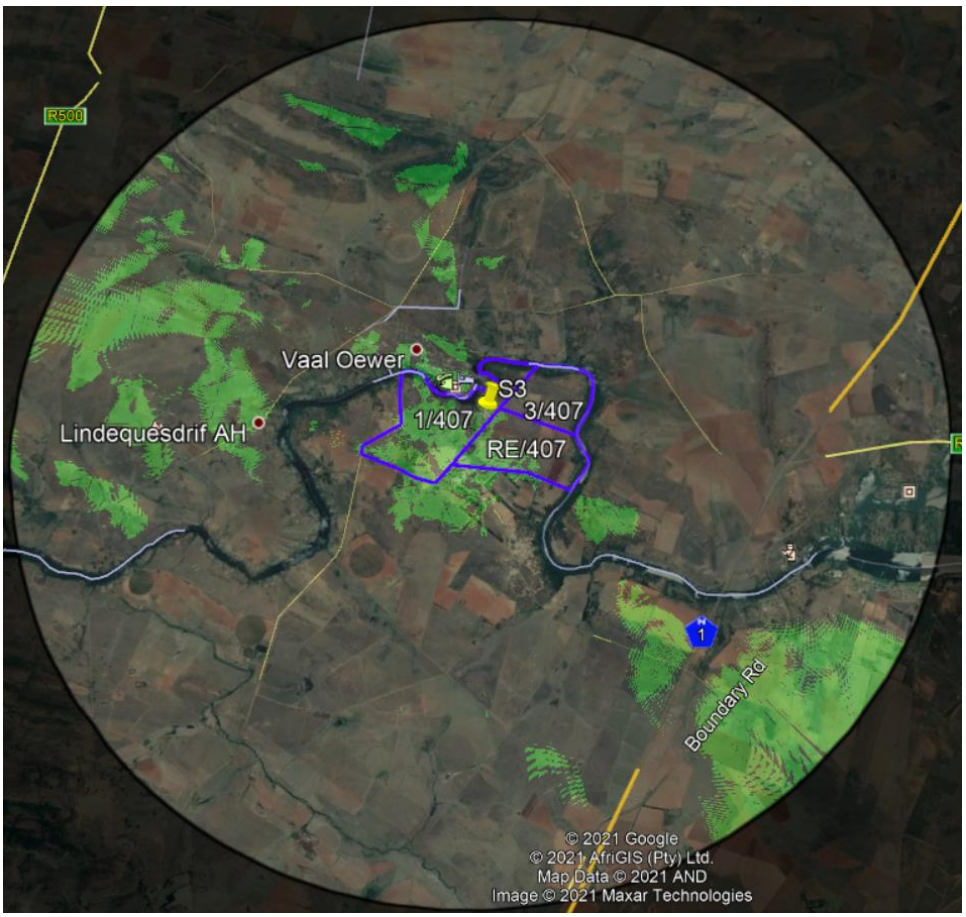

Figure 25: Viewshed analysis of LA3 where the green shaded areas show the positions from where the operation will be visible (image obtained from Google Earth).

AIR AND NOISE QUALITY

Existing Sources of Air Pollution in the Area

The identification of existing sources of emission in the region and the characterisation of existing ambient pollutant concentrations is fundamental to the assessment of the potential for cumulative impacts and synergistic effects given the proposed operation and its associated emissions. Source types present in the area and the pollutants associated with such source types are noted with the aim of identifying pollutants, which may be of importance in terms of cumulative impact potentials.

Existing sources of emission in the area include the following:

- Mining activities.
- Vehicle tailpipe emissions.
- Domestic fuel combustion.
- Biomass burning (veld fires).
- Various miscellaneous fugitive dust sources (agricultural activities, wind erosion of open areas, vehicle- entrainment of dust along paved and unpaved roads).

The current usage of land surrounding the proposed mine includes mining, residential and agriculture. Air Quality (AQ) sensitive receptors include direct surrounding large communities such as Vaaloewer and Lindequesdrif (Figure 26).

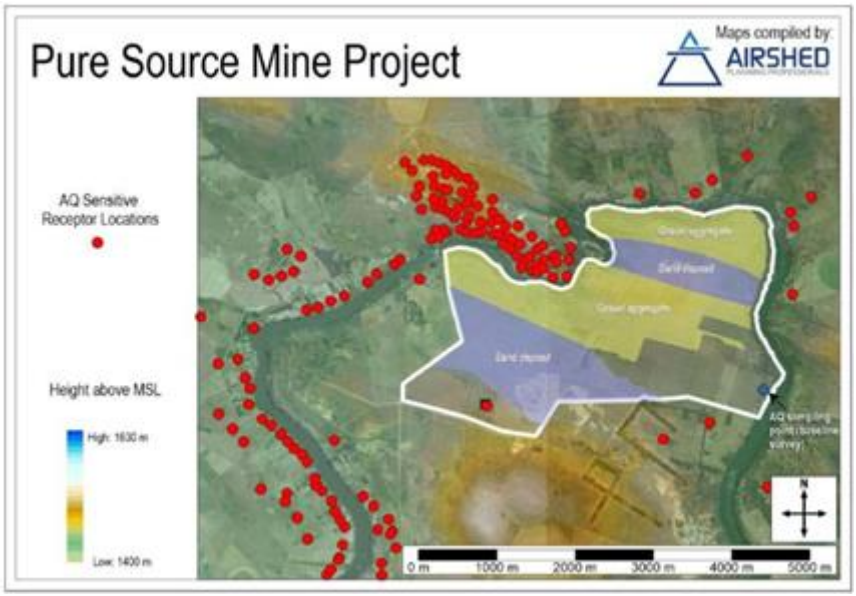

Figure 26: Layout with sensitive receptors (information obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

National Ambient Air Quality Standards

The South African Bureau of Standards (SABS) assisted the Department of Environmental Affairs (DEA) in the development of ambient air quality standards. National Ambient Air Quality Standards (NAAQS) were determined based on international best practice for sulfur dioxide (SO_2), nitrogen dioxide (NO_2), $PM_{2.5}$, PM_{10}, ozone (O_3), carbon monoxide (CO), lead (Pb) and benzene (Figure 27).

Substance	Molecular Formula / Notation	Averaging Period	Concentration (µg/m³)	Permitted Frequency of Exceedance	Compliance Date
Sulfur Dioxide	SO_2	10 minutes	500	526	Immediate
		1 hour	350	88	Immediate
		24 hours	125	4	Immediate
		1 year	50	0	Immediate
Nitrogen Dioxide	NO_2	1 hour	200	88	Immediate
		1 year	40	0	Immediate
Particulate Matter	$PM_{2.5}$	24 hour	40	4	1 Jan 2016 – 31 Dec 2029
			25	4	1 Jan 2030
		1 year	20	0	1 Jan 2016 – 31 Dec 2029
			15	0	1 Jan 2030
	PM_{10}	24 hour	120	4	Immediate – 31 Dec 2014
			75	4	1 Jan 2015
		1 year	50	0	Immediate – 31 Dec 2014
			40	0	1 Jan 2015

Figure 27: National Ambient Air Quality Standards (Government Gazette 32816,2009) (information obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

The National Dust Control Regulations were gazetted on 1 November 2013 (No. 36974). The purpose of the regulations is to prescribe general measures for the control of dust in all areas including residential and light commercial areas. The standard for acceptable dustfall rate is set out in Figure 27. The method to be used for measuring dustfall rate and the guideline for locating sampling points shall be ASTM D1739: 1970, or equivalent method approved by any internationally recognized body**.**

Noise Receptors (NRs) generally include private residences, community buildings such as schools, hospitals and any publicly accessible areas outside an industrial facility's property. Homesteads and residential areas included in the assessment as NRs were identified from available maps and satellite imagery. NRs for the project include the following:

- Places of residence and areas where members of the public may be affected by noise generated by proposed activities.
- A 2 km radius of the proposed operations include several residences on the both banks of the Vaal river to the west and east of the proposed operations, as well as the residential area of Vaaloewer to the north of the operations (Figure 28).

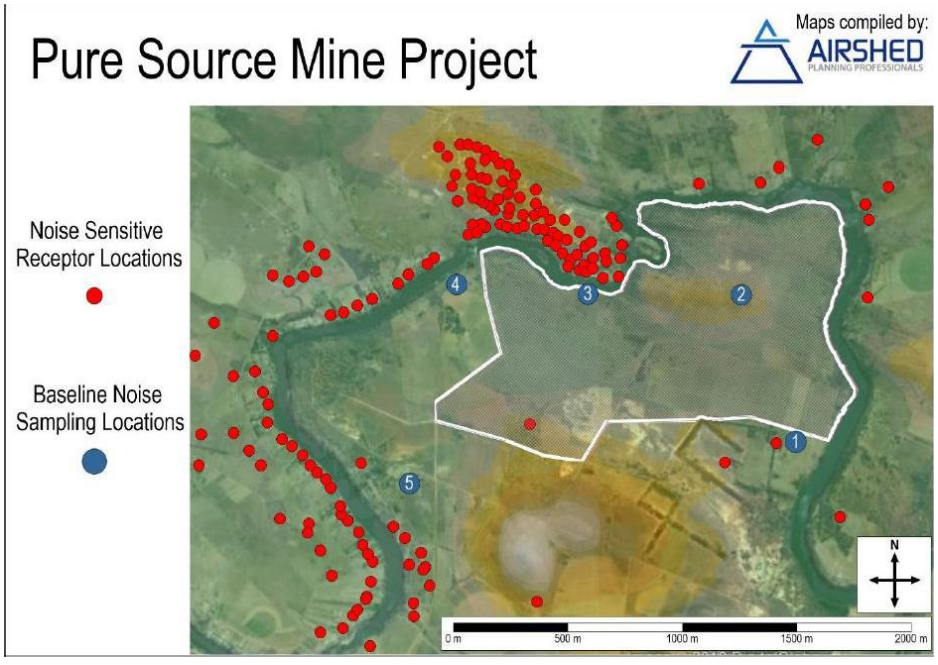

Figure 28: Environmental noise impact study area, NRs, and baseline noise measurement sites (information obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

On average, noise impacts are expected to be slightly more notable to the south of the project activities. Terrain may affect noise propagation between sources and NRs by acting as noise barriers. The acoustic climate at NRs is currently affected by community activities, music, light vehicle and motorcycle traffic, domesticated animals as well as natural noises such as birds, insects and noise created by the Vaal River.

Air Quality Assessment

The proposed open pit surface mining and processing activities will result in air quality impacts in the study area. Particulates represent the main pollutant of concern in the assessment of activities from the proposed operations. Other pollutants include combustion products due to vehicle tailpipe emissions and dryer stack(s), as well as alpha quartz (silica) emissions from the material handling and crushing operations. Airshed Planning Professionals (Pty) Ltd (Airshed) was appointed by Shango Solutions to undertake an environmental air quality specialist study for the project as part of the Environmental Impact Report (EIR) process.

The air quality investigation comprises both a baseline study and an impact assessment. This report outlines the findings of the both component of the air quality specialist study for inclusion in the environmental impact assessment report.

The main findings from the baseline assessment are as follows:

The wind field in the study is dominated by winds from the northern sector during the day and night, with very little wind from the south. Day- and night-time average wind speeds are 3.2 m/s and 3.3 m/s respectively. Calm conditions occur 15.7% of time during the day and 10.0% at night.

Existing sources of emissions in the study area include other sand mining operations, vehicle exhaust and entrainment on paved and unpaved roads, household fuel burning, biomass burning (veld fires), wind erosion from open areas and agricultural activities.

Sensitive receptors in the study area include the residential areas of Vaal Oewer and Lindiquesdrift as well as various other residences and small holdings on both sides of the Vaal river. There are very few sensitive receptor locations directly to the south of the proposed mining operations.

The main findings from the impact assessment are as follows:

Emission sources from the proposed Pure Source Mine Project operations include fugitive dust emissions from material handling, crushing and screening, vehicle entrainment and wind erosion from stockpiles and exposed areas, as well as gaseous emission from vehicle exhausts and the dryer. Pollutants of concern expected to be emitted by the Pure Source Mining Project operations include particulates with aerodynamic diameters less than 10µm and 2.5µm (PM_{10} and $PM_{2.5}$ respectively), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), crystalline silica (SiO_2) and diesel particulate matter (DPM)

To assess worst case air quality impacts, three scenarios were included in the dispersion modelling. These three scenarios represent the identified operating years that would likely result in the highest air quality impacts at sensitive receptor locations. The three scenarios are representative of operational years 12, 18 and 29.

Even with best practice mitigation measures applied to dust generating sources, simulated 99_{th} percentile daily PM_{10} concentrations due to the Pure Source Mine Project sources exceed the South African National Ambient Air Quality Standard (SA NAAQS) (more than 4 days exceeding 75 µg/m³ per year) at a variety of sensitive receptor locations, including at the residential area of Vaal Oewer, for all three scenarios. Based on the large impact area, it can be reasonably predicted that these exceedances would also be experienced during other years of the mining operations. Depending on the active area being mined at the time, additional exceedances could occur at other sensitive receptor locations to the north, east and west of the Vaal river.

Simulated annual average PM_{10} and $PM_{2.5}$ concentrations, as well as simulated NO_2 and SO_2 concentrations for all averaging periods, are in compliance with the SA NAAQS at all sensitive receptor locations.

Simulated annual average SiO_2 concentrations could exceed the California Office of Environmental Health Hazard Assessment (OEHHA) Reference Exposure Level (REL) in the immediate vicinity of the mining operations but are well below the REL at all sensitive receptor locations.

Worst-case diesel particulate concentrations (if all vehicles are operational simultaneously), could exceed the United States Environmental Protection Agency Integrated Risk Information System (US EPA IRIS) guideline value of 5 µg/m³ up to 400 m from the mining operations, including at some sensitive receptor locations when mining operations are closest to these locations. It is however highly unlikely that all vehicles will be simultaneously operational for 12 hours per day, and this simulated impact is highly conservative.

Simulated highest monthly dust fallout rates exceed the SA National Dust Control Regulations (NDCR) non-residential limit up to 300m from of the mining operations and haul roads and the residential limit up to 600 m from the mining operations and haul road. This means that when mining operations are active at the northern and south western aggregate resources respectively, the NDCR is likely to be exceeded at Vaal Oewer and other sensitive receptors to the north of the Vaal river.

Based on the findings above the following recommendations are made if mining operations proceed:

Emission rates from the dryer stack must comply with the Subcategory 5.2 (Drying) "New Plant" Minimum Emission Standards. The plant must be designed, or additional abatement equipment implemented to make sure emission from the dryer stack are in compliance with these standards.

Based on the dispersion modelling results, it is highly unlikely that 99_{th} percentile daily PM_{10} concentrations and highest monthly dust fallout rates would be in compliance with the SA NAAQS at Vaal Oewer and other sensitive receptor locations to the north of Vaal river, due to the relatively small distance between these receptors and the northern and south western aggregate resources. Based on simulated dust fallout rates, it is recommended that no mining activities, including crushing and screening, be undertaken within 400 m to the south, east and west of any sensitive receptor location and within 800m to the north of any sensitive receptor locations.

It is recommended that aggregate crushing not be conducted in the gravel pits but rather located closer to the plant and further from any sensitive receptor locations.

It is recommended that any disturbed areas be immediately rehabilitated to avoid wind erosion emission during periods of high wind speeds.

Best practice mitigation measures (wind breaks, wet suppression etc.) must be implemented. Air quality impacts at nearby sensitive receptor locations would be very high if mining operations proceed without adequate mitigation measures in place.

A complaints register must be kept on-site as well as at secure locations in Vaal Oewer and Lindiquesdrift once operations commence. Staff and the neighbouring communities must be encouraged to report all air quality related problems. Frequent community liaison meetings should be held with the neighbouring communities to address air quality related concerns;

Wet suppression techniques must be used to control dust emissions, especially in areas where dry material is handled or stockpiled.

Exposed soils and other erodible materials must be re-vegetated or covered immediately. New areas must be cleared and opened-up only when absolutely necessary;

Surfaces should be re-vegetated or otherwise rendered non-dust forming when inactive;

Storage for dusty materials should be enclosed or operated with efficient dust suppressing measures;

Loading, transfer, and discharge of materials must take place with a minimum height of fall, and be shielded against the wind, and the use of dust suppression spray systems should be considered;

Vehicles should be fitted with catalytic converters and low sulfur fuel should be used to minimise NO_2 and SO_2 impacts.

Vehicle idle times must be kept to a minimum to minimise CO, NO_2, SO_2, diesel particulate and greenhouse gas emissions.

Strict speed limits must be imposed to reduce entrained emissions and fuel consumption rates.

The vehicle fleet must be regularly serviced and maintained to minimise CO, NO_2, SO_2, diesel particulate and greenhouse gas emissions.

Older vehicles in the fleet must be replaced with newer, more fuel-efficient alternatives where feasible.

PM_{10} and dust fallout monitoring is recommended for the duration of the mining and rehabilitation phases. Dust fallout monitoring must be conducted at all recommended locations while PM_{10} monitoring can be moved to sample concentrations at the closest sensitive receptor locations. Monitoring of both dust fallout rates and PM_{10} concentrations should be started before the mining activities commence in order to establish baseline levels.

If PM_{10} concentrations are found to be in exceedance of the NAAQS or dust fallout rates found to be in exceedance of the NDCR residential limit at the closest sensitive receptor locations additional dust suppression measures must be investigated and

implemented timeously until recorded concentration and dust fallout rates are in compliance with the NAAQS and NDCR respectively. If the mitigation measures employed are considered best practise, additional offset measures should be considered. Such offset measures include upgrading of public road surfaces, electrification of houses for cooking and heating or supply of cleaner burning fuel for cooking and heating purposes. Offsets should be in line with the Air Quality Offsets Guidelines.

Noise Impact Assessment

Airshed Planning Professionals (Pty) Ltd (Airshed) was commissioned by Shango Solutions, the independent Environmental Assessment Practitioner (EAP) to undertake an environmental noise impact study as part of the application for environmental authorisation. The main objective of the noise specialist study was to determine the potential impact on the acoustic environment and noise sensitive receptors (NSRs) as a result of the development of the proposed project and recommend suitable management and mitigation measures.

In the assessment of simulated noise levels, reference was made to the South African National Standard (SANS) 10103 and IFC noise guidelines.

The baseline acoustic environment was described in terms of the location of NSRs, the ability of the environment to attenuate noise over long distances, as well as existing background and baseline noise levels. The following was found:

- NSRs:
    - Include places of residence and areas where members of the public may be affected by noise generated by proposed activities.
    - NSRs within a 2 km radius of the proposed operations include several residences on the both banks of the Vaal River to the west and east of the proposed operations, as well as the residential area of Vaal Oewer to the north of the operations.
- The acoustic climate at NSRs is currently affected by community activities, music, light vehicle and motorcycle traffic, domesticated animals as well as natural noises such as birds, insects and noise created by the Vaal River.
- Recorded $L_{Req,d}$ at all sampling locations during the day-time survey are similar to those given in SANS 10103 as typical for rural districts (45 dBA). Recorded

night-time $L_{Req,n}$ at sampling locations 1, 4 and 5 are typical for rural districts at (35 dBA) as described by SANS 10103. Recorded night-time $L_{Req,n}$ at sampling location 2 and 3 are however more akin to those typical for urban districts (45 dBA) as described by SANS 10103. This is due to insect activity which is prevalent during the summer months.

Noise emissions from diesel powered mobile equipment were estimated using L_W predictions for industrial machinery (Bruce & Moritz, 1998), where L_W estimates are a function of the power rating of the equipment engine. Mobile crushing and screening as well as the generator L_W's were obtained from the database of François Malherbe Acoustic Consulting cc (FMAC) for similar operations. Values from the database are based on source measurements. Estimates of road traffic were made given mining and production rates, truck capacities, assumed vehicle speeds and road conditions.

The source inventory, local meteorological conditions and information on local land use were used to populate the noise propagation model (CadnaA, ISO 9613). The propagation of noise was calculated over an area of 11 km east-west by 8.5 km north-south. The area was divided into a grid matrix with a 50-m. The noise impacts were simulated for the entire Life of Mine (LOM) to determine all potential noise impacts throughout project operations.

The main findings of the impact assessment are:

- A management and mitigation plan are recommended to minimise noise impacts from the project on the surrounding area.
- Day-time and day/night-time noise levels from the project operations exceed the selected noise criteria at NSRs within Vaal Oewer.
- Construction and closure phase impacts are expected to be similar or slightly lower than simulated noise impacts of the operational phase.
- The overall significance for construction and demolition is “low” and for operation is ‘medium’.

The following key recommendations should be included in the project environmental management programme:

- A monitoring programme as per the requirements of the International Finance Corporation (IFC) and SANS 10103:

- Annually during the operational phase at five proposed sampling locations; and
- In response to complaints received.

Based on the findings of the assessment and provided the measures planned and recommended are in place, it is the specialist opinion that the project may be authorized.

GEOLOGY AND SOIL

(Information extracted from the Final Scoping Report of Pure Source Mine, 2018 done by Shango Solutions)

The Pure Source Mine project is located on the north-eastern limb of the Vredefort Dome. The geology of the area is dominated by mainly shale, slate and quartzite of the Pretoria Group; Hekpoort lava; many diabase sills; sporadic occurrence of dolomite and chert, Ventersdorp lava and Ecca shale and sandstone in the south-east. Quartzite usually forms crests and scarps (see figures below).

The geological formations described below are from oldest to youngest.

- **Klipriviersberg Group (Rk).**

The Klipriviersberg Group, Ventersdorp Supergroup, consists of basaltic lavas, agglomerates and tuffs.

This unit unconformably overlies the Witwatersrand Supergroup, and is locally estimated to be between 3 300 and 3 600 m in thickness. The typical lavas of this unit are mostly basaltic in composition and it is amygdaloidal in places.

- **Black Reef Formation (Vbr).**

The Black Reef Formation has been displaced by faulting on the Klipriviersberg Group and Malmani Subgroup contact.

- **Malmani Subgroup (Vmd).**

This sub-group overlies the Black Reef Formation conformably and consists of dolomite, chert and chert-breccia. This unit is between 1 200 and 1 500 m thick in the vicinity of Woodlands 407. The dolomite of this formation is usually covered by soft

sediment, but the more resistant chert and chert- breccia are usually visible as prominent ridges. This unit covers the largest part of the geology on Woodlands.

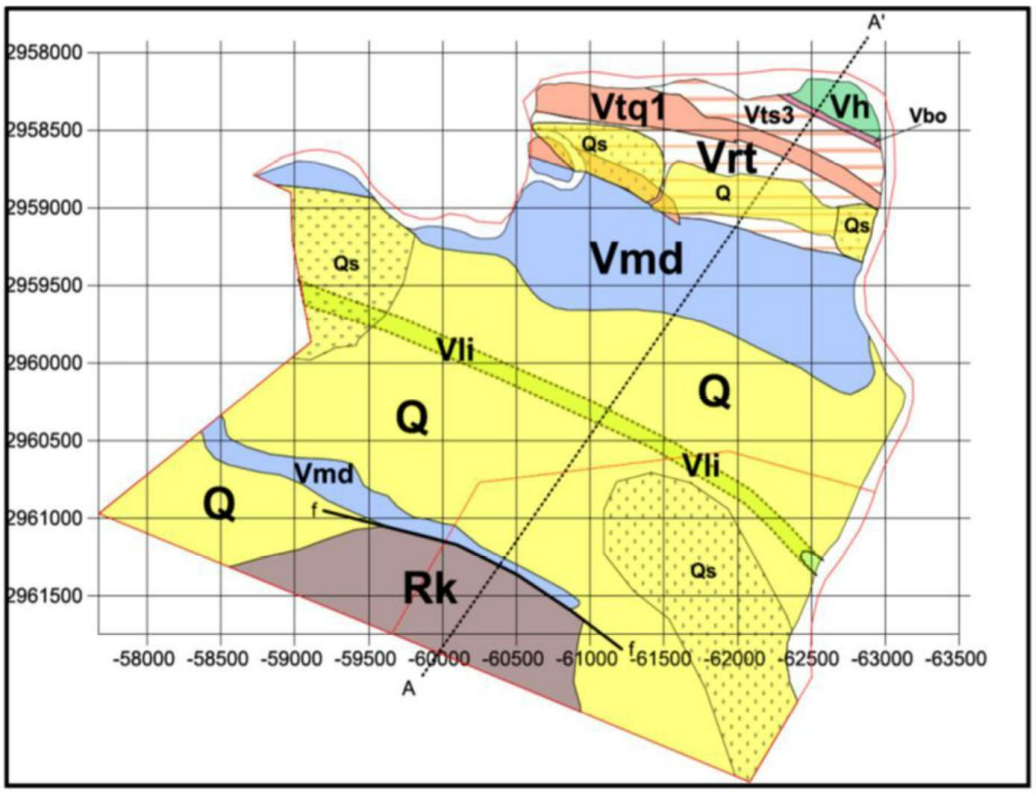

Figure 29: Sub-surface geology of the application area. See text below for key to symbols (image retrieved from Pure Source Mine Final Scoping Report done by Shango Solutions)

- **Lindeques Drift Complex (Vli).**

This intrusive igneous complex forms an elongated body of 11 km in length and is emplaced within the Malmani dolomite. It consists of lamprophyre, syenodiorite and albite-syenite dykes.

- **Rooihoogte Formation (Vrt).**

The Rooihoogte Formation unconformably overlies the Malmani Sub-group, and is on average between 10 and 150 m in thickness. Lower down (basal 30 m) in the succession, this formation consists of breccia and conglomerate, and quartzite. The thicker upper remainder of this formation consists of shale and intercalated quartzite.

- **The Timeball Hill Formation (Vtq 1).**

This formation overlies the Rooihoogte Formation conformably and is made up of the Timeball Hill quartzite. This usually forms prominent ridges. The Vtq2 succession contains an elevated amount of iron when compared to Vtq1.

- **The Timeball Hill Formation (Vts 3).**

This formation overlies the Timeball Hill quartzite and consists of shale horizons.

- **The Hekpoort Formation (Vh).**

The main lithologies are finely crystalline andesitic tuffs and lava flows with amygdoloidal zones.

- **Quaternary Sands (Q).**

Most of the formations in the area are overlain by unconsolidated quaternary sediments of waterborne and windblown sands. The Vaal River is a very old and mature drainage system, borne out by the course it takes across the rim of the Vredefort Dome. There is evidence on Woodlands 407 of a paleo- channel cutting across Portion 4 and the southern parts of the remaining extent, as well as the southern part of the remaining extent of portion 1. Further north in an east-west orientation is additional evidence of separate quaternary sediment deposited on Portion 3 and the remaining extent of Portion 1.

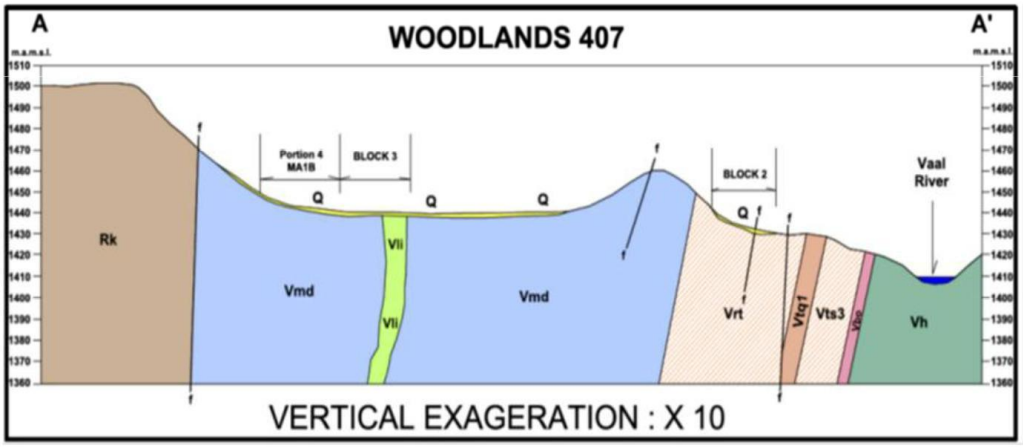

Figure 30: Geological cross section (information obtained from Pure Source Mine Final Scoping Report done by Shango Solutions).

- **Diamondiferous Gravels (Qs).**

The mapped diamondiferous gravels are indicated as Qs. The lithologies described above are shown as a cross section (Figure 30)

Sand and Aggregate Potential

Quaternary age sands and aggregates represent the mining target. These sands are unconsolidated and unconformably overlie sediments of the Transvaal Supergroup. A stratigraphic column of this rock succession is shown in Figure 21. The secondary commodity of interest is the unconsolidated, Quaternary gravels, which potentially contain alluvial diamonds.

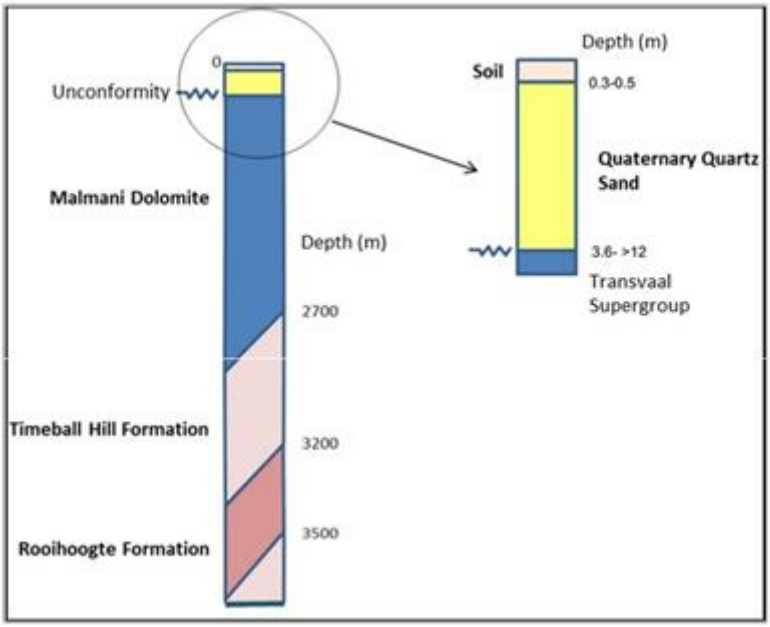

Figure 31: Stratigraphic column of the area on interest (information obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

Alluvial Diamond Potential

During the period 1922-1926, some 25,000ct are recorded as having been recovered from five farms located on the northbank (Marshall, 1987) (Table 13). On Kaalplaats and Zeekoeifontein, intermittent diamond production continued up until 1968 and 1973 respectively. No information exists regarding potential grades or diamond values.

Table 13: Diamond Production from nearby properties (information obtained from Pure Source Mine Final Scoping Report done by Shango Solutions).

Property	Carats Recorded
Boschdraai 575	133.75
Brakfontein 476	44.75
Bronkhorstfontein 566	266.45
Kaalplaats 577	11 147.89
Witkop 475	220.00
Zeekoeifontein 573	13 644.65

The largest number of diamonds recorded historically (+13 000 ct), were recorded from the farm Zeekoeifontein, which is located directly across the river from Woodlands, in the meander bend where Vaal Oewer is situated today.

During a site visit in mid-June 2018 along the banks of the Vaal River across from Zeekoeifontein, the presence of “diggers heaps” (Figure 22) and an old plant-site were noted. The spoil heaps comprise rounded – well- rounded, pebble-cobble size, alluvial clasts that could, conceivably, date back to the mid-1920’s. These diggers heaps prove that diamonds were recovered from the Woodland property, likely at the same time that diamonds were being mined elsewhere in the vicinity. The plant-site probably dates from the 1960’s or 70’s, indicating that gravels were still being processed there up until quite recently (as is the case on Zeekoeifontein and Kaalplaats). What is most encouraging to note is that, both the old diggers heaps on Woodlands and the property with significant diamond production records are located adjacent to the North pit sand deposit (Figure 24). The implication is that alluvial diamond deposition is associated with the palaeochannel that deposited the sand.

Figure 32: Location of historical diamond recoveries (information obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

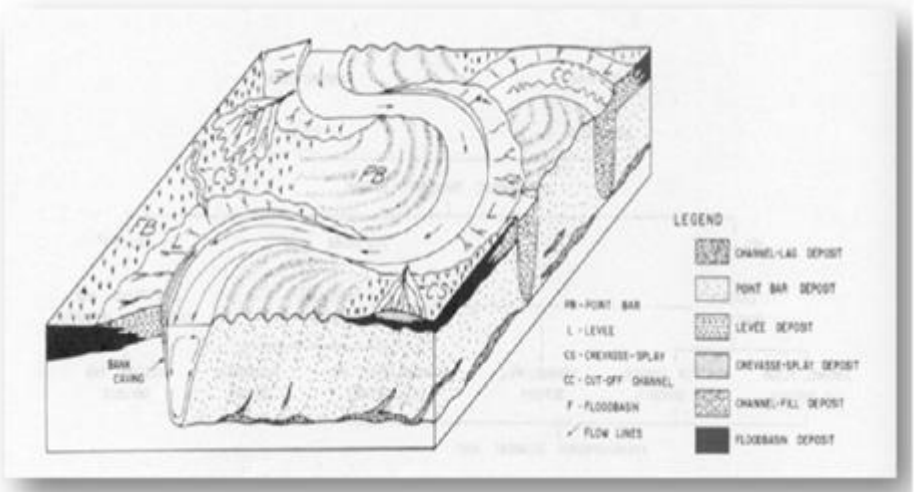

Figure 33: Schematic of point bar (sand) units overlying channel lag deposits (information obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

In a meandering river system, such as the Vaal is seen to be at this location, the coarse-grained (gravel) units occur as channel lag deposits overlain by finer-grained, sandy point bar deposits (Figure 33). The point bar deposits would represent the silica sand deposits that are currently being mined on Woodlands, and the channel lag deposits would be the priority target for alluvial diamonds.

(Information extracted from the Final Scoping Report of Pure Source Mine, 2018 done by Shango Solutions)

The conservation of South Africa's limited soil resources is essential. In the past misuse and poor management of the soil resource has led to the loss of the resource through erosion and destabilisation of the natural systems. In addition, loss of high potential agricultural land due to land use changes is currently a big concern in South Africa. Soil can be seen as the foundation for ecological function. Without a healthy soil system for microbes to thrive in, both flora and fauna would be negatively impacted, which in turn feeds the natural soil system with organics and nutrients.

To identify soils accurately, it is necessary to undertake a soil survey. The aim is to provide an accurate record of the soil resources of an area. Land capability and land potential is then determined from these results. The objective of determining the land capability/potential is to find and identify the most sustainable use of the soil resource without degrading the system. Soil mapping is essential to determine the types of soils present, their depths, their land capability and land potential. According to the land

type database (Land Type Survey Staff, 1972 - 2006) the project falls within the Bc36 land type and a small portion of the Ba39 land type (Figure 34).

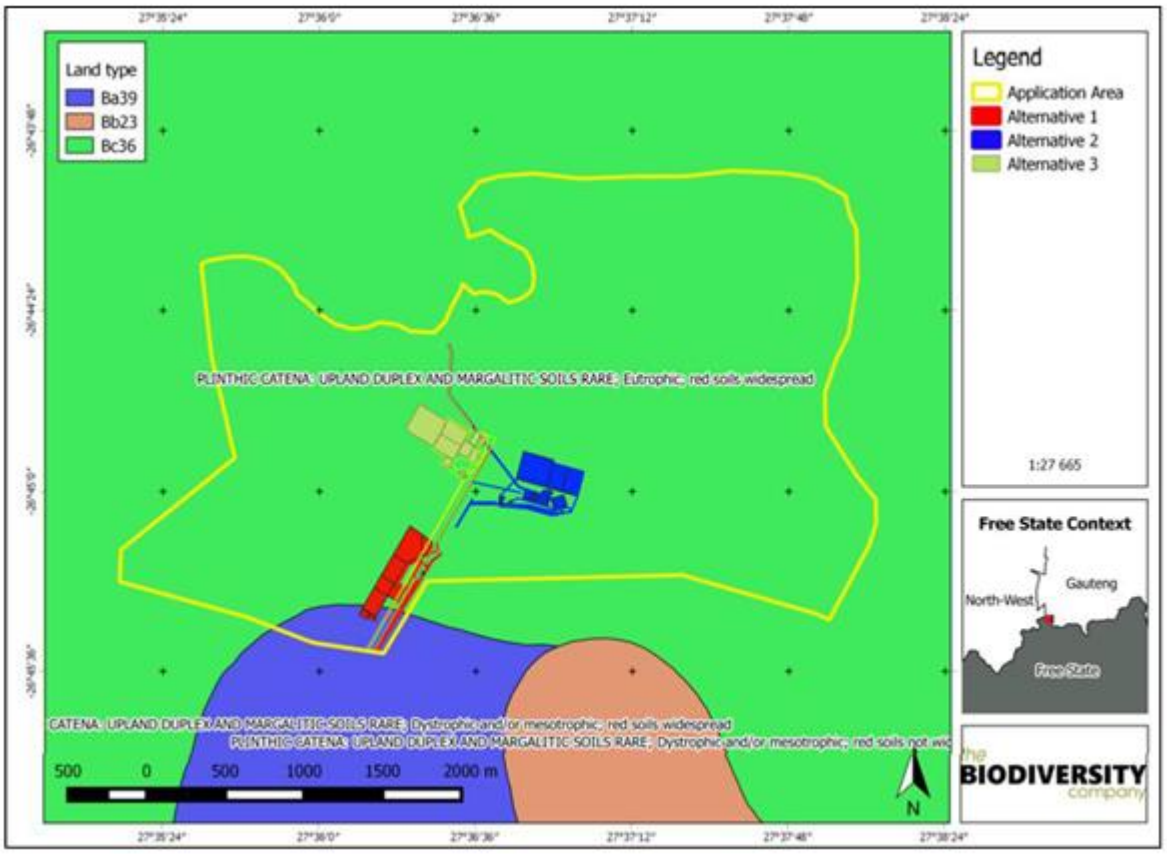

Figure 34: Land type map for the application area (image obtained from the Final Scoping Report of Pure Source Mine, 2018 done Shango Solutiions)

It is expected that the dominant soils in the crest position, with slopes exceeding 16%, will be shallow Mispah and Glenrosa soils. The Hutton, Clovelly, and Oakleaf (freely drained soils) soil forms dominate the southern flatter portions. Areas where water accumulates are dominated by the Westleigh, Longlands and Fernwood soil forms. Figure 35 represent the soil forms that were delineated within the application area.

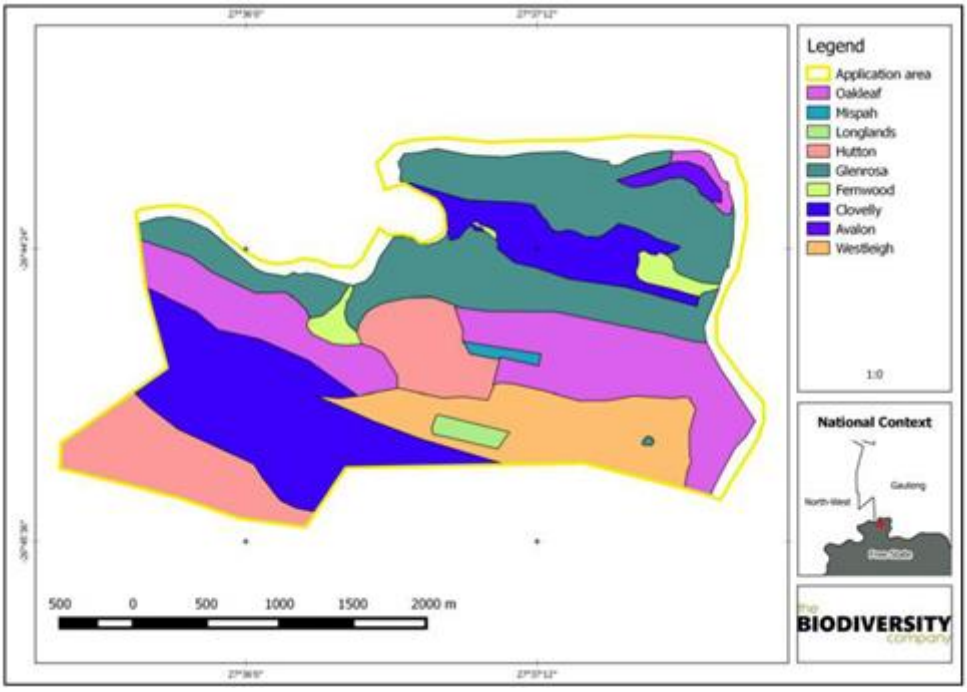

Figure 35: Preliminary soil delineation for the project area (image obtained from the Final Scoping Report of Pure Source Mine, 2018 done Shango Solutiions)

Land capability and agricultural potential is determined by a combination of soil, terrain and climate features. Land capability is defined by the most intensive long term sustainable use of land under rain-fed conditions. At the same time an indication is given about the permanent limitations associated with the different land use classes (Smith, 2006). Land capability is divided into eight classes and these may be divided into three capability groups. Table 14 illustrates how the land classes and groups are arranged in order of decreasing capability and ranges of use. The risk of use increases from class I to class VIII (Smith, 2006).

Table 14: Land capability class and intensity of use (Smith, 2006) (information obtained from the Final Scoping Report of Pure Source Mine, 2018 done Shango Solutiions)

Land Capability Class	Increased Intensity of Use									Land Capability Groups
I	W	F	LG	MG	IG	LC	MC	IC	VIC	**Arable Land**
II	W	F	LG	MG	IG	LC	MC	IC		
III	W	F	LG	MG	IG	LC	MC			
IV	W	F	LG	MG	IG	LC				
V	W		LG	MG						**Grazing Land**
VI	W	F	LG	MG						
VII	W	F	LG							
VIII	W									**Wildlife**
W - Wildlife		**MG – Moderate Grazing**				**MC – Moderate Cultivation**				
F - Forestry		**HG – Intensive Grazing**				**IC – Intensive Cultivation**				
LG – Light grazing		**LC – Light Cultivation**				**VI – Very Intensive Cultivation**				

The overall land capability of the soils identified in the application area is Class III (moderate cultivation) or less. Class III land would pose moderate limitations to agriculture with some erosion hazard, and would require special conservation practice and tillage methods. The farming method for this capability would require the rotation of crops and ley (50%).

HYDROLOGY AND GEOHYDROLOGY

Further studies or amendments on this section might be required by DWS during the Water Use License application by the Department of Water and Sanitation (DWS).

Surface Hydrology

The application area is situated within the Vaal Water Management Area in the C23B quaternary catchment. C23B quaternary catchment drains into the C23B-01731 Sub Quaternary Reach (SQR) of the Vaal River system. The C23B-01731 SQR is 27.52 km in length and it is located within the Southern Temperate Highveld

Ecoregion. The gradient of the watercourse within the application area was determined to be a class F Geoclass which is indicative of a low gradient-gentle slope watercourse (DWS, 2018). The specific reach of the SQR is located downstream of the Vaal River Barrage and upstream of the Goosebay gauging weir near to the town of Vaal Oewer (Figure 24)

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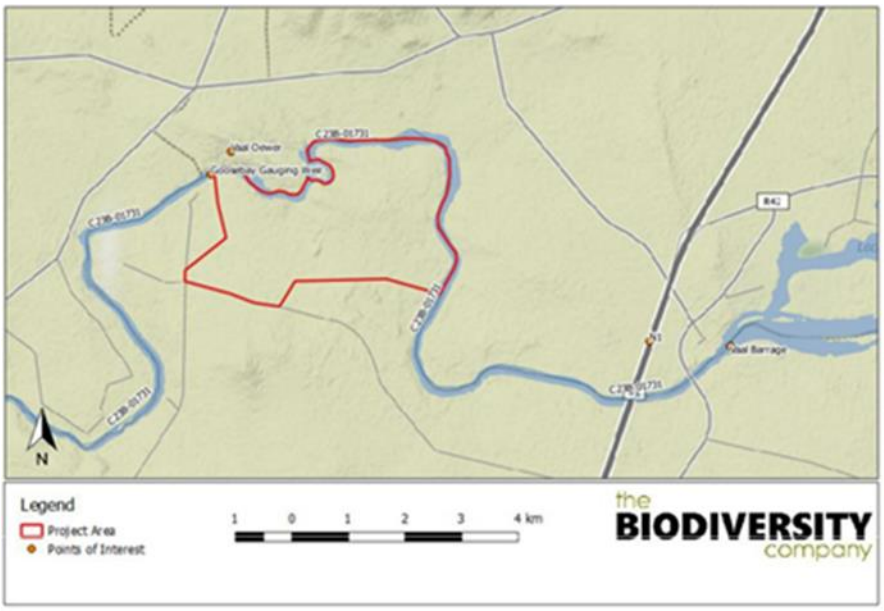

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Figure 36: Surface hydrology (information obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

The catchment draining the project area consists of typical undulating, hygrophilous vegetation. Aquatic fauna of the Vaal River system, particularly in this zone, are

threatened by extensive agriculture, urban development and industrial activities in Vanderbijlpark/Vereeniging. These land uses have resulted in the sedimentation and modification of instream and wetland habitats associated with the Vaal River. In addition, the Ermelo Coal Field is largely located within the overall source zone of the Vaal River basin which has resulted in several point source contaminants from coal mining and power generation activities. The Vaal River basin supports a critical commercial and industrial area in South Africa, supplying water for a multitude of activities and services.

Notable aquatic ecology in the Vaal River basin are the several endemic Cyprinid species such as *Labeo capensis* (Least Concern), *L. umbratus* (Least Concern), *Labeobarbus kimberleyensis* (Near Threatened),

Labeobarbus aeneus (Least Concern) and the Rock Catlet, *Austroglanis sclateri* (Least Concern). In addition to the above species, *Entermoius cf. palidus* is undergoing systematic revision and likely represents several species. In the case of this assessment, *E. cf. palidus* is regarded as a listed species as a precautionary approach. The desktop ecological status of the C23B-01731 SQR is presented in Table 15

Present Ecological Status (PES)	**Largely Modified (class D)**
Ecological Importance (EI)	**Moderate**
Ecological Sensitivity (ES)	**High**
Default Ecological Category	**Largely Natural (Class B)**

Table 15: Desktop Ecological Status of the Vaal River within the C23B-01731 Sub Quaternary Reach (DWS, 2018). (information obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

The desktop data for the Vaal River SQR considered in this assessment indicates that the Present Ecological Status (PES) of the watercourse is Largely Modified (class D). The central factors negatively affecting the PES were water quality deterioration, in the form of excessive sewerage input compounded by industrial, agricultural and urban runoff, habitat quality degradation, in the form of extensive flow regulation and riparian habitat modification. The ecological importance of the watercourse at a desktop level was determined to be moderate.

The moderate rated level of importance can be attributed to the wide distribution of aquatic fauna throughout the Orange-Vaal River Basins. The ecological sensitivity was derived to be high. The presence of flow and water quality sensitive taxa renders the fauna sensitive to changes to the physical components of the watercourse. The default ecological category was rated as Largely Natural (class B). Management of

landuse must be completed in a manner which aims to improve the PES class of the watercourse. However, the extensive and permanent nature of the existing impacts renders the management of the watercourse to this level implausible. The default ecological category should therefore be revised.

Freshwater Ecosystem Priority Area (NFEPA) Status and Riparian Zone Buffer

According to Nel et al. (2011) the catchment of the watercourses in the study area are not National Freshwater Priority Areas (NFEPA). The layout of the proposed project with an approximate riparian zone and 100 m buffer are presented in

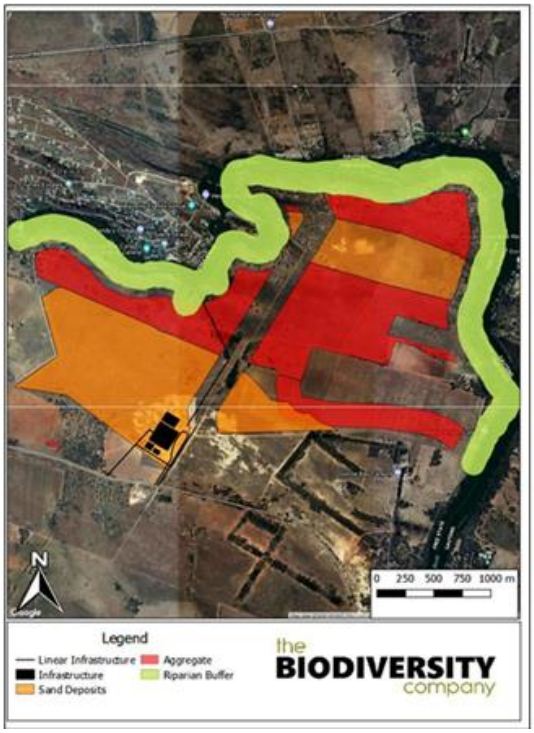

Figure 37: Project layout with approximate riparian bufferzone (information obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

As can be seen in Figure 38 the proposed project is largely outside the delineated riparian and floodline bufferzones. However, site alternative 3 for the plant is situated within the 50 and 100 year floodlines.

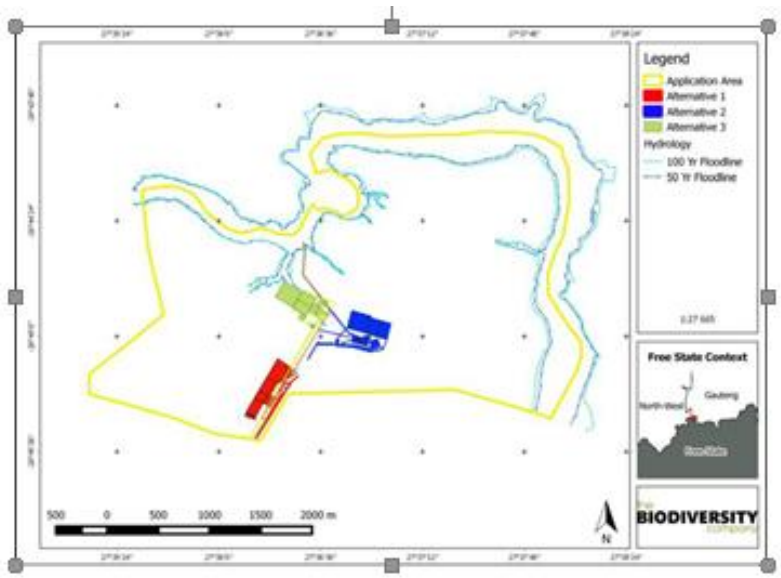

Figure 38: Project layout with approximate Floodline bufferzones (information obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

Wetland Delineation

The wetland areas were delineated in accordance with the DWAF (2005) guidelines. The extent of the delineated wetland areas is presented in Figure 39. As illustrated in this figure, the topographical river line data for quarter degree square “2627” indicates six major river lines flowing from inland towards the Vaal River. These river lines have been investigated and either labelled as likely wetland areas or drainage lines given the suitable topography.

Figure 39: Topographical river lines (information obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

Topographical river lines have been used to identify possible wetland areas. This information has resulted in the classification of various wetlands and dry drainage channels. The river lines labelled “A”, “B”, “E” and “F” have been identified as likely wetland areas, whereas those labelled “C” and “D” have been identified to be likely dry drainage lines.

BIOLOGICAL ENVIRONMENT

MINING AND BIODIVERSITY

(Information extracted from the Final Scoping Report of Pure Source Mine, 2018 done by Shango Solutions).

The Mining and Biodiversity Guidelines

Chamber of Mines, the South African National Biodiversity Institute and the South African Mining and Biodiversity Forum, with the intention to find a balance between economic growth and environmental sustainability. The Guideline is envisioned as a tool to “foster a strong relationship between biodiversity and mining which will eventually translate into best practice within the mining sector.

In identifying biodiversity priority areas which have different levels of risk against mining, the Guideline categorises biodiversity priority areas into four categories of biodiversity priority areas in relation to their importance from a biodiversity and ecosystem service point of view as well as the implications for mining in these areas:

A) Legally protected areas, where mining is prohibited.

B) Areas of highest biodiversity importance, which are at the highest risk for mining.

C) Areas of high biodiversity importance, which are at a high risk for mining.

D) Areas of moderate biodiversity importance, which are at a moderate risk for mining.

The Guideline provides a tool to facilitate the sustainable development of South Africa’s mineral resources in a way that enables regulators, industry and practitioners to minimise the impact of mining on the country’s biodiversity and ecosystem services. It provides the mining sector with a practical, user- friendly manual for integrating biodiversity considerations into the planning processes and managing biodiversity during the operational phases of a mine, from exploration through to closure. The Guideline provides explicit direction in terms of where mining-related impacts are legally prohibited, where biodiversity priority areas may present high risks for mining projects, and where biodiversity may limit the potential for mining.

According to these guidelines, the application area is predominantly classed as having a 'Moderate Biodiversity Importance' and represents a 'Moderate Risk for Mining' (Figure 40). Existing agricultural areas in the southern portion are not given any classification level. The Mining and Biodiversity Guideline's describes areas of highest biodiversity importance as: "*these areas are viewed as necessary to ensure protection of biodiversity, environmental sustainability, and human well-being."* The guideline notes that environmental screening, the EIA and specialists should focus on confirming the presence and significance of biodiversity features, and provide a site-specific basis on which to apply the mitigation hierarchy to inform regulatory decision-making.

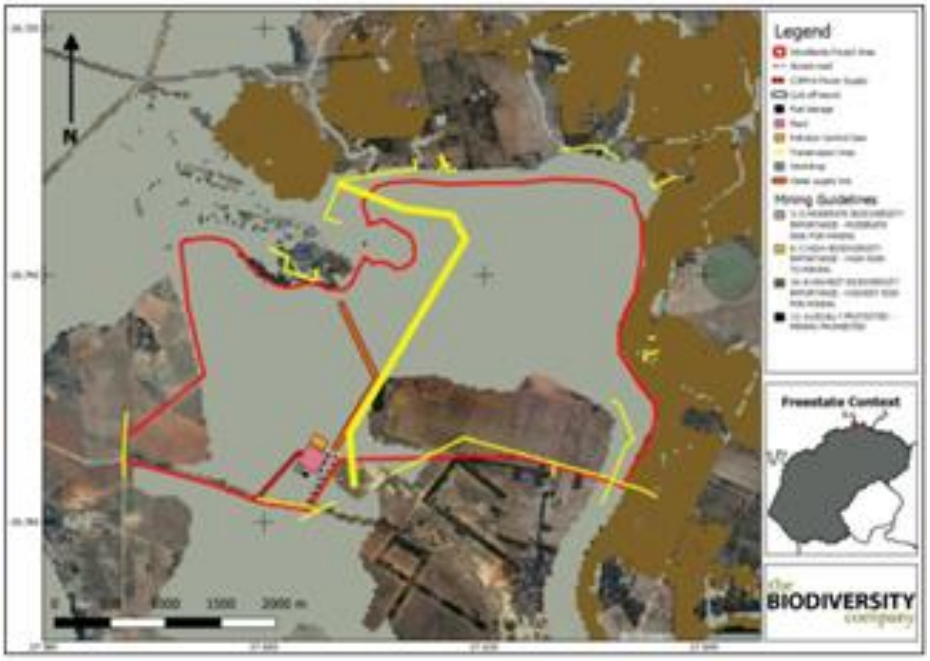

Figure 40: The application area superimposed on the Mining and Biodiversity Guidelines spatial dataset (information obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

BIODIVERSITY CONSERVATION AREAS

(Information extracted from the Final Scoping Report of Pure Source Mine, 2018 done by Shango Solutions).

Free State Terrestrial CBA Plan

A Critical Biodiversity Area (CBA) is considered a significant and ecologically sensitive area and needs to be kept in a pristine or near-natural state to ensure the continued functioning of ecosystems (SANBI, 2017). A CBA represents the best choice for achieving biodiversity targets. ESAs are not essential for achieving targets,

but they play a vital role in the continued functioning of ecosystems and often are essential for proper functioning of adjacent CBAs.

According to the Free State Terrestrial CBA Plan, the project area is comprised of three identified areas: Critical Biodiversity Area 2 (CBA2), Ecological Support Area 1 (ESA1) and Ecological Support Area 2 (ESA2) (Figure 41). All of these areas will have a high or moderately-high biodiversity value. Three areas across the central portion are considered CBA2. These areas coincide with areas which are considered to be rocky ridges and or wetland areas (both high biodiversity areas) based on desktop analyses

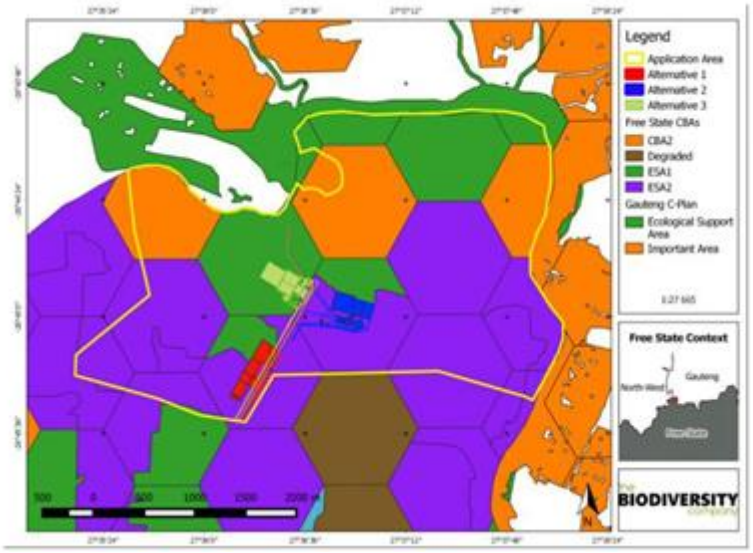

Figure 41: The project area superimposed on the Free State Terrestrial CBA spatial data (BGIS,2018) (information obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

Flora - Ecosystem Threat Status

Ecosystem threat status outlines the degree to which ecosystems are still intact or alternatively losing vital aspects of their structure, function and composition, on which their ability to provide ecosystem services ultimately depends (Driver et al., 2011). Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Least Threatened (LT), based on the proportion of each ecosystem type that remains in good ecological condition (Driver et al., 2011). The proposed project area was superimposed on the terrestrial ecosystem threat status (Figure 30). As seen in Figure 42 the application area

according to the NBA (2011) falls entirely within one ecosystem, which is listed as a Vulnerable (VU) ecosystem

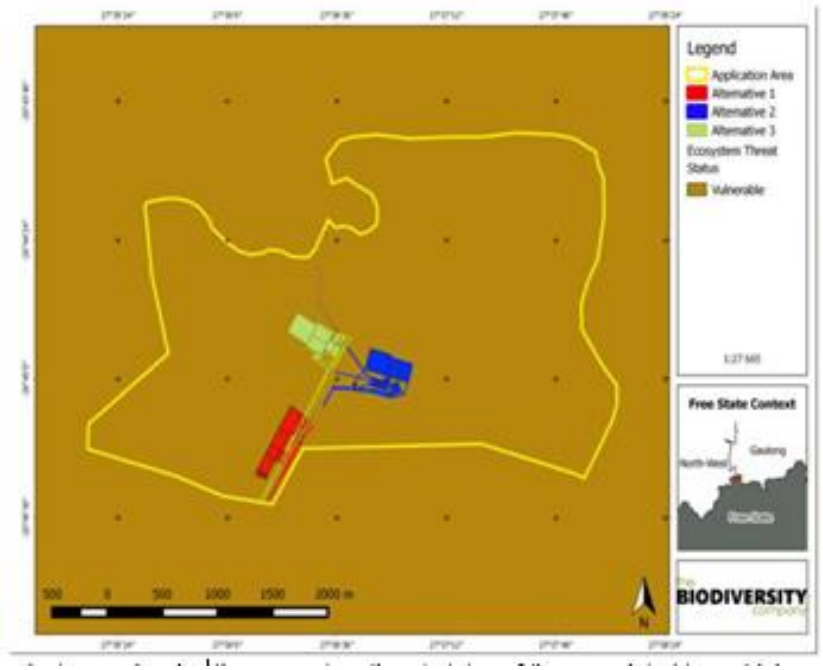

Figure 42: The project area showing the ecosystem threat status of the associated terrestrial ecosystems (BGIS,2018) (Image obtained *from Pure Source Mine Final Scoping Report done by Shango Solutions)*

Ecosystem Protection Level

Ecosystem protection level indicates whether ecosystems are adequately protected or under-protected. Ecosystem types are categorised as not protected, poorly protected, moderately protected or well protected, based on the proportion of each ecosystem type that occurs within a protected area recognised in the Protected Areas Act (Driver et al., 2011). The project area was superimposed on the ecosystem protection level map to assess the protection status of terrestrial ecosystems associated with the development (Figure 42). Based on Figure 43, the terrestrial ecosystems associated with the proposed project area are rated as not protected. This means that this ecosystem type (and associated habitats) are not well protected anywhere in the country (such as in nationally protected areas).

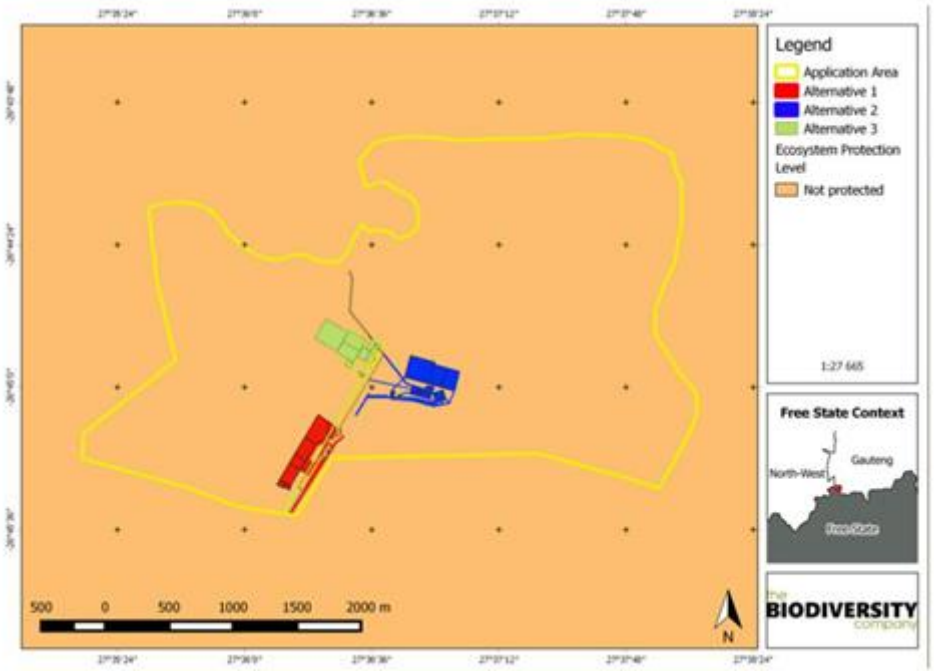

Figure 43: The project area showing the level op protection of terrestrial ecosystems (BGIS,2018) (Image obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

VEGETATION

((Refer to the Final Scoping Report of Pure Source Mine, 2018 done Shango Solutiions)

Vegetation Assessment

The project area is situated within the grassland biome. This biome is centrally located in southern Africa, and adjoins all except the desert, fynbos and succulent Karoo biomes (Mucina and Rutherford, 2006). Grasslands are dominated by a single layer of grasses. The amount of cover depends on rainfall and the degree of grazing. The grassland biome experiences summer rainfall and dry winters with frost (and fire), which are unfavourable for tree growth. Thus, trees are typically absent, except in a few localised habitats. Geophytes (bulbs) are often

abundant. Frosts, fire and grazing maintain the grass dominance and prevent the establishment of trees. The grassland biome comprises many different vegetation types. The application area is situated within a single vegetation type, namely the Soweto Highveld Grassland (Gs4) vegetation type according to Mucina and Rutherford (2006) (Figure 44).

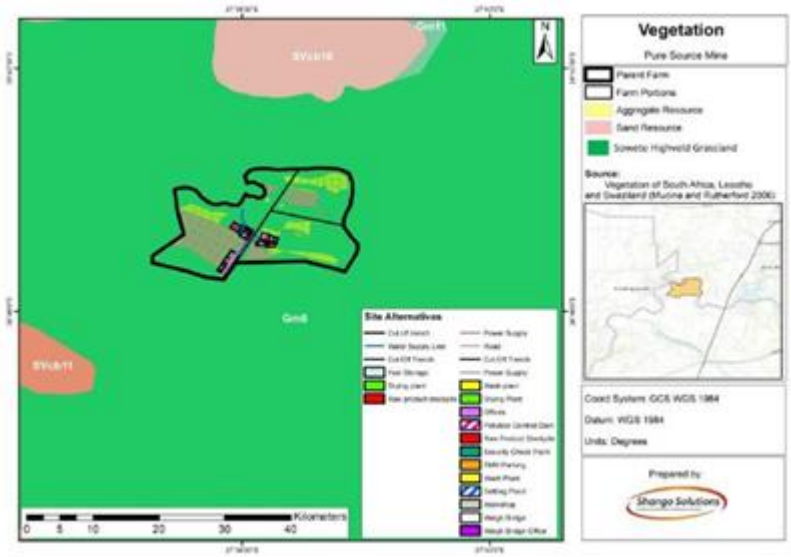

Figure 44: The project area showing the vegetation type based on the Vegetation Map of South Africa, Lesotho and Swaziland (BGIS,2017) (Image obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

Soweto Highveld Grassland (Gs4)

The Soweto Highveld Grassland vegetation type is found in Mpumalanga, Gauteng and to a little extent also in neighbouring Free State and North-West Provinces. This vegetation type typically comprises of an undulating landscape on the Highveld plateau supporting short to medium-high, dense, tufted grassland dominated almost entirely by *Themeda triandra* and accompanied by a variety of other grasses such as *Elionurus muticus*, *Eragrostis racemosa*, *Heteropogon contortus* and *Tristachya leucothrix*. Scattered small wetlands, narrow stream alluvia, pans and occasional ridges or rocky outcrops interrupt the continuous grassland cover (Mucina and Rutherford, 2006).

Important plant taxa

Important plant taxa are those species that have a high abundance, a frequent occurrence or are prominent in the landscape within a particular vegetation type (Mucina and Rutherford, 2006). The following species are important in the Soweto Highveld Grassland.

Graminoids: *Andropogon appendiculatus, Brachiaria serrata, Cymbopogon pospischilii, Cynodon dactylon, Elionurus muticus , Eragrostis capensis, E. chloromelas, E. curvula, E. plana, E. planiculmis, E. racemosa, Heteropogon contortus, Hyparrhenia hirta, Setaria nigrirostris, S. sphacelata, Themeda triandra,*

Tristachya leucothrix, Andropogon schirensis, Aristida adscensionis, A. bipartita, A. congesta, A. junciformis subsp. galpinii, Cymbopogon caesius, Digitaria diagonalis, Diheteropogon amplectens, Eragrostis micrantha, E. superba, Harpochloa falx, Microchloa caffra and Paspalum dilatatum.

Herbs: *Hermannia depressa, Acalypha angustata, Berkheya setifera, Dicoma anomala, Euryops gilfillanii, Geigeria aspera var. aspera, Graderia subintegra, Haplocarpha scaposa, Helichrysum miconiifolium, H. nudifolium var. nudifolium, H. rugulosum, Hibiscus pusillus, Justicia anagalloides, Lippia scaberrima, Rhynchosia effusa, Schistostephium crataegifolium, Selago densiflora, Senecio coronatus, Vernonia oligocephala and Wahlenbergia undulata*.

Geophytic Herbs: *Haemanthus humilis subsp. Hirsutus and H. montanus.*

Herbaceous Climber: *Rhynchosia totta*.

Low Shrubs: *Anthospermum hispidulum, A. rigidum subsp. pumilum, Berkheya annectens, Felicia muricata and Ziziphus zeyheriana.*

Conservation Status of the Vegetation Type

According to Mucina and Rutherford (2006), the Soweto Highveld Grassland vegetation type is classified as Endangered. The national target for conservation protection for both these vegetation types is 24%, but only a few patches are statutorily conserved in Waldrift, Krugersdorp, Leeuwkuil, Suikerbosrand, Rolfe's Pan Nature Reserves or privately conserved in Johanna Jacobs, Tweefontein, Gert Jacobs, Nikolaas and Avalon Nature Reserves and the Heidelberg Natural Heritage Site.

By 2006 nearly half of the area of occupancy of this vegetation type had already been transformed by cultivation, urban sprawl, mining and building of road infrastructure. The amount of area transformed has most likely increased substantially. Some Soweto Grassland areas have been flooded by dams including Grootdraai, Leeukuil, Trichardtsfontein, Vaal and Willem Brummer.

Plant Species of Conservation Concern

Based on the Plants of Southern Africa (BODATSA-POSA, 2016) database, 445 plant species are expected to occur in the project area. Figure 45 shows the extent of the grid that was used to compile the expected species list based on the Plants of Southern Africa (BODATSA-POSA, 2016) database. The list of expected plant species is provided in Appendix A of the Specialist Report. Of the 385-plant species, one (1) species is listed as being a Species of Conservation Concern (SCC) (Table 15).

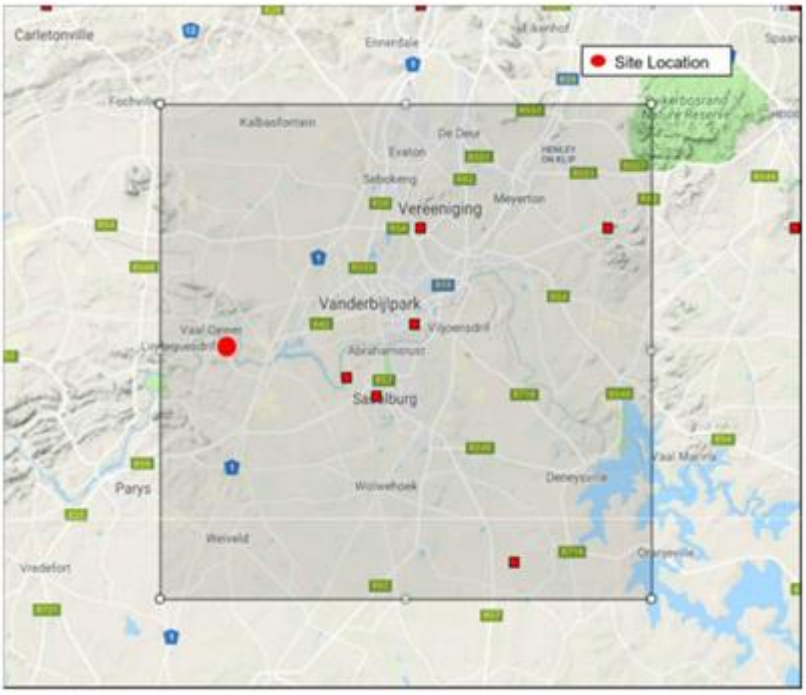

Figure 45: Map showing the grid drawn to compile an expected species list (BODATSA-POSA, 2016) (Image obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

Family	Taxon	Author	IUCN	Ecology
Asphodelacese	*Miraglossum leave*	*Kupicha*	*CR*	*Indigenous; Endemic*

Table 16: Plant Species of Conservation Concern (SCC) expected to occur in the project area (BODATSA-POSA,2016

Miraglossum laeve is a rare and poorly known species. It has been collected twice only: first in 1930, from hills south of Pretoria, and again in 1960, from the hills of the Vredefort Dome north-east of Parys, a disjunction of about 130 km. Despite dedicated searches, this species has not been found again. The 1960 collection has a fairly precise locality description, which indicates that it occurs in Gold Reef Mountain

Bushveld, a vegetation type with a limited distribution on the rocky ridges of Gauteng and adjacent areas in North West Province. The older collection's locality description is too imprecise to determine its habitat, but hills to the south of Pretoria also has another limited vegetation type on them, Gauteng Shale Mountain Bushveld, which is found on three ridges across Gauteng Province, and also extending somewhat into North West Province. It is therefore likely that this species is a rare, localised endemic of ridges in Gauteng Province (von Staden and Victor, 2005).

Threats

Habitat loss and degradation due to urban expansion is a severe threat across Gauteng, and very little natural areas remain. Efforts have been made to limit development on ridges, but these natural areas are now becoming increasingly isolated, and continue to be degraded due to fire exclusion and encroachment of alien invasive plants.

FAUNA

((Information extracted from the Final Scoping Report of Pure Source Mine, 2018 done by Shango Solutions).

Mammals

The IUCN Red List Spatial Data (IUCN, 2017) lists 78 mammal species that could be expected to occur within the vicinity of the project area (Appendix C of the Specialist Report). Of these species, 10 are medium to large conservation dependant species, such as *Ceratotherium simum* (Southern White Rhinoceros) and Equus quagga (Plains Zebra) that, in South Africa, are generally restricted to protected areas such as game reserves. These species are not expected to occur in the project area and are removed from the expected SCC list. They are however still included in Appendix C of the Specialist Report.

Of the remaining 67 small to medium sized mammal species, eleven (11) are listed as being of conservation concern on a regional or global basis (Table 17).

The list of potential species includes:

Five (5) that are listed as Vulnerable (VU) on a regional basis.
Six (6) that are listed as Near Threatened (NT) on a regional scale.

Species	Common name	Conservation Status		Likelihood of Occurrence
		Regional (SANBI, 2016)	IUCN (2017)	
Aonyx capensis	Cape Clawless Otter	NT	NT	High

Atelerix frontalis	South Africa Hedgehog	NT	LC	High
Crocidura maquassiensis	Makwassie Musk Shrew	VU	LC	High
Crocidura mariquensis	Swamp Musk Shrew	NT	LC	Moderate
Felis nigripes	Black-footed Cat	VU	VU	Moderate
Hydrictis maculicollis	Spotted-necked Otter	VU	NT	Moderate
Leptailurus serval	Serval	NT	LC	High
Mystromys albicaudatus	White-tailed Rat	VU	EN	Moderate
Panthera pardus	Leopard	VU	VU	Low
Parahyaena brunnea	Brown Hyaena	NT	NT	High
Poecilogale albinucha	African Striped Weasel	NT	LC	High

Table 17: List of mammal species of conservation concern that may occur in the project area as well as their global and regional conservation statuses (IUCN, 2017; SANBI, 2016) (information obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

Avifauna

Based on the South African Bird Atlas Project, Version 2 (SABAP2) database, 317 bird species are expected to occur in the vicinity of the project area. The full list of potential bird species is provided in Appendix F12 of the Terrestrial Biodiversity Assesment.

Of the expected bird species, twenty-four (24) species are listed as SCC either on a regional scale or international scale (Table 14). The SCC include the following:

- Four (4) species that are listed as Endangered (EN) on a regional basis.
- Six (6) species that are listed as Vulnerable (VU) on a regional basis.
- Twelve (12) species that are listed as Near Threatened (NT) on a regional basis.

Based on the IUCN Red List Spatial Data (IUCN, 2017) and the AmphibianMap database provided by the Animal Demography Unit (ADU, 2017) twenty (20) amphibian species are expected to occur in the application area. One

(1) amphibian species of conservation concern could be present in the application area according to the above-mentioned sources (Table 18).

Species	Common Name	Conservation Status		Likelihood of Occurrence
		Regional (SANBI, 2016)	IUCN (2017)	
Pyxicephalus adspersus	Giant Bullfrog	**NT**	LC	Moderate

Table 18: Amphibian species of conservation concern which may occur in the project area (information obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

HUMAN ENVIRONMENT

CULTURAL AND HERITAGE ENVIRONMENT

(Information extracted from the Final Scoping Report of Pure Source Mine, 2018 done by Shango Solutions).

(Refer to the Heritage Impact Assessment: – Appendix F)

According to the South African Heritage Resources Agency (SAHRA) website and the South African Heritage Information System (SAHRIS) Fossil Sensitivity Map, the application area is depicted having very high (red), high (orange/yellow) and moderate (green) fossil sensitivity and therefore, warrants careful scrutiny.

Stone Age & Iron Age settlements

No Stone Age or Iron Age settlements, structures, features or artefacts were recorded during the survey during the specialist study.

Buildings

Although several stone-walled enclosures were recorded in the survey area, none are older than 60 years and therefore not protected under the NHRA (Act no 25 of 1999). No further action is required.

Of importance is Site 1 which is a strategic entrenchment (redoubt) that probably dates to the South African War (Anglo-Boer War) of 1899 – 1902. The structure is therefore older than 60 years and as a result protected under the NHRA (Act 25 of 1999). Any impact on the site will have to be mitigated by a Phase 2 investigation.

Graves

A cemetery with 48 graves was recorded. Although some of the graves do have inscriptions on the headstones, some of them do not and as a result are also protected under the NHRA (Act 25 of 1999). If impact will occur in the near future, mitigation measures may entail full grave relocation. Such a relocation process must be undertaken by suitably qualified individuals with a proven track record. The relocation must also be undertaken in full cognisance of all relevant legislation, including the specific requirements of the National Heritage Resource Act (Act no. 25 of 1999).

Furthermore, a concerted effort must also be made to identify all buried individuals and to contact their relatives and descendants. Other legislative measures which may be of relevance include the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), the Human Tissues Act (Act no. 65 of 1983, as amended), the Ordinance on Excavations (Ordinance no. 12 of 1980) as well as any local and regional provisions, laws and by-laws that may be in place.

Also note the following:

It should be kept in mind that archaeological deposits usually occur below ground level. Should archaeological artefacts or skeletal material be revealed in the area during construction activities, such activities should be halted, and a university or museum notified in order for an investigation and evaluation of the find(s) to take place (*cf*. NHRA (Act No. 25 of 1999), Section 36 (6)).

Formally protected areas refer to areas protected either by national or provincial legislation. Based on the SANBI (2010) Protected Areas Map and the National Protected Areas Expansion Strategy (NPAES), the application area does not overlap with, nor will it impact upon, any formally protected area.

The central core of the Vredefort Dome World Heritage Site is situated approximately 15 km south-west of the proposed project area. The collar of the outer dome is within 8 km of the proposed project area which is outside of the 5 km protected areas buffer and as such the proposed project is not expected to have an impact on this region (Figure 46). However, due to the international importance of the Vredefort World Heritage Site and its location downstream of the proposed project area, there is a minor chance that any severe impacts caused to the Vaal River system by the proposed development, if any, may have an impact on this site.

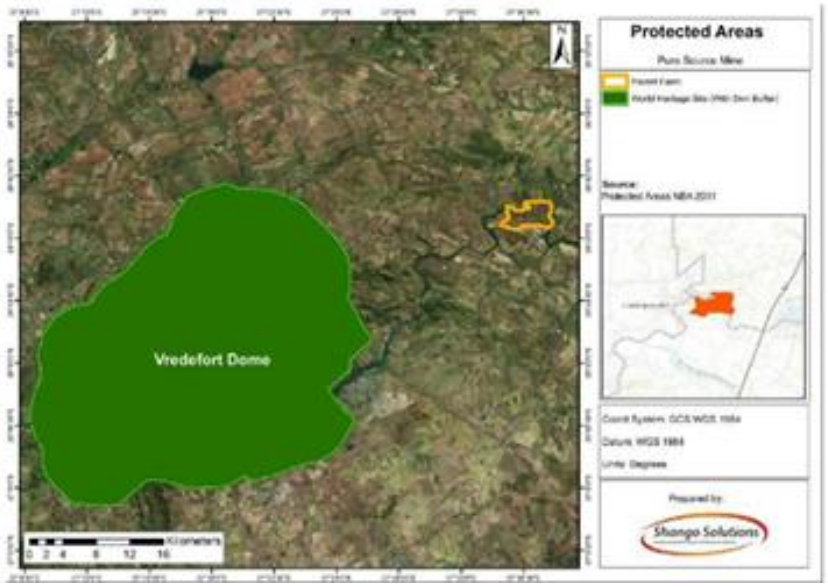

Figure 46: : The project area in relation to the Vredefort Dome World Heritage Site (Image obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

During the course of the mining of sand and gravel, archaeological material may be uncovered in which case an Archaeologist should be engaged to assess the importance of the material and its context for possible conservation

Eight cultural and heritage sites were identified on site as described in Table 19 and Figure 47.

Site	Coordinates	Type	Significance
1	26°44.386'S 27°36.652'E	SA War redoubt	High
2	26°44.487'S 27°36.813'E	Two circular enclosure	Low
3	26°44.476'S 27°36.770'E	Circular enclosure	Low
4	26°44.885'S 27°37.270'E	Cemetery	High
5	26°44.133'S 27°37.000'E	Square enclosure	Low
6	26°44.129'S 27°36.948'E	Circular enclosure	Low
7	26°44.098'S27°36.775'E	Circular enclosure	Low
8	26°45.001'S 27°37.898'E	Modern house	Low

Table 19: Cultural and heritage sites identified on site (information obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

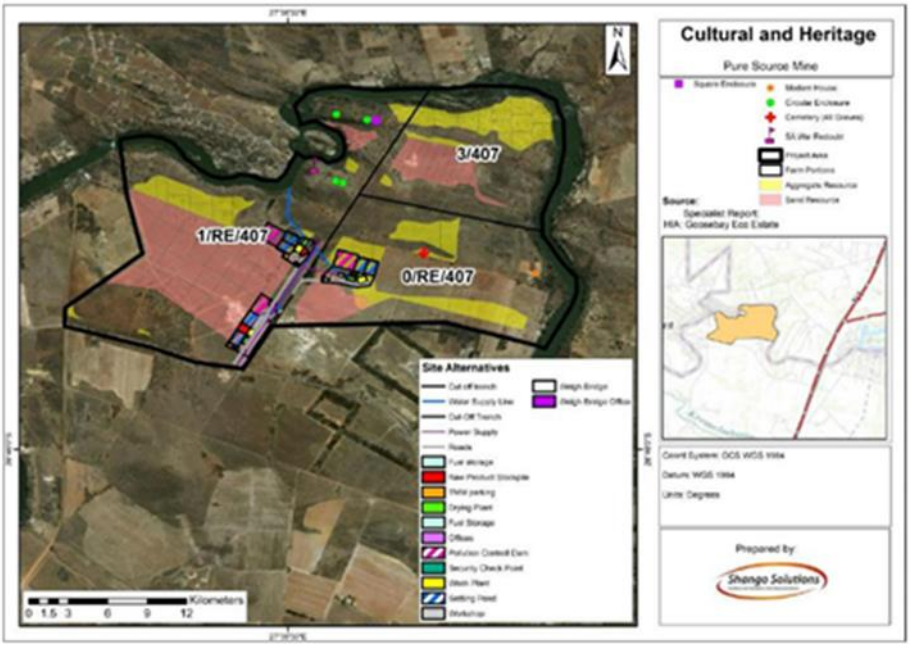

Figure 47: : Heritage sites identified on site (Image obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

Site 1: South African War redoubt

The site consists of stone-walled enclosures and terraces overlooking the Vaal River. Several terraces (Figures 48 and 49) were recorded as well as a small enclosure (3 metres in diameter). The site is probably a strategic entrenchment (redoubt) dating to the South African War (1899 – 1902). No surface finds (insignia) were recorded. The structures are older than 60 years and therefore protected by the NHRA, 1999 (Act 25 of 1999).

Figure 48: : One of the stone-walled enclosures (Image obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

Figure 49: : Sign erected at site (Image obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

Site 2: Stone wall enclosures

The site consists of two attached stone-walled circular enclosures that were probably used to keep livestock (Figure 50). The walls are approximately 0.5 metres high (in some paces the foundations only) and packed with large boulders. The two

enclosures are 18 metres and 10 metres in diameter, respectively. Deposit was recorded in the larger enclosure. No other cultural material was noted on the surface. The enclosures are probably associated with recent farming activities by workers living in the area. The structures are probably not older than 60 years and therefore not protected under the NHRA, 1999 (Act 25 of 1999).

Figure 50: A section of the wall one of the enclosures (Image obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

Site 3: Circular enclosure

The site consists of a stone-walled circular enclosure that was probably used to keep livestock (Figure 51). The walls are approximately 0.5 metres high and the enclosure is approximately 13 metres in diameter. No deposit was recorded in the enclosure. No other cultural material was noted on the surface. The enclosures are probably associated with recent farming activities by workers living in the area. The structures are probably not older than 60 years.

Figure 51: A section of the circular enclosure (Image obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

Site 4: Cemetery

A cemetery with 48 graves was recorded on site (Figure 52). The graves have an east-west orientation, with the headstones on the western side. Some of the graves are demarcated by packed rock and heaps of sand while others have a cement/brick base and headstone (one with granite). The following inscriptions were recorded:

- Paulinah Lebeko Mmamoya: 19/05/1919 – 06/96/1969.
- Name not discernable: Died: 1968.
- Abel Motsetse Ntsoelengoe: Died: 23/12/1967 (Age: 69).
- April Radebe: Died: 27/09/1972.
- Paulinah Mmamohau: No date.
- Abram Tsholo Qai: Died: 11/05/1961.
- ?? Kadi: Died: 28/10/1983.

Figure 52: : Cemetery with 48 graves (Image obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

Most of the graves do not have inscriptions on their headstones and are therefore regarded as older than 60 years. As such, these graves are protected under Section 36 the NHRA, 1999 (Act 25 of 1999). No other structures or features were recorded in association with the cemetery.

Site 5: Square enclosure

Figure 53: Section of the square foundation (Image obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

The site consists of a small stone-walled square enclosure. The dimensions of the structure are 5x12 metres and the walls are 0.5 high (Figure 53). Some deposit was

recorded in the enclosure. No other cultural material was noted on the surface. The enclosures are probably associated with recent farming activities by workers living in the area. The structures are probably not older than 60 years and therefore not protected under the NHRA, 1999 (Act 25 of 1999).

Site 6: Circular enclosure

The site consists of a small stone-walled circular enclosure. The structure is 12 metres in diameter and the walls are 0.5 high. No deposit was recorded in the enclosure. No other cultural material was noted on the surface. The enclosures are probably associated with recent farming activities by workers living in the area. The structures are probably not older than 60 years.

Site 7: Circular enclosure

The site consists of a small stone-walled circular enclosure. The structure is 10 metres in diameter and the walls are 0.3 high. No deposit was recorded in the enclosure. No other cultural material was noted on the surface. The enclosures are probably associated with recent farming activities by workers living in the area. The structures are probably not older than 60 years and therefore not protected under the NHRA, 1999 (Act 25 of 1999).

Site 8: Modern house

Figure 54: : Multi-room stone house (Image obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

The site consists of a multi-room, brick house with corrugated iron roof. A few associated outbuildings were also recorded (Figure 54). The structure is not older than 60 years and therefore not protected under the NHRA, 1999 (Act 25 of 1999).

Palaeontology

According to the South African Heritage Resources Agency (SAHRA) website and the South African Heritage Information System (SAHRIS) Fossil Sensitivity Map (Figure 55), the application area is depicted having very high (red), high (orange/yellow) and moderate (green) fossil sensitivity and therefore, warrants careful scrutiny

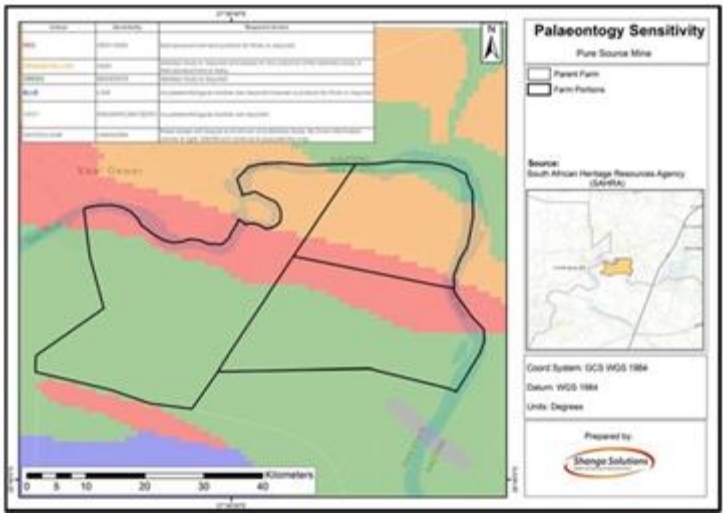

Figure 55: : Palaeontological sensitivity (Image obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

The project area is situated in the collar rocks of the Vredefort Dome northeast of the Vredefort Dome World Heritage Site. The basement granite at Vredefort formed prior to 3 000 million years ago. The strata overlying the basement consist of volcanic and sedimentary rocks (quartzite, shale and dolomite) and were deposited between 3 000 and 2 400 million years ago. They are named (from the base upwards): The Witwatersrand, Ventersdorp and Transvaal supergroups. The impact took place about 2 020 million year ago. After the impact, erosion removed all traces of the actual impact crater, leaving only the deeper levels which form a ring-like collar around the central uplift (Figure 56).

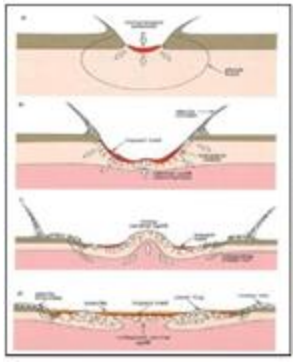

Figure 56: : Diagrams illustrating stages in the development of the Vredefort impact. Erosion has removed the actual impact crater and only the depressed outer ring and central uplift are preserved (Reimold and Gibson, 2009) (Image obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

The penultimate phase of erosion occurred 300 million years ago under the influence of glaciers, at a time when southern Africa, then part of the supercontinent Gondwana, passed over the ice cap of the South Pole. Moving ice is a powerful eroding agent, and the ice sheets carved out the rocks of the Vredefort in accordance with their harness – soft rocks formed valleys and harder rocks formed ridges.

Following emergence from beneath the ice cap, what is now southern Africa was partly submerged beneath a shallow sea. River systems emerging from melting ice deposited sandstone and mudstone (shale) in large deltas which gradually buried the eroded Vredefort landscape. Peat collected in densely vegetated swamps amongst the deltas, which was ultimately converted into coal by accumulated heat and pressure from the overlying sediment.

These sedimentary rocks form part of the Karoo Supergroup The modern river system began to form about 150 million years ago as Gondwana began to break up. By about 50 million years ago, the interior of southern Africa had been eroded down to a low-lying plain, much like present day Australia which has an average elevation of only 330 MAMSL. Uplift of southern Africa occurred between 20 and 5 million years ago, resulting in a central plateau which lies at an elevation largely above 1 000 MAMSL. Only two primary rivers drain the vast interior plateau – the Vaal and Orange rivers, both of which arise near the eastern escarpment and flow across the entire country to the Atlantic Ocean. The Vaal River has been steadily removing the Karoo Supergroup sedimentary rocks. In the Vredefort area, the Karoo cover rocks have been removed from the northwestern section of the dome, but still cover the southeastern section (Figure 57). Essentially only the soft Karoo sedimentary rocks have been eroded away, thus resurrecting the ring-shaped pattern of ridges and

valleys formed by the glaciers that preceded the Karoo sedimentation. The manner in which the Karoo strata wereremoved occasionally resulted in fairly sudden changes in the course of the Vaal River, leaving Vaal River sediment (gravel overlain by sand) preserved in valley bottoms. In addition, during dry periods, especially droughts, sand banks would have been exposed in the bed of the Vaal River, which would have been blown out into adjacent valleys by the wind.

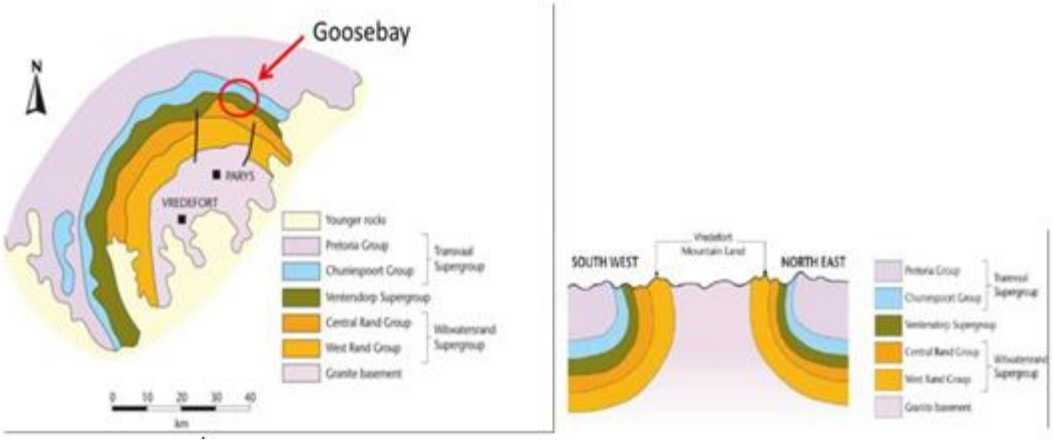

Figure 57: : (Left) Plan view and (Right) Sectional view (Image obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

Palaeontological Implications

The rocks underlying the application area were deposited between 3 000 million and 2 400 million years ago, well before the appearance of animals and plants. As a consequence, no fossils as such can be expected to occur on the property. The dominant life form that prevailed at that time was various species of bacteria, and in fact bacterial growth was largely responsible for the precipitation of the dolomite of the Transvaal Supergroup. Under very special conditions these bacteria were sometimes fossilized, but the fossils are so small they can only be seen using an electron microscope. The structures formed by bacterial colonies are often found preserved, much like abandoned coral reefs and are known as stromatolites. These provide information on the conditions which prevailed at the time of deposition and are useful to sedimentologists, but have very limited palaeontological value.

The dolomite of the Transvaal Supergroup is very widespread, so it is very unlikely that the dolomite that occurs onsite has any special palaeontological value.

SOCIO-ECONOMIC ENVIRONMENT

(Information extracted from the Social and Labour Plan of the Pure Source Mine)

Economic

Long term positive economic impacts can only flow from a project that is financially sustainable (i.e. financially viable in the long term with enough income to cover costs). Discussions with the applicant (MCCP) revealed that the financial viability of the project has been considered at length. Their appraisal followed standard viability and risk assessment methods that have been applied in similar mining projects. In their view, and based on their analysis, the expected rewards of the project outweigh risks making it financially viable to make the necessary investment This view recognises that diamond exploration may prove fruitless. It is nevertheless important to bear in mind that financial sustainability/viability is never a certainty as is the case for virtually all commercial ventures. As a rule, applicants can only assess risks and costs to the degree possible and make an informed decision on whether they are worth taking relative to anticipated financial gains. The available information provides no reason to anticipate financial failure which would argue against the project.

Economic development contributions

In accordance with the Mineral and Petroleum Resources Development Act, and in line with the principles set out in the latest version of the Mining Charter, the applicant has committed to achieving the following objectives, as outlined in the Social and Labour Plan (SLP):

- Promote employment.
- Contribute to the transformation of the mining industry.
- Ensure that holders of mining rights contribute towards the socio-economic development of the areas in which they are operating. MCCP intends to achieve these objectives in three ways outlined in the SLP. Firstly, through the creation of employment opportunities and through a Skills Development Plan, MCCP seeks to promote employment.

Secondly, through an Enterprise Development Strategy, small, medium and micro-sized enterprises (SMMEs) in the surrounding area will be supported and encouraged to grow. Lastly, and with the largest number of potential recipients, as part of the commitment to contributing to the socioeconomic development of the area

surrounding the proposed mine, MCCP is in the process of formulating a Local Economic Development Programme.

The project would result in spending injections that would lead to increased economic activity best measured in terms of impacts on employment and associated incomes focusing on the local area and region. All expenditures will lead to linked direct, indirect and induced impacts on employment and incomes. Taking employment as an example, impacts would be direct where people are employed directly on the project in question (e.g. jobs such as construction workers), indirect - where the direct expenditure associated with a project leads to jobs and incomes in other sectors (e.g. purchasing building materials maintains jobs in that sector) and induced where jobs are created due to the expenditure of employees and other consumers that gained from the project. Direct impacts are the most important of these three categories as they are the largest and more likely to be felt in the local area.

Skills development

MCCP's intentions to contribute to the development of the workforce are outlined in a Skills Development Plan which has the following objectives (MCCP, 2018b: 18):

- Improve the quality of life of employees.
- Expand employees' prospects for work enhancement at Pure Source.
- Enhance safety, productivity and the competitiveness of the employees.
- Improve the levels of return on the investment in education and training.
- Encourage the use of the workplace as an active learning environment.
- Allow new employees to gain relevant work experience.
- Advance the employment prospects of employees through education and training.
- Utilise the Workplace Skills Plan as a vehicle to align skills development with both business growth strategies and employment equity plans.

If the abovementioned objectives are met this will contribute to the development of skills which will allow employees to add a greater share of value to the production process whilst giving them a better chance at securing future employment. In addition, the applicant intends to develop the skills of people

outside of its workforce through an internship and bursary plan focussed on members of the local community. The SLP indicates that one external bursary, one study assistance package, and two internships will be offered at any given time between 2020 and 2023. The SLP also outlines transformation related goals in an Equity Plan which are focussed on maintaining existing levels of diversity within the workforce.

Local Economic Development (LED)

MCCP intends to support a LED Programme that will be guided by the Ngwathe Local municipality's LED priorities. The SLP outlines some of the ways in which MCCP aims to support existing local socio-economic development initiatives:

- Integrates the mine's SLP into the Ngwathe Local Municipality's IDP through serving on the local LED Forum and through consultation with the LED manager for the municipality.
- Assists in implementing LED projects and/or programmes identified in the IDPs, in partnership with local government, business and affected communities.
- Undertakes and support identified sustainable development initiatives in surrounding and affected
- communities.
- Provide Historically Disadvantaged South Africans who possess the required technical ability with a preferred supplier status in all three levels of procurement, namely
    - Capital goods.
    - Consumables.
    - Services.

The amounts which the MCCP intends to spend on the programmes outlined above are shown in Table 20. The amounts are highly preliminary estimates based on conservative cash flow calculations shown in the MWP. Once the project has reached full production, spending on economic development contributions, including LED, HR development and management of downscaling, is estimated to be between R820 000 and R1 380 000 per year.

Spending category	Amount
Local Economic Development	R 20 000 - R 30 000
Human Resource Development	R 350 000 - R 700 000
Management of Downscaling	R 450 000 - R 650 000
Total	**R 820 000 - R 1 380 000**

Table 20: Annual planned expenditure on social and labour plan-related costs (Image obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

These estimates will be revisited in the assessment phase particularly in light of the draft Mining Charter which sets targets for local benefit sharing.

The nature of the project should ensure that it makes a relatively significant contribution to the national fiscus. Payments towards direct taxes, royalties and regulatory fees (including payments towards mine health and safety regulations, national skills fund contributions as well as environmental monitoring and auditing) are key variables for the measurement of these benefits. Estimates of benefits in this regard are provided in this section. It should be noted that these estimates are the result of geological surveys and market analyses contained in the MWP[1]. They are highly preliminary and do not include amounts which may be associated with the discovery ofdiamonds.

Preliminary calculations estimate that payments towards taxes, royalties and regulatory fees should be in the range of R2.5 million and R3.6 million annually once full productions is reached. A breakdown of these estimates is provided in Table 21.

Spending category	Amount
Company tax	R 700 000 - R 1 200 000
Royalties	R 450 000 - R 600 000
Regulatory fees	R 1 400 000 - R 1 800 000
Total	**R 2 550 000 - R 3 600 000**

Table 21: Estimates of payments towards taxes, royalties and regulatory fees (Image obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

(b) Description of the current land uses

Current land use on the site is varied, consisting mainly of agriculture, game farming and one tourist accommodation establishment. Game farming occurs on the central and northern portions of the property. On the eastern border, next to the river, there is an accommodation establishment called Goosebay Canyon Cabin, consisting of cabins and a camp site. There are also several farm dams on the property, some

houses and a transmission line which crosses the three properties under application. Land use in the wider area consists largely of a mixture of agricultural and residential properties as well as mining on the two adjacent properties surrounding the application area. Residential properties are particularly concentrated along the riverside, as well as smallholdings which are characterised by a combination of agriculture, residential and tourism uses.

According to the Land use cover map, the land cover of the application area consists mostly of grassland, with agricultural fields occurring towards the south of the site. Thicker riverine vegetation occurs along the banks of the Vaal River (Figure 58). The land uses surrounding the application area consist of agricultural land, natural areas, sand mining operations on the two neighbouring properties (Figure (59), the urban area of Vaal Oewer with associated houses, livestock and game farming. Infrastructure such as secondary tar roads, gravel roads and homesteads, occur within the proximity of the application area. The Vaal River forms the northern boundary of the proposed project area.

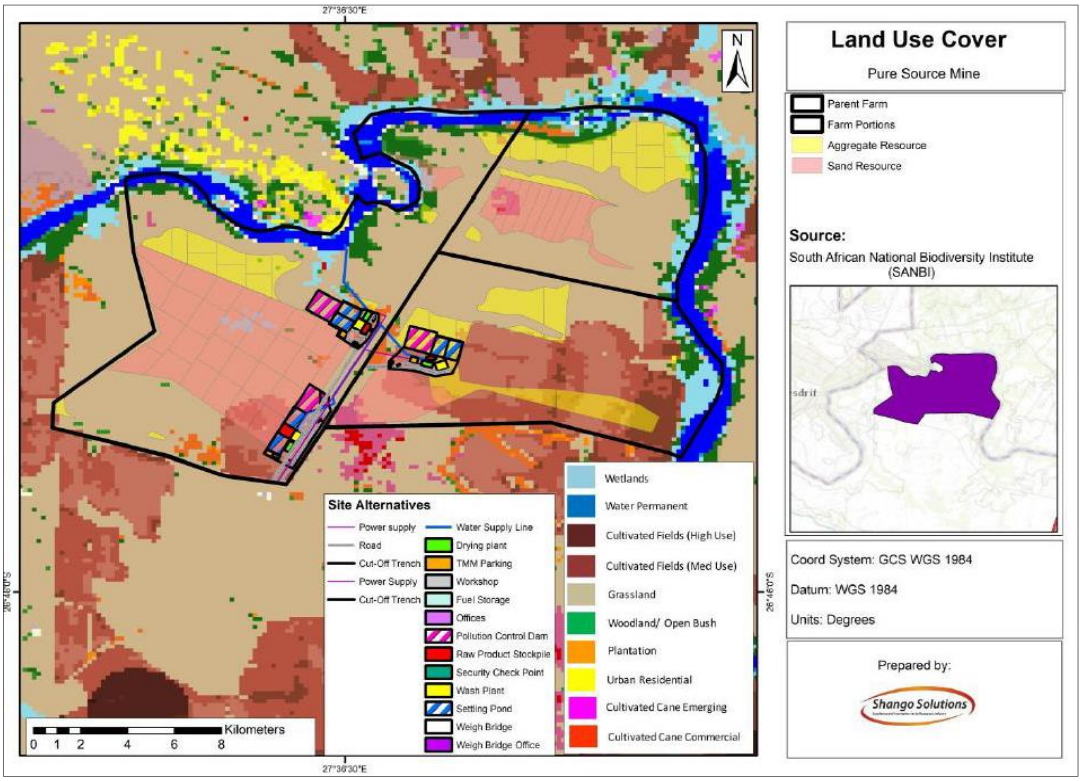

Figure 58: : Land cover and use (refer to Appendix D for enlarged map) (Image obtained from Pure Source Mine Final Scoping Report done by Shango Solutions)

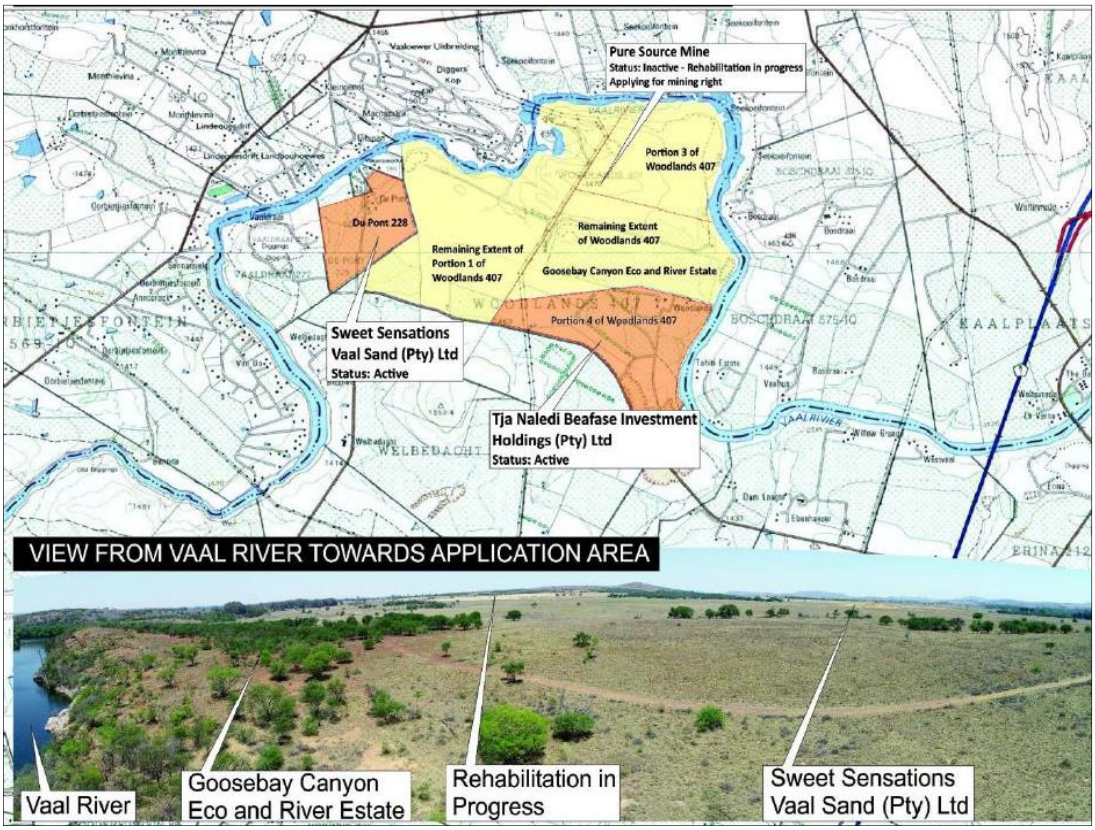

Figure 59: Existing mining activity surrounding the application area (refer to Appendix D for enlarged map).) (Image obtained from Pure Source Mine Final Scoping Report done by Shango Solutions

SITE SPECIFIC EXISTING INFRASTRUCTURE

The following infrastructure components will be established for the mining process:

- Dams.
- Wash plant for sand mining.
- Rotary pan processing plant for alluvial diamond mining.
- Potential alluvial diamond X-ray and/or flow sorting facility.
- Clean and dirty water management infrastructure (pollution control dams, water recycling plan (part of the wash plant), settling ponds, storm water runoff structures, water pipeline network as well as pump stations).
- Drying and screening plants.
- Topsoil and run-of mine stockpiles.

Additional mining and processing infrastructure will include haul roads, workshop, weighbridge and offices, conveyor systems, powerlines, change houses, staff accommodation and recreation facilities and portable chemical ablution facilities for employees during the construction and operational phases.

(c) Environmental and current land use map.

(Show all environmental, and current land use features)

The environmental and current land use maps are attached as Appendix D.

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

(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 table below provides a list of the impacts identified by the EAP or raised by interested and affected parties, as well as the possible management and mitigation measures. The level of residual risk after management or mitigation is also estimated. This would be refined during the EIA phase with specialist input as appropriate.

Affected Environment	Activity	Impact Description	Significance	Mitigation measures	Significance after mitigation
Biodiversity	Open pit mining, site clearance for infrastructure and associated access roads as well as disturbances such as noise, vibrations, dust and increased human presence (and possible poaching)	Loss of areas classified as CBA (Free State CBA, 2014) and sensitive rocky ridges	High (negative)	Avoid CBA areas and implement bufferzones.	High (negative)
		Loss of area of plant endemism (Mucina and Rutherford, 2006)	High (negative)	Avoid areas of remaining indigenous vegetation, restrict infrastructure areas to brownfield areas only.	Moderate (negative)
		Loss of Endangered & Vulnerable habitat (MBSP, 2014) (NBA, 2011)	High (negative)	Avoid high biodiversity sensitivity areas (natural vegetation, watercourses and wetlands) and comply to prescribed bufferzones.	High (negative)
Flora	Open pit mining, site clearance for infrastructure and associated access roads as well as	Loss of plant species of conservation importance (IUCN, 2018)	High (negative)	Avoid areas in which plant species of conservation concern occur. If some areas cannot be avoided implement rescue of	Medium (negative)

	disturbances such as noise, vibrations, dust and increased human presence			plant species of conservation concern.	
		Encroachment of alien invasive plant species	High (negative)	An alien invasive plant management plan needs to be compiled and implemented during construction to prevent the growth of invasive species on cleared areas.	Medium (negative)
Fauna	Open pit mining, site clearance for infrastructure and associated access roads as well as disturbances such as noise, vibrations, dust and increased human presence (and possible poaching)	Loss of habitat for species of conservation concern (NBA, 2011)	High (negative)	Avoid high biodiversity sensitivity areas (natural vegetation, ridges, watercourses & wetlands) and comply to prescribed bufferzones.	High (negative)
		Displacement, direct mortalities and disturbance of faunal community (including multiple threatened species)	High (negative)	Avoid high biodiversity sensitivity areas (natural vegetation, ridges, watercourses and wetlands) and comply	High (negative)

		due to habitat loss and disturbances (such as dust and noise), and poaching		with prescribed bufferzones. • Implement training to ensure that all staff members are aware of faunal sensitivity. Put protocols in place to deal with fauna that are encountered during construction.	
Aquatic and wetland biodiversity	Open pit mining, site clearance for infrastructure and associated access	Destruction of wetland systems	High (negative)	• Limit site clearance to what is absolutely necessary. • Avoid sensitive areas as far as practically possible. • Ensure necessary setback distances from watercourses and wetlands. • Implementation of an alien invasive species programme.	Medium (negative)

				• Limit emissions (dust, light, noise). • Training of employees on the value of biodiversity. • Zero tolerance for harming and harvesting fauna and flora. • Effective waste management and pollution prevention. • Implementation of a biodiversity action plan to ensure that the undeveloped/disturbed areas within the property are properly conserved and maintained. • Effective rehabilitation to achieve post closure land use.	
	Open pit mining, site clearance for	Reduction in surface water quality affecting third party users	High (negative)	• Design and implement contamination containment measures.	Medium (negative)

	infrastructure and associated access			• Mine infrastructure will be constructed and operated so as to comply with the National Water Act 36 of 1998 and Regulation 704 (4 June 1999): o Clean and dirty water system will be separate. o Clean run-off will be diverted away from the site. o Dirty water will be contained. • Conduct surface water monitoring and implement remedial actions as required. • Effective equipment and vehicle maintenance. • Fast and effective clean-up of spills. • Effective waste management.	

				• Education and training of workers. • Apply and operate in line with a water use license.	
	Open pit mining, site clearance for infrastructure and associated access	Reduction in surface water quantity affecting third party users	High (negative)	• Develop and implement a stormwater management plan to minimise containment areas and divert clean water away from the site. • Effective rehabilitation to achieve post closure land use.	Moderate (negative)
Surface water	Open pit mining through drainage lines	Some of the proposed mining deposits occur within drainage lines. The function of these drainage lines is to drain the area during and post rainfall. Mining through drainage lines may result in flooding of pits and other infrastructure, as well	Medium (negative)	According to Regulation 4 (a) and (b) of GN704, no mining should take place within a 100 m buffer of watercourses, or within the 1:50 and 1:100 year floodlines, unless exemption is obtained. Should mining be permitted within the drainage lines, then upstream runoff should be diverted around the open pits,	Medium (negative)

		as a loss of runoff reporting to the Vaal River.		to prevent any unnecessary flooding.	
Ground water	Open pit mining, site clearance for infrastructure and associated access	Reduction in groundwater quantity affecting third party users	High (negative)	• Conduct groundwater monitoring and implement remedial actions where required. This includes compensation for mine related loss of third party water supply. • This monitoring programme should include third party boreholes. • Apply and operate in line with a water use license. • Minimise water usage and optimise water recycling and treatment of dewatering water.	Moderate (negative)
	Groundwater seepage into the open pits	It is highly likely that groundwater will seep into the open pits,	Medium (negative)	Dirty water from the pits should be dewatered for use at the plant. This should	Low (negative)

		resulting in dirty water. The pits may also become flooded due to high seepage rates.		ensure that water levels within the pits are maintained at suitable levels. Dirty water should be kept in a closed system, to ensure that it does not report to the environment.	
Water quantity	Abstraction of water from the Vaal River	Loss of water volumes and a reduction of flows in the Vaal River	Medium (negative)	The plant is likely to have the highest water demands for the Project. Unnecessary pumping of water from the Vaal River must be avoided. This can be done through the recycling of water from groundwater seepage and runoff into the pits, for use at the plant.	Low (negative)
Water quantity	Operation of the plant area and stockpiles	Runoff from the plant area and stockpiles is likely to contain high levels of TSS and potentially high dissolved solids that could runoff into the environment.	Medium (negative)	A stormwater management plan must be designed and implemented that captures and contains dirty water runoff from the site, in accordance with the requirements stipulated in the GN704 Regulations. Dirty water captured, should be recycled and used at the plant, and should not be	Low (negative)

				allowed to report to the environment.	
Air quality	Open pit mining, site clearance for infrastructure and associated access	Decrease in air quality from project emissions	High (negative)	• Limit disturbed areas. • Supress dust effectively. • Maintain equipment and vehicles in good working order. • Monitor pollutants of concern and implement additional mitigation as required. • Effective rehabilitation to achieve post closure land use.	Low (negative)
Noise	Open pit mining, site clearance for infrastructure and associated access	Increase in noise levels	High (negative)	• Maintain vehicles and equipment in good working order. • Provide noise berms where possible between activities and receptors.	Low (negative)

				• Conduct noise monitoring in response to noise complaints.	
Traffic	Open pit mining, site clearance for infrastructure and associated access	Effect on roads due to project related traffic	High (negative)	• ·Road markings, reflective road studs (LED), road signs and overhead lights should be provided and maintained at all the relevant intersections under investigation to ensure visibility during night time, proper visibility of intersection lane geometry and sufficient information to road users. • Construct safe access points/intersections. • Enforce strict vehicle speeds. • If a person or animal is injured by transport activities an emergency	Low (negative)

				response procedure must be implemented. • In order to ensure that mined product and workers can be transported at all times with reference to Road S171, it is recommended that a Roads Maintenance Plan be prepared in collaboration with other land owners, developments and the relevant road authority. • Road safety training for workers and local community. • Continuous maintenance of fencing along relevant roads (proposed mining development can only take responsibility for fencing for properties they own).	

Visual	Open pit mining, site clearance for infrastructure and associated access	Removal of vegetation for infrastructure and open pit mining	High (negative)	• Clearance of vegetation must be limited as far as possible to only necessary areas; • Tall dense vegetation that can conceal the Project from sensitive visual receptors, should as far as possible be left in place; and • Dust suppression measures should be implemented to limit the generation of dust. • If at all possible, the mined out areas should be rehabilitated to a pre-mining topography. • Mined out areas should be vegetated with indigenous species as soon as possible. This will to a degree, mitigate the visual intrusion of	Low (negative)

				these areas on surround visual receptors.	
		The movement of vehicles and heavy machinery likely to create a visual disturbance to surrounding visual receptors.	Medium (negative)	• Tall vegetation along the sides of the roads at the site should not be removed, in order to conceal vehicular movement; and • Dust suppression measures should be implemented to limit the generation of dust along roads.	Low (negative)
	Open pit mining, site clearance for infrastructure and associated access	The erection of mine infrastructure (plant, workshop, etc.) is likely to visually intrude on the landscape.	Medium (negative)	• The height of the proposed mine infrastructure should be limited as far as possible; and • Tall dense vegetation that can conceal the Project from sensitive visual receptors, should as far as possible be left in place.	Low (negative)

Heritage and palaeontology	Open pit mining, site clearance for infrastructure and associated access	Loss of or damage to heritage and/or palaeontological resources	High (negative)	• Plan project to avoid any resources of significant importance. • Training of workers regarding the heritage and cultural sites that may be encountered and about the need to conserve these. • Fence off and limit access to the heritage and cultural sites that could be indirectly disturbed by mining activities. • In the event that resources are identified, a chance find emergency procedure should be implemented.	Low (negative)
Socio- economic	Open pit mining, site clearance for infrastructure and associated access roads as well as	Negative socio economic Impacts (influx of jobseekers, impacts on	Medium (negative)	• Work together with residents to manage issues such as security.	Low (negative)

	disturbances such as noise, vibrations, dust and increased human presence (and possible poaching)	daily living and movement patterns, safety and security risks, nuisance impacts (noise and dust), impact of heavy vehicles, including damage to roads and dust and potential loss of productive agricultural land, job losses at the end of the mining period).		• Employ local people and procure goods and services locally as far as practically possible. • Avoid through implementation of preventative measures (e.g. consultation and communication). • Avoidance and control through preventative measures (e.g. site security, code of conduct) and through mitigation measures (e.g. recruitment procedure, grievance mechanism and code of conduct). • Minimise impacts of job loss through compensation, skills development and livelihood restoration.	

	Open pit mining, site clearance for infrastructure and associated access roads as well as disturbances such as noise, vibrations, dust and increased human presence (and possible poaching)	Positive socio-economic Impacts (job creation, skills development, increase in business opportunities for the construction, industrial and jewellery industries, Gross Domestic Product (GDP) improvement and wealth generation and contribution to royalties and tax revenues)	Medium (Positive)	• Maximise positive impacts through optimisation of economic growth opportunities. • Develop and implement procedures for recruiting, training and procurement that align with good industry practise. • Employ local people and procure goods and services locally as far as practically possible. • Effective communication to manage expectations with regard to employment and other opportunities. • Ensure that closure planning considerations address the re-skilling of employees for the downscaling, early closure and long-term closure scenarios.	High (Positive)

Land-use	Operation of open pit mining activities	Change in land use affecting surrounding land uses	Medium (Negative)	• Effectively manage biophysical, cultural and socio-economic impacts. • Effectively rehabilitate opencast mining areas in line with an approved rehabilitation plan that meets the post closure land use objectives and ensure successful rehabilitation as soon as mining is complete. • Schedule the opencast mining operations in a manner that minimises cumulative impacts on receptors. • Establish a stakeholder communication and grievance mechanisms for the duration of the mining operation.	Low (Negative)

Topography	Operation of open pit mining activities	Surface subsidence	Medium (Negative)	• Access control, barriers and warning signs at hazardous areas. • Monitoring and maintenance post closure to observe whether the relevant long-term safety objectives have been achieved and to identify the need for additional intervention where the objectives have not been met. • Where Pure Source Mine has caused injury or death to third parties and/or animals, appropriate compensation will be provided. • ·In case of injury or death due to subsidence, an emergency response procedure must be implemented.	Low (Negative)

	Operation of open pit mining activities	Alteration in surface water drainage patterns leading to erosion and consequent increase in TSS in surrounding watercourses.	Medium (Negative)	• Stormwater management measures around the dumps, plant area, etc. are proposed; and • Water quality sampling must be implemented upstream and downstream of construction areas. Specific parameters that should be monitored include TSS and turbidity. They should be kept within the baseline water quality range.	Low (Negative)
Surface water	Operation of open pit mining activities	Some of the proposed mining deposits occur within drainage lines. The function of these drainage lines is to drain the area during and post rainfall. Mining through drainage lines may result in flooding of pits and other	Medium (Negative)	• According to Regulation 4 (a) and (b) of GN704, no mining should take place within a 100 m buffer of watercourses, or within the 1:50 and 1:100 year floodlines, unless exemption is obtained. Should mining be permitted within the drainage lines, then	Medium (Negative)

		infrastructure, as well as a loss of runoff reporting to the Vaal River.		upstream runoff should be diverted around the open pits, to prevent any unnecessary flooding.	
Ground water	Operation of open pit mining activities	Reduction in groundwater quantity affecting third party users	High (Negative)	• Conduct groundwater monitoring and implement remedial actions where required. This includes compensation for mine related loss of third party water supply. • This monitoring programme should include third party boreholes. • Apply and operate in line with a water use license. • Minimise water usage and optimise water recycling and treatment of dewatering water.	Moderate (Negative)

Land capability and agricultural potential	Operation of open pit mining activities	It is highly likely that groundwater will seep into the open pits, resulting in dirty water. The pits may also become flooded due to high seepage rates.	Medium (Negative)	• Dirty water from the pits should be dewatered for use at the plant. This should ensure that water levels within the pits are maintained at suitable levels. Dirty water should be kept in a closed system, to ensure that it does not report to the environment.	Low (Negative)
Water quantity	Operation of open pit mining activities	Loss of water volumes and a reduction of flows in the Vaal River	Medium (Negative)	• The plant is likely to have the highest water demands for the Project. Unnecessary pumping of water from the Vaal River must be avoided. This can be done through the recycling of water from groundwater seepage and runoff into the pits, for use at the plant.	Low (Negative)
Water quantity	Operation of open pit mining activities	Runoff from the plant area and stockpiles is likely to contain high levels of TSS and	Medium (Negative)	• A stormwater management plan must be designed and implemented that	Low (Negative)

		potentially high dissolved solids that could runoff into the environment.		captures and contains dirty water runoff from the site, in accordance with the requirements stipulated in the GN704 Regulations. Dirty water captured, should be recycled and used at the plant, and should not be allowed to report to the environment.	
Heritage and palaeontology	Operation of open pit mining activities	Loss of or damage to heritage and/or palaeontological resources	Medium (Negative)	• Plan project to avoid any resources of significant importance. • Training of workers regarding the heritage and cultural sites that may be encountered and about the need to conserve these. • Fence off and limit access to the heritage and cultural sites that could be indirectly disturbed by mining activities.	Low (Negative)

				• In the event that resources are identified, a chance find emergency procedure should be implemented.	
Air quality	Operation of open pit mining activities	Decrease in air quality from project emissions	Medium (Negative)	• Limit disturbed areas. • Supress dust effectively. • Maintain equipment and vehicles in good working order. • Monitor pollutants of concern and implement additional mitigation as required. • Effective rehabilitation to achieve post closure land use.	Medium (Negative)
Visual	Operation of open pit mining activities	Open pit mining will result in depressions that will be approximately 10 m in depth, and will visually intrude on the surrounding landscape.	High (Negative)	• Limit the extent of disturbed areas. • Supress dust to prevent a visual dust cloud.	Medium (Negative)

		Dust will be generated during mining activities.		• Effective waste management. • Implement effective use of lighting which reduces light spill. • Effective rehabilitation to achieve post closure land use. • The use of berms where appropriate.	
		The development of stockpiles, as mining progresses, will visually intrude on the surrounding landscape.	Medium (Negative)	• The height of stockpiles should be limited as far as possible.	Low (Negative)
		The movement of vehicles and heavy machinery during the operational phase is likely to create a visual disturbance to surrounding visual receptors	Medium (Negative)	• Tall vegetation along the sides of the roads at the site should not be removed, in order to conceal vehicular movement; and • Dust suppression measures should be implemented to limit the	Low (Negative)

				generation of dust along roads.	
Fauna	Operation of open pit mining activities	Loss of species of conservation concern and their habitat. Continued displacement, direct mortalities and disturbance of faunal community (including possible threatened species) due to habitat loss and disturbances (such as dust, poaching and noise)	High (Negative)	• Mitigation measures can be added to infrastructure. • Monitoring impacts of operational activities on fauna so that adaptive management practises can be implemented if required. • Restrict access to high biodiversity areas (drainage lines, wetlands etc) in the vicinity of mining operations. • Implement training to ensure that all staff are aware of faunal sensitivity. Put protocols in place to deal with fauna that are encountered during operation.	Medium (Negative)

Economic	Operation of open pit mining activities	Project expenditure/investment	High (Negative)	• The applicant's procurement processes, hiring and training of staff and other measures outlined in the Social and Labour Plan (SLP) should be implemented.	Medium (Negative)
	Operation of open pit mining activities	Economic development contributions	Low (Positive)	• No mitigation is recommended. The SLP appears to be aligned with local government's published planning imperatives and seeks to optimise benefits resulting from the applicant's participation in the local economy.	Medium (Positive)
	Operation of open pit mining activities	Tax, royalty and regulatory fees payments	Low (Positive)	• No mitigation measures are recommended.	Medium (Positive)
	Operation of open pit mining activities	Property values	Low (Positive)	• Impacts on property values are primarily dependent on how the applicant's operations	Medium (Positive)

				are designed, constructed and operated to minimise negative biophysical and social impacts and enhance positive ones. The measures recommended in other specialist reports to minimise negative impacts • (primarily visual, air quality, noise, water quality, traffic and social measures) and enhance positive impacts would thus also reduce impacts on property values and should be implemented.	
	Operation of open pit mining activities	Tourism	High (Negative)	• Impacts on tourism are primarily dependent on how project operations are designed, constructed and executed to minimise negative biophysical and social impacts and enhance positive	Medium (Negative)

				impacts. The measures recommended in other specialist studies to minimise negative impacts (primarily visual, air quality, noise, water quality, botanical, rehabilitation and social measures) and enhance positive impacts would thus also reduce impacts on tourism and should be implemented. These measures are not repeated here. • Serious consideration should be given to funding tourism enhancement projects in collaboration with local tourism stakeholders as part of the mine's future Social and Labour Plan (SLP) contributions. This is a particular need given limited concerted efforts in this regard in the local area. Assistance could, for example, encompass	

				tourism planning, promotion, capacity building, enterprise development and the provision of tourist facilities.	
Traffic	Operation of open pit activities	Road safety	High (Negative)	· Road markings, reflective road studs (LED), road signs and overhead lights should be provided and maintained at all the relevant intersections under investigation to ensure visibility during night time, proper visibility of intersection lane geometry and sufficient information to road users. Construct safe access points/intersections. Enforce strict vehicle speeds. If a person or animal is injured by transport	Medium (Negative)

				activities an emergency response procedure must be implemented. • In order to ensure that mined product and workers can be transported at all times with reference to Road S171, it is recommended that a Roads Maintenance Plan be prepared in collaboration with other land owners, developments and the relevant road authority. • Road safety training for workers and local community. • Continuous maintenance of fencing along relevant roads (proposed mining development can only take responsibility for fencing for properties they own).	

Flora	Decommissioning activities, including removal of infrastructure and rehabilitation of mined areas	Further impacts due to the spread and/or establishment of alien and/or invasive species	High (Negative)	• Implementation of alien invasive plant management plan needs to be continued during decommissioning to prevent the growth of invasive species on rehabilitated areas. • Rehabilitation of site with indigenous vegetation that occurs in the vicinity of Project area.	Low (Negative)
Economic	Decommissioning activities, including removal of infrastructure and rehabilitation of mined areas	Tourism	High (Negative)	• If one takes a sample of mines throughout South Africa, it is clear that rehabilitation effort and success can be highly variable even if all mines are required to abide by the same regulations. This variability can be seen when comparing both operating and closed mines. It therefore stands to reason that, with regards to minimising impacts,	Low (Negative)

				much will depend not only on how the applicant's EMP is conceived but critically and how it is implemented in partnership with the relevant authorities and other stakeholders. Rehabilitation needs to be rigorously applied and adequately funded both concurrently and at closure, especially to minimise visual scarring and other tourism risks.	

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).

Method of Assessing Impact Significance as per Final Scoping Report

Obtained from Pure Source Mine Final Scoping Report done by Shango Solutions

The impact assessment methodology is guided by the requirements of the NEMA 2014 EIA Regulations (as amended). The broad approach to the significance rating methodology is to determine the Environmental Risk (ER) by considering the Consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the Probability/Likelihood (P) of the impact occurring. This determines the environmental risk. In addition, other factors, including cumulative impacts, public concern, and potential for irreplaceable loss of resources, are used to determine a Prioritisation Factor (PF) which is applied to the ER to determine the overall Significance (S).

Determination of Environmental Risk

The significance (S) of an impact is determined by applying a Prioritisation Factor (PF) to the Environmental Risk (ER).

The Environmental Risk is dependent on the Consequence (C) of the particular impact and the Probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and reversibility (R) applicable to the specific impact.

For the purpose of this methodology the consequence of the impact is represented by:

$$C = \frac{(E+D+M+R) \times N}{4}$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in Table 22.

Table 22: Criteria for determination of impact consequence

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary),
	3	Local (i.e. the area within 5 km of the site),
	4	Regional (i.e. extends between 5 and 50 km from the site
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years)
	3	Medium term (6-15 years)
	4	Long term (the impact will cease after the operational life span of the project),
	5	Permanent (no mitigation measure of natural process will reduce the impact after construction).
Magnitude/	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected)

Intensity	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected)
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way)
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease) or

Aspect	Score	Definition
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease)
Reversibility	1	Impact is reversible without any time and cost
	2	Impact is reversible without incurring significant time and cost
	3	Impact is reversible only by incurring significant time and cost
	4	Impact is reversible only by incurring prohibitively high time and cost
	5	Irreversible Impact

Once the C has been determined the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/scored as per Table 23.

Table 23: Criteria for determination of impact consequence

Probability	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or
	5	Definite (the impact will occur),

The result is a qualitative representation of relative ER associated with the impact. ER is therefore calculated as follows (Table 24):

ER = C x P

Table 24: Determination of environmental risk.

Consequence	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	2	3	4	5
		Probability				

The outcome of the environmental risk assessment will result in a range of scores, ranging from 1 through to 25. These ER scores are then grouped into respective classes as described in Table 25.

Table 25: Significance classes.

Environmental Risk Score	
Value	Description
< 10	Low (i.e. where this impact is unlikely to be a significant environmental risk),
≥ 10; < 20	Medium (i.e. where the impact could have a significant environmental risk),
≥ 20	High (i.e. where the impact will have a significant environmental risk).

The impact ER will be determined for each impact without relevant management and mitigation measures (pre- mitigation), as well as post implementation of relevant management and mitigation measures (post-mitigation). This allows for a prediction in the degree to which the impact can be managed/ mitigated.

Impact Prioritisation

In accordance with the requirements of Appendix 3(1)(j) of the NEMA 2014 EIA Regulations (GNR 326, as amended), and further to the assessment criteria presented in the Section above it is necessary to assess

- Each potentially significant impact in terms of: cumulative impacts.
- The degree to which the impact may cause irreplaceable loss of resources.

In addition, it is important that the public opinion, sentiment regarding a prospective development and consequent potential impacts is considered in the decision making process.

In an effort to ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impact ER (post-mitigation). This prioritisation factor does not aim to detract from the risk ratings but rather to focus the attention of the decision-making authority on the higher priority/ significance issues and impacts. The PF will be applied to the ER score based on the assumption that relevant suggested management/mitigation impacts are implemented (Table 26).

Table 26: Criteria for the determination of prioritization

Public response (PR)	Low (1)	Issue not raised in public response.
	Medium (2)	Issue has received a meaningful and justifiable public response.
	High (3)	Issue has received an intense meaningful and justifiable public response.
Cumulative Impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable loss of resources (LR)	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).

The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criterion. The impact priority is therefore determined as follows:

Priority = PR + CI + LR

The result is a priority score which ranges from 3 to 9 and a consequent PF ranging from 1 to 2 (Table 27).

Table 27: Determination of prioritisation factor.

Priority	Ranking	Prioritisation Factor
3	Low	1
4	Medium	1.17
5	Medium	1.33
6	Medium	1.5
7	Medium	1.67
8	Medium	1.83
9	High	2

In order to determine the final impact significance, the PF is multiplied by the ER of the post mitigation scoring. The ultimate aim of the PF is to be able to increase the post mitigation environmental risk rating by a full ranking class, if all the priority attributes are high (i.e. if an impact comes out with a medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential, significant public response, and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a high significance (Table 28).

Table 28: Table to be used to obtain an overall rating of severity, taking into consideration the various criteria.

TYPE OF CRITERIA - ENVIRONMENTAL SIGNIFICANCE RATING	
Value	**Description1**
< -10	Low negative (i.e. where this impact would not have a direct influence on the decision to develop in the area).
0≥ -10 < -20%	21-40%Medium negative (i.e. where the impact could influence the decision to develop in the area).
Qualitative≥ -20	Insignificant / Non-harmfulHigh negative (i.e. where the impact must have an influence on the decision process to develop in the area).
Social/ Community response0	Acceptable / I&AP satisfiedNo impact
< 10	Low positive (i.e. where this impact would not have a direct influence on the decision to develop in the area).
≥ 10 < 20	Medium positive (i.e. where the impact could influence the decision to develop in the area).

DRAFT IMPACT ASSESSMENT

Methodology for the assessment of the potential environmental, social and cultural impacts

DEFINITIONS AND CONCEPTS:

Environmental significance:

The concept of significance is at the core of impact identification, evaluation and decision-making. The concept remains largely undefined and there is no international consensus on a single definition. The following common elements are recognized from the various interpretations:

- Environmental significance is a value judgment

- The degree of environmental significance depends on the nature of the impact
- The importance is rated in terms of both biophysical and socio-economic values
- Determining significance involves the amount of change to the environment perceived to be acceptable to affected communities.

Significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e. intensity, duration and likelihood). Impact significance is the value placed on the change by different affected parties (i.e. level of acceptability) (DEAT (2002) Impact Significance, Integrated Environmental Management, Information Series 5).

The concept of risk has two dimensions, namely the consequence of an event or set of circumstances, and the likelihood of particular consequences being realized (Environment Australia (1999) Environmental Risk Management).

Impact

The positive or negative effects on human well-being and / or the environment.

Consequence

The intermediate or final outcome of an event or situation OR it is the result, on the environment, of an event.

Likelihood

A qualitative term covering both probability and frequency.

Frequency

The number of occurrences of a defined event in a given time or rate.

Probability

The likelihood of a specific outcome measured by the ratio of a specific outcome to the total number of possible outcomes.

Environment

Surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans and their interrelation (ISO 14004, 1996).

Methodology that will be used

The environmental significance assessment methodology is based on the following determination:

Environmental Significance = Overall Consequence X Overall Likelihood

Determination of Overall Consequence

Consequence analysis is a mixture of quantitative and qualitative information and the outcome can be positive or negative. Several factors can be used to determine consequence. For determining the environmental significance in terms of consequence, the following factors were chosen: ***Severity/Intensity, Duration and Extent/Spatial Scale***. Each factor is assigned a rating of 1 to 5, as described in the tables below.

Determination of Severity / Intensity

Severity relates to the nature of the event, aspect or impact to the environment and describes how severe the aspects impact on the biophysical and socio-economic environment.

Table 29 will be used to obtain an overall rating for severity, taking into consideration the various criteria.

Table 29: Table to be used to obtain an overall rating of severity, taking into consideration the various criteria.

TYPE OF CRITERIA	RATING				
	1	2	3	4	5
Quantitative	0-20%	21-40%	41-60%	61-80%	81-100%
Qualitative	Insignificant / Non-harmful	Small / Potentially harmful	Significant/ Harmful	Great/ Very harmful	Disastrous Extremely harmful
Social/ Community response	Acceptable / I&AP satisfied	Slightly tolerable / Possible objections	Intolerable/ Sporadic complaints	Unacceptable / Widespread complaints	Totally unacceptable / Possible legal action
Irreversibility	Very low cost to mitigate/ High potential to mitigate impacts to level of insignificance/ Easily reversible	Low cost to mitigate	Substantial cost to mitigate/ Potential to mitigate impacts/ Potential to reverse impact	High cost to mitigate	Prohibitive cost to mitigate/ Little or no mechanism to mitigate impact Irreversible
Biophysical (Air quality, water quantity and quality, waste production, fauna and flora)	Insignificant change / deterioration or disturbance	Moderate change / deterioration or disturbance	Significant change / deterioration or disturbance	Very significant change / deterioration or disturbance	Disastrous change / deterioration or disturbance

Determination of Duration

Duration refers to the amount of time that the environment will be affected by the event, risk or impact, if no intervention e.g. remedial action takes place.

Table 30: Criteria for the rating of duration.

RATING	DESCRIPTION
1	Up to one month
2	One month to three months (quarter)
3	Three months to one year
4	One to ten years
5	Beyond ten years

Determination of Extent/Spatial Scale

Extent or spatial scale is the area affected by the event, aspect or impact.

Table 31: Criteria for the rating of extent / spatial scale.

RATING	DESCRIPTION
1	Immediate, fully contained area
2	Surrounding area
3	Within Business Unit area of responsibility
4	Within the farm/neighbouring farm area
5	Regional, National, International

Determination of Overall Consequence

Overall consequence is determined by adding the factors determined above and summarized below, and then dividing the sum by 3.

Table 32: Example of calculating overall consequence.

CONSEQUENCE	RATING
Severity	Example 4
Duration	Example 2
Extent	Example 4
SUBTOTAL	**10**
TOTAL CONSEQUENCE: (Subtotal divided by 3)	**3.3**

Determination of Likelihood:

The determination of likelihood is a combination of Frequency and Probability. Each factor is assigned a rating of 1 to 5, as described below and in tables 33 and 34.

Determination of Frequency

Frequency refers to how often the specific activity, related to the event, aspect or impact, is undertaken.

Table 33: Criteria for the rating of frequency.

RATING	DESCRIPTION
1	Once a year or once/more during operation
2	Once/more in 6 Months
3	Once/more a Month
4	Once/more a Week
5	Daily

Determination of Probability

Probability refers to how often the activity or aspect has an impact on the environment.

Table 34: Criteria for the rating of probability.

RATING	DESCRIPTION
1	Almost never / almost impossible
2	Very seldom / highly unlikely
3	Infrequent / unlikely / seldom
4	Often / regularly / likely / possible
5	Daily / highly likely / definitely

Overall Likelihood

Overall likelihood is calculated by adding the factors determined above and summarized below, and then dividing the sum by 2.

Table 35: Example of calculating overall likelihood.

CONSEQUENCE	RATING
Frequency	Example 4
Probability	Example 2
SUBTOTAL	**6**
TOTAL LIKELIHOOD (Subtotal divided by 2)	**3**

Determination of Overall Environmental Significance:

The multiplication of overall consequence with overall likelihood will provide the environmental significance, which is a number that will then fall into a range of **LOW**, **LOW-MEDIUM**, **MEDIUM**, **MEDIUM-HIGH** or **HIGH**, as shown in the table below.

Table 36: Determination of overall environmental significance.

SIGNIFICANCE OR RISK	LOW	LOW-MEDIUM	MEDIUM	MEDIUM-HIGH	HIGH
Overall Consequence x Overall Likelihood	1 - 4.9	5 - 9.9	10 - 14.9	15 – 19.9	20 - 25

Qualitative description or magnitude of Environmental Significance

This description is qualitative and is an indication of the nature or magnitude of the Environmental Significance. It also guides the prioritizations and decision making process associated with this event, aspect or impact.

Table 37: Description of environmental significance and related action required.

SIGNIFICANCE	LOW	LOW-MEDIUM	MEDIUM	MEDIUM-HIGH	HIGH
Impact Magnitude	Impact is of very low order and therefore likely to have very little real effect. Acceptable.	Impact is of low order and therefore likely to have little real effect. Acceptable.	Impact is real, and potentially substantial in relation to other impacts. Can pose a risk to company	Impact is real and substantial in relation to other impacts. Pose a risk to the company. Unacceptable	Impact is of the highest order possible. Unacceptable. Fatal flaw.
Action Required	Maintain current management measures. Where possible improve.	Maintain current management measures. Implement monitoring and evaluate to determine potential increase in risk. Where possible improve	Implement monitoring. Investigate mitigation measures and improve management measures to reduce risk, where possible.	Improve management measures to reduce risk.	Implement significant mitigation measures or implement alternatives.

Based on the above, the significance rating scale has been determined as follows:

High — Of the highest order possible within the bounds of impacts, which could occur. In the case of negative impacts, there would be no possible mitigation and / or remedial activity to offset the impact at the spatial or time scale for which it was predicted. In the case of positive impacts, there is no real alternative to achieving the benefit.

Medium-High — Impacts of a substantial order. In the case of negative impacts, mitigation and / or remedial activity would be feasible but difficult, expensive, time-consuming or some combination of these. In the case of positive impacts, other means of achieving this benefit would be feasible, but these would be more difficult, expensive, time-consuming or some combination of these.

Medium — Impact would be real but not substantial within the bounds of those, which could occur. In the case of negative impacts, mitigation and / or remedial activity would be both feasible and easily possible, In case of positive impacts; other means of achieving these benefits would be about equal in time, cost and effort.

Low-Medium — Impact would be of a low order and with little real effect. In the case of negative impacts, mitigation and / or remedial activity would be either easily achieved of little would be required, or both. In case of positive impacts alternative means for achieving this benefit would likely be easier, cheaper, more effective, less time-consuming, or some combination of these.

Low	Impact would be negligible. In the case of negative impacts, almost no mitigation and or remedial activity would be needed, and any minor steps, which might be needed, would be easy, cheap and simple. In the case of positive impacts, alternative means would almost all likely be better, in one or a number of ways, than this means of achieving the benefit
Insignificant	There would be a no impact at all – not even a very low impact on the system or any of its parts.

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)

POSITIVE IMPACTS ASSOCIATED WITH THE PURE SOURCE MINE

(Information obtained from the Final Scoping Report of the Pure Source Mine, 2018 done by Shango Solutions)

- The potential positive impacts which could arise as a result of the construction activities include increase in job opportunities both for skilled and unskilled labourers. Jobs for the unskilled labourers are likely to be filled by the local community and the skilled personnel likely to be drawn around South Africa.
- The project also brings with it an opportunity for training and capacity building of personnel that will be recruited.
- Furthermore, during construction, the informal business sector, particularly women in the area, could benefit from selling food to construction workers.
- Project expenditure/investment - The applicant's procurement processes, hiring and training of staff and other measures outlined in the Social and Labour Plan (SLP) should be implemented.
- Economic development contributions - The SLP appears to be aligned with local government's published planning imperatives and seeks to optimise benefits resulting from the applicant's participation in the local economy.
- Tax, royalty and regulatory fees payments

NEGATIVE IMPACTS ASSOCIATED WITH THE PURE SOURCE MINE

(Information obtained from the Final Scoping Report of the Pure Source Mine, 2018 done by Shango Solutions)

- Geology – The removal of material from the geological profile of the site;
- Topography – The mine will cause the formation of a local depression in the topographical profile;
- Soil Description – The removal of the sand will change the soil structure of the mine site;
- Land Capability – The excavation to be left as part of the mining activities will alter the land capability for the section temporarily;
- Land Use – The active mining area will temporarily be sterilized in terms of land use while the mined out sections of the site will be rehabilitated;
- Natural Vegetation – The current vegetation on the mine site area will be impacted on, in the short term on the mine site;
- Animal Life – The animal species (if any) will temporarily be displaced from the mine site due to the destruction of habitat and the mine related activities;
- Air Quality – Dust – The mine has the potential to cause dust pollution during high wind conditions;
- Visual Aspects – The mine will have very limited visual aspects.

For the purpose of this project, the need and justification for alternatives was specifically guided by the relatively low sensitivity of the receiving socio-economic and biophysical environment as well as the geology. Three alternative sites are considered for the location of the supporting mining infrastructure within the application area.

Site Alternative 1

Site Alternative 1 (Site 1, Figure 12) is the preferred site for the project. Site 1 is located near the south eastern border of Remaining Extent of Portion 1 of Woodlands 407 on a disturbed area (Figure 11). The site is strategically placed to be in close proximity to the main sand resource, the S171 tar road and power supply. The footprint of the infrastructure (excluding roads, power line and water supply) is approximately 13.5 ha.

Advantages:

- The site is currently disturbed and no additional encroachment on natural vegetation will be required.
- This location will have the least impact on the migration patterns of the game that roam on the farm due to the fact that previous mining occurred in this area. It is also near the perimeter of the farm, bordered by fenced agricultural fields on two sides.
- It is in close proximity to existing infrastructure such as a public road network and power supply, therefore minimising construction and operational impacts.
- It is in close proximity to the main sand and aggregate deposits which in turn requires the least distance for transporting material.

- The site and proposed mine layout, provides a safe separation between active mining in the pit, and vehicle circulation for product collection.
- The site is furthest away from the nearest residential development.

Disadvantages:

- The site is fairly exposed and visible from potential sensitive viewpoints.

Site Alternative 2

Site Alternative 2 (Site 2, Figure 13) is located near the western border of Remaining Extent of Woodlands 407 adjacent to an abandoned gravel pit (Figure 11). The settling ponds and pollution control dam are proposed in the borrow pit to make use of the existing depression. The remainder of the infrastructure will be located on existing cultivated farmland. This site is approximately 1.3 km north of the S171 and east of the main sand deposit. The footprint of the infrastructure (excluding roads, power line and water supply) is approximately 13.5 ha.

Advantages:

- The site is fairly well concealed from potential sensitive viewpoints.
- It makes use of an abandoned borrow pit for the settling and pollution control dams thereby minimising the disturbance footprint.

Disadvantages:

- Part of the site will encroach on actively cultivated agricultural fields.
- An existing transmission line separates the site from the main sand deposit which will create difficulties in transporting the material to and from the processing plant.
- General requirements for mining activities at or near Eskom infrastructure include restrictions of certain activities (such as truck circulation) that may not occur under their powerlines or within their servitude.
- The site is further away from the public road and power supply, therefore requiring greater infrastructure development which may increase construction and operational impacts.

Site Alternative 3

Site Alternative 3 (Site 3, Figure 14) is located on Remaining Extent of Portion 1 of Woodlands 407, near its eastern border and just north of the main sand deposit (Figure 11). It is approximately 1.2 km north of the S171. The existing vegetation cover is predominantly grassland. The footprint of the infrastructure (excluding roads, power line and water supply) is approximately 13.5 ha.

Advantages:

- The site is fairly well concealed from potential sensitive viewpoints. Disadvantages:
- The entire site will encroach on natural grassland which is utilised by the game for grazing.

- The site will most probably interfere with the game's migration patterns as it is fairly close to the centre of the 3 farm portions.
- A part of the site will fall within a preliminary wetland buffer.
- The site is closest to the nearest residential development and may increase impacts such as noise, etc.
- The site is further away from the public road and power supply, therefore requiring greater infrastructure development which may increase construction and operational impacts.

NO-GO ALTERNATIVE

The "No Go" or "No Action" alternative refers to the alternative of not embarking on the proposed project at all. This alternative would denote the current status quo without the proposed project. It is important to note that the No Go alternative is the baseline against which all other alternatives and the development proposal are assessed.

When considering the No Go alternative, the impacts (both positive and negative) associated with any other specific alternative or the current project proposal would not occur and in effect the impacts of the No Go alternative are therefore inadvertently assessed by assessing the other alternatives. In addition to the direct implications of retaining the status quo there are certain other indirect impacts, which may occur should the No Go alternative be followed. The No Go alternative as a specific alternative is not considered feasible for the following reasons:

- The Applicant holds an Environmental Authorisation for the establishment of an Eco-Estate with residential, resort and conservation land uses. Certain areas of the application area are currently utilised for agricultural purposes (in the form of game farming and maize crop production) and eco- tourism. These two functions will continue to remain the primary land uses during the mining activities. If the project is rejected, the Applicant will progress with the establishment of the Eco- Estate (with some agriculture). As such, the status quo of the properties under application will ultimately change, irrespective of the mining activities.

- Mining is important for economic development, to construct durable, modern structures, employment creation and revenue collection. The proposed site has previous sand mining activities, known to provide good quality silica sand to the regional and local building industry.

- Extensive investigations have revealed that there is a shortage of alluvial silica sand in the PWV industrial complex. Alluvial silica sand has a greater utility than silica sand that is created by means of crushing processes. Furthermore, many of the previously existing abundant alluvial silica sand deposits located in the Vaal Triangle are on the verge of being exhausted, thus making the mining of the existing resource at the Pure Source Mine both necessary and desirable, with regards to economic considerations

- Furthermore, if this project is approved, it will ensure that no economically viable mineral resources will be sterilised and that the benefits of the resources available in the area will be maximised.

The No Go alternative, as a specific alternative will not be considered further.

POTENTIAL NEGATIVE IMPACTS ASSOCIATED WITH S1, S2, S3

STRIPPING AND STOCKPILING OF TOPSOIL

- Alteration of the agricultural sense of place;
- Loss of agricultural land for duration of mining;
- Visual intrusion as a result of mining;
- Potential impact on vegetation and listed and protected plant species;
- Potential impact on the sensitive areas;
- Loss of topsoil and fertility during mining and stockpiling;
- Infestation of the topsoil heaps and mining area with invader plant species;
- Potential impact on local fauna due to disturbance and loss of available habitat and migration routes;
- Dust nuisance as a result of the mining activities;
- Noise nuisance as a result of the mining activities;
- Potential impact on archaeological artefacts;
- Potential impact on the drainage lines/watercourses within the mining area;
- Potential increased erosion risk and destabilisation of the dune plume;

EXCAVATION OF SAND / AGGREGATE FROM THE MINING FOOTPRINT AND LOADING ONTO TRUCKS

- Visual intrusion associated with the extraction of material;
- Creating steep slopes and uneven surfaces;
- Soil contamination from hydrocarbon spills;
- Disturbance to fauna within the footprint area;

- Dust nuisance as a result of the mining activities;
- Noise nuisance as a result of the mining activities;
- Potential impact associated with littering at the mining area;
- Potential impact on areas of palaeontological concern;
- Facilitation of erosion;

TRANSPORTING OF MATERIAL

- Dust nuisance caused by vehicles transporting the material;
- Degradation of the access roads;
- Traffic impact on the road as a result of the mining activity;

CUMULATIVE IMPACTS

- Reduced ability to meet conservation obligations and targets;
- Impact the broad-scale ecological processes;
- Cumulative impact of projects on palaeontological resources;

SLOPING AND LANDSCAPING (MEDIUM- & LONG TERM)

- Erosion of returned topsoil after rehabilitation;
- Infestation of the reinstated area with invader plant species;
- Potential impact associated with litter left at the mining area;
- Uneven surfaces or steep slopes left upon closure of the site.

In light of the above, and the review of the potential impacts associated with the different development options, Site Alternative 1 is deemed the preferred development option.

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).

The following mitigation measures are proposed to address/minimize the impact of the Pure Source Mine on the surrounding environment:

TOPOGRAPHY

<u>Landscaping of Mining Area:</u>

- To ensure minimum impact on drainage, it is essential that no depressions are left in the mining floor. A surface slope (even if minimal) must be maintained across the mining floor in the drainage direction, so that all excavations are free draining. This means that mining

depths must be controlled on the down-slope side of the mine, so that the mining floor remains free-draining and above the low point for drainage out of the mining area.

- Mining depths must be controlled across the entire mine so that excavations results in a levelling of the footprint rather than a hole with steep edges.
- After mining, any steep slopes at the edges of excavations must be reduced to a minimum and profiled to blend with the surrounding topography. The entire surface must be sufficiently smoothed and profiled to allow cultivation.

VISUAL CHARACTERISTICS

Visual Mitigation:

- The site must have a neat appearance and be kept in good condition at all times.
- All mining equipment must be stored neatly in a dedicated area with a sealed drip tray underneath when not in use.
- Concurrent rehabilitation must be done as strip mining progress to limit the visual impact on the aesthetic value of the area.
- The MR Applicant must limit vegetation removal, and stripping of topsoil may only be done immediately prior to the mining/use of a specific area.
- Upon closure the site must be rehabilitated and levelled to ensure that the visual impact on the aesthetic value of the area is kept to a minimum.

AIR AND NOISE QUALITY

Fugitive Dust Emission Mitigation:

- The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, straw, water spraying and/or environmentally friendly dust-allaying agents that contains no PCB's (e.g. DAS products).
- The site manager must ensure continuous assessment of the dust suppression equipment to confirm its effectiveness in addressing dust suppression.
- Speed on the access road must be limited to 20 km/h to prevent the generation of excess dust.
- Areas devoid of vegetation, which could act as a dust source, must be minimized and vegetation removal may only be done immediately prior to mining.
- Loads must be flattened to prevent spillage of sand / aggregate during transportation, also minimising windblown dust.
- Weather conditions must be taken into consideration upon commencement of daily operations. Limiting operations during very windy periods would reduce airborne dust and resulting impacts.

- All dust generating activities shall comply with the National Dust Control Regulations, GN No R827 promulgated in terms of NEM: AQA (Act 39 of 2004) and ASTM D1739 (SANS 1137:2012).
- Best practice measures shall be implemented during the stripping of topsoil, loading, and transporting of the sand from the site to minimize potential dust impacts.

Noise Handling:

- The MR Applicant must ensure that the employee and visitors to the site conduct themselves in an acceptable manner while on site.
- No loud music may be permitted at the mining area.
- All mining vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996 (Act No 93 of 1996).
- Best practice measures shall be implemented in order to minimize potential noise impacts.

GEOLOGY AND SOIL

Topsoil Management:

- The upper 300 mm of the soil, of the strip to be mined, must be stripped and stockpiled before mining.
- Topsoil is a valuable and essential resource for rehabilitation and it must therefore be managed carefully to conserve and maintain it throughout the stockpiling and rehabilitation processes.
- Topsoil stripping, stockpiling and re-spreading must be done in a systematic way. The mining plan have to be such that topsoil is stockpiled for the minimum possible time.
- The topsoil must be placed on a levelled area, within the mining footprint. No topsoil may be stockpiled in undisturbed areas.
- Topsoil stockpiles must be protected against losses by water- and wind erosion. Stockpiles must be positioned so as not to be vulnerable to erosion by wind and water. The establishment of plants on the stockpiles will help to prevent erosion.
- Topsoil heaps may not exceed 1.5 m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen.
- The temporary topsoil stockpiles must be kept free of invasive plant species.
- Storm- and runoff water must be diverted around the stockpile area to prevent erosion.
- The stockpiled topsoil must be evenly spread, to a depth of 300 mm, over the rehabilitated area upon closure of the site.
- The MR Applicant must strive to re-instate topsoil at a time of year when vegetation cover can be established as quickly as possible afterwards, so that erosion of returned topsoil by both rain and wind, before vegetation is established, is minimized. The best time of

year is at the end of the rainy season, when there is moisture in the soil for vegetation establishment and the risk of heavy rainfall events is minimal.

- A cover crop must be planted, irrigated and established immediately after spreading of topsoil, to stabilize the soil and protect it from erosion. The cover crop must be fertilized for optimum biomass production, and any soil deficiencies must be corrected, based on a chemical analysis of the re-spread soil (if deemed necessary). It is important that rehabilitation be taken up to the point of cover crop stabilization. Rehabilitation cannot be considered complete until the first cover crop is well established.
- The rehabilitated area must be monitored for erosion, and appropriately stabilized if any erosion occurs for at least 12 months after reinstatement.

HYDROLOGY

Erosion Control and Storm Water Management:

- Soil that are to be removed must be done so at right angles to the slope, as this will slow down surface runoff and help to prevent erosion.
- When mining within steep slopes, it must be ensured that adequate slope protection is provided.
- Storm water must be diverted around the topsoil heaps and mining areas to prevent erosion.
- During mining, the outflow of run-off water from the mining excavation must be controlled to prevent down-slope erosion. This must be done by way of the construction of temporary banks and ditches that will direct run-off water (if needed). These must be in place at any points where overflow out of the excavation might occur.
- Clearing of vegetation must be limited to the proposed mining footprint and associated infrastructure. No clearing outside of the minimum required footprint to take place.
- Phased mining and vegetation clearance must be done, wherein (±28 ha (±7 ha / block for sand up to a maximum of 4 blocks open to be rehabilitated at any given time. ±20 ha (±5 ha / block for aggregate up to a maximum of 4 blocks open to be rehabilitated at any given time. Total distrubed area ±48 ha Only 13.5 ha will be used for infrastructure. No vegetation outside of the active blocks may be disturbed until it is time for that specific area to be mined. Furthermore, upon finishing a block, immediate rehabilitation should occur wherein a stable vegetation cover is established with at least a grass cover.
- Roads and other disturbed areas within the project area must be regularly monitored for erosion and problem areas must receive follow-up monitoring to assess the success of the remediation.

- Any erosion problems within the mining area as a result of the mining activities observed must be rectified immediately (within 48 hours) and monitored thereafter to ensure that it does not re-occur.
- Silt/sediment traps/barriers must be used where there is a danger of topsoil or material stockpiles eroding and entering downstream drainage lines and other sensitive areas. These sediment/silt barriers must regularly be maintained and cleared so as to ensure effective drainage of the areas.
- Stockpiles must be protected from erosion, stored on flat areas where possible, and be surrounded by appropriate berms.
- Construction of gabions and other stabilisation features must be undertaken to prevent erosion, where deemed necessary.
- Mining must be conducted only in accordance with the Best Practice Guideline for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the Department of Water and Sanitation (DWS), and any other conditions which that Department may impose:
    - Clean water (e.g. rainwater) must be kept clean and be routed to a natural watercourse by a system separate from the dirty water system. You must prevent clean water from running or spilling into dirty water systems.
    - Dirty water must be collected and contained in a system separate from the clean water system.
    - Dirty water must be prevented from spilling or seeping into clean water systems.
    - A storm water management plan must apply for the entire life cycle of the mining activity and over different hydrological cycles (rainfall patterns).
    - The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into a storm water management plan.

Management of Drainage Areas:

- The MR Applicant must adhere to the areas regarded as no-go / buffer zones (as indicated in the in the various specialist studies) where no mining may take place.

MINING, BIODIVERSITY CONSERVATION AREAS, AND VEGETATION

Management of Vegetation Removal and Conservation of the sensitive areas:

- The mining boundaries must be clearly demarcated and all operations must be contained to the approved mining area.
- The MR Applicant must adhere to the areas regarded as no-go / buffer zones (as indicated in the in the various specialist studies) where no mining may take place.

- A pre-commencement walk-through of the final mining footprint, must be done by a suitably qualified botanist, for species of conservation concern that would be affected.
- Permits for the removal of protected plant species (if required) must be kept on-site and in the possession of the flora search and rescue team at all times.
- A pre-commencement environmental induction for all staff on site must be provided to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas, etc.
- The on-site ECO must provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially at the initiation of each new block, when the majority of vegetation clearing is taking place.
- Clearing of vegetation must be limited to the proposed mining footprint and associated infrastructure. No clearing outside of the minimum required footprint to take place.
- Phased mining and vegetation clearance must be done, wherein (±28 ha (±7 ha / block for sand up to a maximum of 4 blocks open to be rehabilitated at any given time. ±20 ha (±5 ha / block for aggregate up to a maximum of 4 blocks open to be rehabilitated at any given time. Total distrubed area ±48 ha Only 13.5 ha will be used for infrastructure. No vegetation outside of the active blocks may be disturbed until it is time for that specific area to be mined. Furthermore, upon finishing a block, immediate rehabilitation should occur wherein a stable vegetation cover is established with at least a grass cover.
- All vehicles must remain on demarcated roads and no unnecessary driving in the veld outside these areas may be allowed.
- No plants may be translocated or otherwise uprooted or disturbed for rehabilitation or other purposes without express permission from the ECO and without the relevant permits.
- No fires must be allowed on-site.

Management of Invasive Plant Species:

- An invasive plant species management plan (Appendix K) must be implemented at the site to ensure the management and control of all species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto). Weed/alien clearing must be done on an ongoing basis throughout the life of the mining activities.
- All stockpiles (topsoil) must be kept free of invasive plant species.
- No planting or importing of any alien species to the site for landscaping, rehabilitation or any other purpose may be allowed.
- Management must take responsibility to control declared invader or exotic species on the rehabilitated areas. The following control methods can be used:

- The plants can be uprooted, felled or cut off and can be destroyed completely.
- The plants can be treated chemically by a registered pest control officer (PCO) through the use of an herbicide recommended for use by the PCO in accordance with the directions for the use of such an herbicide.

Cumulative Impacts:

- The MR Applicant must adhere to the layout as proposed in this document, with the no-go area as well as buffer zones.
- The activity footprints of various proposed mining locations and other development proposals in the area must be kept to a minimum and a stable vegetation must be encouraged to return during the post-operational phase.
- The footprint of mining areas within sensitive habitat types must be reduced as much as possible.

FAUNA

Protection of Fauna:

- The site manager must ensure no fauna is caught, killed, harmed, sold or played with.
- Any fauna directly threatened by the operational activities must be removed to a safe location by the ECO or other suitably qualified person.
- All personnel must undergo environmental induction regarding fauna management and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. Workers must be instructed to report any animals that may be trapped in the working area.
- No snares may be set or nests raided for eggs or young.
- All vehicles must adhere to a low speed limit (20 km/h is recommended) to avoid collisions with susceptible species such as snakes and tortoises.
- When possible, no activity must be undertaken at the site between sunset and sunrise, except for security personnel guarding the operation (if needed).
- No litter, food or other foreign material may be thrown or left around the site. Such items must be kept in the site vehicles and daily removed from the mining area.

CULTURAL AND HERITAGE ENVIRONMENT

Archaeological, Heritage and Palaeontological Aspects:

- All mining must be confined to the development footprint area.
- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage

site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.

- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area.
- The senior on-site Manager must inform the ECO of the chance find and its immediate impact on operations. The ECO must then contact a professional archaeologist for an assessment of the finds who must notify SAHRA.
- Work may only continue once the go-ahead was issued by SAHRA.
- The Fossil Chance Find Protocol attached as part of the HIA (Appendix F7) must be implemented for the duration of the operational phase.

LAND USE

Loss of agricultural land for duration of mining:

- The temporary loss of agricultural land for the duration of the mining period is acceptable to the landowner. If needed, mined-out/rehabilitated areas will revert back to agricultural use once the cover crop stabilised.
- The end land use is proposed to be an Eco-Estate for which an Environmental Authorisation was obtained, with residential, resort and conservation land uses. The mined area will ultimately leave behind a void that, with careful planning, will be converted into artificial wetlands or water courses. These watercourses will be beneficial within the estate's vision. In addition, the conversion of the mine voids into artificial wetlands or water courses will result into a nett gain in biodiversity that should have a positive impact.

EXISTING INFRASTRUCTURE

Access Road Mitigation:

- Storm water must be diverted around the access road to prevent erosion.
- Vehicular movement must be restricted to the existing access road and crisscrossing of tracks through undisturbed areas must be prohibited.
- Rutting and erosion of the access road caused as a direct result of the mining activities must be repaired by the MR Applicant.
- Overloading of the trucks must be prevented.
- The MR Applicant must adhere to the Department of Police Roads and Transport Free State Province conditions submitted as part of the access to roads application.

GENERAL

Waste Management:

- Regular vehicle maintenance, repairs and services may only take place at the workshop and service area. If emergency repairs are needed on equipment not able to move to the workshop, drip trays must be present. All waste products must be disposed of in a closed container/bin to be removed from the emergency service area (same day) to the workshop in order to ensure proper disposal. This waste must be treated as hazardous waste and must be disposed of at a registered hazardous waste handling facility, alternatively collected by a registered hazardous waste handling contractor. The safe disposal certificates must be filed for auditing purposes.
- Ablution facilities must be provided in the form of chemical toilets. The chemical toilets must be anchored (to prevent blowing/falling over) and shall be serviced at least once a month for the duration of the mining activities by a registered liquid waste handling contractor. The safe disposal certificates must be filed for auditing purposes.
- The use of any temporary, chemical toilet facilities must not cause any pollution to water sources or pose a health hazard. In addition, no form of secondary pollution should arise from the disposal of refuse or sewage from the temporary, chemical toilets. Any pollution problems arising from the above are to be addressed immediately by the MR Applicant.
- If a diesel bowser is used on site, it must be equipped with a drip tray at all times. Drip trays must be used during each and every refuelling event. The nozzle of the bowser needs to rest in a sleeve to prevent dripping after refuelling.
- Site management must ensure drip trays are cleaned after each use. No dirty drip trays may be used on site. The dirty rags used to clean the drip trays must be disposed as hazardous waste into a designated bin at the off-site workshop, where it is incorporated into the hazardous waste removal system as discussed above.
- Any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. The safe disposal certificates must be filed for auditing purposes.
- An oil spill kit must be obtained, and the employees must be trained in the emergency procedures to follow when a spill occurs as well as the application of the spill kit.
- Should spillage occur, such as oil or diesel leaking from a burst pipe, the contaminated soil must, within the first hour of occurrence, be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. Proof must be filed.
- All general waste must be contained within the site vehicles and daily be removed from the mining area to the general waste storage area at the offices on the farm. No general waste may be burned or buried on the farm, but must be disposed of at the registered landfill site.

- No waste may be stored, buried or burned on the site.
- It is important that any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities is reported to the Department of Water and Sanitation and other relevant authorities. The affected area must be cleaned by a professionally qualified waste handling contractor that must provide proof that the area was successfully cleaned.
- Site management must implement the use of waste registers to keep record of the waste generated and removed from the mining area.
- All employees must be aware of the Emergency Response Procedures attached to this document as Appendix G.

Management of Health and Safety Risks:

- Access to the mining area by unauthorised persons is to be prevented by the Mine Manager, as far as is reasonably practical.
- Adequate ablution facilities and water for human consumption must daily be available on site.
- Sanitary facilities must be located within 100 m from any point of work.
- Worker(s) must have access to the correct personal protection equipment (PPE) as required by law.
- All operations must comply with the Mine Health and Safety Act, 1996 (Act No 29 of 1996).

ix) Motivation where no alternative sites were considered.

Three alternative sites have been investigated for the project. As such, this section is not applicable

x) Statement motivating the alternative development location within the overall site.

(Provide a statement motivating the final site layout that is proposed)

Site Alternative 1 (Site 1) is the preferred site for the project. Site 1 is located near the south eastern border of Remaining Extent of Portion 1 of Woodlands 407 on a disturbed area (Figure 12. The site is strategically placed to be in close proximity to the main sand resource, the S171 tar road and power supply. The footprint of the infrastructure (excluding roads, power line and water supply) is approximately 13.5 ha.

Advantages:

The site is currently disturbed and no additional encroachment on natural vegetation will be required.

This location will have the least impact on the migration patterns of the game that roam on the farm due to the fact that previous mining occurred in this area. It is also near the perimeter of the farm, bordered by fenced agricultural fields on two sides.

It is in close proximity to existing infrastructure such as a public road network and power supply, therefore minimising construction and operational impacts.

It is in close proximity to the main sand deposit which in turn requires the least distance for transporting material.

The site and proposed mine layout, provides a safe separation between active mining in the pit, and vehicle circulation for product collection.

The site is furthest away from the nearest residential development.

Disadvantages:

The site is fairly exposed and visible from potential sensitive viewpoints.

h) 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 following section provides a description of the findings and recommendations of the EIAR, inclusive of the relevant specialist studies, and its associated impact on the receiving and surrounding environment.

CONSTRUCTION PHASE

Impacts on Ecology (Fauna, Avifauna and Flora)

- Site clearance for infrastructure and associated access roads during the construction phase has the potential to directly disturb vegetation, regardless of the alternatives that are selected. The identified impact would result in high severity impacts in the absence of mitigation measures. Where the project plan takes into account the findings of the specialist studies and avoids or minimises impacts on ecologically sensitive areas, the significance of the potential impact is reduced to moderate significance.

- The placement of infrastructure has the potential to destroy habitats for faunal species. In addition, the construction activities may result in disturbances such as noise, vibrations, dust and increased human presence (and possible poaching).

- The significance of this impact would be high in the unmitigated scenario. In the mitigated scenario, which focuses on avoiding ecologically sensitive areas, adhering to bufferzones and

implementing training to ensure that the staff is aware of faunal sensitivity, the significance remains high.

Impacts on Aquatic and Wetland Biodiversity

- The removal of vegetation, ground compaction and infrastructure placement during the construction phase may result in the destruction of wetland systems. The unmitigated significance is considered to be medium. Where the project plan takes into account the findings of specialist studies and applies the necessary mitigation to avoid or minimise the impact, the significance of the potential impact can be reduced to low.

- The placement of infrastructure within the catchment area may result in a loss/reduction in catchment yield. In the absence of mitigation measures, the identified impact is considered to be medium. Where the project plan takes into account the findings of specialist studies and applies the necessary mitigation to avoid or minimise the impact, the significance of the potential impact can be reduced to low.

- Vegetation removal and altered surface flow dynamics may result in an increase in the concentration of suspended solids.

- The unmitigated impact is considered low and will remain low should the necessary mitigation measures be applied.

- On site mixing, fuelling and use of machines and vehicles as well as erosion of the cleared footprint areas may result in the contamination of surface water resources. In the absence of mitigation measures, given the importance of the Vaal River system and based on the mine plan, the severity of the unmitigated impact would be medium. It is important to note that the use or potential contamination of water resourced is regulated through water use licensing requirements of the DWS as the custodian of water resources in South Africa. With the implementation of mitigation measures, the potential impact is reduced to low significance.

- Construction activities may result in noise and traffic which will result in the loss of species diversity. The significance of this impact is medium in the unmitigated scenario. Where the project plan takes into account the findings of the specialist studies and avoids or minimises the impact on species, the significance of the impact can be reduced to low.

- Introduction of "pests" and weeds into the area during the construction phase may result in a change in species abundance. The unmitigated impact is considered low and will remain low should the necessary mitigation measures be applied.

- Preparation of the mining area may result in a loss of wetland systems. In the absence of mitigation measures, the potential impact would result in long term high severity impacts. With the implementation of mitigation measures, the significance can be reduced to moderate.

- Construction of associated infrastructure may result in the loss of sub-surface flows.

- The significance of this impact is high in the unmitigated scenario. With the implementation of mitigation measures, the significance is reduced to medium.

Impacts on Pedology

- Potential disturbances include compaction, physical removal and potential pollution as well as soil erosion.

- The exposed soil surfaces have the potential to erode easily if left uncovered which could lead to the loss of the soil resources. Soils that are excavated for the installation of foundations will have their physical and chemical states altered negatively.

- There may also be potential loss of stockpiled topsoil and other materials through erosion if not protected properly.

- Insufficient storm water control measures may result in localised high levels of soil erosion, possibly creating dongas or gullies, which may lead to decreased water quality in surrounding watercourses. Increased erosion could result in increased sedimentation which could impact on ecological processes.

- The additional hardened surfaces created during construction could increase the amount of storm water runoff, which has the potential to cause erosion.

- Physical disturbance of the soil and plant removal may result in soil erosion/loss. Erosion and potential soil loss from cut and fill activities and areas where naturally dispersive soils occur.

- The unmitigated impact is considered to be of medium significance and can be reduced to low significance should the necessary mitigation measures be applied.

Impacts on Riverine Ecology

- Vegetation clearance during the construction phase may result in the alteration of catchment drainage, resulting in an increased runoff velocity and erosion. In the absence of mitigation measures, the severity of the impact is expected to be medium. The significance can be reduced to low should mitigation measures be implemented.

- Construction of infrastructure and minor earthworks may result in the alteration of the catchment drainage and exposure of un-weathered materials, resulting in increased dissolved solid concentrations in local water bodies. In the absence of mitigation measures, the severity of the impact is expected to be medium. The significance can be reduced to low should mitigation measures be implemented.

- Placement of infrastructure within the catchment area may result in the alteration of the catchment drainage thus causing erosion and sedimentation. In the absence of mitigation measures, the severity of the impact is expected to be medium. The significance can be reduced to low should mitigation measures be implemented.

Impacts on Visual Receptors

- The removal of vegetation during the construction phase will expose the area to sensitive visual receptors, particularly those located on elevated areas surrounding the project area. Dust generated during the construction phase is further likely to create a visual disturbance. In the absence of mitigation measures, the severity of the impact is expected to be high. The significance can be reduced to medium should mitigation measures be implemented.

- The movement of vehicles and heavy machinery as well as dust generated by vehicular movement is likely to create a visual disturbance to surrounding visual receptors. In addition, the erection of mine infrastructure (plant, workshop etc.) is likely to visually intrude on the landscape. However, the development footprint and height of the proposed mine infrastructure is limited. In the absence of mitigation measures, the severity of the impacts is expected to be of medium significance. In the mitigated scenario, the potential impacts can be reduced to low significance.

Impacts Heritage/Cultural Resources

- The placement of infrastructure and mining activities, in all phases prior to closure, may result in the potential removal, damage and destruction of heritage/cultural resources. This will result in the loss of the resource for future generations. In the absence of mitigation measures, the unmitigated severity could be high to low depending on the distance of the resource from the mining activities and associated infrastructure. Where the project planning takes into account the findings of the specialist studies and either avoids resources of high significance or alternatively document and/or relocate resources in line with a permit or the necessary approvals, the significance can be reduced to low.

Impact on Socio-Economic

- The potential positive impacts which could arise as a result of the construction activities include increase in job opportunities both for skilled and unskilled labourers. Jobs for the unskilled labourers are likely to be filled by the local community and the skilled personnel likely to be drawn around South Africa. The project also brings with it an opportunity for training and capacity building of personnel that will be recruited. Furthermore, during construction, the informal business sector, particularly women in the area, could benefit from selling food to construction workers. The unmitigated impacts are considered positive medium to low positive medium and would remain positive medium to low positive medium should the appropriate mitigation measures be implemented.

- An influx of workers and jobseekers to an area (whether locals are employed, or outsiders are employed) could increase the safety risks in the local area and have an impact on the local social dynamics. Should locals be employed, it could minimise the perceived and actual risk in this regard. In the absence of mitigation measures, the severity of the impact is expected to be medium. In the mitigated scenario, the potential impact can be reduced to low significance.

- During the construction phase, adjacent landowners could be negatively affected by the dust, noise and negative aesthetics created as a result of the construction activities. In the absence of mitigation measures, the severity of the impact is expected to be medium. In the mitigated scenario, the potential impact can be reduced to low significance.

- Heavy vehicles and construction activities could result in damage to roads and present safety risks in the local area. The unmitigated impact is considered low and would remain low should the appropriate mitigation measures be implemented.

Impact on Surface Water

- The removal of vegetation and subsequent exposure of soils, laydown of impermeable surfaces such as concrete, alteration to the natural topography due to pit excavations, dumps and infrastructure may result in erosion and consequent increase in TSS in surrounding water courses. In the absence of mitigation measures, the unmitigated severity could be medium. The significance can be reduced to low should appropriate mitigation measures be implemented.

Impact on Groundwater

- During the construction phase little impacts are expected on groundwater quality. Minor impacts on the groundwater can be expected from accidental hydrocarbon spillage from construction vehicles at the service station or diesel bays. The current groundwater quality is good; depending on distance from the Vaal River. In the absence of mitigation measures, the

severity of the impact is expected to be medium. In the mitigated scenario, the potential impact can be reduced to low.

- The use of groundwater as a potential source of water during construction could potentially have an impact on local water users due to the cone of depression around the production boreholes. The study area is not known for high yielding boreholes. The unmitigated impacts are considered medium and would be reduced to low medium should the appropriate mitigation measures be implemented.

Impacts on Air Quality

- Mining activities usually present a number of emission sources that can have a negative impact on ambient air quality and surrounding land uses in all phases, regardless of the alternatives that are selected. Emission sources would include land clearing activities for construction and ahead of mining, materials handling, wind erosion from stockpiles, wind erosion of disturbed areas, vehicle movement along unpaved roads, crushing, drying and exhaust emissions. The main contaminants would include inhalable particulate matter, Total Suspended Particulates (TSP) that relate to dust fallout and Diesel Particulate Matter (DPM). Similar emission sources are likely to be produced by adjacent mining activities which collectively could result in cumulative air quality impacts on potential receptors.

- In the absence of mitigation measures that focus on the control of emissions at source and a rehabilitation plan that allows for rehabilitation and supports the post closure land use, the severity is expected to be high. With mitigation that focuses on controlling emissions sources, the significance could be reduced to medium as the severity, duration, spatial scale and probability would reduce.

Impacts on Noise

- Mining activities have the potential to contribute to an increase in ambient noise levels during the construction and operational phases. For this proposed project, pre-mining ambient noise environment can be described as suburban, urban and of central business district in nature. Project-related noise sources would include construction related activities, emergency power supply, operation and movement of machinery and equipment (including reverse beepers), crushing, transport of product off site and demolition activities.

- Similar noise sources are likely to be produced by adjacent mining activities which collectively could result in cumulative noise impacts on potential noise receptors. In the absence of mitigation measures that consider potential receptor sites in relation to mining activities, the severity is expected to be high. Noise pollution impacts would extend beyond the site boundary

and would occur until full closure is reached. The related unmitigated significance would be high. With mitigation that focuses on minimising impacts through the application of noise control measures, the significance could reduce to medium-high as the severity, duration and probability would reduce.

OPERATIONAL PHASE

Impacts on Ecology (Fauna, Avifauna and Flora)

- Mining related activities have the potential to result in encroachment of alien invasive plant species and possible decrease in available ground-water for floral species. In the absence of mitigation measures, the severity of the impact would be high. The identified impact would result in high severity impacts in the absence of mitigation measures. Where the project plan takes into account the findings of the specialist studies and avoids or minimises impacts on ecologically sensitive areas, the significance of the potential impact is reduced to moderate significance.

- Mining activities could result in loss of species of conservation concern and their habitat as well as continued displacement, direct mortalities and disturbance of faunal community (including possible threatened species) due to habitat loss and disturbances (such as dust, poaching and noise).

- The unmitigated significance is high. With the implementation of mitigation measures, the significance is reduced to moderate.

Impacts on Aquatic and Wetland Biodiversity

- Mining operations have the potential to negatively impact on wetland systems. In the absence of mitigation measures, the severity of the impact is expected to be high. In the mitigated scenario, which focuses on avoiding wetland areas and adhering to recommended buffer areas, the potential impact can be reduced to low significance.

- Operation of the supporting infrastructure to be established within the mining area may result in a reduction in catchment water yield. In the absence of mitigation measures, the severity of the impact is expected to be high. The significance can be reduced to medium should mitigation measures be implemented.

- Operation of the supporting infrastructure to be established within the mining area may result in the loss of sub-surface flows. In the absence of mitigation measures, the severity of the impact is expected to be high. The significance can be reduced to medium should mitigation measures be implemented

- Operation of the supporting infrastructure to be established within the mining area may result in an increase in the concentrations of suspended solids. In the absence of mitigation measures, the severity of the impact is expected to be medium. The significance can be reduced to low should mitigation measures be implemented.

- Mining operations have the potential to negatively impact on water resources through dewatering activities. In the absence of mitigation, given the importance of the Vaal River system, the severity of the unmitigated impact would be of medium significance.

- In the mitigated scenario, which focuses on containing water in a PCD and avoiding discharging contaminated water into water courses, the potential impact can be reduced to low significance.

Impacts on Pedology

- Potential disturbances include compaction, physical removal and potential pollution as well as soil erosion.

- The exposed soil surfaces have the potential to erode easily if left uncovered which could lead to the loss of the soil resources. Soils that are excavated for the installation of foundations will have their physical and chemical states altered negatively.

- There may also be potential loss of stockpiled topsoil and other materials through erosion if not protected properly.

- Insufficient storm water control measures may result in localised high levels of soil erosion, possibly creating dongas or gullies, which may lead to decreased water quality in surrounding watercourses. Increased erosion could result in increased sedimentation which could impact on ecological processes.

- The additional hardened surfaces created during construction could increase the amount of storm water runoff, which has the potential to cause erosion.

- Physical disturbance of the soil and plant removal may result in soil erosion/loss. Erosion and potential soil loss from cut and fill activities and areas where naturally dispersive soils occur.

- The unmitigated impact is considered to be of medium significance and can be reduced to low significance should the necessary mitigation measures be applied.

Impacts on Riverine Ecology

- Operation of the open pit mine may cause alteration of the catchment drainage and exposure of un- weathered materials, resulting in an increase in the concentrations of dissolved solids in local water bodies. In the absence of mitigation, the severity of the unmitigated impact would be of medium significance. In the mitigated scenario, the potential impact can be reduced to low significance.

- During operation of the processing plant, the use and storage of dirty water may result in diffuse or point source contamination via seepage and direct runoff. This may result in an increase in the suspended and dissolved solids within the Vaal River and subsequent ecological impact. In the absence of mitigation measures, the severity of the impact is expected to be medium. In the mitigated scenario, which focuses on adhering to recommended bufferzones and implementing a storm water management plan, the potential impact can be reduced to low significance.

- The operation of active Run of Mine stockpiles may result in runoff of materials from stockpiles thus resulting in an increase in the suspended and dissolved solids within the Vaal River and subsequent ecological impact. In the absence of mitigation measures, the severity of the impact is expected to be medium. The significance can be reduced to low should mitigation measures be implemented.

- Operation of the supporting infrastructure may result in an increase in the suspended/dissolved solid concentrations and erosion from drainage alteration. In the absence of mitigation measures, the severity of the impact is expected to be medium. In the mitigated scenario, which focuses on adhering to recommended bufferzones and implementing a storm water management plan, the potential impact can be reduced to low significance.

- The dewatering of the open pit may result in the discharge of dirty water, resulting in increased suspended and dissolved solids and local water bodies. In the absence of mitigation measures, the severity of the impact is expected to be medium. In the mitigated scenario, which focuses on adhering to recommended bufferzones and implementing a storm water management plan, the potential impact can be reduced to low significance.

Visual Impacts

- Open pit mining will result in depressions which will be approximately 10 m in depth, and will visually intrude on the surrounding landscape. In addition, dust will be generated during the mining activities. In the absence of mitigation measures, the severity of the impact is expected to be high. The significance can be reduced to medium should mitigation measures be implemented.

- The development of dumps, as mining progresses will visually intrude on the surrounding landscape. In the absence of mitigation measures, the severity of the impact is expected to be medium. In the mitigated scenario, which focuses on limiting the height of dumps as far as possible, the potential impact can be reduced to low significance.

Impacts on Heritage/Cultural Resources

- The placement of infrastructure and mining activities, in all phases prior to closure, may result in the potential removal, damage and destruction of heritage/cultural resources. This will result in the loss of the resource for future generations. In the absence of mitigation measures, the unmitigated severity could be high to low depending on the distance of the resource from the mining activities and associated infrastructure. Where the project planning takes into account the findings of the specialist studies and either avoids resources of high significance or alternatively document and/or relocate resources in line with a permit or the necessary approvals, the significance can be reduced to low.

Impacts on Socio-Economic

- Employment opportunities would be created which could result in benefits to unemployed individuals within the local communities. Furthermore, capacity building and skills development throughout the life of the mine (30 years) could be to the benefit of the employees and could assist them in obtaining transferable skills. The unmitigated impact is considered positive and would remain positive medium should the appropriate mitigation measures be implemented.

- Local procurement for general materials, goods and services (e.g. transport, catering (local women may get the opportunity to sell food to mine workers) and security) and other spin-off benefits could materialise. In the absence of mitigation measures, the severity of the impact is expected to be positive low medium. In the mitigated scenario, the potential impact can be increased to positive medium.

- The proposed development will assist in the generation of resources such as sand and diamonds which would boost South Africa’s economy. In the absence of mitigation measures, the severity of the impact is expected to be positive low medium. In the mitigated scenario, the potential impact can be increased to positive medium.

- The permanent visual impact associated with the mine and its associated infrastructure would alter the landscape. The proposed development is located in a farming area. Therefore, the visual implications could have a further negative impact on the area’s sense of place. The

unmitigated impact is considered low and would remain low should the appropriate mitigation measures be implemented.

- The development of the mine is likely to affect tourism in the area. The unmitigated impact is considered low and would remain low should the appropriate mitigation measures be implemented.

- The use of roads by trucks carrying mined products could result in damage to roads and present safety risks in the local area.

- The S171 road does not have a carrying capacity to accommodate trucks. The narrowness of the road poses as great security risk for the local residents who drive small passenger cars.

Impacts on Surface Water

- Open pit mining will result in a loss of contributing catchment area to the Vaal River. Runoff will be captured in the pits that would have otherwise reported to the Vaal River. The unmitigated impact is considered low and would remain low should the appropriate mitigation measures be implemented.

- Runoff from the plant area and stockpiles is likely to contain high levels of TSS and potentially high dissolved solids that could runoff into the environment. In the absence of mitigation measures, the severity of the impact is expected to be medium. In the mitigated scenario, the potential impact can be reduced to low.

- Some of the proposed mining deposits occur within drainage lines. The function of these drainage lines is to drain the area during and post rainfall. Mining through drainage lines may result in flooding of pits and other infrastructure, as well as a loss of runoff reporting to the Vaal River. The unmitigated impact is considered medium and would remain medium should the appropriate mitigation measures be implemented.

- It is highly likely that groundwater will seep into the open pits, resulting in dirty water. The pits may also become flooded due to high seepage rates. In the absence of mitigation measures, the severity of the impact is expected to be medium. In the mitigated scenario, the potential impact can be reduced to low.

- Abstraction of water from the Vaal River is likely to result in loss of water volumes and a reduction of flows. In the absence of mitigation measures, given the importance of the Vaal River system and based on the mine plan, the severity of the unmitigated impact would be medium. It is important to note that the use or potential contamination of water resources is regulated through water use licensing requirements of the DWS as the custodian of water

resources in South Africa. With the implementation of mitigation measures, the potential impact is reduced to low significance.

Impacts on Groundwater

- Groundwater quality could potentially be negatively affected by the excavation of the sand and around the washing facility. Hydrocarbon spillage, as well as the incorrect handling and storage of hazardous waste and sewage can potentially contaminate the aquifers. The unmitigated impacts are considered high and would be reduced to medium should the appropriate mitigation measures be implemented

- Pit dewatering and groundwater abstraction could potentially influence the local groundwater system and may have a negative impact on the local groundwater users. The unmitigated impacts are considered high and would be reduced to medium should the appropriate mitigation measures be implemented.

Impacts on Air Quality

- Mining activities usually present a number of emission sources that can have a negative impact on ambient air quality and surrounding land uses in all phases, regardless of the alternatives that are selected. Emission sources would include land clearing activities for construction and ahead of mining, materials handling, wind erosion from stockpiles, wind erosion of disturbed areas, vehicle movement along unpaved roads, crushing, drying and exhaust emissions. The main contaminants would include inhalable particulate matter, Total Suspended Particulates (TSP) that relate to dust fallout and Diesel Particulate Matter (DPM). Similar emission sources are likely to be produced by adjacent mining activities which collectively could result in cumulative air quality impacts on potential receptors.

- In the absence of mitigation measures that focus on the control of emissions at source and a rehabilitation plan that allows for rehabilitation and supports the post closure land use, the severity is expected to be high. With mitigation that focuses on controlling emissions sources, the significance could be reduced to medium as the severity, duration, spatial scale and probability would reduce.

Noise Impacts

- Mining activities have the potential to contribute to an increase in ambient noise levels during the construction and operational phases. For this proposed project, pre-mining ambient noise environment can be described as suburban, urban and of central business district in nature. Project-related noise sources would include construction related activities, emergency power

supply, operation and movement of machinery and equipment (including reverse beepers), crushing, transport of product off site and demolition activities.

- Similar noise sources are likely to be produced by adjacent mining activities which collectively could result in cumulative noise impacts on potential noise receptors. In the absence of mitigation measures that consider potential receptor sites in relation to mining activities, the severity is expected to be high. Noise pollution impacts would extend beyond the site boundary and would occur until full closure is reached. The related unmitigated significance would be high. With mitigation that focuses on minimising impacts through the application of noise control measures, the significance could reduce to medium-high as the severity, duration and probability would reduce.

Economic Impacts

- The project would result in spending injections that would lead to increased economic activity best measured in terms of impacts on employment and associated incomes focusing on the local area and region. In addition to the direct employment and associated income opportunities indirect opportunities would be associated with the operational phase of the project. These would stem primarily from increased expenditure by the applicants and their employees in the local area and region.

- The nature of the project should ensure that it makes a relatively significant contribution to the national fiscus. Payments towards direct taxes, royalties and regulatory fees (including payments towards mine health and safety regulations, national skills fund contributions as well as environmental monitoring and auditing) are key variables for the measurement of these benefits.

- The key potential sources of negative impacts on property values in the area are visual, air quality, noise and terrestrial and riverine biodiversity impacts.

Impacts on Tourism

- The proposed project has some potential to result in increased tourism to the area as a result of increased business tourism.

- Negative impacts on air quality have the potential to impact on the experience of tourists particularly if significant direct nuisance is caused by dust.

- Noise impacts have the potential to impact on tourism if they are significant and impact negatively on tourism receptors and tourist experiences. The noise specialist study identifies

a number of receptors particularly nearby residences along the Vaal River that include tourism establishments.

- Negative impacts on the freshwater environment have the potential to impact on the experience of tourists particularly if the Vaal River is impacted on given its importance as an attraction. With regards to overall freshwater impacts, the key preliminary finding of the riverine ecology scoping report is that impacts would be low with mitigation.

- The project's impacts on terrestrial biodiversity have the potential to impact negatively on tourism in the area. The biodiversity assessment reveals that the project has been proposed on land which is considered to be high in biodiversity. Impacts on biodiversity, flora and fauna have been given preliminary ratings of moderate to high significance with mitigation.

- The proposed project has some potential to result in increased tourism to the area as a result of increased business tourism. Experience indicates that a number of technical, management and sales staff generally associated with the companies involved in a project of this nature are required to periodically visit the project site to conduct business. These staff members generally fall into middle to higher income brackets and in the event that they have travelled significant distances there is some chance that they could require accommodation and potentially make use of other tourist facilities and services such as restaurants and retail outlets. Given the relatively close proximity of the project site to urban centres where business visitors are likely to come from, these impacts are anticipated to be of minor significance.

- It is anticipated that the proposed mining development would add a significant number of heavy vehicle trips onto the relevant roads network. With the current poor state of Road S171, the additional anticipated heavy vehicle trips to be generated by the proposed mining development that will make use of the Road S171 can have a contribution to the further deterioration of Road S171. It is therefore recommended to collaborate with the relevant road authority, by means of an access to roads application through which special conditions may be required.

- It is anticipated that the sensitivity of the relevant section of Road S171 under investigation and the relevant intersections under investigation would improve with the implementation of the mitigating measures recommended.

DECOMMISSIONING, REHABILITATION AND CLOSURE PHASE

Impacts on Ecology (Fauna, Avifauna and Flora)

- Impacts on flora species due to spread and/or establishment of alien and/or invasive species may occur during the decommissioning and rehabilitation phases. In the absence of mitigation measures, the severity of the impact is expected to be high.

- With the implementation of mitigation measures focused on preventing impacts and thereby reducing the duration and probability of the impacts occurring, the significance is reduced to low.

Impacts on Aquatic and Wetland Biodiversity

- Backfilling of voids and removal of infrastructure will result in restoration of the catchment water yield. The unmitigated impact is considered low and will remain low should the necessary mitigation measures be applied.

- Backfilling of voids and shaping of the catchment area may result in an increase in concentrations of suspended solids.

- The unmitigated impact is considered low and will remain low should the necessary mitigation measures be applied.

- Backfilling of voids during rehabilitation will result in the restoration of shallow recharge. The unmitigated impact is considered low and will remain low should the necessary mitigation measures be applied.

- Degradation of soil resources by means of vehicle transportation may result leaks and compaction as well as contamination of surface water resources. Contaminants from the project are expected to include fuels, hydrocarbons, hazardous wastes etc. In the absence of mitigation measures, given the importance of the Vaal River system and based on the mine plan, the severity of the unmitigated impact would be medium. With the implementation of mitigation measures, the potential impact is reduced to low significance.

- Ripping of compacted areas will result in an improvement in soil quality. The unmitigated impact is considered low and will remain low should the necessary mitigation measures be applied.

Socio-Economic Impacts

- Typically, the major social impacts associated with the decommissioning phase are linked to the loss of jobs and associated income. The unmitigated impacts are considered low medium to low and would be reduced to low should the appropriate mitigation measures be implemented.

An initial significance rating (listed under *v) Impacts and Risks Identified*) was determined for each potential impact should the mitigation measures proposed in this document not be implemented on-site as per the scoping report. The impact assessment process then continued in identifying mitigation measures to address the impact that the proposed mining activity may have on the surrounding environment. The significance rating was again determined for each impact associated with the three identified alternatives (S1, S2 & S3) using the methodology as explained under *vi) Methodology Used in Determining and Ranking the Significance*. The impact ratings listed below was determined for each impact **after** bringing the proposed mitigation measures into consideration and therefore represents the final layout/activity proposal.

SITE ESTABLISHMENT PHASE - STRIPPING AND STOCKPILING OF TOPSOIL

Biodiversity: Loss of areas classified as CBA (Free State CBA, 2014) and sensitive rocky ridges

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low - Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
3	5	1	3	4	1	2.5	**7.5**
Rating: Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
3	5	1	3	4	1	2.5	**7.5**
Rating: Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
3	5	1	3	4	1	2.5	**7.5**

Biodiversity: Loss of area of plant endemism (Mucina and Rutherford, 2006)

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low - Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
3	5	1	3	4	1	2.5	**7.5**
Rating: Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
3	5	1	3	4	1	2.5	**7.5**
Rating: Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
3	5	1	3	4	1	2.5	**7.5**

Biodiversity: Loss of Endangered & Vulnerable habitat (MBSP, 2014) (NBA, 2011)

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low			**Alternative 1**		**Degree of Mitigation: Partial**		
3	5	1	3	2	1	1.5	**4.5**
Rating: Low			**Alternative 2**		**Degree of Mitigation: Partial**		
3	5	1	3	2	1	1.5	**4.5**
Rating: Low			**Alternative 3**		**Degree of Mitigation: Partial**		
3	5	1	3	2	1	1.5	**4.5**

Flora: Loss of plant species of conservation importance (IUCN, 2018)

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low			**Alternative 1**		**Degree of Mitigation: Partial**		
3	5	1	3	2	1	1.5	**4.5**
Rating: Low			**Alternative 2**		**Degree of Mitigation: Partial**		
3	5	1	3	2	1	1.5	**4.5**
Rating: Low			**Alternative 3**		**Degree of Mitigation: Partial**		
3	5	1	3	2	1	1.5	**4.5**

Flora: Encroachment of alien invasive plant species

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	1	2	**5.2**
Rating: Low-Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	1	2	**5.2**
Rating: Low-Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	1	2	**5.2**

Fauna: Loss of habitat for species of conservation concern (NBA, 2011)

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low			**Alternative 1**		**Degree of Mitigation: Partial**		
3	5	1	3	2	1	1.5	**4.5**
Rating: Low			**Alternative 2**		**Degree of Mitigation: Partial**		
3	5	1	3	2	1	1.5	**4.5**
Rating: Low			**Alternative 3**		**Degree of Mitigation: Partial**		
3	5	1	3	2	1	1.5	**4.5**

Fauna: Displacement, direct mortalities and disturbance of faunal community (including multiple threatened species) due to habitat loss and disturbances (such as dust and noise), and poaching

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low			**Alternative 1**		**Degree of Mitigation: Partial**		
3	5	1	3	2	1	1.5	**4.5**
Rating: Low			**Alternative 2**		**Degree of Mitigation: Partial**		
3	5	1	3	2	1	1.5	**4.5**
Rating: Low			**Alternative 3**		**Degree of Mitigation: Partial**		
3	5	1	3	2	1	1.5	**4.5**

Aquatic and wetland biodiversity: Displacement, direct mortalities and disturbance

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
3	5	1	3	4	1	2.5	**7.5**
Rating: Low-Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
3	5	1	3	4	1	2.5	**7.5**
Rating: Low-Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
3	5	1	3	4	1	2.5	**7.5**

Aquatic and wetland biodiversity: Reduction in surface water quality affecting third party users

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**

Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
3	5	1	3	4	1	2.5	**7.5**
Rating: Low-Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
3	5	1	3	4	1	2.5	**7.5**
Rating: Low-Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
3	5	1	3	4	1	2.5	**7.5**

Surface water: Some of the proposed mining deposits occur within drainage lines. The function of these drainage lines is to drain the area during and post rainfall. Mining through drainage lines may result in flooding of pits and other infrastructure, as well as a loss of runoff reporting to the Vaal River.

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
3	5	1	3	4	1	2.5	**7.5**
Rating: Low-Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
3	5	1	3	4	1	2.5	**7.5**
Rating: Low-Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
3	5	1	3	4	1	2.5	**7.5**

Ground water: Reduction in groundwater quantity affecting third party users

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
3	5	1	3	4	1	2.5	**7.5**
Rating: Low-Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
3	5	1	3	4	1	2.5	**7.5**
Rating: Low-Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
3	5	1	3	4	1	2.5	**7.5**

Ground water: Groundwater seepage into the open pits

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
3	5	3	3.6	4	3	3.5	**12.6**
Rating: Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
3	5	3	3.6	4	3	3.5	**12.6**
Rating: Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
3	5	3	3.6	4	3	3.5	**12.6**

Alteration of the agricultural sense of place

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: High			**Alternative 1**		**Degree of Mitigation: Partial**		
3	5	4	4	5	5	5	**20**
Rating: High			**Alternative 2**		**Degree of Mitigation: Partial**		
3	5	4	4	5	5	5	**20**
Rating: High			**Alternative 3**		**Degree of Mitigation: Partial**		
3	5	4	4	5	5	5	**20**

Loss of agricultural land for duration of mining

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low			**Alternative 1**		**Degree of Mitigation: Partial**		
1	4	1	2	3	1	2	**4**
Rating: Low			**Alternative 2**		**Degree of Mitigation: Partial**		
1	4	1	2	3	1	2	**4**
Rating: Low			**Alternative 3**		**Degree of Mitigation: Partial**		
1	4	1	2	3	1	2	**4**

Visual intrusion as a result of mining

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
3	5	2	3.3	4	5	4.5	**14.8**
Rating: Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
3	5	2	3.3	4	5	4.5	**14.8**
Rating: Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
3	5	2	3.3	4	5	4.5	**14.8**

Potential impact on vegetation and listed and protected plant species

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low			**Alternative 1**		**Degree of Mitigation: Partial**		
3	5	1	3	2	1	1.5	**4.5**
Rating: Low			**Alternative 2**		**Degree of Mitigation: Partial**		
3	5	1	3	2	1	1.5	**4.5**
Rating: Low			**Alternative 3**		**Degree of Mitigation: Partial**		
3	5	1	3	2	1	1.5	**4.5**

Loss of topsoil and fertility during mining and stockpiling

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low			**Alternative 1**		**Degree of Mitigation: Partial**		

3	5	1	3	2	1	1.5	**4.5**
Rating: Low			**Alternative 2**		**Degree of Mitigation: Partial**		
3	5	1	3	2	1	1.5	**4.5**
Rating: Low			**Alternative 3**		**Degree of Mitigation: Partial**		
3	5	1	3	2	1	1.5	**4.5**

Dust nuisance as a result of the mining activities

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	4	3.5	**9.1**
Rating: Low-Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	4	3.5	**9.1**
Rating: Low-Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	4	3.5	**9.1**

Noise nuisance as a result of the mining activities

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	4	3.5	**9.1**
Rating: Low-Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	4	3.5	**9.1**
Rating: Low-Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	4	3.5	**9.1**

Potential impact on archaeological artefacts

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low			**Alternative 1**		**Degree of Mitigation: Partial**		
3	5	1	3	2	1	1.5	**4.5**
Rating: Low			**Alternative 2**		**Degree of Mitigation: Partial**		
3	5	1	3	2	1	1.5	**4.5**
3			5		1		
3	5	1	3	2	1	1.5	**4.5**

Potential increased erosion risk

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	2	2	**5.2**
Rating: Low-Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	2	2	**5.2**
Rating: Low-Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	2	2	**5.2**

Potential socio-economic Impacts (Positive Imapct)

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: High			**Alternative 1**		**Degree of Mitigation: Partial**		
4	5	4	4.3	5	5	5	**21.5**
Rating: High			**Alternative 2**		**Degree of Mitigation: Partial**		
4	5	4	4.3	5	5	5	**21.5**
Rating: High			**Alternative 3**		**Degree of Mitigation: Partial**		
4	5	4	4.3	5	5	5	**21.5**

OPERATIONAL PHASE - EXCAVATION OF SAND FROM THE MINING FOOTPRINT AND LOADING ONTO TRUCKS

Change in land use affecting surrounding land uses

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: High			**Alternative 1**		**Degree of Mitigation: Partial**		
3	5	4	4	5	5	5	**20**
Rating: High			**Alternative 2**		**Degree of Mitigation: Partial**		
3	5	4	4	5	5	5	**20**
Rating: High			**Alternative 3**		**Degree of Mitigation: Partial**		
3	5	4	4	5	5	5	**20**

Reduction in groundwater quantity affecting third party users

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
2	5	4	3.6	2	1	1.5	**5.4**
Rating: Low - Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
3	5	4	3.6	2	1	1.5	**5.4**
Rating: Low - Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
3	5	4	3.6	2	1	1.5	**5.4**

Groundwater seepage into the open pits, resulting in dirty water. The pits may also become flooded due to high seepage rates.

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
3	5	3	3.6	4	3	3.5	**12.6**
Rating: Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
3	5	3	3.6	4	3	3.5	**12.6**
Rating: Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
3	5	3	3.6	4	3	3.5	**12.6**

Loss of water volumes and a reduction of flows in the Vaal River

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	2	2	**5.2**
Rating: Low-Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	2	2	**5.2**
Rating: Low-Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	2	2	**5.2**

Runoff from the plant area and stockpiles is likely to contain high levels of TSS and potentially high dissolved solids that could runoff into the environment

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	2	2	**5.2**
Rating: Low-Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	2	2	**5.2**
Rating: Low-Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	2	2	**5.2**

Decrease in air quality from project emissions l

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	4	3.5	**9.1**
Rating: Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	4	3.5	**9.1**
Rating: Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	4	3.5	**9.1**

Visual intrusion associated with the extraction of the mineral

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
3	5	2	3.3	4	5	4.5	**14.8**
Rating: Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
3	5	2	3.3	4	5	4.5	**14.8**
Rating: Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
3	5	2	3.3	4	5	4.5	**14.8**

Creating steep slopes and uneven surfaces

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	2	2	**5.2**

Rating: Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	2	2	**5.2**
Rating: Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	2	2	**5.2**

Soil contamination from hydrocarbon spills

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	2	2	**5.2**
Rating: Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	2	2	**5.2**
Rating: Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	2	2	**5.2**

Disturbance to fauna within the footprint area

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low			**Alternative 1**		**Degree of Mitigation: Partial**		
3	5	1	3	2	1	1.5	**4.5**
Rating: Low			**Alternative 2**		**Degree of Mitigation: Partial**		
3	5	1	3	2	1	1.5	**4.5**
Rating: Low			**Alternative 3**		**Degree of Mitigation: Partial**		
3	5	1	3	2	1	1.5	**4.5**

Dust nuisance as a result of the mining activities

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	4	3.5	**9.1**
Rating: Low-Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	4	3.5	**9.1**
Rating: Low-Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	4	3.5	**9.1**

Noise nuisance as a result of the mining activities

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	5	3.5	**9.1**
Rating: Low-Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	4	3.5	**9.1**
Rating: Low-Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	4	3.5	**9.1**

Potential impact associated with littering at the mining area

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	4	3	**7.8**
Rating: Low-Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	4	3	**7.8**
Rating: Low-Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	4	3	**7.8**

Potential impact on areas of palaeontological concern

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low			**Alternative 1**		**Degree of Mitigation: Partial**		
3	5	1	3	2	1	1.5	**4.5**
Rating: Low			**Alternative 2**		**Degree of Mitigation: Partial**		
3	5	1	3	2	1	1.5	**4.5**
Rating: Low			**Alternative 3**		**Degree of Mitigation: Partial**		
3	5	1	3	2	1	1.5	**4.5**

Facilitation of erosion

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	2	2	**5.2**
Rating: Low-Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	2	2	**5.2**
Rating: Low-Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	2	2	**5.2**

Economic development contributions (Positive Impact)

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: High			**Alternative 1**		**Degree of Mitigation: Partial**		
4	5	4	4.3	5	5	5	**21.5**
Rating: High			**Alternative 2**		**Degree of Mitigation: Partial**		
4	5	4	4.3	5	5	5	**21.5**
Rating: High			**Alternative 3**		**Degree of Mitigation: Partial**		
4	5	4	4.3	5	5	5	**21.5**

Potential impact on Tourism in the area

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: High			**Alternative 1**		**Degree of Mitigation: Partial**		

3	5	4	4	5	5	5	**20**
Rating: High			**Alternative 2**		**Degree of Mitigation: Partial**		
3	5	4	4	5	5	5	**20**
Rating: High			**Alternative 3**		**Degree of Mitigation: Partial**		
3	5	4	4	5	5	5	**20**

OPERATIONAL PHASE - TRANSPORTING OF MINERAL

Dust nuisance caused by vehicles transporting the mineral

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	4	3.5	**9.1**
Rating: Low-Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	4	3.5	**9.1**
Rating: Low-Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	4	3.5	**9.1**

Traffic impact road as a result of the mining activity

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
3	5	4	4	4	3	3.5	**14**
Rating: Low-Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
3	5	4	4	4	3	3.5	**14**
Rating: Low-Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
3	5	4	4	4	3	3.5	**14**

CUMULATIVE IMPACTS

Reduced ability to meet conservation obligations and targets

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
3	5	1	2.6	2	2	2	**5.2**
Rating: Low-Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
3	5	1	2.6	2	2	2	**5.2**
Rating: Low-Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
3	5	1	2.6	2	2	2	**5.2**

Impact the broad-scale ecological processes

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
3	5	1	2.6	2	2	2	**5.2**
Rating: Low-Medium			**Alternative 2**		**Degree of Mitigation: Partial**		

3	5	1	2.6	2	2	2	**5.2**
Rating: Low-Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
3	5	1	2.6	2	2	2	**5.2**

SLOPING AND LANDSCAPING (MEDIUM- & LONG TERM)

Erosion of returned topsoil after rehabilitation

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	2	2	**5.2**
Rating: Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	2	2	**5.2**
Rating: Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	2	2	**5.2**

Infestation of the reinstated area with invader plant species

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	1	2	**5.2**
Rating: Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	1	2	**5.2**
Rating: Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
2	5	1	2.6	3	1	2	**5.2**

Potential impact associated with litter left at the mining area

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	4	3	**7.8**
Rating: Low-Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	4	3	**7.8**
Rating: Low-Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	4	3	**7.8**

Uneven surfaces or steep slopes left upon closure of the site

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	2	2	**5.2**
Rating: Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	2	2	**5.2**
Rating: Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
2	5	1	2.6	2	2	2	**5.2**

Return of the mining area to agricultural / ECO Estate use upon closure **(Positive Impact)**

			Consequence				
Severity	Duration	Extent		Probability	Frequency	Likelihood	**Significance**
Rating: Low-Medium			**Alternative 1**		**Degree of Mitigation: Partial**		
4	5	4	4.3	5	5	5	**21.5**
Rating: Medium			**Alternative 2**		**Degree of Mitigation: Partial**		
4	5	4	4.3	5	5	5	**21.5**
Rating: Medium			**Alternative 3**		**Degree of Mitigation: Partial**		
4	5	4	4.3	5	5	5	**21.5**

ENVIRONMENTAL IMPACT ASSESSMENT RESULTS

SITE ESTABLISHMENT PHASE - STRIPPING AND STOCKPILING OF TOPSOIL	
Biodiversity: Loss of areas classified as CBA (Free State CBA, 2014) and sensitive rocky ridges	Low - Medium
Biodiversity: Loss of area of plant endemism (Mucina and Rutherford, 2006)	Low - Medium
Biodiversity: Loss of Endangered & Vulnerable habitat (MBSP, 2014) (NBA, 2011)	Low
Biodiversity: Loss of Endangered & Vulnerable habitat (MBSP, 2014) (NBA, 2011)	Low
Flora: Loss of plant species of conservation importance (IUCN, 2018)	Low
Flora: Encroachment of alien invasive plant species	Low-Medium
Fauna: Loss of habitat for species of conservation concern (NBA, 2011)	Low
Fauna: Displacement, direct mortalities and disturbance of faunal community (including multiple threatened species) due to habitat loss and disturbances (such as dust and noise), and poaching	Low
Aquatic and wetland biodiversity: Displacement, direct mortalities and disturbance	Low-Medium
Aquatic and wetland biodiversity: Reduction in surface water quality affecting third party users	Low-Medium
Surface water: Some of the proposed mining deposits occur within drainage lines. The function of these drainage lines is to drain the area during and post rainfall. Mining through drainage lines may result in flooding of pits and other	Low-Medium

infrastructure, as well as a loss of runoff reporting to the Vaal River	
Ground water: Reduction in groundwater quantity affecting third party users	Low-Medium
Ground water: Groundwater seepage into the open pits	Medium
Alteration of the agricultural sense of place	High
Loss of agricultural land for duration of mining	Low
Visual intrusion as a result of mining	Medium
Potential impact on vegetation and listed and protected plant species	Low
Loss of topsoil and fertility during mining and stockpiling	Low
Dust nuisance as a result of the mining activities	Low-Medium
Noise nuisance as a result of the mining activities	Low-Medium
Potential impact on archaeological artefacts	Low
Potential increased erosion risk	Low-Medium
Potential socio-economic Impacts	High – Positive Impact
OPERATIONAL PHASE - EXCAVATION OF SAND FROM THE MINING FOOTPRINT AND LOADING ONTO TRUCKS	
Change in land use affecting surrounding land uses	High
Reduction in groundwater quantity affecting third party users	Low-Medium
Groundwater seepage into the open pits, resulting in dirty water. The pits may also become flooded due to high seepage rates	Medium

Reduction in groundwater quantity affecting third party users	Low-Medium
Loss of water volumes and a reduction of flows in the Vaal River	Low-Medium
Runoff from the plant area and stockpiles is likely to contain high levels of TSS and potentially high dissolved solids that could runoff into the environment	Low-Medium
Decrease in air quality from project emissions	Low-Medium
Visual intrusion associated with the extraction of the mineral	Medium
Creating steep slopes and uneven surfaces	Low-Medium
Soil contamination from hydrocarbon spills	Low-Medium
Disturbance to fauna within the footprint area	Low
Dust nuisance as a result of the mining activities	Low
Noise nuisance as a result of the mining activities	Low-Medium
Potential impact associated with littering at the mining area	Low-Medium
Potential impact on areas of palaeontological concern	Low
Facilitation of erosion	Low-Medium
Economic development contributions	High – Positive Impact
Potential impact on Tourism in the area	High
OPERATIONAL PHASE - TRANSPORTING OF MINERAL	

Dust nuisance caused by vehicles transporting the mineral	Low-Medium
Traffic impact road as a result of the mining activity	Low-Medium
OPERATIONAL PHASE - CUMULATIVE IMPACTS	
Reduced ability to meet conservation obligations and targets	Low-Medium
Impact the broad-scale ecological processes	Low-Medium
DISCOMMISSIONING PHASE - SLOPING AND LANDSCAPING (MEDIUM- & LONG TERM)	
Erosion of returned topsoil after rehabilitation	Low-Medium
Infestation of the reinstated area with invader plant species	Low-Medium
Potential impact associated with litter left at the mining area	Low-Medium
Uneven surfaces or steep slopes left upon closure of the site	Low-Medium
Return of the mining area to agricultural / ECO Estate use upon closure (Positive Impact)	High – Positive Impact

An initial significance rating (listed under *v) Impacts and Risks Identified*) was determined for each potential impact should the mitigation measures proposed in this document not be implemented on-site. The impact assessment process then continued in identifying mitigation measures to address the impact that the proposed mining activity may have on the surrounding environment. The significance rating was again determined for each impact associated with the three identified alternatives (S1, S2 &S3) using the methodology as explained under *vi) Methodology Used in Determining and and Ranking the Significance*

i) 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 38: Assessment of each identified potentially significant impact and risk.

ACTIVITY	ASPECTS AFFECTED	IMPACT DESCRIPTION	PHASE	SIGNIFICANCE	MITIGATION MEASURES/RECOMMENDATIONS	Signif after mi
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, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)			In which impact is anticipated. (E.g. Construction, commissioning, operational Decommissioning closure, post closure.)	If not mitigated	(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 through rehabilitation.	If miti
Open pit mining, site clearance for infrastructure and associated access roads as well as disturbances such as noise, vibrations, dust and increased human presence (and possible poaching)	Ecology (Fauna, Avifauna and Flora)	Loss of areas classified as CBA (Free State CBA, 2014) and sensitive rocky ridges	Site Establishment- & Operational Phase	S1,2,3 High (negative)	Control: Implementation of proper housekeeping and site management • Avoid CBA areas and implement bufferzones.	S1 Low - Me
		Loss of area of plant endemism (Mucina and Rutherford, 2006)		S1,2,3 High (negative)	Control: Implementation of proper housekeeping and site management • Avoid areas of remaining indigenous vegetation, restrict infrastructure areas to brownfield areas only.	S1 Low Med
		Loss of Endangered & Vulnerable habitat (MBSP, 2014) (NBA, 2011)		S1,2,3 High (negative)	Control: Implementation of proper housekeeping and site management • Avoid high biodiversity sensitivity areas (natural vegetation, watercourses and wetlands) and comply to prescribed bufferzones.	S1 L
Open pit mining, site clearance for infrastructure and associated access roads as well as disturbances such as noise, vibrations, dust and increased human presence	Flora	Loss of plant species of conservation importance (IUCN, 2018)	Site Establishment- & Operational Phase	S1,2,3 High (negative)	Control: Implementation of proper housekeeping and site management • Avoid areas in which plant species of conservation concern occur. • If some areas cannot be avoided implement rescue of plant species of conservation concern.	S1 Low
		Encroachment of alien invasive plant species		S1,2,3 High (negative)	Control: Implementation of proper housekeeping and site management • An alien invasive plant management plan needs to be compiled and implemented during construction to prevent the growth of invasive species on cleared areas.	S1 Low Med

Open pit mining, site clearance for infrastructure and associated access roads as well as disturbances such as noise, vibrations, dust and increased human presence (and possible poaching)	Fauna	Loss of habitat for species of conservation concern (NBA, 2011)	Site Establishment- & Operational Phase	S1,2,3 High (negative)	Control: Implementation of proper housekeeping and site management • Avoid high biodiversity sensitivity areas (natural vegetation, ridges, watercourses & wetlands) and comply to prescribed bufferzones.	S1 H
		Displacement, direct mortalities and disturbance of faunal community (including multiple threatened species) due to habitat loss and disturbances (such as dust and noise), and poaching		S1,2,3 High (negative)	Control: Implementation of proper housekeeping and site management • Implement training to ensure that all staff members are aware of faunal sensitivity. Put protocols in place to deal with fauna that are encountered during construction.	S1 L
Open pit mining, site clearance for infrastructure and associated access	Aquatic and wetland biodiversity	Destruction of wetland systems	Site Establishment- & Operational Phase	S1,2,3 High (negative)	Control: Implementation of proper housekeeping and site management • Limit site clearance to what is absolutely necessary. • Avoid sensitive areas as far as practically possible. • Ensure necessary setback distances from watercourses and wetlands. • Implementation of an alien invasive species programme. • Limit emissions (dust, light, noise). • Training of employees on the value of biodiversity. • Zero tolerance for harming and harvesting fauna and flora. • Effective waste management and pollution prevention. • Implementation of a biodiversity action plan to ensure that the undeveloped/disturbed areas within the property are properly conserved and maintained. • Effective rehabilitation to achieve post closure land use.	S1 Low

		Reduction in surface water quality affecting third party users		S1,2,3
				High (negative)
					Control: Implementation of proper housekeeping and site management
					• Design and implement contamination containment measures.
					• Mine infrastructure will be constructed and operated so as to comply with the National Water Act 36 of 1998 and Regulation 704 (4 June 1999):
					  • Clean and dirty water system will be separate.
					  • Clean run-off will be diverted away from the site.
					  • Dirty water will be contained.
					• Conduct surface water monitoring and implement remedial actions as required.
					• Effective equipment and vehicle maintenance.
					• Fast and effective clean-up of spills.
					• Effective waste management.
					• Education and training of workers.
						S1
						Low-M

					• Apply and operate in line with a water use license. • Develop and implement a stormwater management plan to minimise containment areas and divert clean water away from the site. • Effective rehabilitation to achieve post closure land use.	
Open pit mining through drainage lines	Surface water	Some of the proposed mining deposits occur within drainage lines. The function of these drainage lines is to drain the area during and post rainfall. Mining through drainage lines may result in flooding of pits and other infrastructure, as well as a loss of runoff reporting to the Vaal River.	Site Establishment- & Operational Phase	S1,2,3 Medium (negative)	<u>Control:</u> Implementation of proper housekeeping and site management • According to Regulation 4 (a) and (b) of GN704, no mining should take place within a 100 m buffer of watercourses, or within the 1:50 and 1:100 year floodlines, unless exemption is obtained. Should mining be permitted within the drainage lines, then upstream runoff should be diverted around the open pits, to prevent any unnecessary flooding.	S1 Low-M
Open pit mining, site clearance for infrastructure and associated access	Pedology	Potential disturbances include compaction, physical removal and potential pollution as well as soil erosion. The exposed soil surfaces have the potential to erode easily if left uncovered which could lead to the loss of the soil resources. Soils that are excavated for the installation of foundations will have their physical and chemical states altered negatively. There may also be potential loss of stockpiled topsoil and other materials through erosion if not protected properly. Insufficient storm water control measures may result in localised high levels of soil erosion, possibly creating dongas or gullies, which may lead to decreased water quality in surrounding watercourses. Increased erosion could result in increased sedimentation which could impact on ecological processes	Site Establishment- & Operational Phase	S1,2,3 Medium (negative)	<u>Control:</u> Implementation of proper housekeeping and site management	S1 Low-M

		The additional hardened surfaces created during construction could increase the amount of storm water runoff, which has the potential to cause erosion. Physical disturbance of the soil and plant removal may result in soil erosion/loss. Erosion and potential soil loss from cut and fill activities and areas where naturally dispersive soils occur. The unmitigated impact is considered to be of medium significance and can be reduced to low significance should the necessary mitigation measures be applied.				
Groundwater seepage into the open pits		It is highly likely that groundwater will seep into the open pits, resulting in dirty water. The pits may also become flooded due to high seepage rates.	Operational Phase	S1,2,3 Medium (negative)	<u>Control:</u> Implementation of proper housekeeping and site management • Dirty water from the pits should be dewatered for use at the plant. This should ensure that water levels within the pits are maintained at suitable levels. Dirty water should be kept in a closed system, to ensure that it does not report to the environment.	S1 Me
Open pit mining, site clearance for infrastructure and associated access	Ground water	Reduction in groundwater quantity affecting third party users	Site Establishment-	S1,2,3 High (negative)	<u>Control:</u> Implementation of proper housekeeping and site management • Conduct groundwater monitoring and implement remedial actions where required. This includes compensation for mine related loss of third party water supply. • This monitoring programme should include third party boreholes. • Apply and operate in line with a water use license. Minimise water usage and optimise water recycling and treatment of dewatering water.	S1 Low-M
Abstraction of water from the Vaal River	Water quantity	Loss of water volumes and a reduction of flows in the Vaal River	Operational Phase	S1,2,3 Medium (negative)	<u>Control:</u> Implementation of proper housekeeping and site management • The plant is likely to have the highest water demands for the Project. Unnecessary pumping of water from the Vaal River must be avoided. This can be done through the recycling of water from groundwater seepage and runoff into the pits, for use at the plant.	S1 Low-M

Operation of the plant area and stockpiles	Water quantity	Runoff from the plant area and stockpiles is likely to contain high levels of TSS and potentially high dissolved solids that could runoff into the environment.	Operational Phase	S1,2,3 Medium (negative)	<u>Control:</u> Implementation of proper housekeeping and site management • A stormwater management plan must be designed and implemented that captures and contains dirty water runoff from the site, in accordance with the requirements stipulated in the GN704 Regulations. Dirty water captured, should be recycled and used at the plant, and should not be allowed to report to the environment.	S1 Low-M
Open pit mining, site clearance for infrastructure and associated access	Riverine Ecology	Vegetation clearance during the construction phase may result in the alteration of catchment drainage, resulting in an increased runoff velocity and erosion. In the absence of mitigation measures, the severity of the impact is expected to be medium. The significance can be reduced to low should mitigation measures be implemented.	Site Establishment & Operational Phase	S1,2,3 Medium (negative)	<u>Control:</u> Implementation of proper housekeeping and site management	S1 Low-M
		Construction of infrastructure and minor earthworks may result in the alteration of the catchment drainage and exposure of un-weathered materials, resulting in increased dissolved solid concentrations in local water bodies. In the absence of mitigation measures, the severity of the impact is expected to be medium. The significance can be reduced to low should mitigation measures be implemented.				
		Placement of infrastructure within the catchment area may result in the alteration of the catchment drainage thus causing erosion and sedimentation. In the absence of mitigation measures, the severity of the impact is expected to be medium. The significance can be reduced to low should mitigation measures be implemented.				

Open pit mining, site clearance for infrastructure and associated access	Air quality	Decrease in air quality from project emissions	Site Establishment- & Operational Phase	S1,2,3 High (negative)	Control: Implementation of proper housekeeping and site management • Limit disturbed areas. • Supress dust effectively. • Maintain equipment and vehicles in good working order. • Monitor pollutants of concern and implement additional mitigation as required. • Effective rehabilitation to achieve post closure land use.	S1 Low-M
Open pit mining, site clearance for infrastructure and associated access	Noise	Increase in noise levels		S1,2,3 High (negative)	Control: Implementation of proper housekeeping and site management • Maintain vehicles and equipment in good working order. • Provide noise berms where possible between activities and receptors • Conduct noise monitoring in response to noise complaints.	S1 Low-M
Open pit mining, site clearance for infrastructure and associated access	Traffic	Effect on roads due to project related traffic		S1,2,3 High (negative)	Control: Implementation of proper housekeeping and site management • Road markings, reflective road studs (LED), road signs and overhead lights should be provided and maintained at all the relevant intersections under investigation to ensure visibility during night time, proper visibility of intersection lane geometry and sufficient information to road users. • Construct safe access points/intersections. • Enforce strict vehicle speeds. • If a person or animal is injured by transport activities an emergency response procedure must be implemented. • In order to ensure that mined product and workers can be transported at all times with reference to Road S171, it is recommended that a Roads Maintenance Plan be prepared in collaboration with other land owners, developments and the relevant road authority. • Road safety training for workers and local community. • Continuous maintenance of fencing along relevant roads (proposed mining development can only take responsibility for fencing for properties they own).	S1 Low-M

Open pit mining, site clearance for infrastructure and associated access	Visual	Removal of vegetation for infrastructure and open pit mining		S1,2,3 High (negative)	<u>Control:</u> Implementation of proper housekeeping and site management • Clearance of vegetation must be limited as far as possible to only necessary areas; • Tall dense vegetation that can conceal the Project from sensitive visual receptors, should as far as possible be left in place; and • Dust suppression measures should be implemented to limit the generation of dust. • If at all possible, the mined out areas should be rehabilitated to a pre-mining topography. • Mined out areas should be vegetated with indigenous species as soon as possible. This will to a degree, mitigate the visual intrusion of these areas on surround visual receptors.	S1 Me
		The movement of vehicles and heavy machinery likely to create a visual disturbance to surrounding visual receptors.	Site Establishment- & Operational Phase	S1,2,3 Medium (negative)	<u>Control:</u> Implementation of proper housekeeping and site management • Tall vegetation along the sides of the roads at the site should not be removed, in order to conceal vehicular movement; and Dust suppression measures should be implemented to limit the generation of dust along roads.	S1 Me
		The erection of mine infrastructure (plant, workshop, etc.) is likely to visually intrude on the landscape.		S1,2,3 Medium (negative)	<u>Control:</u> Implementation of proper housekeeping and site management • The height of the proposed mine infrastructure should be limited as far as possible; and Tall dense vegetation that can conceal the Project from sensitive visual receptors, should as far as possible be left in place.	S1 Me
Open pit mining, site clearance for infrastructure and associated access	Heritage and Palaeontology	Loss of or damage to heritage and/or palaeontological resources	Site Establishment- & Operational Phase	S1,2,3 High (negative)	<u>Control:</u> Implementation of proper housekeeping and site management • Plan project to avoid any resources of significant importance. • Training of workers regarding the heritage and cultural sites that may be encountered and about the need to conserve these. • Fence off and limit access to the heritage and cultural sites that could be indirectly disturbed by mining activities. • In the event that resources are identified, a chance find emergency procedure should be implemented.	S1 L

Open pit mining, site clearance for infrastructure and associated access roads as well as disturbances such as noise, vibrations, dust and increased human presence (and possible poaching)	Socio- economic	Negative socio-economic Impacts (influx of jobseekers, impacts on daily living and movement patterns, safety and security risks, nuisance impacts (noise and dust), impact of heavy vehicles, including damage to roads and dust and potential loss of productive agricultural land, job losses at the end of the mining period).	Site Establishment- & Operational Phase	S1,2,3 Medium (negative)	<u>Control:</u> Implementation of proper housekeeping and site management Work together with residents to manage issues such as security. • Employ local people and procure goods and services locally as far as practically possible. • Avoid through implementation of preventative measures (e.g. consultation and communication). • Avoidance and control through preventative measures (e.g. site security, code of conduct) and through mitigation measures (e.g. recruitment procedure, grievance mechanism and code of conduct). • Minimise impacts of job loss through compensation, skills development and livelihood restoration.	S1 L
Open pit mining, site clearance for infrastructure and associated access roads as well as disturbances such as noise, vibrations, dust and increased human presence (and possible poaching)		Positive socio-economic Impacts (job creation, skills development, increase in business opportunities for the construction, industrial and jewellery industries, Gross Domestic Product (GDP) improvement and wealth generation and contribution to royalties and tax revenues)	Site Establishment- & Operational Phase	S1,2,3 Medium (positive)	<u>Control:</u> Implementation of proper housekeeping and site management • Maximise positive impacts through optimisation of economic growth opportunities. • Develop and implement procedures for recruiting, training and procurement that align with good industry practise. • Employ local people and procure goods and services locally as far as practically possible. • Effective communication to manage expectations with regard to employment and other opportunities. • Ensure that closure planning considerations address the re-skilling of employees for the downscaling, early closure and long-term closure scenarios.	S1 High
Operation of open pit mining activities	Land-use	Change in land use affecting surrounding land uses	Operational Phase	S1,2,3 Medium (negative)	<u>Control:</u> Implementation of proper housekeeping and site management • Effectively manage biophysical, cultural and socio-economic impacts. • Effectively rehabilitate opencast mining areas in line with an approved rehabilitation plan that meets the post closure land use objectives and ensure successful rehabilitation as soon as mining is complete. • Schedule the opencast mining operations in a manner that minimises cumulative impacts on receptors. • Establish a stakeholder communication and grievance mechanisms for the duration of the mining operation.	S1 L

Operation of open pit mining activities	Topography	Surface subsidence	Operational Phase	S1,2,3 Medium (negative)	Control: Implementation of proper housekeeping and site management • Access control, barriers and warning signs at hazardous areas. • Monitoring and maintenance post closure to observe whether the relevant long-term safety objectives have been achieved and to identify the need for additional intervention where the objectives have not been met. • Where Pure Source Mine has caused injury or death to third parties and/or animals, appropriate compensation will be provided. • In case of injury or death due to subsidence, an • emergency response procedure must be implemented.	S1 Low -
		Alteration in surface water drainage patterns leading to erosion and consequent increase in TSS in surrounding watercourses.		S1,2,3 Medium (negative)	Control: Implementation of proper housekeeping and site management • Stormwater management measures around the dumps, plant area, etc. are proposed; and • Water quality sampling must be implemented upstream and downstream of construction areas. Specific parameters that should be monitored include TSS and turbidity. They should be kept within the baseline water quality range.	S1 Low -
	Surface water	Some of the proposed mining deposits occur within drainage lines. The function of these drainage lines is to drain the area during and post rainfall. Mining through drainage lines may result in flooding of pits and other infrastructure, as well as a loss of runoff reporting to the Vaal River.		S1,2,3 Medium (negative)	Control: Implementation of proper housekeeping and site management • According to Regulation 4 (a) and (b) of GN704, no mining should take place within a 100 m buffer of watercourses, or within the 1:50 and 1:100 year floodlines, unless exemption is obtained. Should mining be permitted within the drainage lines, then upstream runoff should be diverted around the open pits, to prevent any unnecessary flooding.	S1 Low-M
	Ground water	Reduction in groundwater quantity affecting third party users		S1,2,3 High (negative)	Control: Implementation of proper housekeeping and site management • Conduct groundwater monitoring and implement remedial actions where required. This includes compensation for mine related loss of third party water supply. • This monitoring programme should include third party boreholes. • Apply and operate in line with a water use license. • Minimise water usage and optimise water recycling and treatment of dewatering water.	S1 Low-M

Operation of open pit mining activities	Land capability and agricultural potential	It is highly likely that groundwater will seep into the open pits, resulting in dirty water. The pits may also become flooded due to high seepage rates.	Operational Phase	S1,2,3 Medium (negative)	Control: Implementation of proper housekeeping and site management • Dirty water from the pits should be dewatered for use at the plant. This should ensure that water levels within the pits are maintained at suitable levels. Dirty water should be kept in a closed • system, to ensure that it does not report to the environment.	S1 Me
	Water quantity	Loss of water volumes and a reduction of flows in the Vaal River		S1,2,3 Medium (negative)	Control: Implementation of proper housekeeping and site management • The plant is likely to have the highest water demands for the Project. Unnecessary pumping of water from the Vaal River must be avoided. This can be done through the recycling of water from groundwater seepage and runoff into the pits, for use at the plant.	S1 Low-M
	Water quantity	Runoff from the plant area and stockpiles is likely to contain high levels of TSS and potentially high dissolved solids that could runoff into the environment.		S1,2,3 Medium (negative)	Control: Implementation of proper housekeeping and site management • A stormwater management plan must be designed and implemented that captures and contains dirty water runoff from the site, in accordance with the requirements stipulated in the GN704 Regulations. • Dirty water captured, should be recycled and used at the plant, and should not be allowed to report to the environment.	S1 Low-M
	Heritage and palaeontology	Loss of or damage to heritage and/or palaeontological resources		S1,2,3 Medium (negative)	Control: Implementation of proper housekeeping and site management • Plan project to avoid any resources of significant importance. • Training of workers regarding the heritage and cultural sites that may be encountered and about the need to conserve these. • Fence off and limit access to the heritage and cultural sites that could be indirectly disturbed by mining activities. • In the event that resources are identified, a chance find emergency procedure should be implemented.	S1 L
Operation of open pit mining activities	Air quality	Decrease in air quality from project emissions	Operational Phase	S1,2,3 Medium (negative)	• Limit disturbed areas. • Supress dust effectively. • Maintain equipment and vehicles in good working order. • Monitor pollutants of concern and implement additional mitigation as required. • Effective rehabilitation to achieve post closure land use.	S1 Me

	Visual	Open pit mining will result in depressions that will be approximately 10 m in depth, and will visually intrude on the surrounding landscape. Dust will be generated during mining activities.		S1,2,3 High (negative)	Control: Implementation of proper housekeeping and site management • Limit the extent of disturbed areas. • Supress dust to prevent a visual dust cloud. • Effective waste management. • Implement effective use of lighting which reduces light spill. • Effective rehabilitation to achieve post closure land use. • The use of berms where appropriate.	S1 Me
		The development of stockpiles, as mining progresses, will visually intrude on the surrounding landscape.		S1,2,3 Medium ((negative)	Control: Implementation of proper housekeeping and site management • The height of stockpiles should be limited as far as possible.	S1 Low (n
		The movement of vehicles and heavy machinery during the operational phase is likely to create a visual disturbance to surrounding visual receptors		S1,2,3 Medium (negative)	Control: Implementation of proper housekeeping and site management • Tall vegetation along the sides of the roads at the site should not be removed, in order to conceal vehicular movement; and • Dust suppression measures should be implemented to limit the generation of dust along roads	S1 Low (n
Operation of open pit mining activities	Fauna	Loss of species of conservation concern and their habitat. Continued displacement, direct mortalities and disturbance of faunal community (including possible threatened species) due to habitat loss and disturbances (such as dust, poaching and noise)	Operational Phase	S1,2,3 High (negative)	Control: Implementation of proper housekeeping and site management • Mitigation measures can be added to infrastructure. • Monitoring impacts of operational activities on fauna so that adaptive management practises can be implemented if required. • Restrict access to high biodiversity areas (drainage lines, wetlands etc) in the vicinity of mining operations. • Implement training to ensure that all staff are aware of faunal sensitivity. Put protocols in place to deal with fauna that are encountered during operation.	S1 L
Operation of open pit mining activities	Economic	Project expenditure/investment	Operational Phase Site	S1,2,3 Low (positive)	The applicant's procurement processes, hiring and training of staff and other measures outlined in the Social and Labour Plan (SLP) should be implemented.	S1 High (p

Operation of open pit mining activities		Economic development contributions		S1,2,3 Low (positive)	Control: Implementation of proper housekeeping and site management • No mitigation is recommended. The SLP appears to be aligned with local government's published planning imperatives and seeks to optimise benefits resulting from the applicant's participation in the local economy.	S1 High (p
Operation of open pit mining activities		Tax, royalty and regulatory fees payments		S1,2,3 Low (positive)	• No mitigation measures are recommended.	S1 High (p
Operation of open pit mining activities		Property values		S1,2,3 High (negative)	Control: Implementation of proper housekeeping and site management • Impacts on property values are primarily dependent on how the applicant's operations are designed, constructed and operated to minimise negative biophysical and social impacts and enhance positive ones. The measures recommended in other specialist reports to minimise negative impacts (primarily visual, air quality, noise, water quality, traffic and social measures) and enhance positive impacts would thus also reduce impacts on property values and should be implemented.	S1 Me
Operation of open pit mining activities		Tourism		S1,2,3 High (negative)	Control: Implementation of proper housekeeping and site management • Impacts on tourism are primarily dependent on how project operations are designed, constructed and executed to minimise negative biophysical and social impacts and enhance positive impacts. The measures recommended in other specialist studies to minimise negative impacts (primarily visual, air quality, noise, water quality, botanical, rehabilitation and social measures) and enhance positive impacts would thus also reduce impacts on tourism and should be implemented. These measures are not repeated here. • Serious consideration should be given to funding tourism enhancement projects in collaboration with local tourism stakeholders as part of the mine's future Social and Labour Plan (SLP) contributions. This is a particular need given limited concerted efforts in this regard in the local area. Assistance could, for example, encompass tourism planning, promotion, capacity building, enterprise • development and the provision of tourist facilities.	S1 Mec

Operation of open pit activities	Traffic	Road safety		S1,2,3 High (negative)	Control: Implementation of proper housekeeping and site management • Road markings, reflective road studs (LED), road signs and overhead lights should be provided and maintained at all the relevant intersections under investigation to ensure visibility during night time, proper visibility of intersection lane geometry and sufficient information to road users. • Construct safe access points/intersections. • Enforce strict vehicle speeds. • If a person or animal is injured by transport activities an emergency response procedure must be implemented. • In order to ensure that mined product and workers can be transported at all times with reference to Road S171, it is recommended that a Roads Maintenance Plan be prepared in collaboration with other land owners, developments and the relevant road authority. • Road safety training for workers and local community. • Continuous maintenance of fencing along relevant roads (proposed mining development can only take responsibility for fencing for properties they own).	S1 Low-M
Decommissioning activities, including removal of infrastructure and rehabilitation of mined areas.	Flora	Further impacts due to the spread and/or establishment of alien and/or invasive species	Decommissioning Phase	S1,2,3 High (negative)	Control: Implementation of proper housekeeping and site management • Implementation of alien invasive plant management plan needs to be continued during decommissioning to prevent the growth of invasive species on rehabilitated areas. Rehabilitation of site with indigenous vegetation that occurs in the vicinity of Project area.	S1 Low-M
	Fauna	Continued displacement, direct mortalities and disturbance of faunal community (including possible threatened species) due to habitat loss and disturbances (such as dust, poaching and noise)	Decommissioning Phase	S1,2,3 High (negative)	Control: Implementation of proper housekeeping and site management • Any infrastructure that could have a negative impact on faunal species needs to be decommissioned and removed.	S1 L

The supporting impact assessment conducted by the EAP must be attached as an appendix, marked Appendix L.

j) 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):

Table 39: Summary of specialist reports.

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
Heritage Impact Assessment: *(See Appendix F for a full copy of the assessment)* Conducted in accordance with the requirements of Appendix 6 of the NEMA EIA Regulations 2014 (as amended).	A heritage impact assessment study was completed by NGT ESHS for the MRA. A standard heritage study process was completed with a survey conducted on the 26th of March 2019. Findings from the survey indicated six stone wall sites, five building structures, a single grave, and 51 graves in an informal cemetery. Stone Age and Iron Age settlements Six stone wall sites were identified and were assigned as sites of medium significance, these sites were determined to have heritage significance. Most wall structures were noted to be dated to the late iron age/early historical period. Buildings and Structures Although several stone-walled enclosures were recorded in the survey area, none are older than 60 years and therefore not protected under the NHRA (Act no 25 of 1999). No further action is required. An important site was observed which included Site 1 which is a strategic entrenchment (redoubt) that probably dates to the South African War (Anglo-Boer War) of 1899 – 1902. The structure is therefore older than 60 years and as a result protected under the NHRA (Act 25 of 1999). Any impact on the site will have to be mitigated by a Phase 2 investigation.	All the recommendations proposed by the specialist are to be implemented on site	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: *Cultural and Heritage Environment.* Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk: *Archaeological, Heritage and Paleontological Aspects.* Part A(1)(u)(i)(2) Impact on any national estate referred to in section 3(2) of the NHRA.

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
	Graves A cemetery with 48 graves was recorded. Although some of the graves do have inscriptions on the headstones, some of them do not and as a result are also protected under the NHRA (Act 25 of 1999). If impact will occur in the near future, mitigation measures may entail full grave relocation. Such a relocation process must be undertaken by suitably qualified individuals with a proven track record. The relocation must also be undertaken in full cognisance of all relevant legislation, including the specific requirements of the National Heritage Resource Act (Act no. 25 of 1999). Furthermore, a concerted effort must also be made to identify all buried individuals and to contact their relatives and descendants. Other legislative measures which may be of relevance include the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), the Human Tissues Act (Act no. 65 of 1983, as amended), the Ordinance on Excavations (Ordinance no. 12 of 1980) as well as any local and regional provisions, laws and by-laws that may be in place. Recommendations It was recommended that all stone walls located in the study area have heritage value and are completely avoided and established as no-goareas. It was further recommended that should mining activities encroach onto identified historical sites that a Phase II heritage study is completed where a demolition permit must be applied for.		

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
	A key recommendation provided include the implementation of the chance find process which must be implemented during the active mining. Also note the following: It should be kept in mind that archaeological deposits usually occur below ground level. Should archaeological artefacts or skeletal material be revealed in the area during construction activities, such activities should be halted, and a university or museum notified in order for an investigation and evaluation of the find(s) to take place (cf. NHRA (Act No. 25 of 1999), Section 36 (6))..		
	According to the South African Heritage Resources Agency (SAHRA) website and the South African Heritage Information System (SAHRIS) Fossil Sensitivity Map, the application area is depicted having very high (red), high (orange/yellow) and moderate (green) fossil sensitivity and therefore, warrants careful scrutiny. This desktop study has revealed that the palaeontological sensitivity of the Goosebay property is very low. The rock formations that underlie the area are older than 2 400 million years and formed long before the evolution of plants and animals. Dolomite rocks in the area were deposited by bacterial colonies, and reef-like features constructed by these colonies may be preserved in the rocks. While interesting to sedimentologists, such features have little palaeontological significance. The Vredefort structure is of especial geological interest, and there may be rock exposures on the property that	All the recommendations proposed by the specialist are to be implemented on site	Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: *Cultural and Heritage Environment.* Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk: *Archaeological, Heritage and Paleontological Aspects.* Part A(1)(u)(i)(2) Impact on any national estate referred to in section 3(2) of the NHRA.

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
	are worthy of conservation. It is therefore recommended that a field investigation be carried out prior to mining to determine if any such sites exist. During mining of the sand and gravel, it is possible that items of archaeological significance may be encountered. It is important that any such objects should be assessed by an archaeologist and their context documented to assess whether the discovery site should be conserved.		
<u>Air Quality Assessment</u> *(See Appendix F for a full copy of the assessment)* Conducted in accordance with the requirements of Appendix 6 of the NEMA EIA Regulations 2014 (as amended).	The proposed open pit surface mining and processing activities will result in air quality impacts in the study area. Particulates represent the main pollutant of concern in the form the proposed operations. Other pollutants include combustion products due to vehicle tailpipe emissions and dryer stack(s), as well as alpha quartz (silica) emissions from the material handling and crushing operations. Airshed Planning Professionals (Pty) Ltd (Airshed) was appointed by Shango Solutions to undertake an environmental air quality specialist study for the project as part of the Environmental Impact Report (EIR) process. The air quality investigation comprised both a baseline study and an impact assessment. The report outlines the findings of the both components of the air quality specialist study for inclusion in the environmental impact assessment report.	All the recommendations proposed by the specialist are to be implemented on site	Part A(1)(d)(ii) Description of the activities to be undertaken: Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk: Mining, Biodiversity and Vegetation. Part A(1)(h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site.

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
	The main findings from the baseline assessment were as follows: The wind field in the study is dominated by winds from the northern sector during the day and night, with little wind from the south. Day- and night-time average wind speeds are 3.2 m/s and 3.3 m/s respectively. Calm conditions occur 15.7% of time during the day and 10.0% at night. Existing sources of emissions in the study area include other sand mining operations, vehicle exhaust and entrainment on paved and unpaved roads, household fuel burning, biomass burning (veld fires), wind erosion from open areas and agricultural activities. Sensitive receptors in the study area include the residential areas of Vaal Oewer and Lindiquesdrift as well as various other residences and small holdings on both sides of the Vaal river. There are few sensitive receptor locations directly to the south of the proposed mining operations. **The main findings from the impact assessment are as follows:**		

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
	Emission sources from the proposed Pure Source Mine Project operations include fugitive dust emissions from material handling, crushing and screening, vehicle entrainment and wind erosion from stockpiles and exposed areas, as well as gaseous emission from vehicle exhausts and the dryer. Pollutants of concern expected to be emitted by the Pure Source Mining Project operations include particulates with aerodynamic diameters less than 10µm and 2.5µm (PM10 and PM2.5 respectively), nitrogen dioxide (NO2), sulfur dioxide (SO2), crystalline silica (SiO2) and diesel particulate matter (DPM). To assess worst case air quality impacts, three scenarios were included in the dispersion modelling. These three scenarios represent the identified operating years that would likely result in the highest air quality impacts at sensitive receptor locations. The three scenarios are representative of operational years 12, 18 and 29. Even with best practice mitigation measures applied to dust generating sources, simulated 99th percentile daily PM10 concentrations due to the Pure Source Mine Project sources exceed the South African National Ambient Air Quality Standard (SA NAAQS) (more than 4 days exceeding 75 µg/m³		

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
	per year) at a variety of sensitive receptor locations, including at the residential area of Vaal Oewer, for all three scenarios. Based on the large impact area, it can be reasonably predicted that these exceedances would also be experienced during other years of the mining operations. Depending on the active area being mined at the time, additional exceedances could occur at other sensitive receptor locations to the north, east and west of the Vaal river. Simulated annual average PM10 and PM2.5 concentrations, as well as simulated NO2 and SO2 concentrations for all averaging periods, are in compliance with the SA NAAQS at all sensitive receptor locations. Simulated annual average SiO2 concentrations could exceed the California Office of Environmental Health Hazard Assessment (OEHHA) Reference Exposure Level (REL) in the immediate vicinity of the mining operations but are well below the REL at all sensitive receptor locations. Worst-case diesel particulate concentrations (if all vehicles are operational simultaneously), could exceed the United States Environmental Protection Agency Integrated Risk Information System (US EPA IRIS) guideline value of 5 µg/m³ up to 400 m from the mining operations, including at some sensitive		

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	receptor locations when mining operations are closest to these locations. It is however highly unlikely that all vehicles will be simultaneously operational for 12 hours per day, and this simulated impact is highly conservative. Simulated highest monthly dust fallout rates exceed the SA National Dust Control Regulations (NDCR) non-residential limit up to 300m from of the mining operations and haul roads and the residential limit up to 600 m from the mining operations and haul road. This means that when mining operations are active at the northern and south western aggregate resources respectively, the NDCR is likely to be exceeded at Vaal Oewer and other sensitive receptors to the north of the Vaal river. **Based on the findings above the following recommendations are made if mining operations proceed:** Emission rates from the dryer stack must comply with the Subcategory 5.2 (Drying) “New Plant” Minimum Emission Standards. The plant must be designed, or additional abatement equipment implemented to make sure emission from the dryer stack are in compliance with these standards. Based on the dispersion modelling results, it is highly unlikely that 99th percentile daily PM10 concentrations and highest monthly dust fallout rates would be in compliance with the SA		

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	NAAQS at Vaal Oewer and other sensitive receptor locations to the north of Vaal river, due to the relatively small distance between these receptors and the northern and south western aggregate resources. Based on simulated dust fallout rates, it is recommended that no mining activities, including crushing and screening, be undertaken within 400 m to the south, east and west of any sensitive receptor location and within 800m to the north of any sensitive receptor locations. It is recommended that aggregate crushing not be conducted in the gravel pits but rather located closer to the plant and further from any sensitive receptor locations. It is recommended that any disturbed areas be immediately rehabilitated to avoid wind erosion emission during periods of high wind speeds. Best practice mitigation measures (wind breaks, wet suppression etc.) must be implemented. Air quality impacts at nearby sensitive receptor locations would be very high if mining operations proceed without adequate mitigation measures in place. A complaints register should be kept on-site as well as at secure locations in Vaal Oewer and Lindiquesdrift once operations commence. Staff and the neighbouring		

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	communities should be encouraged to report all air quality related problems. Frequent community liaison meetings should be held with the neighbouring communities to address air quality related concerns; Wet suppression techniques must be used to control dust emissions, especially in areas where dry material is handled or stockpiled. Exposed soils and other erodible materials should be re-vegetated or covered immediately New areas should be cleared and opened-up only when absolutely necessary; Surfaces should be re-vegetated or otherwise rendered non-dust forming when inactive; Storage for dusty materials should be enclosed or operated with efficient dust suppressing measures; Loading, transfer, and discharge of materials should take place with a minimum height of fall, and be shielded against the wind, and the use of dust suppression spray systems should be considered; Vehicles should be fitted with catalytic converters and low sulfur fuel should be used to minimise NO2 and SO2 impacts.		

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	Vehicle idle times should be kept to a minimum to minimise CO, NO2, SO2, diesel particulate and greenhouse gas emissions. Strict speed limits should be imposed to reduce entrained emissions and fuel consumption rates. The vehicle fleet should be regularly serviced and maintained to minimise CO, NO2, SO2, diesel particulate and greenhouse gas emissions. Older vehicles in the fleet should be replaced with newer, more fuel-efficient alternatives where feasible. PM10 and dust fallout monitoring is recommended for the duration of the mining and rehabilitation phases. Dust fallout monitoring should be conducted at all recommended locations while PM10 monitoring can be moved to sample concentrations at the closest sensitive receptor locations. Monitoring of both dust fallout rates and PM10 concentrations should be started before the mining activities commence in order to establish baseline levels. If PM10 concentrations are found to be in exceedance of the NAAQS or dust fallout rates found to be in exceedance of the		

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	NDCR residential limit at the closest sensitive receptor locations additional dust suppression measures must be investigated and implemented timeously until recorded concentration and dust fallout rates are in compliance with the NAAQS and NDCR respectively. If the mitigation measures employed are considered best practise, additional offset measures should be considered. Such offset measures include upgrading of public road surfaces, electrification of houses for cooking and heating or supply of cleaner burning fuel for cooking and heating purposes. Offsets should be in line with the Air Quality Offsets Guidelines.		
Human Health *(See Appendix F for a full copy of the assessment)* Conducted in accordance with the requirements of Appendix 6 of the NEMA EIA Regulations 2014 (as amended).	Members of neighbouring communities have raised concerns about potential health effects associated with air pollution caused by the mining operations. In particular, exposure to fine airborne particulates (dust) and crystalline silica (quartz) are of primary concern. INFOTOX report provides perspectives on the health risk assessment approach for exposure to airborne particulates and silica-associated disease and the relevance thereof in sand mining. Health risk assessment for community exposure to airborne dust generated by the sand mining operations is conducted on	All the recommendations proposed by the specialist are to be implemented on site	Part A(1)(d)(ii) Description of the activities to be undertaken: Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: Part A(1)(g)(viii) The possible mitigation measures that could be

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	the quantification of exposure to airborne fine dust particulate matter (PM2.5). Mortality or hospitalisation rates for respiratory or cardiovascular causes are the measures of associated illness that are mostly applied in epidemiological studies of community health risks associated with exposure to airborne particulates. Incremental contributions of the proposed Pure Source Mine Project to air concentrations of PM2.5 in the receptor communities surrounding the mineral processing plant are used to quantify the associated health risks. Potential contributions to health effects in the receptor communities were estimated for three scenarios as outlined in the modelling report by Airshed Planning Professionals. These are for the years 12, 18 and 29 over the lifespan of the mining activities. These periods are for scenarios where the mining operations would be closest to receptors, thus representing the worst-case community exposures. It cannot be expected that health risks would be zero in the proximity of mining operations. The question that should be considered is whether any health risks would be of such magnitude that it would be possible to distinguish additional risks from the baseline risks that exist in the absence of the mining activities.		applied and the level of risk: Mining, Biodiversity and Vegetation. Part A(1)(h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site.

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	The health risk assessment has shown that the increased risk of cardiovascular hospital admissions due to short-term exposure to PM2.5 would be very low and not of concern. The highest increased percentage of risk of respiratory hospital emissions for short-term exposure to PM2.5 is at the Manager's residence. The highest increased risks at off-site locations were shown to be lower than at the Manager's residence, which is on the mining site. Overall, risk levels are low and will not require intervention in future mining operations. The personal risks of mortality (natural and cardiovascular) for long-term exposure are the highest at the Manager's residence, but the risks are low and should not be regarded as of concern. The highest increased risks at off-site locations were shown to be lower than at the on-site residence. In order to address concerns about community exposure to airborne crystalline silica and the potential for developing silicosis, INFOTOX reviewed the toxicology of crystalline silica and the mechanisms of developing silicosis. Inferences drawn from human studies support the view that exposure to aged crystalline silica surfaces (environmental silica) may be less hazardous than exposure to freshly cut		

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	surfaces. Overall, there are sufficient grounds to conclude that occupational exposure to freshly cut surfaces of crystalline silica will pose greater health risks than exposure to ”aged” surfaces. This is an important observation that emphasises the difference in the risk of developing silicosis between mining and quarrying, where workers are exposed to freshly-generated silica crystals, as opposed to community exposure to environmental silica, which generally represents exposure to aged crystalline silica surfaces, such as the sand that is mined. Mineralogical information on the aggregate mining and specifically the quartz content of the rock material that will be crushed was considered in the community exposure assessment. The potential for formation of freshly produced crystalline silica during crushing activities was indicated as a potential health risk. Mineralogical analysis of rock samples that will be crushed confirmed the presence of crystalline silica, in some cases at very high concentrations. It was thus considered important to assess exposures of members of the community to crystalline silica from the crushing of rocks. Considering the mechanism of development of silicosis, PM2.5 is the appropriate particle size to apply in the inhalation exposure assessment for silica health risk assessment. The assessment for exposure to silica was thus based on		

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	modelling of PM2.5 particulates from the rock crushing activities and assessing community exposure on the basis of the crystalline silica content of the particulates. This assessment was conducted separately from the assessment of exposure to PM2.5 particulates, which included rock crushing as a source. The Standards Development Branch of Ontario Ministry of the Environment and Climate Change introduced an ambient air criterion for quartz, christobalite and tridymite of 5 µg/m3, averaged over 24 hours. If the PM2.5 exposure data in this study were assumed to be 100 per cent quartz, it was shown that health risks for community exposure to freshly-cut crystalline silica dust would be low, not exceeding the Ontario ambient air concentration criterion. This assessment is very conservative as the entire rock body does not consist of quartz. It can thus be concluded that the rock crushing activities will not lead to a risk of silicosis in the communities. The mathematical dispersion modelling of dust generation from the mining activities assumed mitigated conditions. The INFOTOX health risk assessment is based on mitigated scenarios and the conclusions will not be valid for unmitigated conditions		

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<u>Noise Impact Assessment</u>
 	
(See Appendix F for a full copy of the assessment)
 	
Conducted in accordance with the requirements of Appendix 6 of the NEMA EIA Regulations 2014 (as amended).
	Airshed was commissioned by Shango Solutions, the independent Environmental Assessment Practitioner (EAP) to undertake an environmental noise impact study as part of the application for environmental authorisation. The main objective of the noise specialist study was to determine the potential impact on the acoustic environment and noise sensitive receptors (NSRs) as a result of the development of the proposed project and recommend suitable management and mitigation measures. To meet the above objective, the following tasks were included in the Scope of Work (SoW):
	
	• A review of available technical project information.
	• A review of the legal requirements and applicable environmental noise guidelines.
	• A study of the receiving (baseline) acoustic environment, including:
	  ○ The identification of NSRs from available maps and field observations;
	  ○ A study of environmental noise attenuation potential by referring to available weather records, land use and topography data sources; and
	  ○ Determining representative baseline noise levels through the analysis of sampled environmental noise
		All the recommendations proposed by the specialist are to be implemented on site	Part A(1)(d)(ii) Description of the activities to be undertaken:
			
			Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity:
			
			Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site:
			
			Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk: Mining, Biodiversity and Vegetation.
			
			Part A(1)(h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site.

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	levels obtained from surveys conducted on 28 February and 1 March 2018. o An impact assessment, including: • The establishment of a source inventory for proposed activities. • Noise propagation simulations to determine environmental noise levels as a result of the project. • The screening of simulated noise levels against environmental noise criteria. • The identification and recommendation of suitable mitigation measures and monitoring requirements. • The preparation of a comprehensive specialist noise impact assessment report. In the assessment of simulated noise levels, reference was made to the South African National Standard (SANS) 10103 and IFC noise guidelines. The baseline acoustic environment was described in terms of the location of NSRs, the ability of the environment to attenuate noise over long distances, as well as existing background and baseline noise levels. The following was found: NSRs:		

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	Include places of residence and areas where members of the public may be affected by noise generated by proposed activities. NSRs within a 2 km radius of the proposed operations include several residences on the both banks of the Vaal River to the west and east of the proposed operations, as well as the residential area of Vaal Oewer to the north of the operations. The acoustic climate at NSRs is currently affected by community activities, music, light vehicle and motorcycle traffic, domesticated animals as well as natural noises such as birds, insects and noise created by the Vaal River. Recorded LReq,d at all sampling locations during the day-time survey are similar to those given in SANS 10103 as typical for rural districts (45 dBA). Recorded night-time LReq,n at sampling locations 1, 4 and 5 are typical for rural districts at (35 dBA) as described by SANS 10103. Recorded night-time LReq,n at sampling location 2 and 3 are however more akin to those typical for urban districts (45 dBA) as described by SANS 10103. This is due to insect activity which is prevalent during the summer months.		

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	Noise emissions from diesel powered mobile equipment were estimated using LW predictions for industrial machinery (Bruce & Moritz, 1998), where LW estimates are a function of the power rating of the equipment engine. Mobile crushing and screening as well as the generator LW's were obtained from the database of François Malherbe Acoustic Consulting cc (FMAC) for similar operations. Values from the database are based on source measurements. Estimates of road traffic were made given mining and production rates, truck capacities, assumed vehicle speeds and road conditions. The source inventory, local meteorological conditions and information on local land use were used to populate the noise propagation model (CadnaA, ISO 9613). The propagation of noise was calculated over an area of 11 km east-west by 8.5 km north-south. The area was divided into a grid matrix with a 50-m. The noise impacts were simulated for the entire Life of Mine (LOM) to determine all potential noise impacts throughout project operations. The main findings of the impact assessment are: • A management and mitigation plan are recommended to minimise noise impacts from the project on the surrounding area.		

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	• Day-time and day/night-time noise levels from the project operations exceed the selected noise criteria at NSRs within Vaal Oewer. Construction and closure phase impacts are expected to be similar or slightly lower than simulated noise impacts of the operational phase. The overall significance for construction and demolition is “low” and for operation is ‘medium’. The following key recommendations should be included in the project environmental management programme: • A monitoring programme as per the requirements of the International Finance Corporation (IFC) and SANS 10103: • Annually during the operational phase at five proposed sampling locations; and • In response to complaints received. Based on the findings of the assessment and provided the measures planned and recommended are in place, it is the specialist opinion that the project may be authorised		
Biodiversity Assessment	The Biodiversity Company (TBC) was appointed to conduct the biodiversity specialist baseline and impact studies (terrestrial, aquatic and wetland ecology) for the Pure Source Mining	All the recommendations proposed by the specialist are to be implemented on site.	Part A(1)(d)(ii) Description of the activities to be undertaken:

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(See Appendix F for a full copy of the assessment) Conducted in accordance with the requirements of Appendix 6 of the NEMA EIA Regulations 2014 (as amended).	project. These specialist studies were completed to meet the requirements of a Mining Right Application (MRA) and the associated environmental authorisations for a proposed open pit mine. From a land cover perspective, the development is situated close to, and within, various natural and semi-disturbed habitats. From an ecological conservation perspective, the PDA is associate with Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs), riverine habitats and rocky ridges. Although largely disturbed by historical agricultural activities, it was found that these areas support diverse faunal and floral species and there is a strong likelihood that Species of Conservation Concern (SCC) occur in the Proposed Development Area (PDA). The proposed activities will result in the direct modification of the terrestrial habitats, including an endangered vegetation type – Soweto Highveld Grassland, various rocky ridges, ESAs and a CBA, direct mortalities and displacement of fauna and flora are also expected. The removal of natural vegetation to accommodate mining and infrastructure will reduce the habitat available for fauna species and which will change animal populations and species compositions within the area. The primary mitigation measure to be implemented is avoidance. Areas high biodiversity or sensitivity such as areas with natural vegetation, ridges, watercourses and wetlands are recommended to be avoided whereby buffer zones from these sensitive areas. The project area intersects with a CBA and therefore the proposed layout options must ensure avoidance is achieved. Where avoidance is not possible, mitigation actions are		Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk: Mining, Biodiversity and Vegetation. Part A(1)(h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site.

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	provided and strict rehabilitation of the disturbed areas must be implemented. In order to further mitigate the impact to sensitive areas, the remaining natural areas must be enhanced. Field surveys (conducted during July and November 2019) confirmed the presence of natural Soweto Highveld Grassland as well as a high diversity of naturally occurring faunal and floral species. Although no species of SCC were recorded during the field surveys, due to the presence of suitable habitat, the likelihood that certain SCC occur remains moderate to high. According to the Mining and Biodiversity Guidelines (2013), the project area is classed as having a 'Moderate Biodiversity Importance' and represents a 'Moderate Risk for Mining'.		
Riverine Ecology Assessment *(See Appendix F for a full copy of the assessment)* Conducted in accordance with the requirements of Appendix 6 of the NEMA EIA Regulations 2014 (as amended).	TBC was commissioned by the Van Wyk Development Corporation (Pty) Ltd to conduct a riverine ecology assessment to support the Mining Right Application and Environmental Authorisation process for the proposed Pure Source Mine project. This report aims to provide a detailed baseline ecological assessment of the riverine ecology which may be potentially affected through the proposed mining activities. Standard River Ecosystem Monitoring Programme methods were applied to determine the baseline Present Ecological Status (PES) of the associated watercourses. The project area was situated within the Vaal Water Management Area in the C23B quaternary catchment. The	All the recommendations proposed by the specialist are to be implemented on site.	Part A(1)(d)(ii) Description of the activities to be undertaken: Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk: Mining, Biodiversity and Vegetation.

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	catchment of the project area drains into the C23B-01731 Sub Quaternary Reach (SQR) of the Vaal River system. The C23B-01731 SQR is 27.52 km in length and is within the Highveld Ecoregion. Baseline Condition The results of the PES assessment derived a largely/seriously modified ecological category (class D/E) for the Vaal River reach. This PES was below the attainable ecological management class (class B) and not currently meeting the gazetted Resource Quality Objectives (RQO's) for the reach. The modified status can be attributed to persistent cumulative modifications within the reach, including a myriad of instream impoundments and acutely toxic ammonia concentrations impact on water quality, resulting in significant instream condition modification. Risk Assessment The proposed project activities were determined to have two primary potential impacts to the riverine ecology. The first was determined to be related to the conditions within the physical make-up of the considered river reaches. This includes the riverine substrates, banks, riparian vegetation and water column. These physical components of a water course determine the quality of the aquatic habitats. Therefore, modification of these physical components would result in a habitat quality impact. The second impact was determined to be related to the chemical properties of water. Considering aquatic biota have requirements for habitat, as well as sensitivity to		Part A(1)(h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site

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	changes in water chemistry, a change to water quality is anticipated to have negative impacts to local aquatic biota. The central anticipated impacts associated with the proposed project are related to increased suspended solids and sedimentation. The proposed open pit mining methods, without mitigation, will strip vegetation resulting in increased runoff velocities and subsequent erosion, sedimentation and increased suspended solids. In addition, processing activities make use of water. Water utilised in the process activities will contain elevated suspended solids, mitigation actions have been provided. Furthermore, avoidance of wetland tributaries and drainage lines have been proposed. The modification of the landcover within the PDA will alter the topography of the catchment feeding the C23B-01731 SQR which will result in the permanent alteration of the hydrology within the considered river reach. Conclusion The outcomes of the riverine study have indicated a considerably modified riverine environment. The results of the impact assessment did not identify any fatal flaws for the proposed project should mitigation actions be effectively implemented. Additional water resource studies and a Water Use Licence process has been recommended. The aim of the additional water resource studies would be to derive the impact of final void water storage on the Vaal River system.		

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Surface Water Assessment *(See Appendix F for a full copy of the assessment)* Conducted in accordance with the requirements of Appendix 6 of the NEMA EIA Regulations 2014 (as amended).	Hydrospatial (Pty) Ltd (hereafter Hydrospatial) were appointed to complete the surface water hydrological study for the proposed MRA. The following deliverables formed part of the assessment: • Surface water and hydrological baseline condition assessment; • Floodline delineation; • Conceptual Stormwater Management Plan; • Water balance; and • Surface water impact assessment. The watercourses associated with the PDA included the Vaal River system within the C23B quaternary catchment. A single survey was completed on the 1st of August 2018 whilst long term monitoring data completed by the Department of Water and Sanitation (DWS) was utilised to derive the baseline chemical quality of the Vaal River. The results of the baseline water quality analysis in the Vaal River indicated that Electrical Conductivity (EC) and Total Suspended Solids (TSS) exceeded the South African Water Quality Guideline (SAWQG) for irrigation during the August 2018 survey. Turbidity results obtained during the survey indicated exceedances of the SANS 241:2015 limits at all sampling points. The concentrations of nitrate/nitrite exceeded the SANS 241:2015 limits at the DWS monitoring point 90688	All the recommendations proposed by the specialist are to be implemented on site.	Part A(1)(d)(ii) Description of the activities to be undertaken: Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk: Mining, Biodiversity and Vegetation. Part A(1)(h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site

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	(C2H140Q01). Faecal coliforms exceeded the SAWQG limits for irrigation at all sampling points, this was an expected results given the sewage discharge from upstream wastewater treatment plants. The floodline delineation was completed and a 100m buffer zone was prescribed. Several mineral deposits and infrastructure within alternative 3 fell within the delineated floodlines. It was recommended that the infrastructure and pits should be as far as possible be located outside of the delineated floodlines, should this not be achievable a GN704 exemption from DWS must be applied for. A conceptual stormwater management plan was provided for the proposed activities. The primary aim of the stormwater management plan was to contain dirty water and divert clean water resources. The surface water impact assessment rated high impacts related to proposed abstraction activities and cumulative impacts. The impacts were largely associated with the long term abstraction of water from the Vaal River. Medium impacts to surface water resources were associated with the open pit mining and processing activities with most impacts determined to be mitigatable. Un-mitigatable medium impacts included the open pit mining of areas associated with drainage lines and wetlands. It was recommended that these areas were avoided.		
Wetland Assessment	TBC completed the wetland studies. Two wetland types were identified within the project area, which were divided into five Hydrogeomorphic (HGM) units. The overall PES scores for all of the HGM units have been determined to be “Largely Modified”	All the recommendations proposed by the specialist are to be implemented on site.	Part A(1)(d)(ii) Description of the activities to be undertaken:

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(See Appendix F for a full copy of the assessment) Conducted in accordance with the requirements of Appendix 6 of the NEMA EIA Regulations 2014 (as amended).	except for that of HGM 4, which was scored "Moderately Modified". The average ecosystem services score was determined to be "Intermediate" for HGM 1, 3, 4 and 5 with HGM 2 being rated "Moderately Low". A "high" Ecological Important and Sensitivity (EIS) was scored for HGM 1, with the rest of the HGM units being scored "Moderate". The Hydrological/Functional Importance was rated "High" for HGM 1 and HGM 5, with the remainder of the HGM units being scored "Moderate". The Direct Human Benefits were scored "Low" for all of the identified HGM units given the lack of cultural benefits and the fact that no crop fields are reliant on irrigation from these wetlands. A buffer size of 79 m was recommended for the delineated wetlands to limit impacts from the proposed development. Several project activities, including mineral deposits were identified to be located within the recommended 79 m buffer zones. Infrastructure, such as the proposed water supply pipeline were also noted to be located within the delineated buffer zones. It was recommended that avoidance of these buffer zones must be implemented, including the complete avoidance by mining activities. Where this was not achievable, strict rehabilitation must be implemented. Measures to reduce siltation and erosion in the associated wetlands must be implemented, and includes effective storm water management. Should no avoidance be implemented, the open cast mining activities will result in a direct loss of wetlands, subsequently enforcing the last step in the mitigation hierarchy, which is wetland offsets. It is therefore recommended that avoidance		Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk: Mining, Biodiversity and Vegetation. Part A(1)(h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site

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	measures are strictly implemented to avoid the requirements for a wetland offset.		
Groundwater Report	The proposed Pure Source Mine mining area is located within the C23B quaternary catchment of the Upper Vaal Water Management Area. The main drainage associated with the C23B quaternary catchment is the Kromelmboogspruit and is approximately 6 km to the southwest from Pure Source Mine Farm. During the 2018 hydrocensus 20 groundwater sites were identified. The 20 sites included: o 14 boreholes which are in use. o 3 blocked boreholes. o 1 open / capped borehole – new and to be used soon. o 2 old boreholes, not in use. The boreholes are the only source of water to the community in the study area. Water is drawn from the Vaal River, in places, for irrigation purposes. An assumption has been made that there will be a strong correlation between the groundwater quality and water levels for boreholes GOO5, GOO7, GOO12, GOO18, GOO19 and GOO20 and the Vaal River level and quality. These boreholes are located on the banks of the Vaal River. The groundwater levels varied from 2.5 m to 7 m across the proposed mining area, to a maximum depth of 20.5 m bgl along the tar road. To the south of the big hill (south of the tar road and proposed mining area) the average water table depth is 10 m below surface.	All the recommendations proposed by the specialist are to be implemented on site.	Part A(1)(d)(ii) Description of the activities to be undertaken: Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk: Mining, Biodiversity and Vegetation. Part A(1)(h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site

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	The general groundwater flow direction is in a northerly direction towards the Vaal River. There is a strong possibility of good surface water-groundwater interaction based on the shallow groundwater levels in the proposed mining area and the proximity of the Vaal River. The shallow groundwater table in the PDA also indicates the possibility of groundwater inflow into the sand and aggregate excavations. Elevated element concentrations recorded in the sampled groundwater are only elevated in one or two sampling points, mostly in the Vaal River and boreholes close to the river. Most of the salts and metals were present in concentrations below the SANS241 guideline limits. Based on the SANS241 drinking water guideline and on the sampled borehole water results, the groundwater sampled from 9 boreholes are fit for human consumption (treatment still recommended). The sampled groundwater was not showing any negative impacts associated with the historical mining activities on the Farm Pure Source Mine or at the neighbouring sand mine operations. Impacts identified during the groundwater study indicated potential impacts to local groundwater quality and quantity. The impacts to groundwater were however derived to be limited in terms of extent and significance. The limited nature of the impacts in terms of groundwater quantity were concluded due to the low yielding nature of the boreholes in the study area. Groundwater quality impacts may be attributed to hydrocarbon spillages and dirty water infiltration around the open pits and processing facilities.		

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Visual Impact Assessment *(See Appendix F for a full copy of the assessment)* Conducted in accordance with the requirements of Appendix 6 of the NEMA EIA Regulations 2014 (as amended).	Hydrospatial was appointed by Monte Cristo Commercial Park (Pty) Ltd (hereafter the client) to conduct a Visual Impact Assessment (VIA) study for an environmental authorisation and a Mining Right Application (MRA) process, for the Pure Source Mine. The following mine infrastructure was proposed: • Dams; • Wash plant for the washing of mined sand; • Rotary pan processing plant for alluvial diamond mining; • Potential alluvial diamond X-ray and/or flow sorting facility; • Clean and dirty water management infrastructure such as Pollution Control Dams (PCD), water recycling plan (part of the wash plant), settling ponds, stormwater runoff structures, water pipeline network and pump stations; • Drying and screening plants; and • Topsoil and Run of Mine (ROM) stockpiles. Additional mining and processing infrastructure will include haul roads, workshop, weighbridge and offices, powerlines, change houses, staff accommodation and recreation facilities and portable chemical ablution facilities for employees during the construction and operational phases. Three alternative mine infrastructure layout plans were considered, with the most	All the recommendations proposed by the specialist are to be implemented on site.	Part A(1)(d)(ii) Description of the activities to be undertaken: Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site: Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk: Mining, Biodiversity and Vegetation. Part A(1)(h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site

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	appropriate from an environmental, economic and buffer zone perspective selected. Scope of Work The scope of work for the VIA included the following: • Provide a baseline (pre-construction and mining) description of the visual and aesthetic characteristics of the area; • Provide a visual and aesthetic evaluation of the Project; and • Conduct an impact assessment to assess the visual impacts of the Project. The topography of the study area is undulating. The land cover of the study area consists of grassland and cultivated land. Riverine vegetation occurs along the banks of the Vaal River and consists of tall non-native vegetation such as Eucalyptus sp.. The PDA was actively utilised for crop and game farming. Directly to the north of the PDA, a housing development was located at Vaal Oewer on an elevated ridge overlooking the Vaal River. A number of further housing developments are located along the Vaal River towards the north-west and west of the PDA near Lindequesdrif. Guesthouses, lodges and resorts are common in the area, as the Vaal River is a popular weekend and holiday destination, offering recreational activities such as boat cruisers, water sports and angling. Sand mining activities are evident directly south, south-east and west of the PDA. Active sand mines occur on the adjacent properties to the PDA		

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	and include Sweet Sensations Vaal Sand mine to the west, and Tja Naledi Beafase Investment Holdings to the south. The study area can be broadly divided into three main categories: • Agricultural areas – crop and livestock agriculture are the dominant land use in the area; • Residential/housing and accommodation – housing developments and places offering accommodation, occur mostly along the Vaal River; and • Sand mining activities. • The following visual receptors have been identified within a 5 km radius of the Project area: • Residential/housing developments, particularly those located along the Vaal River to the north and west of the Project; • Places providing accommodation (guesthouses, resorts, lodges and campsites); • Conference centres; • Farmhouses; and • Motorists on roads within the surrounding area.		

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	In terms of sense of place, crop and livestock farming areas, which dominate the landscape, largely evoke a feeling of a farming community, while along the Vaal River, where residential houses and places of accommodation are located, a tranquil sense of place is evoked. The sand mining areas evoke an open and barren sense of place, which is typically associated with open pit mining activities. Visual and Aesthetic Evaluation Viewshed analysis modelling was undertaken to determine the visibility of the three mine infrastructure alternatives on the surrounding landscape. For all three alternatives, the Project will have a high visual exposure on visual receptors located at Vaal Oewer and campsite, conference centre, resorts, lodges, and a number of houses. The visual quality of the area was determined to be high along the Vaal River, and medium further back from the river, where grassland and cultivated land dominate the landscape. The inactive and active sand mining areas have a low visual quality. The Visual Absorption Capacity (VAC) of the landscape in which the Project area is located, has a moderate potential to conceal the Project. This is due to the mine infrastructure and pits being mostly located in open grassland and moderately undulating topography. The proposed Project will partially fit in with the existing active sand mines in the area. However, on a cumulative scale open pit mining was likely to take place on a bigger scale than what is currently being undertaken, and will result in a clearly		

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	noticeable mining area. For these reasons, the Project will exert a moderate visual intrusion on the existing landscape. The viewer sensitivity was determined to be high for the houses, resorts, lodges, conference centres and campsites that will have a line of site of the proposed mine. Impact Assessment Although the Project is located in a historical and active sand mining area, the scale of the Project in comparison to other sand mining in the area, moderate VAC of the landscape to conceal the Project, high visual quality along the Vaal River, and high viewer sensitivity of houses and places of accommodation within a 2 km buffer of the Project, will result in an overall high visual impact. The main sources of visual impact will be the transformation of grassland and agricultural land to open barren areas through open pit mining, generation of dust from exposed areas, increased heavy machinery and vehicular movement, and the erection of mine infrastructure. This, however, can be mitigated to an overall medium visual impact, by ensuring that rollover mining practices occur, dust suppression measures are strictly and timeously adhered to, concurrent rehabilitation takes place through re-shaping and re-vegetation, down lighting and shielding is used, and ensuring that mine infrastructure blends into the surrounding landscape through careful positioning and painting		
Pedology Environmental Impact Assessment	TBC was appointed to conduct a pedology (agricultural potential, land capability and land use) Environmental Impact Assessment (EIA) for the Pure Source Mining project. This specialist study is completed to meet the requirements of a		

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(See Appendix F for a full copy of the assessment) Conducted in accordance with the requirements of Appendix 6 of the NEMA EIA Regulations 2014 (as amended).	Mining Right Application (MRA) and the associated environmental authorisations for a proposed open pit mine. The proposed project will involve the development of various open pit mines associated with the "roll-over mining" method, a processing plant and associated infrastructure. Commodities to be mined will include sand, gravel and diamond (alluvial) with the Life of Mine (LoM) being envisaged to last 30 years. Northern, central and southern portions of the project area are proposed for aggregate mining and one central and eastern portion are proposed for sand mining. The applicant has a Prospecting Right (PR) over the proposed MRA area approximately 859 hectares in size and consists of Portion 1 and Portion 3 of Woodlands 407 (District Parys) of which a prospecting right has being issued in terms of Section 18 of the Minerals and Petroleum Reserve Development Act (N.P.R.D.A.), 2002 (Law 28 OF 2002). Approximately 401.67 ha of the property will be mined for aggregate and 283.1 ha for sand. The findings from this assessment indicated the presence of nine identified soils forms, which were divided into four different land capability classes given the depth, permeability, clay percentage and slope percentage of these soils. These four land capability classes were divided into three different land potential classes, which takes into consideration any climatic restrictions of the area. The proposed infrastructure "Alternative 3" is located within the "Vlei" land potential class with Alternative 1 and 2 being located within a "Moderate" sensitivity area in regard to land potential		

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	sensitivity. The proposed open cast mining areas cover most of the project area, including the "Low" sensitivity land potential classes, the "Moderate" sensitivity land potential classes and the "Vlei" land potential class. Impact Assessment Summary The impacts to local pedology was rated as high for the open cast mining and material stockpile activities. The impacts associated with the construction and operation of the proposed infrastructure components has been rated "Moderate" impact. Mitigation measures have been recommended by the pedology specialist to ensure that impacts are minimised. It however is the specialist's opinion that these mitigation measures will not be sufficient. It therefore was recommended that a suitable rehabilitation plan be established to decrease the degradation of soil resources.		
<u>Socio Economic Impact Assessment</u> *(See Appendix F for a full copy of the assessment)* Conducted in accordance with the requirements of Appendix 6	Based on the initial assessment of the receiving environment it is anticipated that the proposed mine could have some negative as well as positive social impacts. The most important potential social benefits associated with the construction and operation of the proposed mine include job opportunities and possible socio - economic spin-offs that can be created. New economic activities such as the mine having the potential to assist with the developmental challenges faced by the province, which include; providing employment and skills development to the local community and contributing to the social, economic and institutional development of the local area. Additional	All the recommendations proposed by the specialist are to be implemented on site.	Part A(1)(d)(ii) Description of the activities to be undertaken: Part A(1)(g)(iv)(1)(a) Type of environment affected by the proposed activity: Part A(1)(g)(iv)(1)(c) Description of specific environmental features and infrastructure on the site:

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of the NEMA EIA Regulations 2014 (as amended).	employment and associated indirect economic benefits could improve the quality of life of the local community. The significance of the impact is High Positive. The main negative impacts are associated with the influx of in-migrants and intrusion impacts associated with the construction phase, dust, as well as the visual impacts/ sense of place impacts from the mine during the operation phase. However, the significance is viewed to be of Low Negative at this stage. The extent of the negative impacts and possible benefits would be further assessed during the EIA phase. ***<u>This was not conducted due to covid 19 constraints</u>*** Furthermore, the assessment of key issues indicated that there were no negative impacts identified during the social economic assessment that would be considered fatal flaws.		Part A(1)(g)(viii) The possible mitigation measures that could be applied and the level of risk: Mining, Biodiversity and Vegetation. Part A(1)(h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site

k) Environmental impact statement

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

The key findings of the environmental impact assessment regarding the proposed mining area entail the following:

Project proposal:

Mining under the Mining Right will be undertaken by a “truck and shovel” method utilising suitably sized diesel driven equipment. A 363.5 ha area will be demarcated for phased open pit mining and associated infrastructure. The area containing the sand deposit will be mined in portions of on average 6.8 ha each year, with continuous roll-over rehabilitation. The area containing the aggregate resource will be mined in portions of on average 4.6 ha, per year. The planned open pit mine will comprise three distinct areas for the silica sand (main pit, north pit and east pit) and four areas for the aggregate (northern pit, central pit, south eastern pit and south western pit). Each area considers an estimated maximum depth of 12 m but may exceed a depth of 12 m in certain areas. The entire application area could have potential for diamond bearing gravels. The anticipated life of the mine is 30 years. An overview of the mining method for the three commodities has been described throughout the document.

Visual Characteristics:

The following mine infrastructure was proposed:

- Dams;
- Wash plant for the washing of mined sand;
- Rotary pan processing plant for alluvial diamond mining;
- Potential alluvial diamond X-ray and/or flow sorting facility;
- Clean and dirty water management infrastructure such as Pollution Control Dams (PCD), water recycling plan (part of the wash plant), settling ponds, stormwater runoff structures, water pipeline network and pump stations;
- Drying and screening plants; and
- Topsoil and Run of Mine (ROM) stockpiles.

Additional mining and processing infrastructure will include haul roads, workshop, weighbridge and offices, powerlines, change houses, staff accommodation and recreation facilities and portable chemical ablution facilities for employees during the construction and operational phases. Three alternative mine infrastructure layout plans were considered, with the most appropriate from an environmental, economic and buffer zone perspective selected.

Scope of Work

The scope of work for the VIA included the following:

- Provide a baseline (pre-construction and mining) description of the visual and aesthetic characteristics of the area;
- Provide a visual and aesthetic evaluation of the Project; and
- Conduct an impact assessment to assess the visual impacts of the Project.

The topography of the study area is undulating. The land cover of the study area consists of grassland and cultivated land. Riverine vegetation occurs along the banks of the Vaal River and consists of tall non-native vegetation such as Eucalyptus sp.. The PDA was actively utilised for crop and game farming. Directly to the north of the PDA, a housing development was located at Vaal Oewer on an elevated ridge overlooking the Vaal River. A number of further housing developments are located along the Vaal River towards the north-west and west of the PDA near Lindequesdrif. Guesthouses, lodges and resorts are common in the area, as the Vaal River is a popular weekend and holiday destination, offering recreational activities such as boat cruisers, water sports and angling. Sand mining activities are evident directly south, south-east and west of the PDA. Active sand mines occur on the adjacent properties to the PDA and include Sweet Sensations Vaal Sand mine to the west, and Tja Naledi Beafase Investment Holdings to the south.

The study area can be broadly divided into three main categories:

- Agricultural areas – crop and livestock agriculture are the dominant land use in the area;
- Residential/housing and accommodation – housing developments and places offering accommodation, occur mostly along the Vaal River; and
- Sand mining activities.
- The following visual receptors have been identified within a 5 km radius of the Project area:
- Residential/housing developments, particularly those located along the Vaal River to the north and west of the Project;

- Places providing accommodation (guesthouses, resorts, lodges and campsites);
- Conference centres;
- Farmhouses; and
- Motorists on roads within the surrounding area.

In terms of sense of place, crop and livestock farming areas, which dominate the landscape, largely evoke a feeling of a farming community, while along the Vaal River, where residential houses and places of accommodation are located, a tranquil sense of place is evoked. The sand mining areas evoke an open and barren sense of place, which is typically associated with open pit mining activities.

Visual and Aesthetic Evaluation

Viewshed analysis modelling was undertaken to determine the visibility of the three mine infrastructure alternatives on the surrounding landscape. For all three alternatives, the Project will have a high visual exposure on visual receptors located at Vaal Oewer and campsite, conference centre, resorts, lodges, and a number of houses.

The visual quality of the area was determined to be high along the Vaal River, and medium further back from the river, where grassland and cultivated land dominate the landscape. The inactive and active sand mining areas have a low visual quality.

The Visual Absorption Capacity (VAC) of the landscape in which the Project area is located, has a moderate potential to conceal the Project. This is due to the mine infrastructure and pits being mostly located in open grassland and moderately undulating topography.

The proposed Project will partially fit in with the existing active sand mines in the area. However, on a cumulative scale open pit mining was likely to take place on a bigger scale than what is currently being undertaken, and will result in a clearly noticeable mining area. For these reasons, the Project will exert a moderate visual intrusion on the existing landscape.

The viewer sensitivity was determined to be high for the houses, resorts, lodges, conference centres and campsites that will have a line of site of the proposed mine.

Impact Assessment

Although the Project is located in a historical and active sand mining area, the scale of the Project in comparison to other sand mining in the area, moderate VAC of the landscape to conceal the Project, high visual quality along the Vaal River, and high viewer sensitivity of houses and places of accommodation within a 2 km buffer of the Project, will result in an overall high visual impact. The main sources of visual

impact will be the transformation of grassland and agricultural land to open barren areas through open pit mining, generation of dust from exposed areas, increased heavy machinery and vehicular movement, and the erection of mine infrastructure. This, however, can be mitigated to an overall medium visual impact, by ensuring that rollover mining practices occur, dust suppression measures are strictly and timeously adhered to, concurrent rehabilitation takes place through re-shaping and re-vegetation, down lighting and shielding is used, and ensuring that mine infrastructure blends into the surrounding landscape through careful positioning and painting

Air and Noise Quality:

The proposed open pit surface mining and processing activities will result in air quality impacts in the study area. Particulates represent the main pollutant of concern in the form the proposed operations. Other pollutants include combustion products due to vehicle tailpipe emissions and dryer stack(s), as well as alpha quartz (silica) emissions from the material handling and crushing operations. Airshed Planning Professionals (Pty) Ltd (Airshed) was appointed by Shango Solutions to undertake an environmental air quality specialist study for the project as part of the Environmental Impact Report (EIR) process.

The air quality investigation comprised both a baseline study and an impact assessment. The report outlines the findings of the both components of the air quality specialist study for inclusion in the environmental impact assessment report.

The main findings from the baseline assessment were as follows:

The wind field in the study is dominated by winds from the northern sector during the day and night, with little wind from the south. Day- and night-time average wind speeds are 3.2 m/s and 3.3 m/s respectively. Calm conditions occur 15.7% of time during the day and 10.0% at night.

Existing sources of emissions in the study area include other sand mining operations, vehicle exhaust and entrainment on paved and unpaved roads, household fuel burning, biomass burning (veld fires), wind erosion from open areas and agricultural activities.

Sensitive receptors in the study area include the residential areas of Vaal Oewer and Lindiquesdrift as well as various other residences and small holdings on both sides of the Vaal river. There are few sensitive receptor locations directly to the south of the proposed mining operations.

The main findings from the impact assessment are as follows:

Emission sources from the proposed Pure Source Mine Project operations include fugitive dust emissions from material handling, crushing and screening, vehicle entrainment and wind erosion from stockpiles and exposed areas, as well as gaseous emission from vehicle exhausts and the dryer. Pollutants of concern expected to be emitted by the Pure Source Mining Project operations include particulates with aerodynamic diameters less than 10µm and 2.5µm (PM10 and PM2.5 respectively), nitrogen dioxide (NO2), sulfur dioxide (SO2), crystalline silica (SiO2) and diesel particulate matter (DPM).

To assess worst case air quality impacts, three scenarios were included in the dispersion modelling. These three scenarios represent the identified operating years that would likely result in the highest air quality impacts at sensitive receptor locations. The three scenarios are representative of operational years 12, 18 and 29.

Even with best practice mitigation measures applied to dust generating sources, simulated 99th percentile daily PM10 concentrations due to the Pure Source Mine Project sources exceed the South African National Ambient Air Quality Standard (SA NAAQS) (more than 4 days exceeding 75 µg/m³ per year) at a variety of sensitive receptor locations, including at the residential area of Vaal Oewer, for all three scenarios. Based on the large impact area, it can be reasonably predicted that these exceedances would also be experienced during other years of the mining operations. Depending on the active area being mined at the time, additional exceedances could occur at other sensitive receptor locations to the north, east and west of the Vaal river.

Simulated annual average PM10 and PM2.5 concentrations, as well as simulated NO2 and SO2 concentrations for all averaging periods, are in compliance with the SA NAAQS at all sensitive receptor locations.

Simulated annual average SiO2 concentrations could exceed the California Office of Environmental Health Hazard Assessment (OEHHA) Reference

Exposure Level (REL) in the immediate vicinity of the mining operations but are well below the REL at all sensitive receptor locations.

Worst-case diesel particulate concentrations (if all vehicles are operational simultaneously), could exceed the United States Environmental Protection Agency Integrated Risk Information System (US EPA IRIS) guideline value of 5 µg/m³ up to 400 m from the mining operations, including at some sensitive receptor locations when mining operations are closest to these locations. It is however highly unlikely that all vehicles will be simultaneously operational for 12 hours per day, and this simulated impact is highly conservative.

Simulated highest monthly dust fallout rates exceed the SA National Dust Control Regulations (NDCR) non-residential limit up to 300m from of the mining operations and haul roads and the residential limit up to 600 m from the mining operations and haul road. This means that when mining operations are active at the northern and south western aggregate resources respectively, the NDCR is likely to be exceeded at Vaal Oewer and other sensitive receptors to the north of the Vaal river.

Based on the findings above the following recommendations are made if mining operations proceed:

Emission rates from the dryer stack must comply with the Subcategory 5.2 (Drying) “New Plant” Minimum Emission Standards. The plant must be designed, or additional abatement equipment implemented to make sure emission from the dryer stack are in compliance with these standards.

Based on the dispersion modelling results, it is highly unlikely that 99th percentile daily PM10 concentrations and highest monthly dust fallout rates would be in compliance with the SA NAAQS at Vaal Oewer and other sensitive receptor locations to the north of Vaal river, due to the relatively small distance between these receptors and the northern and south western aggregate resources. Based on simulated dust fallout rates, it is recommended that no mining activities, including crushing and screening, be undertaken within 400 m to the south, east and west of any sensitive receptor location and within 800m to the north of any sensitive receptor locations.

It is recommended that aggregate crushing not be conducted in the gravel pits but rather located closer to the plant and further from any sensitive receptor locations.

It is recommended that any disturbed areas be immediately rehabilitated to avoid wind erosion emission during periods of high wind speeds.

Best practice mitigation measures (wind breaks, wet suppression etc.) must be implemented. Air quality impacts at nearby sensitive receptor locations would be very high if mining operations proceed without adequate mitigation measures in place.

A complaints register should be kept on-site as well as at secure locations in Vaal Oewer and Lindiquesdrift once operations commence. Staff and the neighbouring communities should be encouraged to report all air quality related problems. Frequent community liaison meetings should be held with the neighbouring communities to address air quality related concerns;

Wet suppression techniques must be used to control dust emissions, especially in areas where dry material is handled or stockpiled.

Exposed soils and other erodible materials should be re-vegetated or covered immediately New areas should be cleared and opened-up only when absolutely necessary;

Surfaces should be re-vegetated or otherwise rendered non-dust forming when inactive;

Storage for dusty materials should be enclosed or operated with efficient dust suppressing measures;

Loading, transfer, and discharge of materials should take place with a minimum height of fall, and be shielded against the wind, and the use of dust suppression spray systems should be considered;

Vehicles should be fitted with catalytic converters and low sulfur fuel should be used to minimise NO2 and SO2 impacts.

Vehicle idle times should be kept to a minimum to minimise CO, NO2, SO2, diesel particulate and greenhouse gas emissions.

Strict speed limits should be imposed to reduce entrained emissions and fuel consumption rates.

The vehicle fleet should be regularly serviced and maintained to minimise CO, NO2, SO2, diesel particulate and greenhouse gas emissions.

Older vehicles in the fleet should be replaced with newer, more fuel-efficient alternatives where feasible.

PM10 and dust fallout monitoring is recommended for the duration of the mining and rehabilitation phases. Dust fallout monitoring should be conducted at all recommended locations while PM10 monitoring can be moved to sample concentrations at the closest sensitive receptor locations. Monitoring of both dust fallout rates and PM10 concentrations should be started before the mining activities commence in order to establish baseline levels.

If PM10 concentrations are found to be in exceedance of the NAAQS or dust fallout rates found to be in exceedance of the NDCR residential limit at the closest sensitive receptor locations additional dust suppression measures must be investigated and implemented timeously until recorded concentration and dust fallout rates are in compliance with the NAAQS and NDCR respectively. If the mitigation measures employed are considered best practise, additional offset measures should be considered. Such offset measures include upgrading of public road surfaces, electrification of houses for cooking and heating or supply of cleaner burning fuel for cooking and heating purposes. Offsets should be in line with the Air Quality Offsets Guidelines.

Noise

Airshed was commissioned by Shango Solutions, the independent Environmental Assessment Practitioner (EAP) to undertake an environmental noise impact study as part of the application for environmental authorisation. The main objective of the noise specialist study was to determine the potential impact on the acoustic environment and noise sensitive receptors (NSRs) as a result of the development of the proposed project and recommend suitable management and mitigation measures. To meet the above objective, the following tasks were included in the Scope of Work (SoW):

1) A review of available technical project information.

2) A review of the legal requirements and applicable environmental noise guidelines.
3) A study of the receiving (baseline) acoustic environment, including:
    a) The identification of NSRs from available maps and field observations;
    b) A study of environmental noise attenuation potential by referring to available weather records, land use and topography data sources; and
    c) Determining representative baseline noise levels through the analysis of sampled environmental noise levels obtained from surveys conducted on 28 February and 1 March 2018.
4) An impact assessment, including:
    a) The establishment of a source inventory for proposed activities.
    b) Noise propagation simulations to determine environmental noise levels as a result of the project.
    c) The screening of simulated noise levels against environmental noise criteria.
5) The identification and recommendation of suitable mitigation measures and monitoring requirements.
6) The preparation of a comprehensive specialist noise impact assessment report.

In the assessment of simulated noise levels, reference was made to the South African National Standard (SANS) 10103 and IFC noise guidelines.

The baseline acoustic environment was described in terms of the location of NSRs, the ability of the environment to attenuate noise over long distances, as well as existing background and baseline noise levels. The following was found:

- NSRs:
    - Include places of residence and areas where members of the public may be affected by noise generated by proposed activities.
    - NSRs within a 2 km radius of the proposed operations include several residences on the both banks of the Vaal River to the west and east of the proposed operations, as well as the residential area of Vaal Oewer to the north of the operations.
- The acoustic climate at NSRs is currently affected by community activities, music, light vehicle and motorcycle traffic, domesticated animals as well as natural noises such as birds, insects and noise created by the Vaal River.

- Recorded LReq,d at all sampling locations during the day-time survey are similar to those given in SANS 10103 as typical for rural districts (45 dBA). Recorded night-time LReq,n at sampling locations 1, 4 and 5 are typical for rural districts at (35 dBA) as described by SANS 10103. Recorded night-time LReq,n at sampling location 2 and 3 are however more akin to those typical for urban districts (45 dBA) as described by SANS 10103. This is due to insect activity which is prevalent during the summer months.

Noise emissions from diesel powered mobile equipment were estimated using LW predictions for industrial machinery (Bruce & Moritz, 1998), where LW estimates are a function of the power rating of the equipment engine. Mobile crushing and screening as well as the generator LW's were obtained from the database of François Malherbe Acoustic Consulting cc (FMAC) for similar operations. Values from the database are based on source measurements. Estimates of road traffic were made given mining and production rates, truck capacities, assumed vehicle speeds and road conditions.

The source inventory, local meteorological conditions and information on local land use were used to populate the noise propagation model (CadnaA, ISO 9613). The propagation of noise was calculated over an area of 11 km east-west by 8.5 km north-south. The area was divided into a grid matrix with a 50-m. The noise impacts were simulated for the entire Life of Mine (LOM) to determine all potential noise impacts throughout project operations.

The main findings of the impact assessment are:

- A management and mitigation plan are recommended to minimise noise impacts from the project on the surrounding area.
- Day-time and day/night-time noise levels from the project operations exceed the selected noise criteria at NSRs within Vaal Oewer.
- Construction and closure phase impacts are expected to be similar or slightly lower than simulated noise impacts of the operational phase.
- The overall significance for construction and demolition is "low" and for operation is 'medium'.

The following key recommendations should be included in the project environmental management programme:

- A monitoring programme as per the requirements of the International Finance Corporation (IFC) and SANS 10103:
  - Annually during the operational phase at five proposed sampling locations; and

- In response to complaints received.

Based on the findings of the assessment and provided the measures planned and recommended are in place, it is the specialist opinion that the project may be authorised.

Geology:

Hydrology:

Biodiversity Conservation Areas:

The Biodiversity Company (TBC) was appointed to conduct the biodiversity specialist baseline and impact studies (terrestrial, aquatic and wetland ecology) for the Pure Source Mining project. These specialist studies were completed to meet the requirements of a Mining Right Application (MRA) and the associated environmental authorisations for a proposed open pit mine. From a land cover perspective the development is situated close to, and within, various natural and semi-disturbed habitats. From an ecological conservation perspective the PDA is associate with Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs), riverine habitats and rocky ridges. Although largely disturbed by historical agricultural activities, it was found that these areas support diverse faunal and floral species and there is a strong likelihood that Species of Conservation Concern (SCC) occur in the Proposed Development Area (PDA).

The proposed activities will result in the direct modification of the terrestrial habitats, including an endangered vegetation type – Soweto Highveld Grassland, various rocky ridges, ESAs and a CBA, direct mortalities and displacement of fauna and flora are also expected. The removal of natural vegetation to accommodate mining and infrastructure will reduce the habitat available for fauna species and which will change animal populations and species compositions within the area.

The primary mitigation measure to be implemented is avoidance. Areas high biodiversity or sensitivity such as areas with natural vegetation, ridges, watercourses and wetlands are recommended to be avoided whereby buffer zones from these sensitive areas.

The project area intersects with a CBA and therefore the proposed layout options must ensure avoidance is achieved. Where avoidance is not possible, mitigation actions are provided and strict rehabilitation of the disturbed areas must be

implemented. In order to further mitigate the impact to sensitive areas, the remaining natural areas must be enhanced.

Field surveys (conducted during July and November 2019) confirmed the presence of natural Soweto Highveld Grassland as well as a high diversity of naturally occurring faunal and floral species. Although no species of SCC were recorded during the field surveys, due to the presence of suitable habitat, the likelihood that certain SCC occur remains moderate to high.

According to the Mining and Biodiversity Guidelines (2013), the project area is classed as having a 'Moderate Biodiversity Importance' and represents a 'Moderate Risk for Mining'.

Cultural and Heritage Environment:

Socio-Economic Environment:

Based on the initial assessment of the receiving environment it is anticipated that the proposed mine could have some negative as well as positive social impacts. The most important potential social benefits associated with the construction and operation of the proposed mine include job opportunities and possible socio - economic spin-offs that can be created. New economic activities such as the mine having the potential to assist with the developmental challenges faced by the province, which include; providing employment and skills development to the local community and contributing to the social, economic and institutional development of the local area. Additional employment and associated indirect economic benefits could improve the quality of life of the local community. The significance of the impact is High Positive. The main negative impacts are associated with the influx of in-migrants and intrusion impacts associated with the construction phase, dust, as well as the visual impacts/ sense of place impacts from the mine during the operation phase. However, the significance is viewed to be of Low Negative at this stage.

Furthermore, the assessment of key issues indicated that there were no negative impacts identified during the social economic assessment that would be considered fatal flaws.

ii) Finale Site Map

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

See the map showing the site activities attached as Appendix D.

iii) Summary of the positive and negative implications and risks of the proposed activity and identified alternatives

The positive impacts associated with the proposed mining area include the following:

- The proposed footprint offers the MR Applicant access to the mineral deposits on the property.
- Access to the proposed mining area is possible from the existing road.
- The proposed block mining method and associated progressive rehabilitation of the area will minimise the visual impact of the activities on the receiving environment.
- Although strip mining will be implemented, extending the mining area in a north/north-western direction will lessen the visual impact on the surrounding environment according to the viewshed analysis.

The negative impacts associated with the proposed application that were deemed to have a Low-Medium or higher significance/risk includes:

SITE ESTABLISHMENT PHASE - STRIPPING AND STOCKPILING OF TOPSOIL	
Biodiversity: Loss of areas classified as CBA (Free State CBA, 2014) and sensitive rocky ridges	Low - Medium
Biodiversity: Loss of area of plant endemism (Mucina and Rutherford, 2006)	Low - Medium
Flora: Encroachment of alien invasive plant species	Low-Medium
Aquatic and wetland biodiversity: Displacement, direct mortalities and disturbance	Low-Medium
Aquatic and wetland biodiversity: Reduction in surface water quality affecting third party users	Low-Medium
Surface water: Some of the proposed mining deposits occur within drainage lines. The function of these drainage lines is to drain the area during and post rainfall. Mining through drainage lines may result in flooding of pits and other infrastructure, as well as a loss of runoff reporting to the Vaal River	Low-Medium
Ground water: Reduction in groundwater quantity affecting third party users	Low-Medium
Ground water: Groundwater seepage into the open pits	Medium
Alteration of the agricultural sense of place	High
Visual intrusion as a result of mining	Medium

Dust nuisance as a result of the mining activities	Low-Medium
Noise nuisance as a result of the mining activities	Low-Medium
Potential increased erosion risk	Low-Medium
OPERATIONAL PHASE - EXCAVATION OF SAND FROM THE MINING FOOTPRINT AND LOADING ONTO TRUCKS	
Change in land use affecting surrounding land uses	High
Reduction in groundwater quantity affecting third party users	Low-Medium
Groundwater seepage into the open pits, resulting in dirty water. The pits may also become flooded due to high seepage rates	Medium
Reduction in groundwater quantity affecting third party users	Low-Medium
Loss of water volumes and a reduction of flows in the Vaal River	Low-Medium
Runoff from the plant area and stockpiles is likely to contain high levels of TSS and potentially high dissolved solids that could runoff into the environment	Low-Medium
Decrease in air quality from project emissions	Low-Medium
Visual intrusion associated with the extraction of the mineral	Medium
Creating steep slopes and uneven surfaces	Low-Medium

Soil contamination from hydrocarbon spills	Low-Medium
Noise nuisance as a result of the mining activities	Low-Medium
Potential impact associated with littering at the mining area	Low-Medium
Facilitation of erosion	Low-Medium
Potential impact on Tourism in the area	High
OPERATIONAL PHASE - TRANSPORTING OF MINERAL	
Dust nuisance caused by vehicles transporting the mineral	Low-Medium
Traffic impact road as a result of the mining activity	Low-Medium
OPERATIONAL PHASE - CUMULATIVE IMPACTS	
Reduced ability to meet conservation obligations and targets	Low-Medium
Impact the broad-scale ecological processes	Low-Medium
DISCOMMISSIONING PHASE - SLOPING AND LANDSCAPING (MEDIUM- & LONG TERM)	
Erosion of returned topsoil after rehabilitation	Low-Medium
Infestation of the reinstated area with invader plant species	Low-Medium
Potential impact associated with litter left at the mining area	Low-Medium

Uneven surfaces or steep slopes left upon closure of the site	Low-Medium

l) 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 authorization.

Table 40: Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
TOPOGRAPHY Landscaping of Mining Area	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Ensure no depressions are left in the mining floor to minimize the impact on drainage. Maintain a surface slope (even if minimal) across the mining floor in the drainage direction, so that all excavations are free draining. Control mining depths on the down-slope side of the mine, so that the mining floor remains free-draining and above the low point for drainage out of the mining area. • Control mining depths across the entire mine so that excavations results in a levelling of the footprint rather than a hole with steep edges. • Limit mining to the underlying sandstone layer. • Reduce any steep slopes at the edges of excavations, after mining, to a minimum and profiled it to blend with the surrounding topography. Smooth and profile the entire surface sufficiently to allow cultivation.	• Effectively restoring each mined-out strip to allow the use of the area for agricultural purposes when mining ends.
VISUAL CHARACTERISTICS Visual Mitigation	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Ensure that the site have a neat appearance and is kept in good condition at all times. • Store mining equipment neatly in a dedicated area with a sealed drip tray underneath when not in use. • Do concurrent rehabilitation as strip mining progress to limit the visual impact on the aesthetic value of the area. • Limit vegetation removal, and only strip topsoil immediately prior to the mining/use of a specific area.	• Minimise the impact of the mining operations on the visual characteristics of the receiving environment during the operational phase, and minimise the residual impact after closure.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		• Rehabilitate and level the site upon closure to ensure that the visual impact on the aesthetic value of the area is kept to a minimum.	
AIR AND NOISE QUALITY Dust Mitigation	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Control the liberation of dust into the surrounding environment by the use of; inter alia, water spraying and/or other dust-allaying agents. • Ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. • Limit speed on the haul roads to 20 km/h to prevent the generation of excess dust. • Minimise areas devoid of vegetation, and only remove vegetation immediately prior to mining. • Flatten loads to ensure minimal spillage of material takes place during transportation, also preventing windblown dust. • Consider weather conditions upon commencement of daily operations. • Ensure dust-generating activities comply with the National Dust Control Regulations, GN No R827 promulgated in terms of NEM:AQA, 2004 and ASTM D1739 (SANS 1137:2012). • Implement best practice measures during the stripping of topsoil, loading, and transporting of sand from the site to minimize potential dust impacts. • Do not use potable water for dust suppression purposes.	• Dust prevention measures are applied to minimise the generation of dust.
AIR AND NOISE QUALITY Noise Mitigation	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Ensure that employee and visitors to the site conduct themselves in an acceptable manner while on site. • Do not permit loud music at the mining area. • Ensure that all project related vehicles are equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996.	• Prevent unnecessary noise to the environment by ensuring that noise from development activity is mitigated.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		• Implement best practice measures to minimise potential noise impacts.	
GEOLOGY AND SOIL Topsoil Handling	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Strip and stockpile the upper 300 mm of the soil before mining. • Carefully manage and conserve the topsoil throughout the stockpiling and rehabilitation process. • Ensure topsoil stripping, stockpiling and re-spreading is done in a systematic way. Plan mining in such a way that topsoil is stockpiled for the minimum possible time. • Place the topsoil heaps on a levelled area within the mining footprint area. Do not stockpile topsoil in undisturbed areas. • Protect topsoil stockpiles against losses by water- and wind erosion. Position stockpiles so as not to be vulnerable to erosion by wind and water. Establish plants on the stockpiles to prevent erosion. • Ensure that topsoil heaps do not exceed 1.5 m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen. • Keep temporary topsoil stockpiles free of invasive plant species. • Divert storm- and runoff water around the stockpile area to prevent erosion. • Spread the topsoil evenly, to a depth of 300 m, over the rehabilitated area upon closure of the site. • Strive to re-instate topsoil at a time of the year when vegetation cover can be established as quickly as possible afterwards, to that erosion of returned topsoil is minimized. The best time of year is at the end of the rainy season. • Plant a cover crop immediately after spreading topsoil to stabilise the soil and protect it from erosion. Fertilise the cover crop for optimum	• Adequate fertile topsoil is available to rehabilitate each mined-out strip.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		production. Rehabilitation extends until the first cover crop is well established. • Monitor the rehabilitated area for erosion, and appropriately stabilize if erosion do occur, for at least 12 months after reinstatement.	
HYDROLOGY Erosion Control and Storm Water Management	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Remove soil at right angles to the slope, as this will slow down surface runoff and help to prevent erosion. • Ensure adequate slope protection when mining within steep slopes. • Limit mining to the underlying sandstone layer. • Divert storm water around the topsoil heaps and mining areas to prevent erosion. • During mining, control the outflow of run-off water from the mining excavation to prevent down-slope erosion. If needed, construct temporary banks and ditches that will direct run-off water. These must be in place at any points where overflow out of the excavation might occur. • Limit clearing of vegetation to the proposed mining footprint and associated infrastructure. Prevent clearing outside of the minimum required footprint. • Implement phased mining and vegetation clearance, wherein small strips are mined. Do not disturb vegetation outside of the active strips until it is time for that specific area to be mined. Immediately rehabilitate a finished strip with a stable vegetation cover. • Regularly monitor roads and other disturbed areas within the project area for erosion problems and conduct follow-up monitoring of problem areas to assess the success of the remediation. • Rectify any erosion problems within the mining area as a result of the mining activities immediately (within 24 hours) and monitor it thereafter to ensure that it does not re-occur.	• Impact to the environment caused by storm water discharge is avoided and erosion is managed.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		• Use silt/sediment traps/barriers where there is a danger of topsoil or material stockpiles eroding and entering downstream drainage lines and other sensitive areas. Regularly maintain and clean these sediment/silt barriers to ensure effective drainage of the areas. • Protect stockpiles from erosion, stored it on flat areas, and surround it by appropriate berms where possible. • Undertake construction of gabions and other stabilisation features to prevent erosion, where deemed necessary. • Conduct activity in terms of the Best Practice Guidelines for small-scale mining as developed by DWS.	
HYDROLOGY Management of Drainage Areas	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Adhere to the layout, as proposed in this document, including all no-go areas and buffer zones.	• Drainage areas protected from any impact as a result of mining.
MINING, BIODIVERSITY CONSERVATION AREAS AND VEGETATION Management of Vegetation Removal and Conservation of the CBA.	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Botanist to assist with the relocation of plants of importance (when needed). Compliance to be monitored by the Environmental Control Officer.	• Clearly demarcate the mining boundaries and contain all operations to the approved mining area. • Adhere to the footprint of the site, as proposed in this document, with the the proposed no-go areas and buffer zones. • Arrange a pre-commencement walk-through of the final mining footprint by a suitably qualified botanist, for species of conservation concern that would be affected. • Keep permits for the removal of protected plant species (if required) on-site and in the possession of the flora search and rescue team at all times. • Conduct a pre-commencement environmental induction for all staff on site to ensure that basic environmental principles are adhered to.	• Vegetation clearing is restricted to the authorised development footprint of the mine.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas, etc. • Ensure that the on-site ECO provide supervision and oversee vegetation clearing activities and other activities which may cause damage to the environment, especially at the initiation of each new strip, when the majority of vegetation clearing is taking place. • Limit clearing of vegetation to the proposed mining footprint and associated infrastructure. Prevent clearing outside of the minimum required footprint. • Implement phased mining and vegetation clearance, wherein small strips are mined. Do not disturb vegetation outside of the active strips until it is time for that specific area to be mined. Upon finishing a strip, immediate rehabilitate and establish a stable vegetation cover. • Keep all vehicles on demarcated roads and prevent unnecessary driving in the veld outside these areas. • Do not translocate plants or otherwise uprooted or disturbed it for rehabilitation or other purposes without express permission from the ECO and without the relevant permits. • Do not allow fires on-site.	
MINING, BIODIVERSITY AND VEGETATION Management of Invasive Plant Species	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Implement an invasive plant species management plan to control all invasive plant species on site in terms of NEM:BA, 2004 and CARA, 1983. • Implement an invasive plant species management plan at the site to ensure the management and control of all species regarded as Category 1a and 1b invasive species in terms of NEM:BA, 2004. Do weed/alien removal on an ongoing basis throughout the life of the mining activities.	• Mining area is kept free of invasive plant species.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		• Keep all stockpiles (topsoil & overburden) free of invasive plant species. • Do not allow planting or importing of any alien species to the site for landscaping, rehabilitation or any other purpose. • Control declared invader or exotic species on the rehabilitated areas.	
MINING, BIODIVERSITY AND VEGETATION Cumulative Impacts	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Adhere to the layout, as proposed in this document, including all no-go areas and buffer zones. • Keep the activity footprints of various proposed mining locations and other development proposals in the area to a minimum and encourage a stable vegetation to return during the post-operational phase. • Reduce the footprint of mining areas within sensitive habitat types as much as possible.	• Mining area does not affect the conservation obligations and targets of the CBA or impact on the broad-scale ecological processes.
FAUNA Protection of Fauna	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Ensure no fauna is caught, killed, harmed, sold or played with. • Arrange the ECO or other suitably qualified person to remove any fauna directly threatened by the operational activities to a safe location. • Conduct environmental induction with all personnel regarding fauna management and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. Instruct workers to report any animals that may be trapped in the working area. • Ensure no snares are set or nests raided for eggs or young. • Ensure all vehicles adhere to a low speed limit (20 km/h) to avoid collisions with susceptible species such as snakes and tortoises.	• Disturbance to fauna is minimised.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		• When possible, prevent activity at the site between sunset and sunrise, except for security personnel guarding the operation (if needed). • Prevent litter, food or other foreign material being thrown or left around the site. Keep such items in the site vehicles and daily remove it from the mining area.	
CULTURAL AND HERITAGE ENVIRONMENT Archaeological, Heritage and Palaeontological Aspects	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Archaeologist to comment should any features of importance be unearthed. Compliance to be monitored by the Environmental Control Officer.	• Confine all mining to the development footprint area. • Implement the following change find procedure when discoveries are made on site: ▪ If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. ▪ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area. ▪ The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the Heritage Western Cape (HWC). ▪ Work may only continue once the go-ahead was issued by HWC. • Implement the Fossil Chance Find Protocol attached as part of the HIA (Appendix J) for the duration of the operational phase.	• Impact to cultural/heritage resources is avoided or at least minimised.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
LAND USE Loss of agricultural land for duration of mining.	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• If needed, sign mined-out/rehabilitated areas back to agricultural use once the cover crop stabilised.	• Mining has the least possible impact on the operation of the property.
EXISTING INFRASTRUCTURE Access Road Mitigation	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Divert storm water around the access road to prevent erosion. • Restrict vehicular movement to the existing access road to prevent crisscrossing of tracks through undisturbed areas. • Repair rutting and erosion of the access road caused as a direct result of the mining activities. • Prevent the overloading of the trucks. • Adhere to the DTPW conditions submitted as part of the land use application.	• The access road remains accessible to the landowner during the operational phase, and upon closure, the road is returned in a better, or at least the same state as received by the right Applicant.
GENERAL Waste Management	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer.	• Ensure regular vehicle maintenance, repairs and services only take place at the off-site workshop and service area. Ensure drip trays are present if emergency repairs are needed on equipment not able to move to the workshop. Dispose all waste products in a closed container/bin to be removed from the emergency service area (same day) to the workshop in order to ensure proper disposal. Treat this as hazardous waste and dispose of it at a registered hazardous waste handling facility, alternatively arrange collection by a registered hazardous waste handling contractor. File safe disposal certificates for auditing purposes. • Provide ablution facilities in the form of a chemical toilet. Anchor the chemical toilet and arrange that it be serviced at least once a month by a registered liquid waste handling contractor for the duration of the	• Wastes are appropriately handled and safely disposed of at recognised waste facilities.

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		mining activities. File the safe disposal certificates for auditing purposes. • Ensure that the use of any temporary, chemical toilet facilities does not cause pollution to water sources or pose a health hazard. In addition, prevent any form of secondary pollution from the disposal of refuse or sewage from the temporary, chemical toilets. Address any pollution problems arising from the above immediately. • If a diesel bowser is used on site, equip it with a drip tray at all times. Ensure that drip trays are used during each and every refuelling event. The nozzle of the bowser needs to rest in a sleeve to prevent dripping after refuelling. • Clean drip trays after use. Do not use dirty drip trays. Dispose of the dirty rags used to clean the drip trays as hazardous waste into a designated bin at the off-site workshop, and incorporate it into the hazardous waste removal system. • Collect any effluents containing oil, grease or other industrial substances in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. File the safe disposal certificates for auditing purposes. • Obtain an oil spill kit, and train the employees in the emergency procedures to be followed when a spill occurs as well as the application of the spill kit. • Should spillage occur, such as oil or diesel leaking from a burst pipe, collect the contaminated soil, within the first hour of occurrence, in a suitable receptacle and remove it from the site, either for resale or for appropriate disposal at a recognized facility. File proof. • Contain all general waste within the site vehicles and daily remove it from the mining area to the general waste storage area at the offices on the farm. Do not burn or bury general waste on the farm, but dispose of it at the Registered landfill site.	

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTIONS	MANAGEMENT OUTCOMES
		• Prevent the storage, burning or burying of waste on site. • Report any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities to the DWS and other relevant authorities. Arrange that the affected area is cleaned by a professionally qualified waste handling contractor that must provide proof that the area was successfully cleaned. • Implement the use of waste registers to keep record of the waste generated and removed from the mining area. • Ensure all employees are aware of the Emergency Response Procedures attached to this document as Appendix G.	
GENERAL Management of Health and Safety Risks	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Health and safety representative to manage H&S aspects at the mine. Compliance to be monitored by the Environmental Control Officer.	• Prevent access to the mining area by unauthorised persons as far as is reasonably practical. • Ensure adequate ablution facilities and water for human consumption are daily available on site. • Ensure sanitary facilities is located within 100 m from any point of work. • Ensure that workers have access to the correct PPE as required by law. • Manage all operations in compliance with the Mine Health and Safety Act, 1996 (Act No 29 of 1996).	• Employees work in a healthy and safe environment.

m) Final proposed alternatives.

(provide an explanation for the final layout of the infrastructure and activities on the overall site as shown on the final site map together with the reasons why they are the final proposed alternatives, which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment)

As explained under *Part A(1)(g) Motivation for preferred development footprint.*

Site Alternative 1 (Site 1, Figure 1) is the preferred site for the project. Site 1 is located near the south eastern border of Remaining Extent of Portion 1 of Woodlands 407 on a disturbed area (Figure 11). The site is strategically placed to be in close proximity to the main sand resource, the S171 tar road and power supply. The footprint of the infrastructure (excluding roads, power line and water supply) is approximately 13.5 ha.

Advantages:

- The site is currently disturbed and no additional encroachment on natural vegetation will be required.
- This location will have the least impact on the migration patterns of the game that roam on the farm due to the fact that previous mining occurred in this area. It is also near the perimeter of the farm, bordered by fenced agricultural fields on two sides.
- It is in close proximity to existing infrastructure such as a public road network and power supply, therefore minimising construction and operational impacts.
- It is in close proximity to the main sand and aggregate deposits which in turn requires the least distance for transporting material.
- The site and proposed mine layout, provides a safe separation between active mining in the pit, and vehicle circulation for product collection.
- The site is furthest away from the nearest residential development. See the final site map attached as Appendix D.

n) Aspects for inclusion as conditions of Authorization.

Any aspects which have not formed part of the EMPr that must be made conditions of the Environmental Authorization

The management objectives listed in this report under *Part A(1)(L) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR* above should be considered for inclusion in the environmental authorisation.

Additional to those conditions the following must be considered as conditions of the Environmental Authorisation:

- Access to Roads Application to the Department of Police, Roads and Transport Free State.
- Water Use License Application to the Department of Water and Sanitation

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

(Which relate to the assessment and mitigation measures proposed)

The assumptions made in this document which relate to the assessment and mitigation measures proposed, stem from site-specific information gathered from the MR Applicant, as well as site inspections, and background information and specialist studies. No uncertainty regarding the proposed project or the receiving environment could be identified at this stage.

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

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

When considering the the impacts (both positive and negative) associated with this project this project is feasible for the following reasons:

The Applicant holds an Environmental Authorisation for the establishment of an Eco-Estate with residential, resort and conservation land uses. Certain areas of the application area are currently utilised for agricultural purposes (in the form of game farming and maize crop production) and eco- tourism. These two functions will continue to remain the primary land uses during the mining activities. The mining area will be fully rehabilitated by the establishment of the Eco- Estate (with concurrent synergistic Agricultural uses).

Goosebay Farm (Pty) Ltd is, as stated above, the Landowner of the 3 Farm Portions, which comprise Goosebay Farm. It should be noted that the Applicant (Monte Cristo Commercial Park (Pty) Ltd), shares common Shareholding and Directorship with the Landowner. Therefore notwithstanding, that the Mining Right Applicant is a different Legal Persona from the Landowner, the said Applicant obviously has a vested interest, to ensure that all mitigation measures and conditions set out in this document, as well as any authorisations that may follow, should be fully adhered to and complied with, in order to minimise any impact on themselves as a related party to the Landowner of this property. Both the

Landowner and the Applicant (as related parties with common Shareholding and Directorships), will be directly affected by any impacts arising from the proposed Mining Activities.

ii) Conditions that must be included in the authorization

(1) Specific conditions to be included into the compilation and approval of EMPr

The management objectives listed in this report under *Part A(1)(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR* were included into the compilation of the EMPr, and should be considered for approval by the competent authority.

(2) Rehabilitation requirements

The rehabilitation- and closure objectives proposed in *Part B(d)(i) Determination of Closure Objectives* and the Closure Plan attached as Appendix M, to this report, must be included in the authorisation.

Once the entire mining area was rehabilitated the MR Applicant is required to submit a closure application to the Department of Mineral Resources and Energy in accordance with section 43(4) of the MPRDA, 2002 that states: *"An application for a closure certificate must be made to the Regional Manager in whose region the land in question is situated within 180 days of the occurrence of the lapsing, abandonment, cancellation, cessation, relinquishment or completion contemplated in subsection (3) and must be accompanied by the prescribed environmental risk report".* The Closure Application will also be submitted in terms of Regulation 62 of the MPRDA, 2002, and Government Notice 940 of NEMA, 1998 (as amended).

q) Period for which the Environmental Authorization is required.

The MR Applicant requested that the Environmental Authorisation be valid for the duration of the mining right (at least until 2051).

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.

The undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the Environmental Impact Assessment Report and the Environmental Management Programme report.

s) Financial Provision

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

i) Explain how the aforesaid amount was derived.

The updated amount calculated as per the Template for Level 2: "Rules-based" assessment of the quantum for financial provision that will be necessary for the rehabilitation of damages caused by the operation, both sudden closures during the normal operation of the project and at final, planned closure gives a sum total of R 2 858 655.01. An actual cost calculation to determine the rehabilitation will be send to DMRE in order to finalise the guarantee amount. Please see the explanation as to how this amount was derived at attached as Appendix F12 – Calculation of quantum.

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).

Monte Criso Commercial Park (Pty) Ltd is responsible for the financial and technical aspects of the mining project. The operating expenditure is provided for as such in the Financial Provision Assessment attached as Appendix F12 to this report.

t) Deviations from the approved scoping report and plan of study.

i) Deviations from the methodology used in determining the significance of potential environmental impacts and risks.

(Provide a list of activities in respect of which the approved scoping report was deviated from, the reference in this report identifying where the deviation was made, and a brief description of the extent of the deviation).

No deviation from the methodology used in determining the significance of potential environmental impacts and risks were deemed necessary. The methodology described in the Scoping Report as conducted by Shango Solutions was also used in the Environmental Impact Assessment Report.

ii) Motivation for the deviation.

Not applicable.

u) Other 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 Appendix 219.1 and confirm that the applicable mitigation is reflected in 2.5.3, 2.11.6 and 2.12 herein).

The following potential impacts were identified that may affect socio-economic conditions of directly affected persons:

- **Visual intrusion associated with the mining:**

The removal of the vegetation cover to access the sand / aggregate will impact on the visual character of the study area. However, the small scale of the proposed operation in comparison with the total mining area of 858.5825ha (±28 ha (±7 ha / block for sand up to a maximum of 4 blocks open to be rehabilitated at any given time ±20 ha (±5 ha / block for aggregate up to a maximum of 4 blocks open to be rehabilitated at any given time. Total distrubed area ±48 ha), proposed progressive rehabilitation, as well as the fact that only 13.5 ha will be used for infrastructure assist in mitigating the visual impact of the proposed development on the surrounding environment. Very little (if any) residual visual impact is expected upon closure of the mine and therefore this impact is deemed to be of medium significance.

- **Impact on the air quality and noise ambiance of the study area:**

As per the Air Quality assessement conducted by Airshed Planning Professionals (Pty) Ltd

Emission sources from the proposed Pure Source Mine Project operations include fugitive dust emissions from material handling, crushing and screening, vehicle entrainment and wind erosion from stockpiles and exposed areas, as well as gaseous emission from vehicle exhausts and the dryer. Pollutants of concern expected to be emitted by the Pure Source Mining Project operations include particulates with aerodynamic diameters less than 10µm and 2.5µm (PM10 and PM2.5 respectively), nitrogen dioxide

(NO2), sulfur dioxide (SO2), crystalline silica (SiO2) and diesel particulate matter (DPM).

To assess worst case air quality impacts, three scenarios were included in the dispersion modelling. These three scenarios represent the identified operating years that would likely result in the highest air quality impacts at sensitive receptor locations. The three scenarios are representative of operational years 12, 18 and 29.

Even with best practice mitigation measures applied to dust generating sources, simulated 99th percentile daily PM10 concentrations due to the Pure Source Mine Project sources exceed the South African National Ambient Air Quality Standard (SA NAAQS) (more than 4 days exceeding 75 µg/m³ per year) at a variety of sensitive receptor locations, including at the residential area of Vaal Oewer, for all three scenarios. Based on the large impact area, it can be reasonably predicted that these exceedances would also be experienced during other years of the mining operations. Depending on the active area being mined at the time, additional exceedances could occur at other sensitive receptor locations to the north, east and west of the Vaal river.

Simulated annual average PM10 and PM2.5 concentrations, as well as simulated NO2 and SO2 concentrations for all averaging periods, are in compliance with the SA NAAQS at all sensitive receptor locations.

Simulated annual average SiO2 concentrations could exceed the California Office of Environmental Health Hazard Assessment (OEHHA) Reference Exposure Level (REL) in the immediate vicinity of the mining operations but are well below the REL at all sensitive receptor locations.

Worst-case diesel particulate concentrations (if all vehicles are operational simultaneously), could exceed the United States Environmental Protection Agency Integrated Risk Information System (US EPA IRIS) guideline value of 5 µg/m³ up to 400 m from the mining operations, including at some sensitive receptor locations when mining operations are closest to these locations. It is however highly unlikely that all vehicles will be simultaneously operational for 12 hours per day, and this simulated impact is highly conservative.

Simulated highest monthly dust fallout rates exceed the SA National Dust Control Regulations (NDCR) non-residential limit up to 300m from of the mining operations and haul roads and the residential limit up to 600 m from the mining operations and haul road. This means that when mining operations are active at the northern and south western aggregate resources respectively, the NDCR is likely to be exceeded at Vaal Oewer and other sensitive receptors to the north of the Vaal river..

The baseline acoustic environment was described in terms of the location of NSRs, the ability of the environment to attenuate noise over long distances, as well as existing background and baseline noise levels. The following was found:

- NSRs:
  - Include places of residence and areas where members of the public may be affected by noise generated by proposed activities.
  - NSRs within a 2 km radius of the proposed operations include several residences on the both banks of the Vaal River to the west and east of the proposed operations, as well as the residential area of Vaal Oewer to the north of the operations.
- The acoustic climate at NSRs is currently affected by community activities, music, light vehicle and motorcycle traffic, domesticated animals as well as natural noises such as birds, insects and noise created by the Vaal River.
- Recorded LReq,d at all sampling locations during the day-time survey are similar to those given in SANS 10103 as typical for rural districts (45 dBA). Recorded night-time LReq,n at sampling locations 1, 4 and 5 are typical for rural districts at (35 dBA) as described by SANS 10103. Recorded night-time LReq,n at sampling location 2 and 3 are however more akin to those typical for urban districts (45 dBA) as described by SANS 10103. This is due to insect activity which is prevalent during the summer months.

Noise emissions from diesel powered mobile equipment were estimated using LW predictions for industrial machinery (Bruce & Moritz, 1998), where LW estimates are a function of the power rating of the equipment engine. Mobile crushing and screening as well as the generator LW's were obtained from the database of François Malherbe Acoustic Consulting cc (FMAC) for similar operations. Values from the database are based on source measurements. Estimates of road traffic were made given mining and production rates, truck capacities, assumed vehicle speeds and road conditions.

The source inventory, local meteorological conditions and information on local land use were used to populate the noise propagation model (CadnaA, ISO 9613). The propagation of noise was calculated over an area of 11 km east-west by 8.5 km north-south. The area was divided into a grid matrix with

a 50-m. The noise impacts were simulated for the entire Life of Mine (LOM) to determine all potential noise impacts throughout project operations.

The main findings of the impact assessment are:

- A management and mitigation plan are recommended to minimise noise impacts from the project on the surrounding area.
- Day-time and day/night-time noise levels from the project operations exceed the selected noise criteria at NSRs within Vaal Oewer.
- Construction and closure phase impacts are expected to be similar or slightly lower than simulated noise impacts of the operational phase.
- The overall significance for construction and demolition is “low” and for operation is ‘medium’.

The following key recommendations should be included in the project environmental management programme:

- A monitoring programme as per the requirements of the International Finance Corporation (IFC) and SANS 10103:
  - Annually during the operational phase at five proposed sampling locations; and
  - In response to complaints received.

Based on the findings of the assessment and provided the measures planned and recommended are in place, it is the specialist opinion that the project may be authorised

(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 219.2** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6 and 2.12 herein).

A heritage impact assessment study was completed by NGT ESHS for the MRA. A standard heritage study process was completed with a survey conducted on the 26th of March 2019.

Findings from the survey indicated six stone wall sites, five building structures, a single grave, and 51 graves in an informal cemetery.

Stone Age and Iron Age settlements

Six stone wall sites were identified and were assigned as sites of medium significance, these sites were determined to have heritage significance. Most wall structures were noted to be dated to the late iron age/early historical period.

Buildings and Structures

Although several stone-walled enclosures were recorded in the survey area, none are older than 60 years and therefore not protected under the NHRA (Act no 25 of 1999). No further action is required.

An important site was observed which included Site 1 which is a strategic entrenchment (redoubt) that probably dates to the South African War (Anglo-Boer War) of 1899 – 1902. The structure is therefore older than 60 years and as a result protected under the NHRA (Act 25 of 1999). Any impact on the site will have to be mitigated by a Phase 2 investigation.

Graves

A cemetery with 48 graves was recorded. Although some of the graves do have inscriptions on the headstones, some of them do not and as a result are also protected under the NHRA (Act 25 of 1999). If impact will occur in the near future, mitigation measures may entail full grave relocation. Such a relocation process must be undertaken by suitably qualified individuals with a proven track record. The relocation must also be undertaken in full cognisance of all relevant legislation, including the specific requirements of the National Heritage Resource Act (Act no. 25 of 1999). Furthermore, a concerted effort must also be made to identify all buried individuals and to contact their relatives and descendants. Other legislative measures which may be of relevance include the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), the Human Tissues Act (Act no. 65 of 1983, as amended), the Ordinance on Excavations (Ordinance no. 12 of 1980) as well as any local and regional provisions, laws and by-laws that may be in place.

Recommendations

It was recommended that all stone walls located in the study area have heritage value and are completely avoided and established as no-goareas.

It was further recommended that should mining activities encroach onto identified historical sites that a Phase II heritage study is completed where a demolition permit must be applied for.

A key recommendation provided include the implementation of the chance find process which must be implemented during the active mining.

Also note the following:

- It should be kept in mind that archaeological deposits usually occur below ground level. Should archaeological artefacts or skeletal material be revealed in the area during construction activities, such activities should be halted, and a university or museum notified in order for an investigation and evaluation of the find(s) to take place (cf. NHRA (Act No. 25 of 1999), Section 36 (6)).

v) Other matter required in terms of section 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 site alternatives associated with the proposed mining area, investigated during the impact assessment process, were done at the hand of information obtained during the site investigation, public participation process, specialist studies as well as desktop studies conducted of the study area. As discussed earlier the following alternatives were considered:

Site Alternative 1

Site Alternative 1 (Site 1, Figure 12) is the preferred site for the project. Site 1 is located near the south eastern border of Remaining Extent of Portion 1 of Woodlands 407 on a disturbed area (Figure 11). The site is strategically placed to be in close proximity to the main sand resource, the S171 tar road and power supply. The footprint of the infrastructure (excluding roads, power line and water supply) is approximately 13.5 ha.

Site Alternative 2

Site Alternative 2 (Site 2, Figure 1) is located near the western border of Remaining Extent of Woodlands 407 adjacent to an abandoned gravel pit (Figure 12). The settling ponds and pollution control dam are proposed in the

borrow pit to make use of the existing depression. The remainder of the infrastructure will be located on existing cultivated farmland. This site is approximately 1.3 km north of the S171 and east of the main sand deposit. The footprint of the infrastructure (excluding roads, power line and water supply) is approximately 13.5 ha.

Site Alternative 3

Site Alternative 3 (Site 3, Figure 1) is located on Remaining Extent of Portion 1 of Woodlands 407, near its eastern border and just north of the main sand deposit (Figure 13). It is approximately 1.2 km north of the S171. The existing vegetation cover is predominantly grassland. The footprint of the infrastructure (excluding roads, power line and water supply) is approximately 13.5 ha.

The "No Go" or "No Action" alternative

The "No Go" or "No Action" alternative refers to the alternative of not embarking on the proposed project at all. This alternative would denote the current status quo without the proposed project. It is important to note that the No Go alternative is the baseline against which all other alternatives and the development proposal are assessed.

When considering the No Go alternative, the impacts (both positive and negative) associated with any other specific alternative or the current project proposal would not occur and in effect the impacts of the No Go alternative are therefore inadvertently assessed by assessing the other alternatives. In addition to the direct implications of retaining the status quo there are certain other indirect impacts, which may occur should the No Go alternative be followed. The No Go alternative as a specific alternative is not considered feasible for the following reasons:

The Applicant holds an Environmental Authorisation for the establishment of an Eco-Estate with residential, resort and conservation land uses. Certain areas of the application area are currently utilised for agricultural purposes (in the form of game farming and maize crop production) and eco- tourism. These two functions will continue to remain the primary land uses during the mining activities. If the project is rejected, the Applicant will progress with the establishment of the Eco- Estate (with some agriculture). As such, the status

quo of the properties under application will ultimately change, irrespective of the mining activities.

The No Go alternative, as a specific alternative will not be considered further.

The results of the alternative assessment indicate that from a biodiversity and water perspective the placement of the infrastructure at Alternative Site 1 would be the most suitable. From a noise and air quality perspective it is also expected that Alternative Site 1 would be most suitable given prevailing wind direction and the distance from sensitive receptors at Vaal Oewer. Furthermore, the heritage specialist assessment also recommended Alternative Site 1. The only aspect that was not in agreement with the other studies was visual which indicated that alternative 1 was the most visible to receptors.

The mitigation hierarchy was utilised for this alternative assessment, and this approach implements avoidance as a key mechanism. Considering the outcomes of the various specialist studies Alternative Site 1 would be preferable.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1. Draft 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 details and expertise of Mrs S Smit of Greenmined Environmental (Pty) Ltd that acts as EAP on this project has been included in *Part A(1)(a) Details of Greenmined Environmental* as well as Appendix C as required.

b) Description of the Aspects of the Activity

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

The aspects of the activity that are covered by the draft environmental management programme has been described and included in *Part A(1)(h) 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*.

c) Composite Map

(Provide a map (**Attached as an Appendix**) 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 should be avoided, including buffers)

As mentioned under *Part A(1)(k)(ii) Finale Site Map* the map was compiled and is attached as Appendix C.

d) Description of Impact management objectives including management statements

i) Determination of closure objectives.

(ensure that the closure objectives are informed by the type of environment described in 2.4 herein)

The primary objective, at the end of the mine's life, is to obtain a closure certificate at minimum cost and in as short a time period as possible whilst still complying with the requirements of the Minerals and Petroleum Resources Development Act (Act No. 28 of 2002) [MPRDA]. To realise this, the following main objectives must be achieved:

- Remove all temporary infrastructure and waste from the mine as per the requirements of this EMPR and of the Provincial Department of Minerals and Resources and Energy.
- Shape and contour disturbed areas in compliance with the EMPR.
- Ensure that permanent changes in topography (due to mining) are sustainable and do not cause erosion or the damming of surface water.
- Use the topsoil effectively to promote the re-establishment of vegetation.
- Ensure that all rehabilitated areas are stable and self-sustaining in terms of vegetation cover.
- Eradicate all weeds/invader plant species by intensive management of the mine site.

The site-specific closure objectives are discussed in detail in the attached Closure Plan (Appendix M), however, a summary of the closure objectives for the Pure Source Mine were included below.

Rehabilitation from the mining industry perspective means the disturbed areas will adhere to a pre-determined plan or fulfil a function that is sustainable and usable. It recognises that extraction of a resource will occur and that the original topography will be altered. The basic requirements for rehabilitation are to construct a stable, safe and functioning environment, post mining. The intention is not to restore the original topography, but to sculpt the mined areas to facilitate various ecological habitats.

The end land use is proposed to be an Eco-Estate for which an Environmental Authorisation was obtained, with residential, resort and conservation land uses. The mined area will ultimately leave behind a void that, with careful planning, will be converted into artificial wetlands or water courses. These watercourses will be beneficial within the estate's vision. In addition, the conversion of the mine voids into artificial wetlands or water courses will result into a nett gain in biodiversity that should have a positive impact.

The application area is currently utilised as a game farm and this will continue to remain the primary land use with other agricultural activities such as crop production. Mining is an interim land use and it will be conducted in a sensitive manner that will not have a negative impact on the game.

Progressive rehabilitation will follow the mining activity. Rehabilitation will start the year after the extraction of the resource is completed in the block of that year (as illustrated in Figures 1 to 3). Four basic phases usually accompany rehabilitation, namely. The MR Applicant proposes the following regarding the rehabilitation of the mined-out strips:

- The mining plan will be such that topsoil is stockpiled for the minimum possible time through rehabilitating different mining blocks progressively as mining continues.
- To ensure minimum impact on drainage, the applicant will take care not to leave any depressions in the mining floor. A surface slope (even if minimal) will be maintained across the mining floor in the drainage direction, so that all excavations are free draining.
- After mining, any steep slopes at the edges of excavations will be reduced to a minimum and profiled to blend with the surrounding topography.
- The stockpiled topsoil will then be evenly spread over the entire mining area, so that there is a depth of 300 mm of sandy topsoil above the underlying soil. The depth will be monitored during spreading to ensure that coverage is adequate and even.
- The MR Applicant will strive to (when possible) spread topsoil at a time of the year when vegetation cover can be established as quickly as possible afterwards, so that erosion of returned topsoil by both rain and wind, is minimized.
- A cover crop will be planted and established immediately after spreading of topsoil to stabilize the soil and protect it from erosion.
- The rehabilitated area will monthly be monitored for erosion, and appropriately stabilized if any erosion occurs.
- The MR Applicant will ensure monthly monitoring of weeds/invader plants that may germinated within the rehabilitated areas. The invasive plant species management plan (Appendix F will constantly be implemented on site

The right Applicant will comply with the minimum closure objectives as prescribed by DMRE and detailed below:

Rehabilitation of the excavated area:

- No waste may be permitted to be deposited in the mining area.
- The topsoil previously stored must be returned to its original depth over the area.

- The area must be fertilized if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local or adapted indigenous seed mix in order to propagate the locally or regionally occurring flora, should natural vegetation not re-establish within six months from closure of the site.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager (DMRE) may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a vegetation seed mix to his or her specification.

Final rehabilitation:

- Rehabilitation of the surface area shall entail landscaping, levelling, top dressing, land preparation, seeding (if required), maintenance, and clearing of invasive plant species.
- All equipment, plant, and other items used during the mining period must be removed from the site (section 44 of the MPRDA).
- Waste material of any description, including receptacles, scrap, rubble and tyres, must be removed entirely from the mining area and disposed of at a recognized landfill facility. It will not be permitted to be buried or burned on the site.
- The management of invasive plant species must be done in a sporadic manner during the life of the mining activities. Species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto) need to be eradicated from the site.
- Final rehabilitation must be completed within a period specified by the Regional Manager (DMRE).

Control of invasive plant species is an important aspect after topsoil replacement and seeding has been done in an area. Site management must implement an invasive plant species management plan (see Appendix K) during the 12 months' aftercare period to address germination of problem plants in the area.

ii) The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity.

Due to the nature of the sand / aggregate mining operation, it is believed that the risk of environmental damage or pollution is of low significance. If site management implement the mitigation measures as prescribed in this document, it is believed that the impact on the receiving environment can be adequately controlled.

All employees must be trained in the Emergency Response Procedures attached to this document as Appendix P.

iii) Potential risk of Acid Mine Drainage.

(Indicate whether or not the mining can result in acid mine drainage).

Not applicable.

iv) Steps taken to investigate, assess, and evaluate the impact of acid mine drainage.

Not applicable.

v) Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage.

Not applicable.

vi) Measures that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage.

Not applicable.

vii) Volumes and rate of water use required for the mining, trenching or bulk sampling operation.

As mentioned in *Part A(1)(d)(ii) Description of the activities to be undertaken – 1.2.6 Water Management*. Dust generated on the access road is, as far as possible, managed through alternative dust suppression methods to minimise water use.

viii) Has a water use license been applied for?

The MR Applicant applied for water use authorisation for activities that trigger the NWA, 1998.

ix) Impacts to be mitigated in their respective phases

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

Table 41: Impact to be mitigated in their respective phases

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
(as listed in 2.11.1)	of operation in which activity will take place. State; Planning and design, Pre-Construction, Operational, Rehabilitation, Closure, Post closure	(volumes, tonnages and hectares or m^2)	(describe how each of the recommendations herein will remedy the cause of pollution or degradation and migration of pollutants)	(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)	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.
Sand / Aggregate / Alluvial Diamond Mining.	Operational Phase	±363.5ha	• Dust suppression must be active in order to prevent dust pollution. • No open fires may be allowed on the site. • Alien vegetation needs to be eradicated. • Topsoil management and re-use must be a priority. • Rehabilitation must occur concurrent to progress of the mining.	• NEM:AQA. 2004 Regulation 6(1) • National Dust Control Regulations, GN No R827 • CARA, 1983 • NEM:BA, 2004 • NEMA, 1998 • MPRDA, 2002 • Closure Plan (Appendix M)	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
• Demarcation of site with visible beacons.	Site Establishment phase	363.5ha	Demarcation of the site will ensure that all employees are aware of the boundaries of the mining area, and that work stay within the approved area.	Mining is only allowed within the boundaries of the approved area. • MPRDA, 2002 • NEMA, 1998	Beacons need to be in place throughout the life of the mine.
• Stripping and stockpiling of topsoil.	Site Establishment- & Operational Phase	±28 ha (±7 ha / block for sand up to a maximum of 4 blocks open to be rehabilitated at any given time. ±20 ha (±5 ha / block for aggregate up to a maximum of 4 blocks open to be rehabilitated at any given time. Total distrubed area ±48 ha	**<u>Loss of agricultural land for duration of mining:</u>** • The temporary loss of agricultural land for the duration of the mining period is acceptable to the landowner. If needed, mined-out/rehabilitated areas will revert back to agricultural use once the cover crop stabilised.	Use of agricultural land must be managed in accordance with the: • CARA, 1983 • Closure Plan (Appendix M)	Throughout the site establishment- and operational phases.
• Stripping and stockpiling of topsoil. • Excavation of sand from the mining footprint and	Site Establishment- & Operational Phase	±28 ha (±7 ha / block for sand up to a maximum of 4 blocks open to be rehabilitated at any given time.	**<u>Visual Mitigation:</u>** • The site must have a neat appearance and be kept in good condition at all times.	Management of the mining activities must be in accordance with the: • MPRDA, 2002 • NEMA, 1998	Throughout the site establishment- and operational phases.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
loading onto trucks.		±20 ha (±5 ha / block for aggregate up to a maximum of 4 blocks open to be rehabilitated at any given time. Total distrubed area ±48 ha	• Mining equipment must be stored neatly in a dedicated area with a sealed drip tray underneath when not in use. • Concurrent rehabilitation must be done as block mining progress to limit the visual impact on the aesthetic value of the area. • The MR Applicant must limit vegetation removal, and stripping of topsoil may only be done immediately prior to the mining/use of a specific area. • Upon closure the site must be rehabilitated and levelled to ensure that the visual impact on the aesthetic value of the area is kept to a minimum.		
• Stripping and stockpiling of topsoil.	Site Establishment- & Operational Phase	±28 ha (±7 ha / block for sand up to a maximum of 4 blocks open to be rehabilitated at any given time. ±20 ha (±5 ha / block for aggregate up to a maximum of 4 blocks open to be rehabilitated at any given time. Total distrubed area ±48 ha	**Management of vegetation Removal and Conservation sensitive areas:** • The mining boundaries must be clearly demarcated and all operations must be contained to the approved mining area. • The MR Applicant must adhere to the layout of, as proposed in this document, as well as no-go area as buffer zones. • A pre-commencement walk-through of the final mining footprint, must be done by a suitably qualified botanist, for species of conservation concern that would be affected (also to comply with the Free State Nature Conservation Ordinance and Free State Economic, Small Business Development, Tourism and Environmental Affairs permit conditions). • Permits for the removal of protected plant species (if required) must be kept on-site and in	Natural vegetated areas must be managed in accordance with the: • NEM:BA 2004 • Free State Biodiversity Plan	Throughout the site establishment- and operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			the possession of the flora search and rescue team at all times. • A pre-commencement environmental induction for all staff on site must be provided to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas, etc. • The on-site ECO must provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially at the initiation of each new strip, when the majority of vegetation clearing is taking place. • Clearing of vegetation must be limited to the proposed mining footprint and associated infrastructure. No clearing outside of the minimum required footprint to take place. • Phased mining and vegetation clearance must be done, wherein small strips are mined. No vegetation outside of the active strips may be disturbed until it is time for that specific area to be mined. Furthermore, upon finishing a strip, immediate rehabilitation should occur wherein a stable vegetation cover is established with a grass cover. • All vehicles must remain on demarcated roads and no unnecessary driving in the veld outside these areas may be allowed. • No plants may be translocated or otherwise uprooted or disturbed for rehabilitation or other		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			purposes without express permission from the ECO and without the relevant permits. • No fires must be allowed on-site.		
• Stripping and stockpiling of topsoil.	Site Establishment, Operational- and Decommissioning Phase	±28 ha (±7 ha / block for sand up to a maximum of 4 blocks open to be rehabilitated at any given time. ±20 ha (±5 ha / block for aggregate up to a maximum of 4 blocks open to be rehabilitated at any given time. Total distrubed area ±48 ha	**<u>Topsoil Management:</u>** • The upper 300 mm of the soil, of the strip to be mined, must be stripped and stockpiled before mining. • Topsoil is a valuable and essential resource for rehabilitation and it must therefore be managed carefully to conserve and maintain it throughout the stockpiling and rehabilitation processes. • Topsoil stripping, stockpiling and re-spreading must be done in a systematic way. The mining plan have to be such that topsoil is stockpiled for the minimum possible time. • The topsoil must be placed on a levelled area, within the mining footprint. No topsoil may be stockpiled in undisturbed areas. • Topsoil stockpiles must be protected against losses by water- and wind erosion. Stockpiles must be positioned so as not to be vulnerable to erosion by wind and water. The establishment of plants on the stockpiles will help to prevent erosion. • Topsoil heaps may not exceed 1.5 m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen. • The temporary topsoil stockpiles must be kept free of invasive plant species.	Topsoil stripping must be managed in accordance with the: • CARA, 1983 • NEM:BA, 2004 • MPRDA, 2002 • Closure Plan (Appendix M) • Free State Noise Control Regulations GN 24/PG 35/19980424	Throughout the site establishment- and operational-, and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			• Storm- and runoff water must be diverted around the stockpile area to prevent erosion. • The stockpiled topsoil must be evenly spread, to a depth of 300 mm, over the rehabilitated area upon closure of the site. • The MR Applicant must strive to re-instate topsoil at a time of year when vegetation cover can be established as quickly as possible afterwards, so that erosion of returned topsoil by both rain and wind, before vegetation is established, is minimized. The best time of year is at the end of the rainy season, when there is moisture in the soil for vegetation establishment and the risk of heavy rainfall events is minimal. • A cover crop must be planted, irrigated and established immediately after spreading of topsoil, to stabilize the soil and protect it from erosion. The cover crop must be fertilized for optimum biomass production, and any soil deficiencies must be corrected, based on a chemical analysis of the re-spread soil (if deemed necessary). It is important that rehabilitation be taken up to the point of cover crop stabilization. Rehabilitation cannot be considered complete until the first cover crop is well established. • The rehabilitated area must be monitored for erosion, and appropriately stabilized if any erosion occurs for at least 12 months after reinstatement.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
• Stripping and stockpiling of topsoil. • Sloping and landscaping (medium- & long term).	Site Establishment & Operational-, and Decommissioning Phase	±28 ha (±7 ha / block for sand up to a maximum of 4 blocks open to be rehabilitated at any given time. ±20 ha (±5 ha / block for aggregate up to a maximum of 4 blocks open to be rehabilitated at any given time. Total distrubed area ±48 ha	**<u>Management of Invader Plant Species:</u>** • An invasive plant species management plan (Appendix F) must be implemented at the site to ensure the management and control of all species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto). Weed/alien clearing must be done on an ongoing basis throughout the life of the mining activities. • All stockpiles (topsoil) must be kept free of invasive plant species. • No planting or importing of any alien species to the site for landscaping, rehabilitation or any other purpose may be allowed. • Management must take responsibility to control declared invader or exotic species on the rehabilitated areas. The following control methods can be used: ▪ The plants can be uprooted, felled or cut off and can be destroyed completely. ▪ The plants can be treated chemically by a registered pest control officer (PCO) through the use of an herbicide recommended for use by the PCO in accordance with the directions for the use of such an herbicide.	Invader plants must be managed in accordance with the: • CARA, 1983 • NEM:BA 2004 • Invasive Plant Species Management Plan (Appendix K)	Throughout the site establishment-, operational, and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
• Stripping and stockpiling of topsoil. • Excavation of sand from the mining footprint and loading onto trucks.	Site Establishment & Operational Phase	±28 ha (±7 ha / block for sand up to a maximum of 4 blocks open to be rehabilitated at any given time. ±20 ha (±5 ha / block for aggregate up to a maximum of 4 blocks open to be rehabilitated at any given time. Total distrubed area ±48 ha	**<u>Protection of Fauna:</u>** • The site manager must ensure no fauna is caught, killed, harmed, sold or played with. • Any fauna directly threatened by the operational activities must be removed to a safe location by the ECO or other suitably qualified person. • All personnel must undergo environmental induction regarding fauna management and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. Workers must be instructed to report any animals that may be trapped in the working area. • No snares may be set or nests raided for eggs or young. • All vehicles must adhere to a low speed limit (20 km/h is recommended) to avoid collisions with susceptible species such as snakes and tortoises. • When possible, no activity must be undertaken at the site between sunset and sunrise, except for security personnel guarding the operation (if needed). • No litter, food or other foreign material may be thrown or left around the site. Such items must be kept in the site vehicles and daily removed from the mining area.	Fauna must be managed in accordance with the: • NEM:BA 2004	Throughout the site establishment-, and operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
• Stripping and stockpiling of topsoil. • Excavation of sand from the mining footprint and loading onto trucks. • Transporting of mineral.	Site Establishment- & Operational Phase	±28 ha (±7 ha / block for sand up to a maximum of 4 blocks open to be rehabilitated at any given time. ±20 ha (±5 ha / block for aggregate up to a maximum of 4 blocks open to be rehabilitated at any given time. Total distrubed area ±48 ha	**<u>Dust Mitigation:</u>** • The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, straw, water spraying and/or environmentally friendly dust-allaying agents that contains no PCB's (e.g. DAS products). • The site manager must ensure continuous assessment of the dust suppression equipment to confirm its effectiveness in addressing dust suppression. • Speed on the access road must be limited to 20 km/h to prevent the generation of excess dust. • Areas devoid of vegetation, which could act as a dust source, must be minimized and vegetation removal may only be done immediately prior to mining. • Loads must be flattened to prevent spillage of sand during transportation, also minimising windblown dust. • Weather conditions must be taken into consideration upon commencement of daily operations. Limiting operations during very windy periods would reduce airborne dust and resulting impacts. • All dust generating activities shall comply with the National Dust Control Regulations, GN No R827 promulgated in terms of NEM:AQA (Act 39 of 2004) and ASTM D1739 (SANS 1137:2012).	Dust generation must be managed in accordance with the: • NEM:AQA. 2004 Regulation 6(1) • National Dust Control Regulations, GN No R827 • ASTM D1739 (SANS 1137:2012)	Throughout the site establishment-, and operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			• Best practice measures shall be implemented during the stripping of topsoil, loading, and transporting of the sand from the site to minimize potential dust impacts. • No potable water may be used for dust suppression purposes.		
• Stripping and stockpiling of topsoil. • Excavation of sand from the mining footprint and loading onto trucks.	Site Establishment- and, Operational Phase	±28 ha (±7 ha / block for sand up to a maximum of 4 blocks open to be rehabilitated at any given time. ±20 ha (±5 ha / block for aggregate up to a maximum of 4 blocks open to be rehabilitated at any given time. Total distrubed area ±48 ha	**<u>Noise Handling:</u>** • The MR Applicant must ensure that the employee and visitors to the site conduct themselves in an acceptable manner while on site. • No loud music may be permitted at the mining area. • All mining vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996 (Act No 93 of 1996). • Best practice measures shall be implemented in order to minimize potential noise impacts.	Noise generation must be managed in accordance with the: • NEM:AQA. 2004 Regulation 6(1) • NRTA, 1996 • Free State Noise Control Regulations GN 24/PG 35/19980424	Throughout the site establishment-, and operational phase.
• Stripping and stockpiling of topsoil. • Excavation of sand from the mining	Site Establishment- and, Operational Phase	±28 ha (±7 ha / block for sand up to a maximum of 4 blocks open to	**<u>Archaeological, Heritage and Palaeontological Aspects:</u>** • All mining must be confined to the development footprint area.	Cultural/heritage aspects must be managed in accordance with the: • NHRA, 1999	Throughout the site establishment-, and operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
footprint and loading onto trucks.		be rehabilitated at any given time. ±20 ha (±5 ha / block for aggregate up to a maximum of 4 blocks open to be rehabilitated at any given time. Total distrubed area ±48 ha	• If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. • It is the responsibility of site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area. • The site Manager must inform the ECO of the chance find and its immediate impact on operations. The ECO must then contact a professional archaeologist for an assessment of the finds who must notify (SAHRA). • Work may only continue once the go-ahead was issued by SAHRA. • The Fossil Chance Find Protocol attached as part of the HIA (Appendix F7) must be implemented for the duration of the operational phase.		
• Stripping and stockpiling of topsoil.	Site Establishment- and, Operational Phase	±28 ha (±7 ha / block for sand up to a maximum of 4 blocks open to be rehabilitated at any given time.	**<u>Mitigating the Impact on the Drainage Areas:</u>** • The MR Applicant must adhere to the layout, as proposed in this document, including all no-go areas and buffer zones. • The MR Applicant must demarcate a 100 m buffer area from the most northern drainage line	The drainage lines must be protected in accordance with the: • NWA, 1998	Throughout the site establishment-, and operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
		±20 ha (±5 ha / block for aggregate up to a maximum of 4 blocks open to be rehabilitated at any given time. Total distrubed area ±48 ha	and manage it as part of the abovementioned no-go area where no mining can take place.		
• Excavation of sand / aggregate from the mining footprint and loading onto trucks. • Sloping and landscaping (medium- & long term).	Operational-, and Decommissioning Phase	±28 ha (±7 ha / block for sand up to a maximum of 4 blocks open to be rehabilitated at any given time. ±20 ha (±5 ha / block for aggregate up to a maximum of 4 blocks open to be rehabilitated at any given time. Total distrubed area ±48 ha	**<u>Landscaping of Mining Area:</u>** • To ensure minimum impact on drainage, it is essential that no depressions are left in the mining floor. A surface slope (even if minimal) must be maintained across the mining floor in the drainage direction, so that all excavations are free draining. This means that mining depths must be controlled on the down-slope side of the mine, so that the mining floor remains free-draining and above the low point for drainage out of the mining area. • Mining depths must be controlled across the entire mine so that excavations results in a levelling of the footprint rather than a hole with steep edges. • No mining may extend into/below the underlying sandstone layer. • After mining, any steep slopes at the edges of excavations must be reduced to a minimum and profiled to blend with the surrounding topography. The entire surface must be	Management of the mining area must be in accordance with the: • CARA, 1983 • NEM:BA, 2004 • MPRDA, 2002 • Closure Plan (Appendix M)	Throughout the operational-, and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			sufficiently smoothed and profiled to allow cultivation.		
• Excavation of sand from the mining footprint and loading onto trucks. • Sloping and landscapting (medium- & long terrm).	Operational-, and Decommissioning Phase	±28 ha (±7 ha / block for sand up to a maximum of 4 blocks open to be rehabilitated at any given time. ±20 ha (±5 ha / block for aggregate up to a maximum of 4 blocks open to be rehabilitated at any given time. Total distrubed area ±48 ha	**<u>Waste Management:</u>** • Regular vehicle maintenance, repairs and services may only take place at the off-site workshop and service area. If emergency repairs are needed on equipment not able to move to the workshop, drip trays must be present. All waste products must be disposed of in a closed container/bin to be removed from the emergency service area (same day) to the workshop (off-site) in order to ensure proper disposal. This waste must be treated as hazardous waste and must be disposed of at a registered hazardous waste handling facility, alternatively collected by a registered hazardous waste handling contractor. The safe disposal certificates must be filed for auditing purposes. • Ablution facilities must be provided in the form of a chemical toilet. The chemical toilet must be anchored (to prevent blowing/falling over) and shall be serviced at least once a month for the duration of the mining activities by a registered liquid waste handling contractor. The safe disposal certificates must be filed for auditing purposes. • The use of any temporary, chemical toilet facilities must not cause any pollution to water sources or pose a health hazard. In addition, no form of secondary pollution should arise from the disposal of refuse or sewage from the	Mining related waste must be managed in accordance with the: • NWA, 1998 • NEM:WA, 2008 • NEM:WA, 2008: National norms and standards for the storage of waste (GN 926) • NEMA, 1998 (Section 30)	Throughout the site establishment-, operational-, and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			temporary, chemical toilets. Any pollution problems arising from the above are to be addressed immediately by the MR Applicant. • If a diesel bowser is used on site, it must be equipped with a drip tray at all times. Drip trays must be used during each and every refuelling event. The nozzle of the bowser needs to rest in a sleeve to prevent dripping after refuelling. • Site management must ensure drip trays are cleaned after each use. No dirty drip trays may be used on site. The dirty rags used to clean the drip trays must be disposed as hazardous waste into a designated bin at the off-site workshop, where it is incorporated into the hazardous waste removal system as discussed above. • Any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. The safe disposal certificates must be filed for auditing purposes. • An oil spill kit must be obtained, and the employees must be trained in the emergency procedures to be followed when a spill occurs as well as the application of the spill kit. • Should spillage occur, such as oil or diesel leaking from a burst pipe, the contaminated soil must, within the first hour of occurrence, be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. Proof must be filed.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			• All general waste must be contained within the site vehicles and daily be removed from the mining area to the general waste storage area at the offices on the farm. No general waste may be burned or buried on the farm, but must be disposed of at the Registered landfill site. • No waste may be stored, buried or burned on the site. • It is important that any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities is reported to the Department of Water and Sanitation and other relevant authorities. The affected area must be cleaned by a professionally qualified waste handling contractor that must provide proof that the area was successfully cleaned. • Site management must implement the use of waste registers to keep record of the waste generated and removed from the mining area. • All employees must be aware of the Emergency Response Procedures attached to this document as Appendix J.		
• Transporting of mineral.	Operational Phase	±1 km	**<u>Access Road Mitigation:</u>** • Storm water must be diverted around the access road to prevent erosion. • Vehicular movement must be restricted to the existing access road and crisscrossing of tracks through undisturbed areas must be prohibited. • Rutting and erosion of the access road caused as a direct result of the mining activities must be repaired by the MR Applicant.	The access road must be managed in accordance with the: • NRTA, 1996	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			• Overloading of the trucks must be prevented. • The MR Applicant must adhere to the DPRT conditions submitted as part of the access to roads application.		
• Stripping and stockpiling of topsoil. • Excavation of sand /aggregate from the mining footprint and loading onto trucks. • Sloping and landscaping during rehabilitation.	Site establishment-, Operational- and Decommissioning Phase.	±28 ha (±7 ha / block for sand up to a maximum of 4 blocks open to be rehabilitated at any given time. ±20 ha (±5 ha / block for aggregate up to a maximum of 4 blocks open to be rehabilitated at any given time. Total distrubed area ±48 ha	**<u>Erosion Control and Storm Water Mitigation:</u>** • Soil that are to be removed must be done so at right angles to the slope, as this will slow down surface runoff and help to prevent erosion. • When mining within steep slopes, it must be ensured that adequate slope protection is provided. • No mining may extend into/below the underlying sandstone layer. • Storm water must be diverted around the topsoil heaps and mining areas to prevent erosion. • During mining, the outflow of run-off water from the mining excavation must be controlled to prevent down-slope erosion. This must be done by way of the construction of temporary banks and ditches that will direct run-off water (if needed). These must be in place at any points where overflow out of the excavation might occur. • Clearing of vegetation must be limited to the proposed mining footprint and associated infrastructure. No clearing outside of the minimum required footprint to take place. • Phased mining and vegetation clearance must be done, wherein small strips are mined. No vegetation outside of the active strips may be disturbed until it is time for that specific area to	Storm water must be managed in accordance with the: • CARA, 1983 • NEMA, 1998 • NWA, 1998	Throughout the site establishment-, operational- and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			be mined. Furthermore, upon finishing a strip, immediate rehabilitation must occur wherein a stable vegetation cover is established with a grass cover. • Roads and other disturbed areas within the project area must be regularly monitored for erosion problems and problem areas must receive follow-up monitoring to assess the success of the remediation. • Any erosion problems within the mining area as a result of the mining activities observed must be rectified immediately (within 24 hours) and monitored thereafter to ensure that it does not re-occur. • Silt/sediment traps/barriers must be used where there is a danger of topsoil or material stockpiles eroding and entering downstream drainage lines and other sensitive areas. These sediment/silt barriers must regularly be maintained and cleared so as to ensure effective drainage of the areas. • Stockpiles must be protected from erosion, stored on flat areas where possible, and be surrounded by appropriate berms. • Construction of gabions and other stabilisation features must be undertaken to prevent erosion, where deemed necessary. • Mining must be conducted only in accordance with the Best Practice Guideline for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the Department of		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			Water and Sanitation (DWS), and any other conditions which that Department may impose: ▪ Clean water (e.g. rainwater) must be kept clean and be routed to a natural watercourse by a system separate from the dirty water system. You must prevent clean water from running or spilling into dirty water systems. ▪ Dirty water must be collected and contained in a system separate from the clean water system. ▪ Dirty water must be prevented from spilling or seeping into clean water systems. ▪ A storm water management plan must apply for the entire life cycle of the mining activity and over different hydrological cycles (rainfall patterns). ▪ The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into a storm water management plan.		
• Cumulative Impacts.	Site Establishment Phase	±28 ha (±7 ha / block for sand up to a maximum of 4 blocks open to be rehabilitated at any given time. ±20 ha (±5 ha / block for aggregate up to	**<u>Cumulative Impacts - Ecological:</u>** • The MR Applicant must adhere to the layout, as proposed in this document, including all no-go areas and buffer zones. • The activity footprints of various proposed mining locations and other development proposals in the area must be kept to a minimum and a stable vegetation must be encouraged to return during the post-operational phase.	Management of the mining area must be in accordance with the: • CARA, 1983 • NEM:BA, 2004 • MPRDA, 2002 • Closure Plan	Throughout the operational-, and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
		a maximum of 4 blocks open to be rehabilitated at any given time. Total distrubed area ±48 ha	• The footprint of mining areas within sensitive habitat types must be reduced as much as possible.		
• Cumulative Impacts	Operational Phase	±28 ha (±7 ha / block for sand up to a maximum of 4 blocks open to be rehabilitated at any given time. ±20 ha (±5 ha / block for aggregate up to a maximum of 4 blocks open to be rehabilitated at any given time. Total distrubed area ±48 ha	**<u>Cumulative Impacts - Palaeontological:</u>** • The MR Applicant must implement a Fossil Chance Find Protocol in the EMPR (see HIA for the protocol).	Management of the mining area must be in accordance with the: • NHRA, 1999 • Fossil Chance Find Protocol	Throughout the operational phase.
• Stipping and stockpiling of topsoil.	Site Establishment-, Operational- and	±28 ha (±7 ha / block for sand up to a maximum of	**<u>Management of Health and Safety Risks:</u>**	Management of the mining activity must be in accordance with the: • MHSA, 1996	Throughout the operational-, and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
• Excavation of sand /aggregate from the mining footprint and loading onto trucks. • Transporting of material. • Sloping and landscaping.	Decommissioning Phase	4 blocks open to be rehabilitated at any given time. ±20 ha (±5 ha / block for aggregate up to a maximum of 4 blocks open to be rehabilitated at any given time. Total distrubed area ±48 ha	• Access to the mining area by unauthorised persons is to be prevented by the Mine Manager, as far as is reasonably practical. • Adequate ablution facilities and water for human consumption must daily be available on site. • Sanitary facilities must be located within 100 m from any point of work. • Worker(s) must have access to the correct personal protection equipment (PPE) as required by law. • All operations must comply with the Mine Health and Safety Act, 1996 (Act No 29 of 1996).		

e) Impact Management Outcomes

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

Table 42: Impact Management Outcomes

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
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, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc..etc.)	(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc...etc..)		In which impact is anticipated (e.g. Construction, commissioning, operational Decommissioning, closure, post-closure))	(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.	(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.
• Demarcation of site with visible beacons.	• No impact could be identified other than the beacons being outside the boundaries of the approved mining area.	N/A	Site Establishment phase	<u>Control:</u> Implementation of proper housekeeping and site management.	Mining is only allowed within the boundaries of the approved area. • MPRDA, 2002 • NEMA, 1998
• Stripping and stockpiling of topsoil.	• Alteration of the agricultural sense of place.	The impact affects the agricultural operations of the property.	Site Establishment- & Operational Phase	The study area does not have a high agritourism potential, and the sand mine has a low visibility. The significance is therefore deemed to be low-medium during the operational phase and negligible upon the closure of the mine.	Use of agricultural land must be managed in accordance with the: • CARA, 1983 • Closure Plan (Appendix M)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
• Stripping and stockpiling of topsoil.	• Loss of agricultural land for duration of mining.	The impact affects the agricultural operations of the property.	Site Establishment- & Operational Phase	Should the proposed project be approved, the operation will temporarily interrupt the agricultural activities of the footprint area, only to be reversed upon the closure of the mine. The impact could be controlled through progressive rehabilitation.	Use of agricultural land must be managed in accordance with the: • CARA, 1983 • Closure Plan (Appendix M)
• Stripping and stockpiling of topsoil. • Excavation of sand / aggregate from the mining footprint and loading onto trucks.	• Visual intrusion as a result of mining. • Visual intrusion associated with the extraction of the mineral.	The visual impact may affect the aesthetics of the landscape.	Site Establishment- & Operational Phase	Control: Proper housekeeping and implementation of progressive rehabilitation.	Management of the mining activities must be in accordance with the: • MPRDA, 2002 • NEMA, 1998
• Stripping and stockpiling of topsoil.	• Potential impact on vegetation and listed and protected plant species.	This will impact on the biodiversity of the receiving environment.	Site Establishment- & Operational Phase	Modify & Control: Keeping mining operations to the approved boundaries.	Natural vegetated areas must be managed in accordance with the: • NEM:BA 2004 • Free State Biodiversity Plan
• Stripping and stockpiling of topsoil. • Excavation of sand / aggregate from the mining footprint and loading onto trucks. • Sloping and landscaping (medium- & long term).	• Loss of topsoil and fertility during mining and stockpiling. • Potential erosion risk and destabilisation of the dune plume. • Facilitation of erosion.	Loss of topsoil will affect the rehabilitation success upon closure of the mine.	Site Establishment, Operational- and Decommissioning Phase	Control & Remedy: Proper housekeeping and storm water management.	Topsoil stripping must be managed in accordance with the: • CARA, 1983 • NEM:BA, 2004 • MPRDA, 2002 • Closure Plan (Appendix M)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
	• Erosion of returned topsoil after rehabilitation.				
Sand / Aggregate / Alluvial Diamond mining.	• Impact on the physical and chemical components.	• Geology. • Air Quality – Dust. • Air Quality – Emissions. • Groundwater. • Visual Aspects. • Topography.	Operational Phase	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	• NEM:AQA. 2004 Regulation 6(1) • National Dust Control Regulations, GN No R827 • NWA, 1998
Sand / Aggregate / Alluvial Diamond mining.	• Impact on the biological and ecological components.	• Natural Vegetation. • Soils. • Sensitive Landscapes. • Land Use. • Land Capability. • Animal Life.	Operational Phase	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	• CARA, 1983 • NEM:BA, 2004 • NEMA, 1998 • MPRDA, 2002
Sand / Aggregate / Alluvial Diamond mining..	• Impact on sociological and cultural components.	• Interested and Affected Parties. • Archaeological Artefacts. • Noise.	Operational Phase	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	• NEMA, 1998 • NHRA, 1999 • NEM:AQA. 2004 Regulation 6(1)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
Sand / Aggregate / Alluvial Diamond mining..	• Impact on economical and operational components.	• Regional Socio Economic Structure.	Operational Phase	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	• MPRDA, 2002 • NEMA, 1998
• Stripping and stockpiling of topsoil. • Sloping and landscaping (medium- & long term).	• Infestation of the topsoil heaps and mining area with invader plant species. • Infestation of the reinstated area with invader plant species.	This will impact on the biodiversity of the receiving environment.	Site Establishment & Operational-, and Decommissioning Phase	Control: Implementing soil- and invader plant control/management.	Invader plants must be managed in accordance with the: • CARA, 1983 • NEM:BA 2004 • Invasive Plant Species Management Plan (Appendix K)
• Stripping and stockpiling of topsoil. • Excavation of sand / aggregate from the mining footprint and loading onto trucks.	• Potential impact on local fauna due to disturbance and loss of available habitat and migration routes. • Disturbance to fauna within the footprint area.	This will impact on the biodiversity of the receiving environment.	Site Establishment & Operational Phase	Control & Stop: Implementing good management practices.	Fauna must be managed in accordance with the: • NEM:BA 2004
• Stripping and stockpiling of topsoil. • Excavation of sand / aggregate from the mining footprint and loading onto trucks. • Transporting of mineral.	• Dust nuisance as a result of the mining activities. • Dust nuisance caused by vehicles	Increased dust will impact on the air quality of the receiving environment.	Site Establishment- & Operational Phase	Control: Dust suppression methods and proper housekeeping.	Dust generation must be managed in accordance with the: • NEM:AQA. 2004 Regulation 6(1)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
	transporting the mineral.				• National Dust Control Regulations, GN No R827 • ASTM D1739 (SANS 1137:2012)
• Stripping and stockpiling of topsoil. • Excavation of sand / aggregate from the mining footprint and loading onto trucks.	• Noise nuisance as a result of the mining activities. • Noise nuisance as result of the mining activities.	Should the noise levels become excessive it may have an impact on the noise ambiance of the receiving environment.	Site Establishment- and, Operational Phase	Control: Noise suppression methods and proper housekeeping.	Noise generation must be managed in accordance with the: • NEM:AQA. 2004 Regulation 6(1) • NRTA, 1996 • Free State Noise Control Regulations
• Stripping and stockpiling of topsoil. • Excavation of sand / aggregate from the mining footprint and loading onto trucks.	• Potential impact on archaeological artefacts. • Potential impact on areas of palaeonological concern.	This could impact on the cultural and heritage legacy of the receiving environment.	Site Establishment- and, Operational Phase	Control & Stop: Implementation of a chance-find procedure.	Cultural/heritage aspects must be managed in accordance with the: • NHRA, 1999
• Stripping and stockpiling of topsoil.	• Potential impact on the drainage lines/watercourses within the mining area.	This impact could affect the hydrology of the surrounding environment.	Site Establishment- and, Operational Phase	Control: Keeping mining operations to the approved boundaries.	The drainage lines must be protected in accordance with the: • NWA, 1998
• Excavation of sand / aggregate from the mining footprint and loading onto trucks. • Sloping and landscaping (medium- & long term).	• Creating steep slopes and uneven surfaces. • Uneven surfaces or steep slopes left	The impact will prevent or hinder future cultivation.	Operational-, and Decommissioning Phase	Control: Effective rehabilitation according to the closure plan.	Management of the mining area must be in accordance with the: • CARA, 1983 • NEM:BA, 2004

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
	upon closure of the site.				• MPRDA, 2002 • Closure Plan (Appendix M)
• Excavation of sand / aggregate from the mining footprint and loading onto trucks. • Sloping and landscapting (medium- & long terrm).	• Soil contamination from hydrocarbon spills. • Potential impact associated with littering at the mining area. • Potential impact associated with litter left at the mining area.	Contamination of the footprint area will negatively impact the soil, surface runoff and potentially the groundwater. It will also incur additional costs to the MR Applicant. .	Operational-, and Decommissioning Phase	<u>Control & Remedy:</u> Proper housekeeping and implementation of the emergency response procedures and waste management registers.	Mining related waste must be managed in accordance with the: • NWA, 1998 • NEM:WA, 2008 • NEM:WA, 2008: National norms and standards for the storage of waste (GN 926) • NEMA, 1998 (Section 30)
• Transporting of mineral.	• Degradation of the access roads. • Traffic impact on the road as a result of the mining activity.	Collapse of the internal road infrastructure will affect the landowner negatively, and if the mine negatively affect public traffic it may incur additional costs and complaints from the public.	Operational Phase	<u>Control & Remedy:</u> Maintaining the access road for the duration of the operational phase as per conditions to be received from DPRT, as well as leaving it in a representative or better condition than prior to mining.	The access road must be managed in accordance with the: • NRTA, 1996
• Cumulative Impacts	• Reduced ability to meet conservation obligations and targets.	This impact will affect the biodiversity of the receiving environment.	Site Establishment-, and Operational Phase	<u>Control</u>: Keeping mining operations to the approved boundaries.	The cumulative impacts must be managed in accordance with the: • CARA, 1983 • NEM:BA, 2004 • Closure Plan

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
• Cumulative Impacts	• Impact the broad-scale ecological processes.	This impact will affect the biodiversity of the receiving environment.	Site Establishment-, and Operational Phase	Control: Keeping mining operations to the approved boundaries.	The cumulative impacts must be managed in accordance with the: • CARA, 1983 • NEM:BA, 2004 • Closure Plan
• Cumulative Impacts	• Cumulative impact of projects on palaeontological resources.	This could impact on the cultural and heritage legacy of the receiving environment.	Operational Phase	Control & Stop: Implementation of a chance-find procedure.	Management of the mining area must be in accordance with the: • NHRA, 1999 • Fossil Chance Find Protocol

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 43: Impact Management Actions

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
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, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc..etc.)	(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc...etc..)	(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.	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.	(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)
• Demarcation of site with visible beacons.	• No impact could be identified other than the beacons being outside the boundaries of the approved mining area.	Control: Implementation of proper housekeeping and site management.	Beacons need to be in place throughout the life of the mine.	Mining is only allowed within the boundaries of the approved area. • MPRDA, 2002 • NEMA, 1998
• Stripping and stockpiling of topsoil.	• Alteration of the agricultural sense of place.	The study area does not have a high agritourism potential, and the sand mine has a low visibility. The significance is therefore deemed to be low-medium during the operational phase and negligible upon the closure of the mine.	Throughout the site establishment- and operational phases.	Use of agricultural land must be managed in accordance with the: • CARA, 1983 • Closure Plan (Appendix M)

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
• Stripping and stockpiling of topsoil.	• Loss of agricultural land for duration of mining.	Should the proposed project be approved, the operation will temporarily interrupt the agricultural activities of the footprint area, only to be reversed upon the closure of the mine. The impact could be controlled through progressive rehabilitation.	Throughout the site establishment phase.	Use of agricultural land must be managed in accordance with the: • CARA, 1983 • Closure Plan (Appendix M)
• Stripping and stockpiling of topsoil. • Excavation of sand / aggregate from the mining footprint and loading onto trucks.	• Visual intrusion as a result of mining. • Visual intrusion associated with the extraction of the mineral.	Control: Proper housekeeping and implementation of progressive rehabilitation.	Throughout the site establishment, and operational phase.	Management of the mining activities must be in accordance with the: • MPRDA, 2002 • NEMA, 1998
• Stripping and stockpiling of topsoil.	• Potential impact on vegetation and listed and protected plant species.	Control: Keeping mining operations to the approved boundaries.	Throughout the site establishment-, and operational phase.	Natural vegetated areas must be managed in accordance with the: • NEM:BA 2004 • Free State Biodiversity Plan
• Stripping and stockpiling of topsoil.	• Potential impact on the CBA1 area.	Control: Keeping mining operations to the approved boundaries.	Throughout the site establishment-, and operational phase.	Natural vegetated areas must be managed in accordance with the: • NEM:BA 2004 • Free State Biodiversity Plan
• Stripping and stockpiling of topsoil. • Excavation of sand / aggregate from the mining footprint and loading onto trucks. • Sloping and landscaping (medium- & long term).	• Loss of topsoil and fertility during mining and stockpiling. • Potential erosion risk and destabilisation of the dune plume.	Control & Remedy: Proper housekeeping and storm water management.	Throughout the site establishment-, and operational phase.	Topsoil stripping must be managed in accordance with the: • CARA, 1983 • NEM:BA, 2004 • MPRDA, 2002 • Closure Plan (Appendix M)

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
	• Facilitation of erosion. • Erosion of returned topsoil after rehabilitation.			• Western Cape Noise Control Regulations (PN 200/2013), June 2013
• Stripping and stockpiling of topsoil. • Sloping and landscaping (medium- & long term).	• Infestation of the topsoil heaps and mining area with invader plant species. • Infestation of the reinstated area with invader plant species.	Control: Implementing soil- and invader plant control/management.	Throughout the site establishment-, operational-, and decommissioning phase.	Invader plants must be managed in accordance with the: • CARA, 1983 • NEM:BA 2004 • Invasive Plant Species Management Plan (Appendix K)
• Stripping and stockpiling of topsoil. • Excavation of sand / aggregate from the mining footprint and loading onto trucks.	• Potential impact on local fauna due to disturbance and loss of available habitat and migration routes. • Disturbance to fauna within the footprint area.	Control & Stop: Implementing good management practices.	Throughout the site establishment-, and operational phase.	Fauna must be managed in accordance with the: • NEM:BA 2004
• Stripping and stockpiling of topsoil. • Excavation of sand / aggregate from the mining footprint and loading onto trucks. • Transporting of mineral.	• Dust nuisance as a result of the mining activities. • Dust nuisance caused by vehicles transporting the mineral.	Control: Dust suppression methods and proper housekeeping.	Throughout the site establishment-, and operational phase.	Dust generation must be managed in accordance with the: • NEM:AQA. 2004 Regulation 6(1) • National Dust Control Regulations, GN No R827 • ASTM D1739 (SANS 1137:2012)

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
• Stripping and stockpiling of topsoil. • Excavation of sand / aggregate from the mining footprint and loading onto trucks.	• Noise nuisance as a result of the mining activities. • Noise nuisance as result of the mining activities.	Control: Noise suppression methods and proper housekeeping.	Throughout the site establishment-, and operational phase.	Noise generation must be managed in accordance with the: • NEM:AQA. 2004 Regulation 6(1) • NRTA, 1996 • Western Cape Noise Control Regulations (PN 200/2013), June 2013
• Stripping and stockpiling of topsoil. • Excavation of sand / aggregate from the mining footprint and loading onto trucks.	• Potential impact on archaeological artefacts. • Potential impact on areas of palaeonological concern.	Control & Stop: Implementation of a chance-find procedure.	Throughout the site establishment-, and operational phase.	Cultural/heritage aspects must be managed in accordance with the: • NHRA, 1999
• Stripping and stockpiling of topsoil.	• Potential impact on the drainage lines/watercourses within the mining area.	Modify & Control: Keeping mining operations to the approved boundaries.	Throughout the site establishment-, and operational phase.	The drainage lines must be protected in accordance with the: • NWA, 1998
Sand / Aggregate / Alluvial diamond mining.	• Impact on the physical and chemical components.	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	Throughout the operational phase.	• NEM:AQA. 2004 Regulation 6(1) • National Dust Control Regulations, GN No R827 • NWA, 1998
Sand / Aggregate / Alluvial diamond mining.	• Impact on the biological and ecological components.	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	Throughout the operational phase.	• CARA, 1983 • NEM:BA, 2004 • NEMA, 1998 • MPRDA, 2002

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
Sand / Aggregate / Alluvial diamond mining.	• Impact on sociological and cultural components.	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	Throughout the operational phase.	• NEMA, 1998 • NHRA, 1999 • NEM:AQA. 2004 Regulation 6(1)
Sand / Aggregate / Alluvial diamond mining.	• Impact on economical and operational components.	Control & Remedy: Proper housekeeping and implementation of the proposed mitigation measures.	Throughout the operational phase.	• MPRDA, 2002 • NEMA, 1998
• Excavation of sand / aggregate from the mining footprint and loading onto trucks. • Sloping and landscaping (medium- & long term).	• Creating steep slopes and uneven surfaces. • Uneven surfaces or steep slopes left upon closure of the site.	Control: Effective rehabilitation according to the closure plan.	Throughout the operational-, and decommissioning phase.	Management of the mining area must be in accordance with the: • CARA, 1983 • NEM:BA, 2004 • MPRDA, 2002 • Closure Plan (Appendix M)
• Excavation of sand / aggregate from the mining footprint and loading onto trucks. • Sloping and landscapting (medium- & long terrm).	• Soil contamination from hydrocarbon spills. • Potential impact associated with littering at the mining area. • Potential impact associated with litter left at the mining area.	Control & Remedy: Proper housekeeping and implementation of the emergency response procedures and waste management registers.	Throughout operational and decommissioning phases.	Mining related waste must be managed in accordance with the: • NWA, 1998 • NEM:WA, 2008 • NEM:WA, 2008: National norms and standards for the storage of waste (GN 926) • NEMA, 1998 (Section 30)
• Transporting of mineral.	• Degradation of the access roads.	Control & Remedy: Maintaining the access road for the duration of the operational phase as per conditions to be received from DPRT, as well as leaving	Throughout the operational phase.	The access road must be managed in accordance with the: • NRTA, 1996

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
	• Traffic impact on the road as a result of the mining activity.	it in a representative or better condition than prior to mining.		
• Cumulative Impacts	• Reduced ability to meet conservation obligations and targets.	Modify & Control: Keeping mining operations to the approved boundaries.	Throughout the decommissioning phase.	The cumulative impacts must be managed in accordance with the: • CARA, 1983 • NEM:BA, 2004 • Closure Plan
• Cumulative Impacts	• Impact the broad-scale ecological processes.	Modify & Control: Keeping mining operations to the approved boundaries.	Throughout the decommissioning phase.	The cumulative impacts must be managed in accordance with the: • CARA, 1983 • NEM:BA, 2004 • Closure Plan
• Cumulative Impacts	• Cumulative impact of projects on palaeontological resources.	Control & Stop: Implementation of a chance-find procedure.	Throughout the operational phase.	Management of the mining area must be in accordance with the: • NHRA, 1999 • Fossil Chance Find Protocol

i) 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 Regulation 22 (2) (d) as described in 2.4 herein.

The end land use is proposed to be an Eco-Estate for which an Environmental Authorisation was obtained, with residential, resort and conservation land uses. The mined area will ultimately leave behind a void that, with careful planning, will be converted into artificial wetlands or water courses. These watercourses will be beneficial within the estate's vision. In addition, the conversion of the mine voids into artificial wetlands or water courses will result into a nett gain in biodiversity that should have a positive impact.

The application area is currently utilised as a game farm and this will continue to remain the primary land use with other agricultural activities such as crop production. Mining is an interim land use and it will be conducted in a sensitive manner that will not have a negative impact on the game.

Final rehabilitation will entail the removal of all equipment from the site. Final landscaping, levelling and top dressing will be done on all areas. Site management will implement an invasive plant species management plan (see Appendix K) during the 12 months' aftercare period to address germination of problem plants in the area. The MR Applicant will comply with the minimum closure objectives as prescribed by DMRE.

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

This report, the draft EIAR & EMPr, includes all the environmental objectives in relation to closure and will be available for perusal by the landowner, I&AP's and stakeholders over a 30-days commenting period. The comments received on the draft EIAR will be incorporated into the Final EIAR & EMPr.

(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 rehabilitation plan is attached as Appendix E.

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

Rehabilitation from the mining industry perspective means the disturbed areas will adhere to a pre-determined plan or fulfil a function that is sustainable and usable. It recognises that extraction of a resource will occur and that the original topography will be altered. The basic requirements for rehabilitation are to construct a stable, safe and functioning environment, post mining. The intention is not to restore the original topography, but to sculpt the mined areas to facilitate various ecological habitats.

The end land use is proposed to be an Eco-Estate for which an Environmental Authorisation was obtained, with residential, resort and conservation land uses. The mined area will ultimately leave behind a void that, with careful planning, will be converted into artificial wetlands or water courses. These watercourses will be beneficial within the estate's vision. In addition, the conversion of the mine voids into artificial wetlands or water courses will result into a nett gain in biodiversity that should have a positive impact.

The application area is currently utilised as a game farm and this will continue to remain the primary land use with other agricultural activities such as crop production. Mining is an interim land use and it will be conducted in a sensitive manner that will not have a negative impact on the game.

Progressive rehabilitation will follow the mining activity. Rehabilitation will start the year after the extraction of the resource is completed in the block of that year. Four basic phases usually accompany rehabilitation, namely:

- Bulk earthworks.
- Topsoil spreading and fine grading.
- Re-vegetation either by seeding or planting by hand depending on the post-closure vision requirements, i.e. establishing grazing or an artificial wetland.
- Monitoring.

The decommissioning phase will entail the final rehabilitation of the Pure Source Mine footprint. The rehabilitation of the mining area as indicated on the rehabilitation above will comply with the minimum closure objectives as prescribed by DMRE and detailed below, and therefore is deemed compatible:

Rehabilitation of the excavated area:

- No waste may be permitted to be deposited in the mining area.
- The topsoil previously stored must be returned to its original depth over the area.
- The area must be fertilized if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local or adapted indigenous seed mix in order to propagate the locally or regionally occurring flora, should natural vegetation not re-establish within six months from closure of the site.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager (DMRE) may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a vegetation seed mix to his or her specification.

Final rehabilitation:

- Rehabilitation of the surface area shall entail landscaping, levelling, top dressing, land preparation, seeding (if required), maintenance, and clearing of invasive plant species.
- All equipment, plant, and other items used during the mining period must be removed from the site (section 44 of the MPRDA).
- Waste material of any description, including receptacles, scrap, rubble and tyres, must be removed entirely from the mining area and disposed of at a recognized landfill facility. It will not be permitted to be buried or burned on the site.
- The management of invasive plant species must be done in a sporadic manner during the life of the mining activities. Species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto) need to be eradicated from the site.
- Final rehabilitation must be completed within a period specified by the Regional Manager (DMRE).

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

The calculation of the quantum for financial provision was according to Section B of the working manual. The following calculation includes both the footprint of the proposed processing and the proposed excavation area.

Mine type and saleable mineral by-product

According to Tables B.12, B.13 and B.14

Mine type	Sand, aggregate and diamonds (alluvial)
Saleable mineral by-product	None

Risk ranking

According to Tables B.12, B.13 and B.14

Primary risk ranking (either Table B.12 or B.13	C (Low risk)
Revised risk ranking (B.14)	N/A

Environmental sensitivity of the mine area

According to Table B.4

Environmental sensitivity of the mine area	Low

Level of information

According to Step 4.2:

Level of information available	Extensive

Identify closure components

According to Table B.5 and site-specific conditions

COMPONENT NO.	MAIN DESCRIPTION	APPLICABILITY OF CLOSURE COMPONENTS (CIRCLE YES OR NO)	
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	-	NO
2(A)	Demolition of steel buildings and structures	-	NO
2(B)	Demolition of reinforced concrete buildings and structures	-	NO
3	Rehabilitation of access roads	-	NO
4(A)	Demolition and rehabilitation of electrified railway lines	-	NO
4(B)	Demolition and rehabilitation of non-electrified railway lines	-	NO
5	Demolition of housing and facilities	-	NO
6	Opencast rehabilitation including final voids and ramps	YES	-
7	Sealing of shafts, adits and inclines	-	NO
8(A)	Rehabilitation of overburden and spoils	-	NO
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing)	-	NO
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich)	-	NO
9	Rehabilitation of subsided areas	-	NO
10	General surface rehabilitation, including grassing of all denuded areas	YES	-
11	River diversions	-	NO
12	Fencing	-	NO
13	Water management (Separating clean and dirty water, managing polluted water and managing the impact on groundwater)	-	NO
14	2 to 3 years of maintenance and aftercare		NO

Unit rates for closure components

According to Table B.6 master rates and multiplication factors for applicable closure components. The master rate from the DMRE Master Rates table for financial provision of 2021 was used.

COMPONENT NO.	MAIN DESCRIPTION	MASTER RATE	MULTIPLICATION FACTOR
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	-	-
2(A)	Demolition of steel buildings and structures	-	-
2(B)	Demolition of reinforced concrete buildings and structures	-	-
3	Rehabilitation of access roads	-	-
4(A)	Demolition and rehabilitation of electrified railway lines	-	-
4(B)	Demolition and rehabilitation of non-electrified railway lines	-	-
5	Demolition of housing and facilities	-	-

COMPONENT NO.	MAIN DESCRIPTION	MASTER RATE	MULTIPLICATION FACTOR
6	Opencast rehabilitation including final voids and ramps	268 200	0.04
7	Sealing of shafts, adits and inclines	-	-
8(A)	Rehabilitation of overburden and spoils	-	-
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing)	-	-
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich)	-	-
9	Rehabilitation of subsided areas	-	-
10	General surface rehabilitation, including grassing of all denuded areas	141 640	1.00
11	River diversions	-	-
12	Fencing	-	-
13	Water management (Separating clean and dirty water, managing polluted water and managing the impact on groundwater)	-	-
14	2 to 3 years of maintenance and aftercare	18 849	1.00

Determine weighting factors

According to Tables B.7 and B.8

Weighting factor 1: Nature of terrain/accessibility	1.00 (Flat)
Weighting factor 2: Proximity to urban area where goods and services are to be supplied	1.05 (Peri-Urban)

Calculation of closure costs[1]

Table B.10 Template for Level 2: "Rules-based" assessment of the quantum for financial provision.

Table 44: Calculation of closure cost

CALCULATION OF THE QUANTUM							
Mine:	**Pure Source Mine**			**Location:**	**Parys**		
Evaluators:	**C Fouché**			**Date:**	**15 March 2021**		
No	**Description**	**Unit**	**A Quantity**	**B Master rate**	**C Multiplication factor**	**D Weighting factor 1**	**E=A *B*C*D Amount (rands)**
			Step 4.5	**Step 4.3**	**Step 4.3**	**Step 4.4**	
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	m^3	0	18	1.00	1.00	R 0.00
2(A)	Demolition of steel buildings and structures	m^2	0	256	1.00	1.00	R 0.00
2(B)	Demolition of reinforced concrete buildings and structures	m^2	0	377	1.00	1.00	R 0.00
3	Rehabilitation of access roads	m^2	0	46	1.00	1.00	R 0.00
4(A)	Demolition and rehabilitation of electrified railway lines	m	0	444	1.00	1.00	R 0.00
4(B)	Demolition and rehabilitations of non-electrified railway lines	m	0	242	1.00	1.00	R 0.00
5	Demolition of housing and/or administration facilities	m^2	0	512	1.00	1.00	R 0.00
6	Opencast rehabilitation including final voids and ramps	ha	12	268 200	0.04	1.00	R 128736.00
7	Sealing of shaft, audits and inclines	m^3	0	137	1.00	1.00	R 0.00
8(A)	Rehabilitation of overburden and spoils	ha	0	178 800	1.00	1.00	R 0.00
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste)	ha	0	222 692	1.00	1.00	R 0.00

8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	ha	0	646 804	0.51	1.00	R 0.00
9	Rehabilitation of subsided areas	ha	0	149 718	1.00	1.00	R 0.00
10	General surface rehabilitation	ha	13.5	141 640	1.00	1.00	R 1 912 140.00
11	River diversions	ha	0	141 640	1.00	1.00	R 0.00
12	Fencing	m	0	162	1.00	1.00	R 0.00
13	Water Management	ha	0	53 855	0.17	1.00	R 0.00
14	2 to 3 years of maintenance and aftercare	ha	0	18 849	1.00	1.00	R 838 780.50
15(A)	Specialists study	Sum	0				R 0.00
15(B)	Specialists study	Sum	0				R 0.00
						Sum of items 1 to 15 above	R 2040876.00
Multiply Sum of 1-15 by Weighting factor 2 (Step 4.4)		1.05		R 3 083 488.50	**Sub Total 1**		R 2142919.80

1	Preliminary and General	6% of Subtotal 1 if Subtotal 1 <R100 000 000.00	R 128575.19
		12% of Subtotal 1 if Subtotal 1 >R100 000 000.00	-
2	Contingency	10.0% of Subtotal 1	R 214291.98
		Sub Total 2 (Subtotal 1 plus management and contingency)	R 2485786.97
		Vat (15%)	R 372868.05
		GRAND TOTAL (Subtotal 3 plus VAT)	**R 2 858 655.01**

The updated amount calculated as per the Template for Level 2: "Rules-based" assessment of the quantum for financial provision that will be necessary for the rehabilitation of damages caused by the operation, both sudden closures during the normal operation of the project and at final, planned closure

gives a sum total of R 2 858 655.01. An actual cost calculation to determine the rehabilitation will be send to DMRE in order to finalise the guarantee amount.

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

Herewith I, the person, whose name is stated below confirm that I am the person authorised to act as representative of the right Applicant in terms of the resolution submitted with the application. I herewith confirm that the company will provide the amount that will be determined by the Regional Manager in accordance with the prescribed guidelines.

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

g) Monitoring of Impact Management Actions
h) Monitoring and reporting frequency
i) Responsible persons
j) Time period for implementing impact management actions
k) Mechanism for monitoring compliance

Table 45: Mechanisms for monitoring compliance with and performance assessment against the EMPR and reporting thereon.

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
▪ Demarcation of site with visible beacons.	▪ Maintenance of beacons	▪ Visible beacons need to be established at the corners of the mining area.	<u>Role:</u> ▪ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ▪ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u>	Applicable throughout site establishment-, operational-, and decommissioning phases. ▪ Daily compliance monitoring by site management. ▪ Annual compliance monitoring of site by an Environmental Control Officer.

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
			• Ensure beacons are in place throughout the life of the mine.	
• Stripping and stockpiling of topsoil.	<u>Land Use</u> • Loss of agricultural land for duration of mining.	• Mining schedule	<u>Role:</u> • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> • If needed, sign mined-out/rehabilitated areas back to agricultural use once the cover crop stabilised.	Applicable throughout site establishment- and operational phases. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.
• Stripping and stockpiling of topsoil. • Excavation of sand aggregate from the mining footprint and loading onto trucks.	<u>Visual Characteristics</u> • Visual intrusion as a result of mining. • Visual intrusion associated with the extraction of material.	• Minimize the visual impact of the activity on the surrounding environment through proper site management and implementing good housekeeping practices.	<u>Role:</u> • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> • Ensure that the site have a neat appearance and is kept in good condition at all times. • Store mining equipment neatly in a dedicated area with a sealed drip tray underneath when not in use. • Do concurrent rehabilitation as strip mining progress to limit the visual impact on the aesthetic value of the area. • Limit vegetation removal, and only strip topsoil immediately prior to the mining/use of a specific area.	Applicable throughout site establishment-, operational-, and decommissioning phases. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.

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
			• Rehabilitate and level the site upon closure to ensure that the visual impact on the aesthetic value of the area is kept to a minimum.	
• Stripping and stockpiling of topsoil.	<u>Mining, Biodiversity Conservation Areas and Vegetation</u> • Potential impact on vegetation and listed and protected plant species. • Potnetial impact on the CBA1 area.	• Visible beacons indicating the boundary of the mineable area. • Pre-commencement walkthrough with botanist. • Obtain removal permit should protected or red data species be relocated. • Cover crop to seed reinstated areas.	<u>Role:</u> • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> • Clearly demarcate the mining boundaries and contain all operations to the approved mining area. • Adhere to the layout of mining area, as proposed in this document, • Arrange a pre-commencement walk-through of the final mining footprint by a suitably qualified botanist, for species of conservation concern that would be affected. • Keep permits for the removal of protected plant species (if required) on-site and in the possession of the flora search and rescue team at all times. • Conduct a pre-commencement environmental induction for all staff on site to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas, etc. • Ensure that the on-site ECO provide supervision and oversee vegetation clearing activities and other activities which may cause damage to the environment, especially at the initiation of	Applicable throughout site establishment-, and operational phases. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.

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
			each new strip, when the majority of vegetation clearing is taking place. • Limit clearing of vegetation to the proposed mining footprint and associated infrastructure. Prevent clearing outside of the minimum required footprint. • Implement phased mining and vegetation clearance, wherein year blocks are mined. Do not disturb vegetation outside of the active blocks until it is time for that specific area to be mined. Upon finishing a block, immediate rehabilitate and establish a stable vegetation cover. • Keep all vehicles on demarcated roads and prevent unnecessary driving in the veld outside these areas. • Do not translocate plants or otherwise uprooted or disturbed it for rehabilitation or other purposes without express permission from the ECO and without the relevant permits. • Do not allow fires on-site.	
• Stripping and stockpiling of topsoil.	<u>Geology and Soil:</u> • Loss of topsoil and fertility during mining and stockpiling.	• Earthmoving equipment to reinstate mined-out areas. • Cover crop to be established on reinstated areas. • Erosion control infrastructure (if necessary).	<u>Role:</u> • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> • Strip and stockpile the upper 300 mm of the soil before mining. • Carefully manage and conserve the topsoil throughout the stockpiling and rehabilitation process. • Ensure topsoil stripping, stockpiling and re-spreading is done in a systematic way. Plan mining in such a way that topsoil is stockpiled for the minimum possible time.	Applicable throughout site establishment-, and operational phases. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.

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
			• Place the topsoil heaps on a levelled area within the mining footprint area. Do not stockpile topsoil in undisturbed areas. • Protect topsoil stockpiles against losses by water- and wind erosion. Position stockpiles so as not to be vulnerable to erosion by wind and water. Establish plants on the stockpiles to prevent erosion. • Ensure that topsoil heaps do not exceed 1.5 m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen. • Keep temporary topsoil stockpiles free of invasive plant species. • Divert storm- and runoff water around the stockpile area to prevent erosion. • Spread the topsoil evenly, to a depth of 300 m, over the rehabilitated area upon closure of the site. • Strive to re-instate topsoil at a time of the year when vegetation cover can be established as quickly as possible afterwards, to that erosion of returned topsoil is minimized. The best time of year is at the end of the rainy season. • Plant a cover crop immediately after spreading topsoil to stabilise the soil and protect it from erosion. Fertilise the cover crop for optimum production. Rehabilitation extends until the first cover crop is well established. • Monitor the rehabilitated area for erosion, and appropriately stabilize if erosion do occur, for at least 12 months after reinstatement.	

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
• Stripping and stockpiling of topsoil. • Excavation of sand / aggregate from the mining footprint and loading onto trucks. • Sloping and landscaping (Medium- & long term).	<u>Hydrology:</u> • Facilitation of erosion. • Erosion of returned topsoil after rehabiliation.	• Earthmoving equipment to reinstate mined-out areas. • Cover crop to be established on reinstated areas. • Erosion control infrastructure (if necessary).	<u>Role:</u> • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> • Remove soil at right angles to the slope, as this will slow down surface runoff and help to prevent erosion. • Ensure adequate slope protection when mining within steep slopes. • Divert storm water around the topsoil heaps and mining areas to prevent erosion. • During mining, control the outflow of run-off water from the mining excavation to prevent down-slope erosion. If needed, construct temporary banks and ditches that will direct run-off water. These must be in place at any points where overflow out of the excavation might occur. • Limit clearing of vegetation to the proposed mining footprint and associated infrastructure. Prevent clearing outside of the minimum required footprint. • Implement phased mining and vegetation clearance, wherein year blocks are mined. Do not disturb vegetation outside of the active blocks until it is time for that specific area to be mined. Upon finishing a block, immediate rehabilitate and establish a stable vegetation cover. • Regularly monitor roads and other disturbed areas within the project area for erosion problems and conduct follow-up	Applicable throughout site establishment-, and operational phases. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.

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
			monitoring of problem areas to assess the success of the remediation. • Rectify any erosion problems within the mining area as a result of the mining activities immediately (within 24 hours) and monitor it thereafter to ensure that it does not re-occur. • Use silt/sediment traps/barriers where there is a danger of topsoil or material stockpiles eroding and entering downstream drainage lines and other sensitive areas. Regularly maintain and clean these sediment/silt barriers to ensure effective drainage of the areas. • Protect stockpiles from erosion, stored it on flat areas, and surround it by appropriate berms where possible. • Undertake construction of gabions and other stabilisation features to prevent erosion, where deemed necessary. • Conduct activity in terms of the Best Practice Guidelines for small-scale mining as developed by DWS.	
• Stripping and stockpiling of topsoil. • Sloping and landscaping (Medium- & Long Term).	<u>Mining, Biodiviersity and Vegetation:</u> • Infestation of the topsoil heaps and mining area with invader plant species. • Infestation of the reinstated area with invader plant species.	• Designated team to cut or pull out invasive plant species that germinated on site. • Herbicide application equipment.	<u>Role:</u> • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> • Implement an invasive plant species management plan to control all invasive plant species on site in terms of NEM:BA, 2004 and CARA, 1983. • Implement an invasive plant species management plan at the site to ensure the management and control of all species regarded as Category 1a and 1b invasive species in terms of	Throughout the site establishment-, and operational phase. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.

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
			NEM:BA, 2004. Do weed/alien clearing on an ongoing basis throughout the life of the mining activities. • Keep all stockpiles (topsoil & overburden) free of invasive plant species. • Do not allow planting or importing of any alien species to the site for landscaping, rehabilitation or any other purpose. • Control declared invader or exotic species on the rehabilitated areas.	
• Strippping and stockpiling of topsoil. • Excavation of sand /aggregate from the mining footprint and loading onto trucks.	<u>Fauna:</u> • Potential impact on local fauna due to disturbance and loss of available habitat and migration routes. • Disturbance to fauna within the footprint area.	• Toolbox talks to educate employees how to handle fauna that enter the work areas.	<u>Role:</u> • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> • Ensure no fauna is caught, killed, harmed, sold or played with. • Arrange the ECO or other suitably qualified person to remove any fauna directly threatened by the operational activities to a safe location. • Conduct environmental induction with all personnel regarding fauna management and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. Instruct workers to report any animals that may be trapped in the working area. • Ensure no snares are set or nests raided for eggs or young. • Ensure all vehicles adhere to a low speed limit (20 km/h) to avoid collisions with susceptible species such as snakes and tortoises.	Applicable throughout site establishment-, and operational phases. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.

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
			• Prevent litter, food or other foreign material being thrown or left around the site. Keep such items in the site vehicles and daily remove it from the mining area.	
• Stripping and stockpiling of topsoil • Excavation of sand from the mining footprint and loading onto trucks. • Transporting of material.	<u>Air and Noise Quality:</u> • Dust nuisance as a result of the mining activities. • Dust nuisance as a result of the mining actvities. • Dust nuisance caused by vehicles transporting the material.	• Dust suppression equipment such as a water car. • Signage that clearly reduce the speed on the access roads.	<u>Role:</u> • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> • Control the liberation of dust into the surrounding environment by the use of; inter alia, water spraying and/or other dust-allaying agents. • Ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. • Limit speed on the haul roads to 20 km/h to prevent the generation of excess dust. • Minimise areas devoid of vegetation, and only remove vegetation immediately prior to mining. • Flatten loads to ensure minimal spillage of material takes place during transportation, also preventing windblown dust. • Consider weather conditions upon commencement of daily operations. • Ensure dust-generating activities comply with the National Dust Control Regulations, GN No R827 promulgated in terms of NEM:AQA, 2004 and ASTM D1739 (SANS 1137:2012).	Applicable throughout site establishment-, operational-, and decommissioning phases. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.

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
			• Implement best practice measures during the stripping of topsoil, loading, and transporting of sand from the site to minimize potential dust impacts. • Do not use potable water for dust suppression purposes.	
• Stripping and stockpiling of topsoil • Excavation of sand from the mining footprint and loading onto trucks.	<u>Air and Noise Quality:</u> • Noise nuisance as a result of the mining activities.	• Silencers fitted to all project related vehicles, and the use of vehicles that are in road worthy condition in terms of the National Road Traffic Act, 1996.	<u>Role:</u> • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPr. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> • Ensure that employee and visitors to the site conduct themselves in an acceptable manner while on site. • Do not permit loud music at the mining area. • Ensure that all project related vehicles are equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996. • Implement best practice measures to minimise potential noise impacts.	Applicable throughout site establishment-, operational-, and decommissioning phases. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.
• Stripping and stockpiling of topsoil. • Excavation of sand from the mining footprint and loading onto trucks.	<u>Cultural and Heritage Environment:</u> • Potential impact on archaeological artefacts. • Potential impact on areas of	• Contact number of an archaeologist & palaeontologist that can be contacted when a discovery is made on site.	<u>Role:</u> • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> • Confine all mining to the development footprint area.	Applicable throughout site establishment-, operational-, and decommissioning phases. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.

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
	palaeontological concern.		• Implement the following change find procedure when discoveries are made on site: ▪ If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. ▪ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area. ▪ The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify South African Heritage Resources Agency (SAHRA). ▪ Work may only continue once the go-ahead was issued by SAHRA.	
• Stripping and stockpiling of topsoil.	<u>Hydrology:</u> • Potential impact on the drainage lines/watercourses within the mining area.	• Visible beacons indicating the boundary of the mineable area and the start all buffer zones.	<u>Role:</u> • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u>	Throughout the site establishment-, and operational phase. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.

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
			• Adhere to the layout, as proposed in this document, including all no-go areas and buffer zones.	
• Excavation of sand / aggregate from the mining footprint and loading onto trucks. • Sloping and landscaping (Medium- & Long Term)	<u>Topography:</u> • Creating steep slopes and uneven surfaces. • Uneven surfaces or steep slopes left upon closure of the site.	• Earthmoving equipment to reinstate mined-out areas.	<u>Role:</u> • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPr. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> • Ensure no depressions are left in the mining floor to minimize the impact on drainage. Maintain a surface slope (even if minimal) across the mining floor in the drainage direction, so that all excavations are free draining. Control mining depths on the down-slope side of the mine, so that the mining floor remains free-draining and above the low point for drainage out of the mining area. • Control mining depths across the entire mine so that excavations results in a levelling of the footprint rather than a hole with steep edges. • Reduce any steep slopes at the edges of excavations, after mining, to a minimum and profiled it to blend with the surrounding topography. Smooth and profile the entire surface sufficiently to allow cultivation.	Applicable throughout site establishment-, operational-, and decommissioning phases. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.
• Excavation of sand /aggregates from the mining footprint and loading onto trucks.	<u>General</u> • Soil contamination from hydrocabon spills.	• Sealed drip trays. • Formal waste disposal system with waste registers.	<u>Role:</u> • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPr.	Applicable throughout site establishment-, operational-, and decommissioning phases. • Daily compliance monitoring by site management.

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
• Sloping and landscaping during rehabilitation (Medium- & Long Term).	• Potential impact associated with littering at the mining area. • Potential impact assicated with litter left at the mining area.		• Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> • Ensure regular vehicle maintenance, repairs and services only take place at the workshop and service area. Ensure drip trays are present if emergency repairs are needed on equipment not able to move to the workshop. Dispose all waste products in a closed container/bin to be removed from the emergency service area (same day) to the workshop in order to ensure proper disposal. Treat this as hazardous waste and dispose of it at a registered hazardous waste handling facility, alternatively arrange collection by a registered hazardous waste handling contractor. File safe disposal certificates for auditing purposes. • Provide ablution facilities in the form of a chemical toilet. Anchor the chemical toilet and arrange that it be serviced at least once a month by a registered liquid waste handling contractor for the duration of the mining activities. File the safe disposal certificates for auditing purposes. • Ensure that the use of any temporary, chemical toilet facilities does not cause pollution to water sources or pose a health hazard. In addition, prevent any form of secondary pollution from the disposal of refuse or sewage from the temporary, chemical toilets. Address any pollution problems arising from the above immediately. • If a diesel bowser is used on site, equip it with a drip tray at all times. Ensure that drip trays are used during each and every refuelling event. The nozzle of the	• Annual compliance monitoring of site by an Environmental Control Officer.

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
			bowser needs to rest in a sleeve to prevent dripping after refuelling. • Clean drip trays after use. Do not use dirty drip trays. Dispose of the dirty rags used to clean the drip trays as hazardous waste into a designated bin at the off-site workshop, and incorporate it into the hazardous waste removal system. • Collect any effluents containing oil, grease or other industrial substances in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. File the safe disposal certificates for auditing purposes. • Obtain an oil spill kit, and train the employees in the emergency procedures to be followed when a spill occurs as well as the application of the spill kit. • Should spillage occur, such as oil or diesel leaking from a burst pipe, collect the contaminated soil, within the first hour of occurrence, in a suitable receptacle and remove it from the site, either for resale or for appropriate disposal at a recognized facility. File proof. • Contain all general waste within the site vehicles and daily remove it from the mining area to the general waste storage area at the offices on the farm. Do not burn or bury general waste on the farm, but dispose of it at registered landfill site. • Prevent the storage, burning or burying of waste on site. • Report any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities to the DWS and other relevant authorities. Arrange that the affected area is cleaned by a professionally qualified waste handling contractor that must provide proof that the area was successfully cleaned.	

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
			• Report any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities to the to all relevant authorities, including Department Environmental Affairs– Directorate - Pollution and Chemicals Management, in accordance with section 30 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA") pertaining to the control of incidents. In the event of a significant accidental spill or leak of hazardous substances (e.g. petrol, diesel, etc.) during any phase of the proposed activities, such an incident(s) must be reported. • Site management must implement the use of waste registers to keep record of the waste generated and removed from the mining area. • Implement the use of waste registers to keep record of the waste generated and removed from the mining area. • Ensure all employees are aware of the Emergency Response Procedures attached to this document as Appendix J.	
• Transporting of material.	<u>Existing Infrastructure:</u> • Deterioration of the access roads. • Traffiic impact on access road as a result of the mining activity.	• Adhere to nessasary conditions received from Department of Police, Roads and Transport access to records application.	<u>Role:</u> • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPr. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> • Divert storm water around the access road to prevent erosion.	Applicable throughout operational-, and decommissioning phases. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.

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
			• Restrict vehicular movement to the existing access road to prevent crisscrossing of tracks through undisturbed areas. • Repair rutting and erosion of the access road caused as a direct result of the mining activities. • Prevent the overloading of the trucks. • Adhere to the DPRT conditions submitted as part of the access to roads application.	
• Stripping and stockpiling of topsoil. • Excavation of sand from the mining footprint and loading onto trucks. • Transporting of material • Sloping and landscaping (Medium- & Long Term)	<u>General:</u> • Management of Health and Safety Risks.	• Stocked first aid box. • Level 1 certified first aider. • All appointments in terms of the Mine Health and Safety Act, 1996.	<u>Role:</u> • Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPr. • Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> • Prevent access to the mining area by unauthorised persons as far as is reasonably practical. • Ensure adequate ablution facilities and water for human consumption are daily available on site. • Ensure sanitary facilities is located within 100 m from any point of work. • Ensure that workers have access to the correct PPE as required by law. • Manage all operations in compliance with the Mine Health and Safety Act, 1996 (Act No 29 of 1996).	Applicable throughout decommissioning phase. • Daily compliance monitoring by site management. • Annual compliance monitoring of site by an Environmental Control Officer.

l) Indicate the frequency of the submission of the performance assessment report.

An Environmental Audit Report in accordance with Appendix 7 as prescribed in Regulation 34 of the EIA Regulations, 2014 (as amended) will biennially be submitted to DMRE for compliance monitoring purposes or in accordance with the frequency stipulated by the Environmental Authorisation.

m) Environmental Awareness Plan

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

Once the Mining Right application was approved, a copy of the amended EMPR will be handed to the site manager. An induction meeting will be held with the mining related employees (operator & management) to inform them of the Basic Rules of Conduct with regard to the environment.

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

The operations manager must ensure that he/she understands the EMPR document and its requirement and commitments before any mining takes place. An Environmental Control Officer needs to check compliance of the mining activities to the management programmes described in the EMPR.

The following list represents the basic steps towards environmental awareness, which all participants in this project must consider whilst preforming their tasks.

- **Site Management:**
  - Stay within boundaries of site – do not enter adjacent properties
  - Keep tools and material properly stored
  - Smoke only in designated areas
  - Use toilets provided – report full or leaking toilets

- **Water Management and Erosion:**
  - Check that rainwater flows around work areas and are not contaminated
  - Report any erosion
  - Check that dirty water is kept from clean water

- **Waste Management:**
  - Take care of your own waste
  - Place waste in containers and always close lid
  - Don't burn waste
  - Pick-up any litter laying around

- **Hazardous Waste Management (Petrol, Oil, Diesel, Grease)**
  - Never mix general waste with hazardous waste
  - Use only sealed, non-leaking containers
  - Keep all containers closed and store only in approved areas
  - Always put drip trays under vehicles and machinery
  - Empty drip trays after rain
  - Stop leaks and spills, if safe
    - ✓ Keep spilled liquids moving away
    - ✓ Immediately report the spill to the site manager/supervision
    - ✓ Locate spill kit/supplies and use to clean-up, if safe
    - ✓ Place spill clean-up wastes in proper containers
    - ✓ Label containers and move to approved storage area
- **Discoveries:**
  - Stop work immediately
  - Notify site manager/supervisor
  - Includes – Archaeological finds, Cultural artefacts, Contaminated water, Pipes, Containers, Tanks and drums, Any buried structures

- **Air Quality:**
  - Wear protection when working in very dusty areas
  - Implement dust control measures:
    - ✓ Water all roads and work areas according to instructions
    - ✓ Minimize handling of material
    - ✓ Obey speed limit and cover trucks

- **Driving and Noise:**
  - Use only approved access roads
  - Respect speed limits
  - Only use turn-around areas – no crisscrossing through undisturbed areas

- Avoid unnecessary loud noises
- Report or repair noisy vehicles

- **Vegetation and Animal life:**
  - Do not remove any plants or trees without approval of the site manager
  - Do not collect fire wood
  - Do not catch, kill, harm, sell or play with any animal, reptile, bird or amphibian on site
  - Report any animal trapped in the work area
  - Do not set snares or raid nests for eggs or young

- **Fire Management:**
  - Do not light any fires on site, unless contained in a drum at demarcated area
  - Put cigarette butts in a rubbish bin
  - Know the position of firefighting equipment
  - Report all fires
  - Don't burn waste or vegetation

n) Specific information required by the Competent Authority

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

The MR Applicant undertakes to annually review and update the financial provision calculation, upon which it will be submitted to DMRE for review and approved as being sufficient to cover the environmental liability at the time and for closure of the mine at that time.

2. UNDERTAKING

I, Monte Cristo Commercial Park (PTY) Ltd.

The undersigned and duly authorised thereto by Mark van Wyk (Director)

Company / ~~Closed Corporation / Municipality or Council~~
(Delete whichever is not applicable)

hereby undertake to implement all the aspects contained in the ~~BAR and EMPr /~~ EIA and EMPr and accept full responsibility therefore.
(Delete whichever is not applicable)

SIGNED at Bothaville this 18th day March 2021

18 March 2021

SIGNATURE

WITNESSES:

1.....

2.....

Official use

APPROVAL

Approved in terms of the National Environmental Management Act (NEMA), 1998 (Act 107 of 1998), as amended.

SIGNED at ..... this ..... day 2020

REGIONAL MANAGER
FREE STATE
Undertaking/eg

3. UNDERTAKING

The EAP herewith confirms

a) the correctness of the information provided in the reports ☒
b) the inclusion of comments and inputs from stakeholders and I&AP's; ☒
c) the inclusion of inputs and recommendations from the specialist reports where relevant; ☒ and
d) the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed; ☒

Signature of the environmental assessment practitioner:

Greenmined Environmental (Pty) Ltd

Name of Company:

18 March 2021

Date:

-END-